PROCEEDINGS OF THE

1st INTERNATIONAL CONGRESS ON AGRICULTURAL SCIENCES AND VETERINARY

20 and 21 NOVEMBER 2022

NIGDE, TURKEY

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WELCOME NOTES

You are welcome to our 1st International Congress on Agricultural Sciences and Veterinary organized by T Fide R&D Innovation Industry and Trade Limited Company. The congress accepts papers on subjects related to Agricultural Sciences, Veterinary, and Natural Science and all other related Engineering fields are included. It is aimed to organize a qualified and scientific congress in order to present valuable research from different disciplines, share with each other and bring them together on an international common platform. Our congress will be held online with the participation of domestic and foreign universities. Our expectation is that every participant and valuable people of the science and business world will follow our congress with pleasure and benefit from the outcomes.

We are pleased and happy to be together with you, the scientists who contribute to the scientific field and literature, with the "1st International Congress on Agricultural Sciences and Veterinary", the first of which will be held between 20-21 November 2022 in Niğde, Turkey.

PARTICIPANTS COUNTRIES: Turkey (15), Azerbaijan (3), Algeria (5), The UK (1), Spain (2), Peru (10), Tunisia (6), Costa Rica (2), Albania (2), Ecuador (5), Pakistan (7), Brazil (10), Samoa (1), USA (1)

Conference Topics

Role of new technologies in Agriculture, Agribusiness, Block Chain Technology in Agriculture, Virtual Farming, IOT Application in Agriculture, Agricultural Policies, Climate Smart Agriculture, Effects of climate change on Agriculture, Nutrition sensitive agriculture, Political Science, Irrigation Systems, Banking and Agricultural Loans, Farmers' Unions, Department of Food Hygiene and Technology, Department of Clinical Sciences, Department of Preclinical Sciences, Department of Basic Sciences, Department of Animal Science and Animal Nutrition, Climate Change, Environmental Aspects of the Covid-19 Pandemic, Soil Pollution and Management, Basin and Water Quality Management, Solid, Industrial and Hazardous Waste Management, Air pollution, Water- Wastewater Treatment, Product and Energy Recovery and Sludge Management, Environmental Management Systems, Application and Tools, Digital Solutions in Environmental Engineering: Measurement, Analysis. Monitoring and Evaluation, Organization and Interdisciplinary Relations in Environmental Engineering, Environmental Impact (EIA) and Risk Assessment, Environmental Security: Water, Food, Air, Energy Security, Noise Pollution and Management, Preventive Environmental Management, Cleaner Production and Pollution Prevention, Lifecycle Management, Reuse and recovery of waste, Plant Protection, Farm plants, Garden plants, Plant protection, Biosystem Engineering, Landscape architecture, Farming economy, Agricultural Biotechnology, Soil Science and Plant Nutrition, Agricultural machinery, Animal Science, Seafood, Food, Food Science, Food engineering, Biology, Biochemistry, Chemistry, Meat and Dairy Technology, Veterinary, Economy, Rural Development, Agricultural Policies, Political Science, Irrigation Systems, Banking and Agricultural Loans, Farmer Associations, Food Hygiene and Technology Department, Clinical Sciences Department, Pre-Clinical Sciences Department, Basic Sciences, Climate Change, Agriculture and gender related areas, Animal Science and Animal Nutrition, Natural Sciences and all other related sciences.

Dr. Ass. Tefide KIZILDENİZ

Head of the Organizing Committee

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Dr. Ece Ümmü DEVECİ	Niğde Ömer Halisdemir University	TURKEY

INVITED SPEAKERS

Dr. Sigfrido ROMEO	Food and Agriculture Organization of the United Nations (FAO)	Independent State of Samoa
Dr. Bilge Kaan TEKELİOĞLU	Ceyhan Faculty of Veterinary Medicine, Çukurova University	TURKEY
Dr. Marcelle MICHELOTTI BETTONI	Agronomia da Faculdade de Ciências Exatas e de Tecnologia, Universidad Tuiuti del Paraná	BRAZIL
Dr. Nestor Alor ROMERO	NEIKER-Basque Institute for Agricultural Research and Development-BRTA, Vitoria	SPAIN
Dr. Daniel GANDARILLAS	Faculty of Veterinary, Universidad Nacional Jorge Basadre Grohman	PERU

EDITOR OF THE PROCEEDING BOOK

Dr. Ass. Tefide KIZILDENİZ GÜRBÜZ

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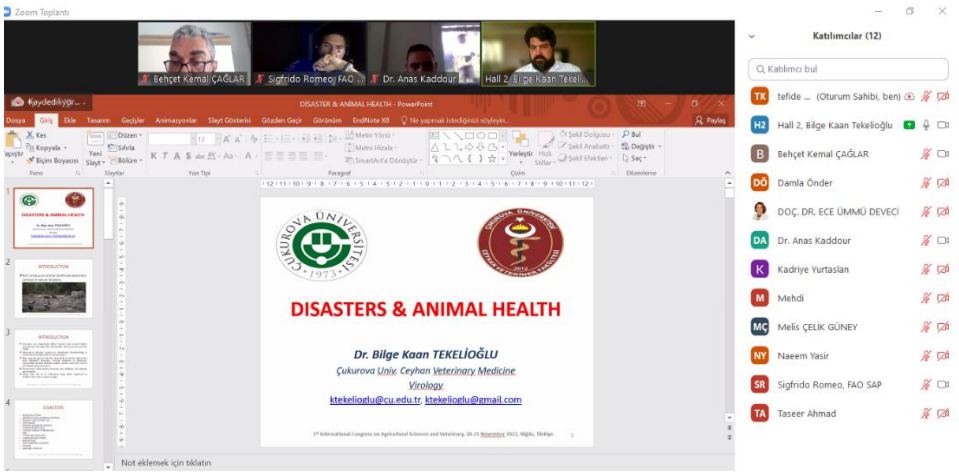

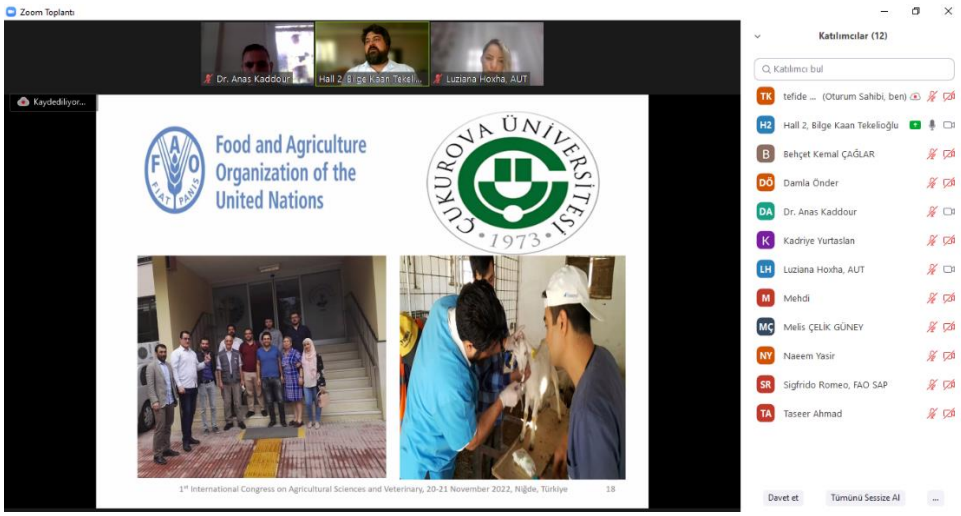


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Dr. Anas Kaddour
Hall 2, Bilge Kaan Tekeli...
Luziana Hoxha, AUT
Kaydediliyor...
HANDS on TRAININGS LAB
DIAGNOSTIC and POULTRY HELATH
1st International Congress on Agricultural Sciences and Veterinary, 20-21 November 2022, Niğde, Türkiye 19
Katılımcılar (12)
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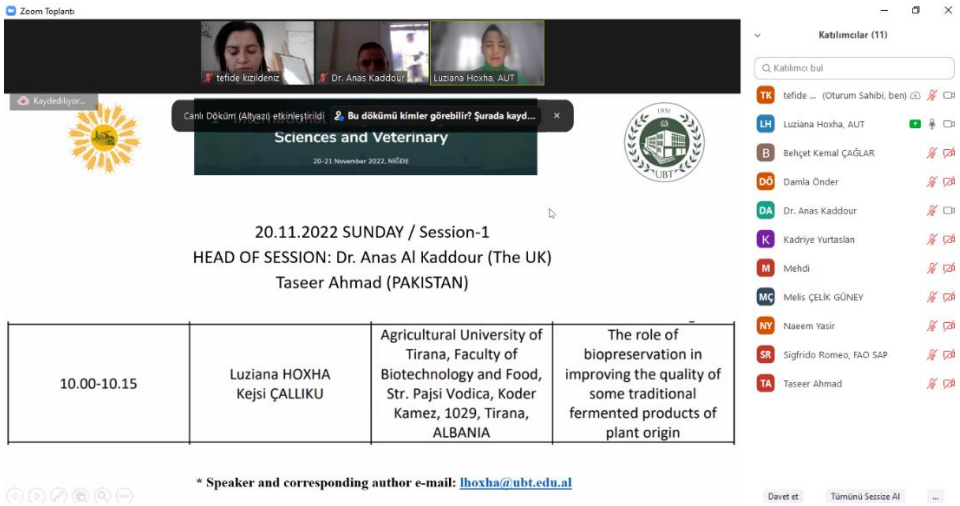
Hall 2, Bilge Kaan Tekelioğlu
Behçet Kemal ÇAĞLAR
Damla Önder
Dr. Anas Kaddour
Kadriye Yurtaslan
Luziana Hoxha, AUT
Mehdi
Melis ÇELİK GÜNEY
Naeem Yasir
Sigfrido Romeo, FAO SAP
Taseer Ahmad
Davet et
Tümünü Sessize Al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Kaydediliyor...
Canlı Döküm (Altyazı) etkinleştirildi
Bu dökümü kimler görebilir? Şurada kayd...
Sciences and Veterinary
20-21 November 2022, NİĞDE
20.11.2022 SUNDAY / Session-1
HEAD OF SESSION: Dr. Anas Al Kaddour (The UK)
Taseer Ahmad (PAKISTAN)
10.00-10.15
Luziana HOXHA
Kejsi ÇALLIKU
Agricultural University of Tirana, Faculty of Biotechnology and Food, Str. Pajsi Vodica, Koder Kamez, 1029, Tirana, ALBANIA
The role of biopreservation in improving the quality of some traditional fermented products of plant origin
* Speaker and corresponding author e-mail: lhoxha@ubt.edu.al
Katılımcılar (11)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Luziana Hoxha, AUT
Behçet Kemal ÇAĞLAR
Damla Önder
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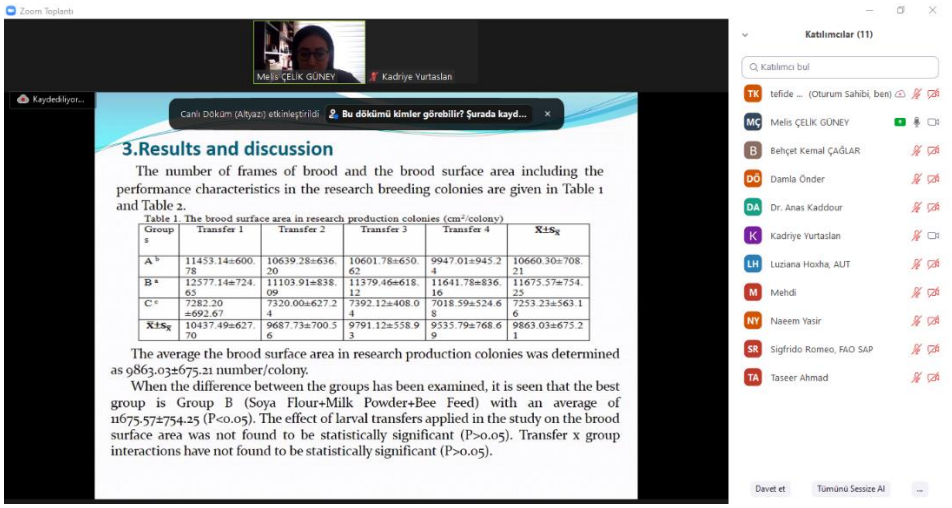
Sigfrido Romeo, FAO SAP
Taseer Ahmad
Davet et
Tümünü Sessize Al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Kaydediliyor...
Canlı Döküm (Altyazı) etkinleştirildi
Bu dökümü kimler görebilir? Şurada kayd...
3.Results and discussion
The number of frames of brood and the brood surface area including the performance characteristics in the research breeding colonies are given in Table 1 and Table 2.
Table 1. The brood surface area in research production colonies (cm²/colony)
Group s | Transfer 1 | Transfer 2 | Transfer 3 | Transfer 4 | X̄±Sx̄
A b | 11453.14±600.78 | 10639.28±636.20 | 10601.78±650.62 | 9947.01±945.24 | 10660.30±708.21
B a | 12577.14±724.65 | 11103.91±838.09 | 11379.46±618.12 | 11641.78±836.16 | 11675.57±754.25
C c | 7282.20±692.67 | 7320.00±627.24 | 7392.12±408.04 | 7018.59±524.68 | 7253.23±563.16
X̄±Sx̄ | 10437.49±627.70 | 9687.73±700.56 | 9791.12±558.93 | 9535.79±768.69 | 9863.03±675.21
The average the brood surface area in research production colonies was determined as 9863.03±675.21 number/colony.
When the difference between the groups has been examined, it is seen that the best group is Group B (Soya Flour+Milk Powder+Bee Feed) with an average of 11675.57±754.25 (P<0.05). The effect of larval transfers applied in the study on the brood surface area was not found to be statistically significant (P>0.05). Transfer x group interactions have not found to be statistically significant (P>0.05).
Katılımcılar (11)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
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Taseer Ahmad
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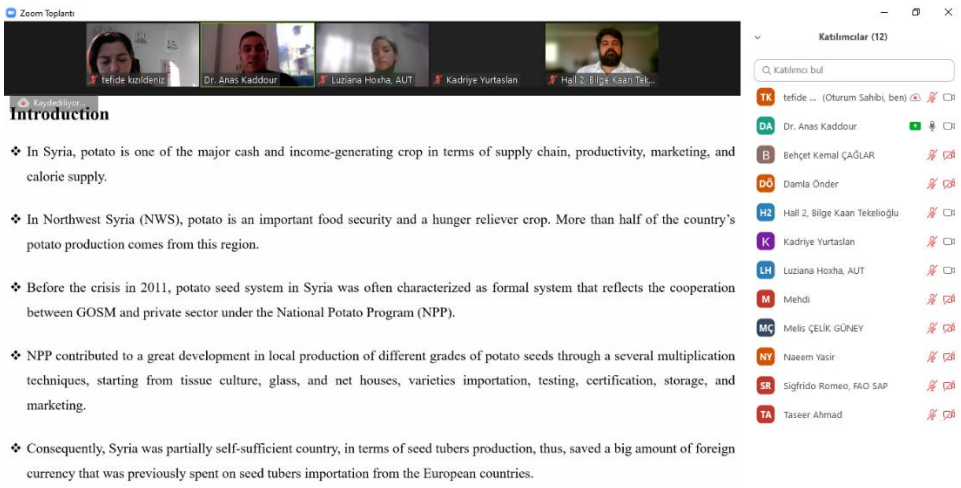
Tümünü Sessize Al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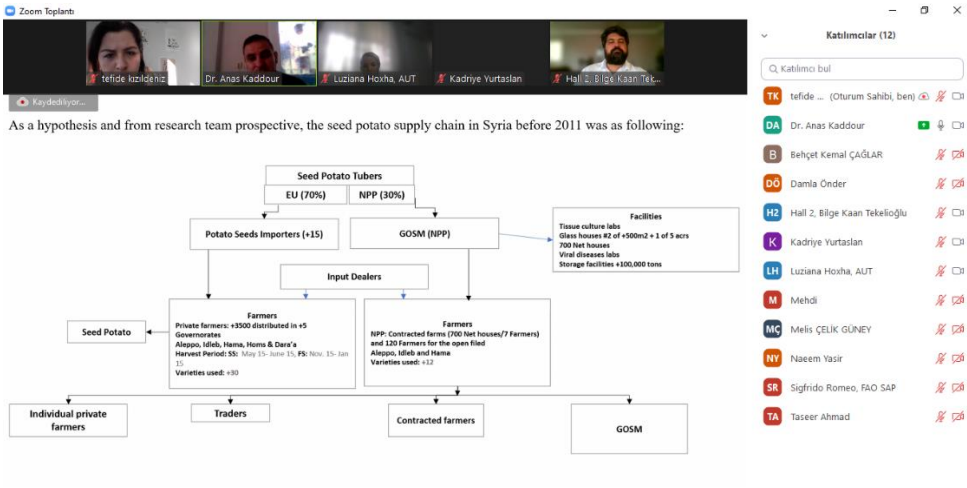
Introduction
❖ In Syria, potato is one of the major cash and income-generating crop in terms of supply chain, productivity, marketing, and calorie supply.
❖ In Northwest Syria (NWS), potato is an important food security and a hunger reliever crop. More than half of the country's potato production comes from this region.
❖ Before the crisis in 2011, potato seed system in Syria was often characterized as formal system that reflects the cooperation between GOSM and private sector under the National Potato Program (NPP).
❖ NPP contributed to a great development in local production of different grades of potato seeds through a several multiplication techniques, starting from tissue culture, glass, and net houses, varieties importation, testing, certification, storage, and marketing.
❖ Consequently, Syria was partially self-sufficient country, in terms of seed tubers production, thus, saved a big amount of foreign currency that was previously spent on seed tubers importation from the European countries.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Mehdi
Melis ÇELİK GÜNEY
Naeem Yasir
Sigfrido Romeo, FAO SAP
Taseer Ahmad
As a hypothesis and from research team prospective, the seed potato supply chain in Syria before 2011 was as following:
Seed Potato Tubers
EU (70%)
NPP (30%)
Potato Seeds Importers (+15)
GOSM (NPP)
Facilities
Tissue culture labs
Glass houses #2 of +500m2 + 1 of 5 acrs
700 Net houses
Viral diseases labs
Storage facilities +100,000 tons
Input Dealers
Seed Potato
Farmers
Private farmers: +3500 distributed in +5 Governorates
Aleppo, Idleb, Hama, Homs & Dara'a
Harvest Period: SS: May 15- June 15, FS: Nov. 15- Jan 15
Varieties used: +30
Farmers
NPP: Contracted farms (700 Net houses/7 Farmers) and 120 Farmers for the open filed
Aleppo, Idleb and Hama
Varieties used: +12
Individual private farmers
Traders
Contracted farmers
GOSM


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Damla Önder
Kaydediliyor...
Katılımcılar (9)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
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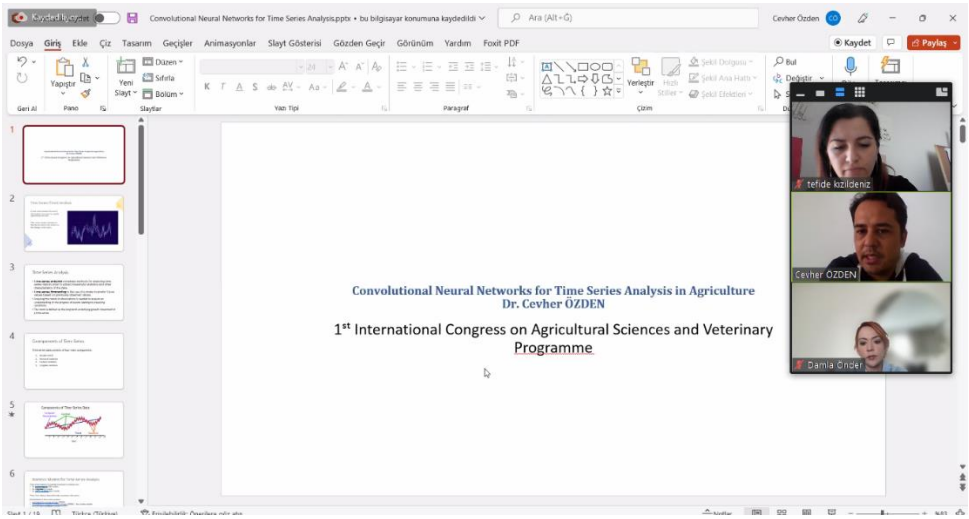
Naeem Yasir
Bakhtiyar Babashli
Behçet Kemal ÇAĞLAR
Cevher ÖZDEN
Funda Sahin
nestor.alor
Taha Enes Eker
1st International Congress on Agricultural Sciences and Veterinary
Antioxidant Variations during Flower Development of Rosa damascena
Damla ÖNDER[1*]
[1]Süleyman Demirel University, Department of Biology, Isparta, Türkiye
* Speaker and corresponding author: damlaguvercin@sdu.edu.tr
20-21 November 2022, Niğde, Turkey


Convolutional Neural Networks for Time Series Analysis in Agriculture
Dr. Cevher ÖZDEN
1st International Congress on Agricultural Sciences and Veterinary
Programme
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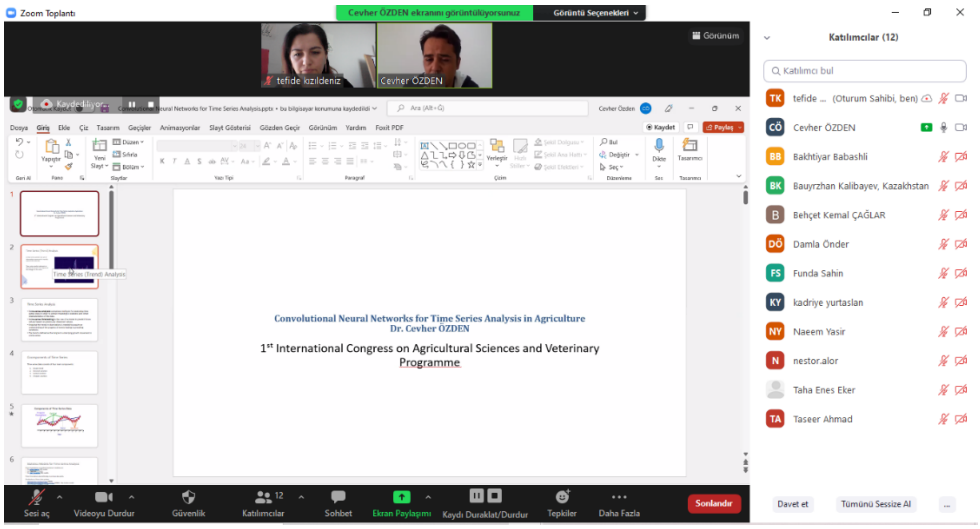
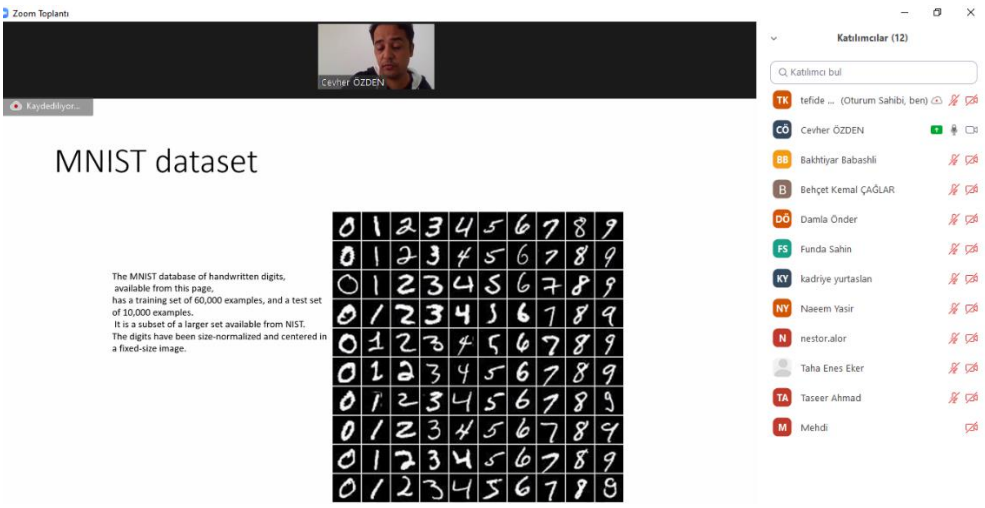
Cevher ÖZDEN
Damla Önder


Zoom Toplantı
Cevher ÖZDEN ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
Cevher ÖZDEN
Katılımcılar (12)
Convolutional Neural Networks for Time Series Analysis in Agriculture
Dr. Cevher ÖZDEN
1st International Congress on Agricultural Sciences and Veterinary
Programme
Sonlandır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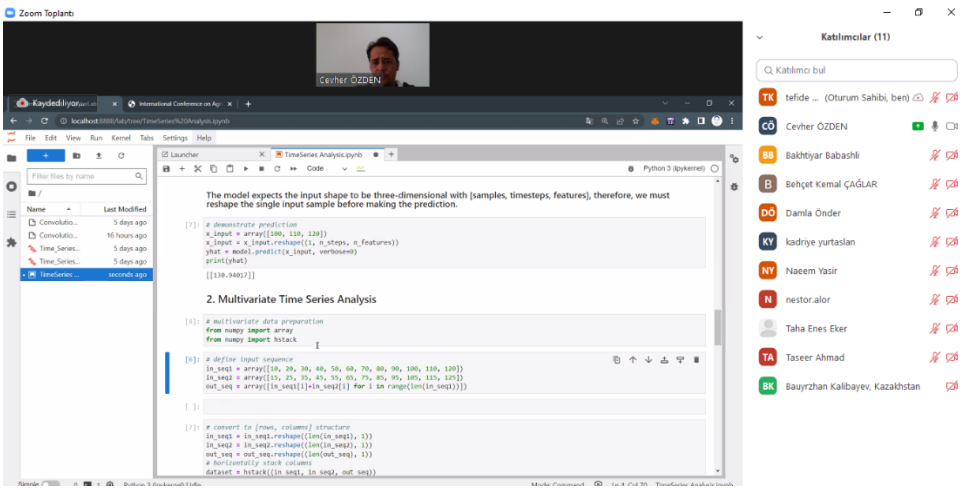
Katılımcılar (12)
MNIST dataset
The MNIST database of handwritten digits, available from this page, has a training set of 60,000 examples, and a test set of 10,000 examples. It is a subset of a larger set available from NIST. The digits have been size-normalized and centered in a fixed-size image.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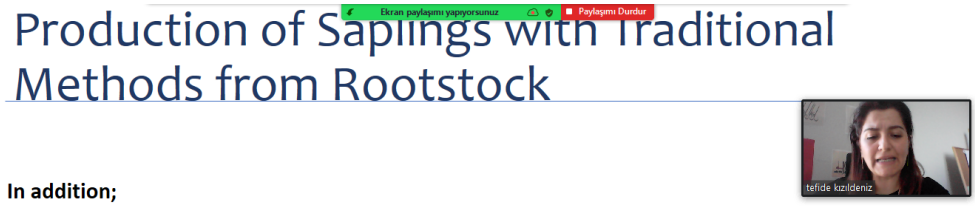
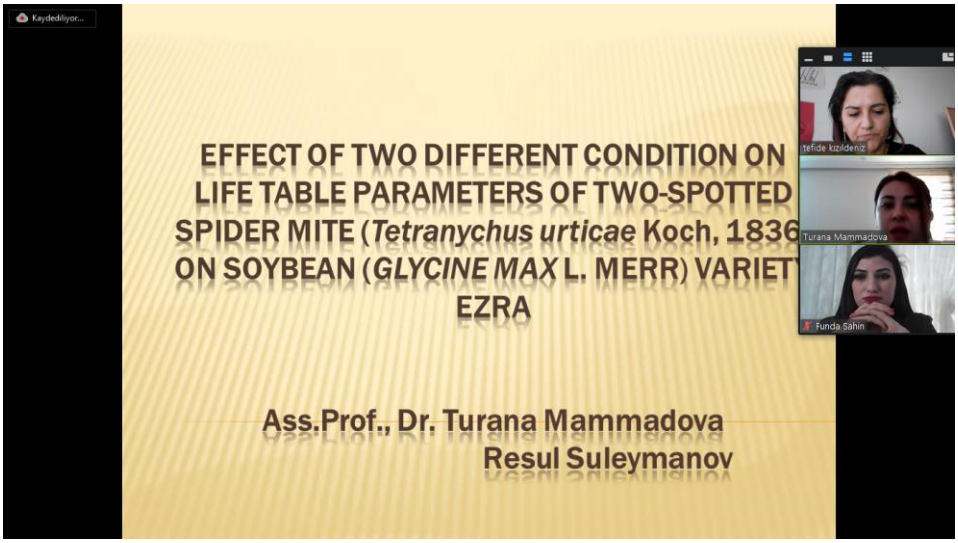
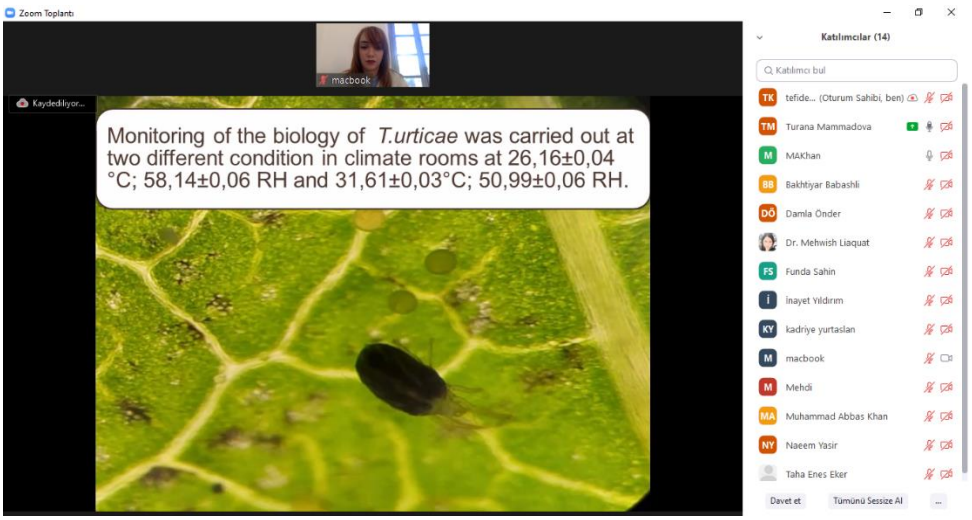
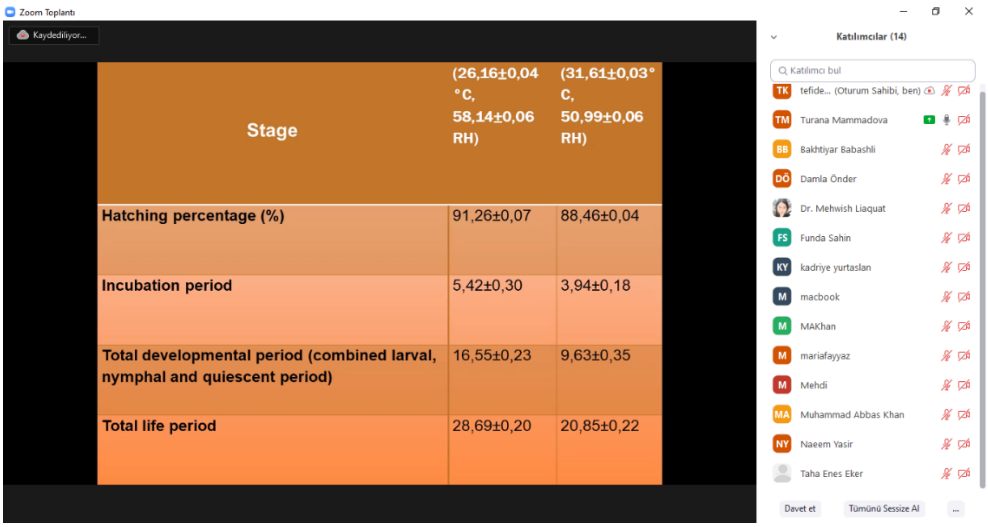
Katılımcılar (11)
2. Multivariate Time Series Analysis

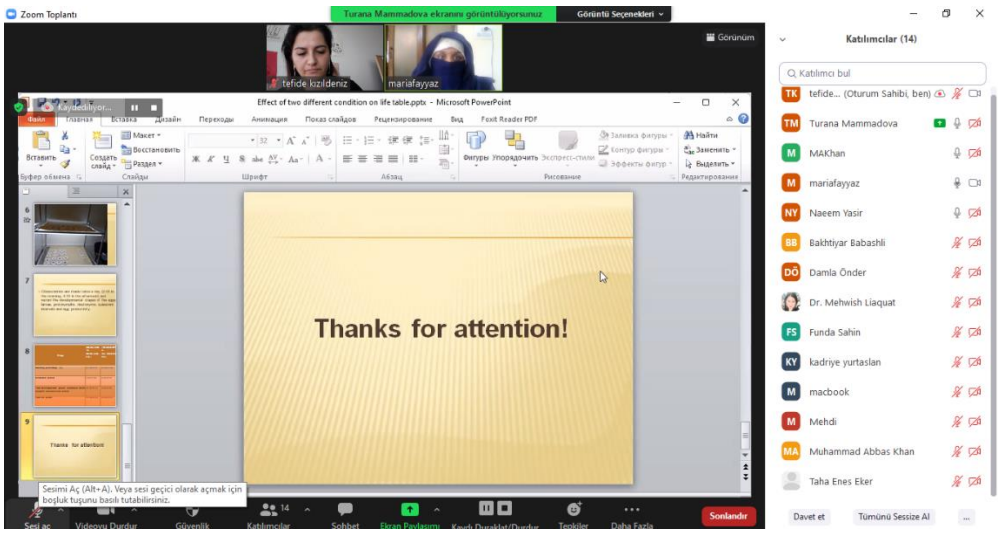

Ekran paylaşımı yapıyorsunuz
Paylaşımı Durdur
Production of Saplings with Traditional Methods from Rootstock
tefide kızıldeniz
In addition;
• For some plants, it is extremely difficult or even impossible to produce sapling from rootstock. (Ex: For avocado and cranberry plants, it is nearly not possible to produce sapling from rootstocks.)

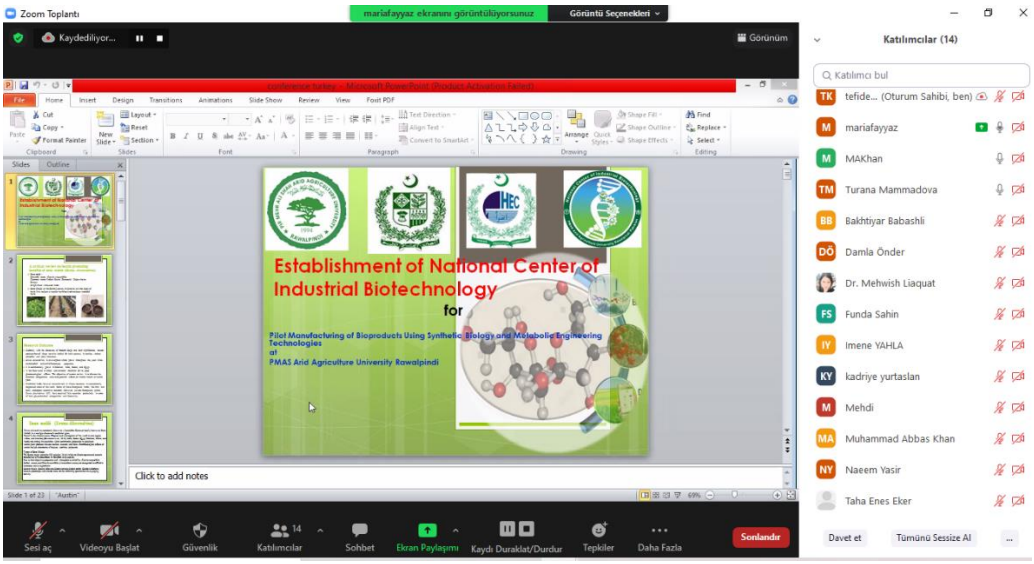

Kaydediliyor...
EFFECT OF TWO DIFFERENT CONDITION ON LIFE TABLE PARAMETERS OF TWO-SPOTTED SPIDER MITE (Tetranychus urticae Koch, 1836 ON SOYBEAN (GLYCINE MAX L. MERR) VARIET EZRA
Ass.Prof., Dr. Turana Mammadova
Resul Suleymanov
tefide kızıldeniz
Turana Mammadova
Funda Şahin

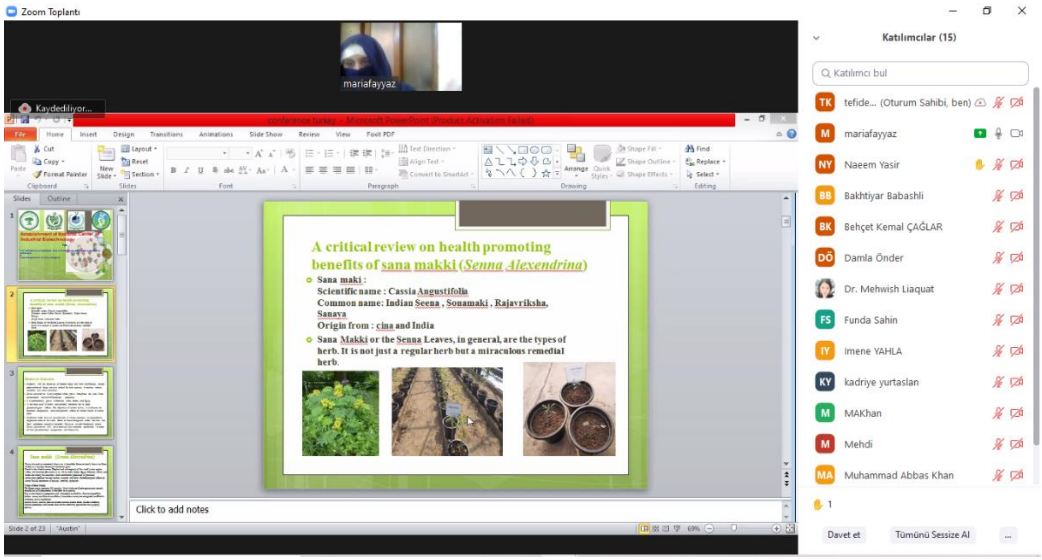


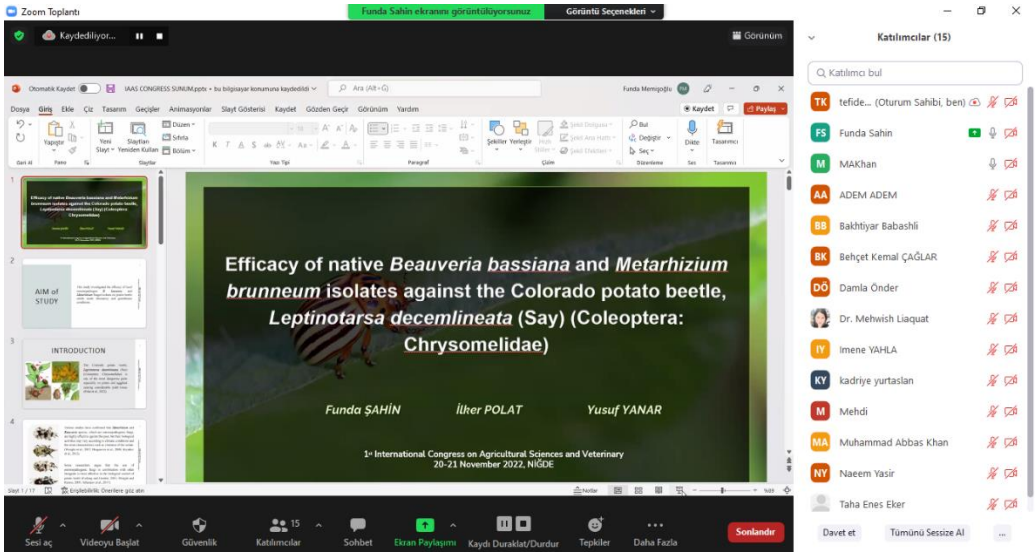


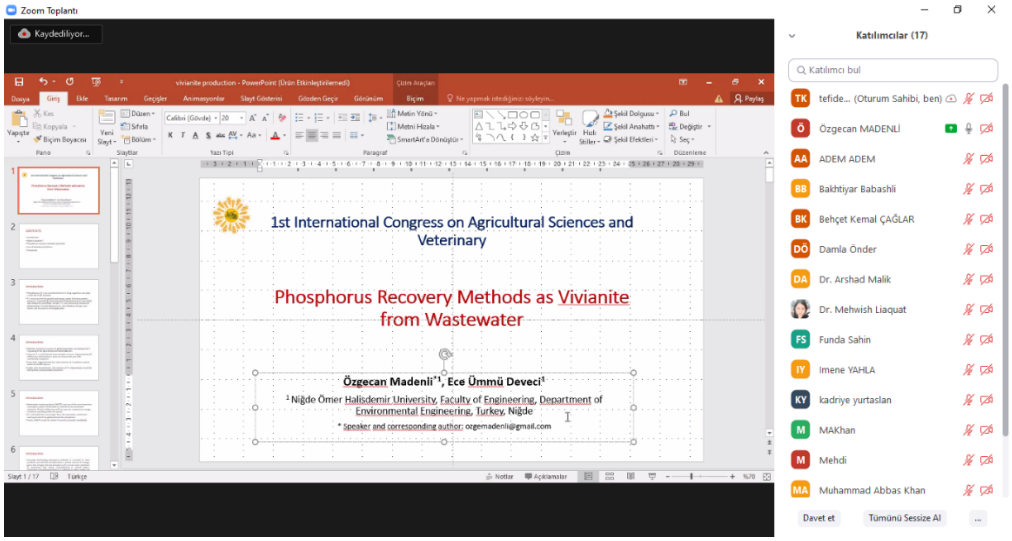
Stage	(26,16±0,04 °C, 58,14±0,06 RH)	(31,61±0,03° C, 50,99±0,06 RH)
Hatching percentage (%)	91,26±0,07	88,46±0,04
Incubation period	5,42±0,30	3,94±0,18
Total developmental period (combined larval, nymphal and quiescent period)	16,55±0,23	9,63±0,35
Total life period	28,69±0,20	20,85±0,22




Establishment of National Center of Industrial Biotechnology
for
Pilot Manufacturing of Bioproducts Using Synthetic Biology and Metabolic Engineering Technologies
at
PMAS Arid Agriculture University Rawalpindi
Katılımcılar (14)


A critical review on health promoting benefits of sana makki (Senna Alexendrina)
Katılımcılar (15)


Efficacy of native Beauveria bassiana and Metarhizium brunneum isolates against the Colorado potato beetle, Leptinotarsa decemlineata (Say) (Coleoptera: Chrysomelidae)
Funda ŞAHİN İlker POLAT Yusuf YANAR
1st International Congress on Agricultural Sciences and Veterinary
20-21 November 2022, NİĞDE
Katılımcılar (15)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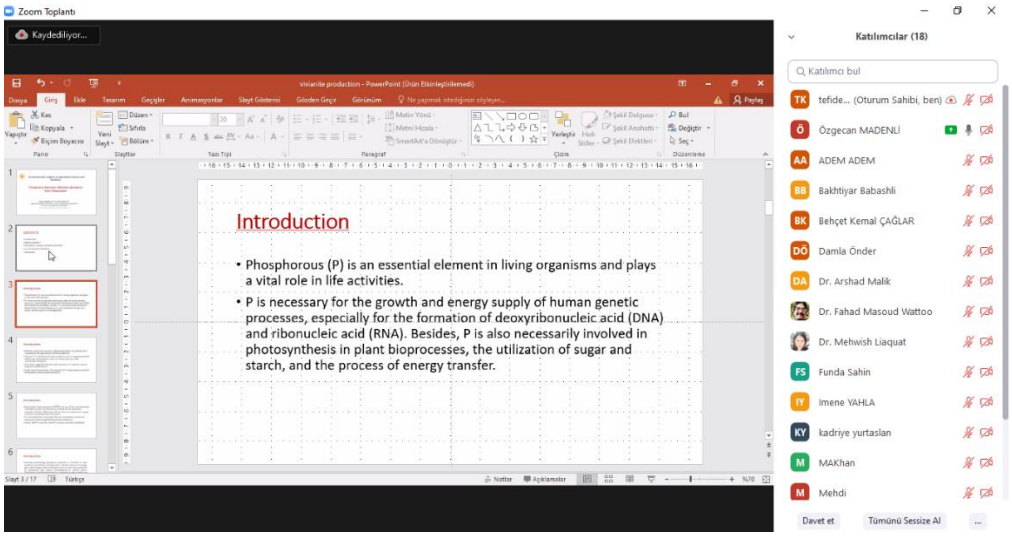
Katılımcılar (17)
1st International Congress on Agricultural Sciences and Veterinary
Phosphorus Recovery Methods as Vivianite from Wastewater
Özgecan Madenli*1, Ece Ümmü Deveci1
1 Niğde Ömer Halisdemir University, Faculty of Engineering, Department of Environmental Engineering, Turkey, Niğde
* Speaker and corresponding author: ozgemadenli@gmail.com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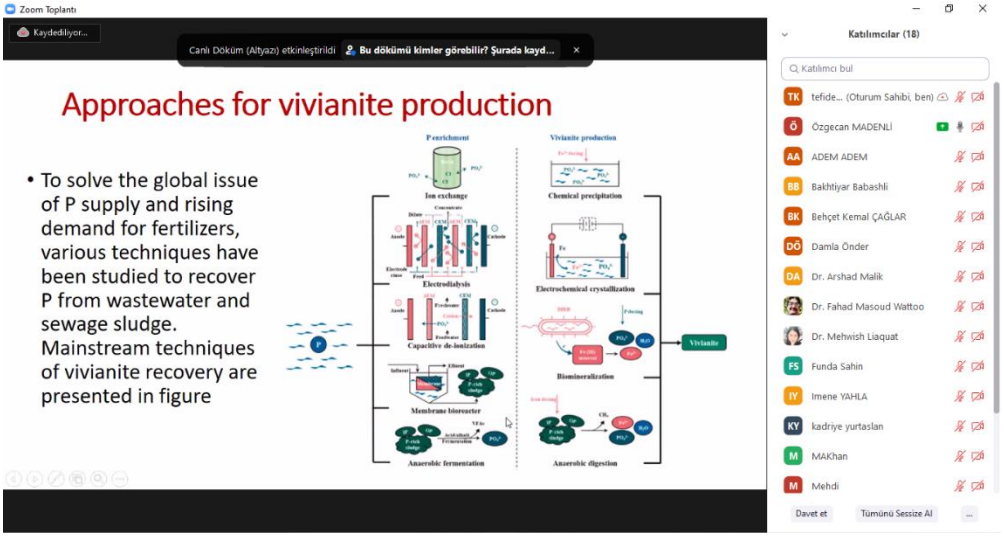
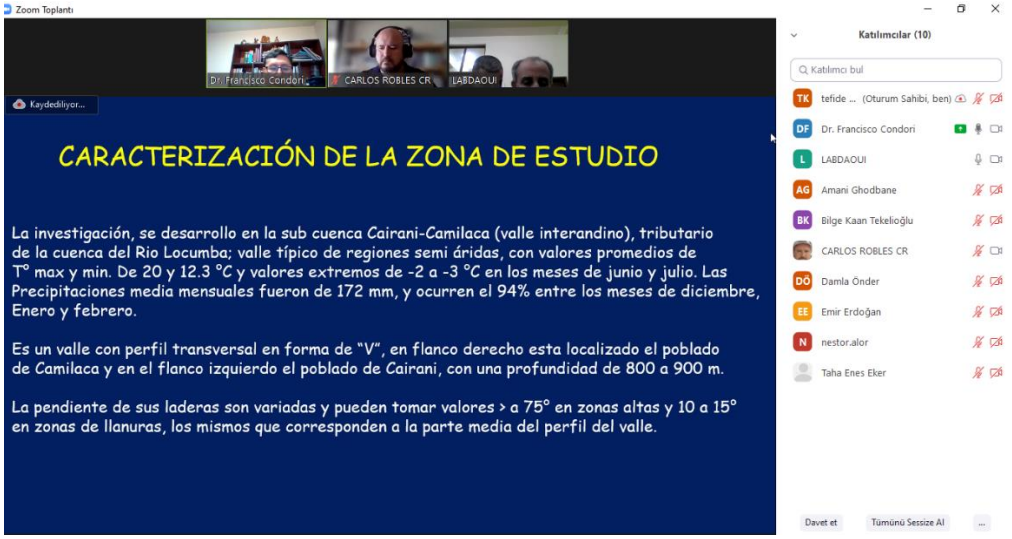
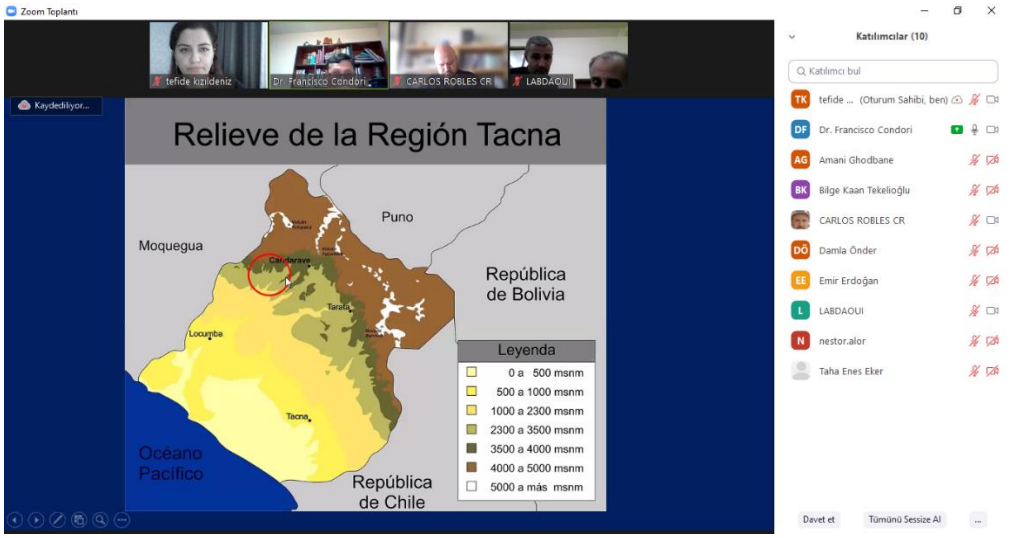
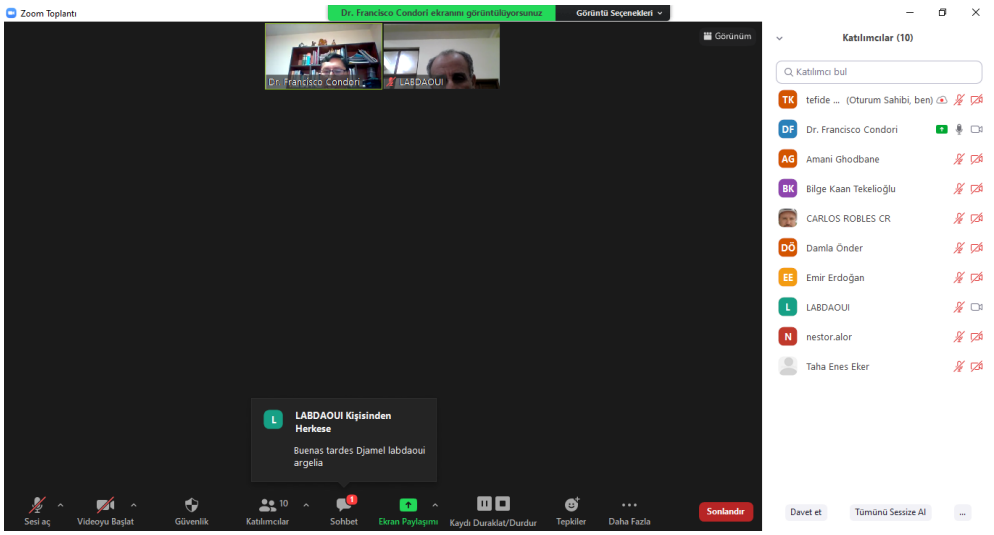
Kaydediliyor...
Katılımcılar (18)
Introduction
• Phosphorous (P) is an essential element in living organisms and plays a vital role in life activities.
• P is necessary for the growth and energy supply of human genetic processes, especially for the formation of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). Besides, P is also necessarily involved in photosynthesis in plant bioprocesses, the utilization of sugar and starch, and the process of energy transfer.


Zoom Toplantı
Kaydediliyor...
Katılımcılar (18)
Approaches for vivianite production
• To solve the global issue of P supply and rising demand for fertilizers, various techniques have been studied to recover P from wastewater and sewage sludge. Mainstream techniques of vivianite recovery are presented in figure
Enrichment
Vivianite production
Ion exchange
Chemical precipitation
Electrodialysis
Electrochemical crystallization
Capacitive de-ionization
Biomineralization
Vivianite
Membrane bioreactor
Anaerobic fermentation
Anaerobic digestion

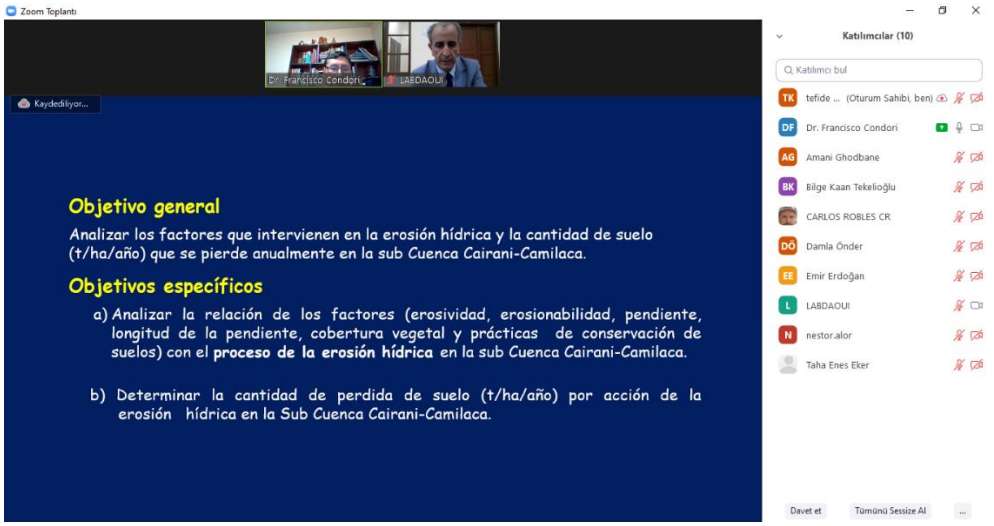

Zoom Toplantı
tefide kizildeniz
Dr. Francisco Condori
Kaydediliyor...
Katılımcılar (5)
tefide ... (Oturum Sahibi, ben)
Dr. Francisco Condori
Emir Erdoğan
nestor.alor
Taha Enes Eker
Davet et
Tümünü Sessize Al
Sohbet
si, te escucho bien a ti
Profesor le escucho un poco bajo
no tiene un micro mas cerca?
Mesajlarınızı kimler görebilir? Kaydetme Açık
Kime: Herkes
Mesajı buraya yazın...
Dr. Francisco Condori


Zoom Toplantı
Dr. Francisco Condori
CARLOS ROBLES CR
LABDAOUI
Kaydediliyor...
CARACTERIZACIÓN DE LA ZONA DE ESTUDIO
La investigación, se desarrollo en la sub cuenca Cairani-Camilaca (valle interandino), tributario de la cuenca del Rio Locumba; valle típico de regiones semi áridas, con valores promedios de T° max y min. De 20 y 12.3 °C y valores extremos de -2 a -3 °C en los meses de junio y julio. Las Precipitaciones media mensuales fueron de 172 mm, y ocurren el 94% entre los meses de diciembre, Enero y febrero.
Es un valle con perfil transversal en forma de "V", en flanco derecho esta localizado el poblado de Camilaca y en el flanco izquierdo el poblado de Cairani, con una profundidad de 800 a 900 m.
La pendiente de sus laderas son variadas y pueden tomar valores > a 75° en zonas altas y 10 a 15° en zonas de llanuras, los mismos que corresponden a la parte media del perfil del valle.
Katılımcılar (10)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Dr. Francisco Condori
LABDAOUI
Amani Ghodbane
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Damla Önder
Emir Erdoğan
nestor.alor
Taha Enes Eker
Davet et
Tümünü Sessize Al


Zoom Toplantı
tefide kizildeniz
Dr. Francisco Condori
CARLOS ROBLES CR
LABDAOUI
Kaydediliyor...
Relieve de la Región Tacna
Puno
Moquegua
República de Bolivia
Locumba
Tacna
Océano Pacífico
República de Chile
Leyenda
0 a 500 msnm
500 a 1000 msnm
1000 a 2300 msnm
2300 a 3500 msnm
3500 a 4000 msnm
4000 a 5000 msnm
5000 a más msnm
Katılımcılar (10)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Dr. Francisco Condori
Amani Ghodbane
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Damla Önder
Emir Erdoğan
LABDAOUI
nestor.alor
Taha Enes Eker
Davet et
Tümünü Sessize Al


Zoom Toplantı
Dr. Francisco Condori ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
Dr. Francisco Condori
LABDAOUI
Katılımcılar (10)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Dr. Francisco Condori
Amani Ghodbane
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Damla Önder
Emir Erdoğan
LABDAOUI
nestor.alor
Taha Enes Eker
LABDAOUI Kişisinden Herkese
Buenas tardes Djamel labdaoui argelia
Sesi aç
Videoyu Başlat
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır
Davet et
Tümünü Sessize Al


Zoom Toplantı
Kaydediliyor...
Suelos degradados por la erosión
Suelos perdieron Capacidad Productiva y fueron abandonados
Katılımcılar (10)
Sesi Açmayı İste
Daha Fazla
Sohbet
labdaoui argelia
bienvenidos professor Djamel. Saludos desde Turquia
Mesaj buraya yazın...


Zoom Toplantı
Kaydediliyor...
Objetivo general
Analizar los factores que intervienen en la erosión hídrica y la cantidad de suelo (t/ha/año) que se pierde anualmente en la sub Cuenca Cairani-Camilaca.
Objetivos específicos
a) Analizar la relación de los factores (erosividad, erosionabilidad, pendiente, longitud de la pendiente, cobertura vegetal y prácticas de conservación de suelos) con el proceso de la erosión hídrica en la sub Cuenca Cairani-Camilaca.
b) Determinar la cantidad de perdida de suelo (t/ha/año) por acción de la erosión hídrica en la Sub Cuenca Cairani-Camilaca.
Katılımcılar (10)


Zoom Toplantı
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Kaydediliyor...
LOCALIZACIÓN DEL AMBITO DE ESTUDIO
Camilaca
Cairani
Huaruyo
Katılımcılar (10)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Dr. Francisco Condori
Amani Ghodbane
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Damla Önder
Emir Erdoğan
LABDAOUI
nestor.alor
Taha Enes Eker
Davet et
Tümünü Sessize Al

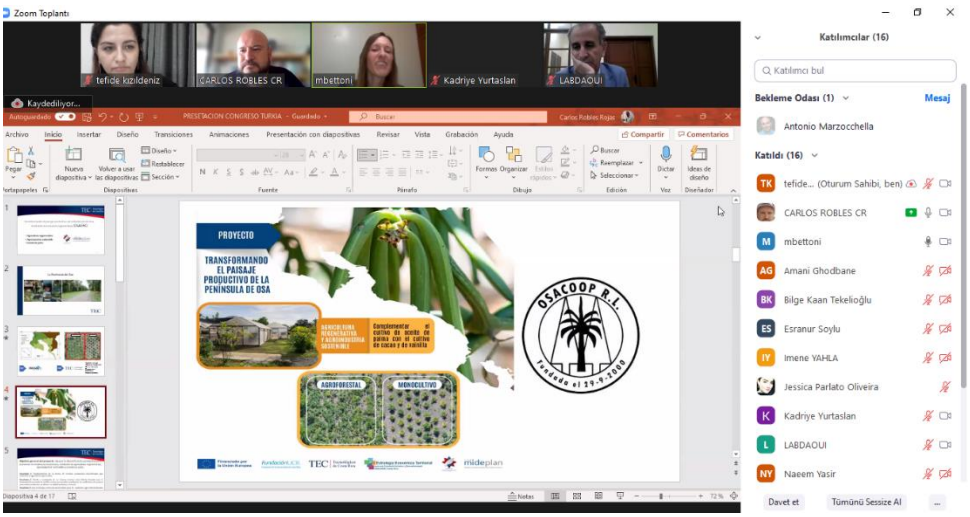

Zoom Toplantı
Dr. Francisco Condori
LABDAOUI
Kadriye Yurtaslan
Kaydediliyor...
Factores que originan la erosión
1. Erosividad (R)
Lluvia
Precipitaciones:
1964 – 2019
Cairani
Candarave
Ilabaya
Tacalaya
Humaizo
2. Erodabilidad (K)
Muestreo de Suelos y análisis (físico-quimico)
Pruebas de infiltración
3. Topografía (LS)
4. Cobertura v. (C)
Imágenes de satélite: LandSat 5; LandSat 8; Alos
5. Conservación (P)
Evaluación campo
Katılımcılar (11)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Dr. Francisco Condori
Amani Ghodbane
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Damla Önder
Hall 2, Bilge Kaan Tekelioğlu
Kadriye Yurtaslan
LABDAOUI
nestor.alor
Taha Enes Eker
Davet et
Tümünü Sessize Al


Zoom Toplantı
CARLOS ROBLES CR ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
CARLOS ROBLES CR
Kadriye Yurtaslan
LABDAOUI
Görünüm
Kaydediliyor...
TEC Tecnológico de Costa Rica
Transformando el paisaje productivo de la Península de Osa, mediante la economía regenerativa, OSAGRO
Agricultura regenerativa
Agroindustria sostenible
Comercio justo
mideplan
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır
Katılımcılar (10)
Katılımcı bul
Bekleme Odası (1)
Mesaj
Jessica Parlato Oliveira
Katılıyor...
Katıldı (10)
tefide ... (Oturum Sahibi, ben)
CARLOS ROBLES CR
Dr. Francisco Condori
Amani Ghodbane
Imene YAHLA
Kadriye Yurtaslan
LABDAOUI
nestor.alor
Taha Enes Eker
Zehra Çetin
Davet et
Tümünü Sessize Al

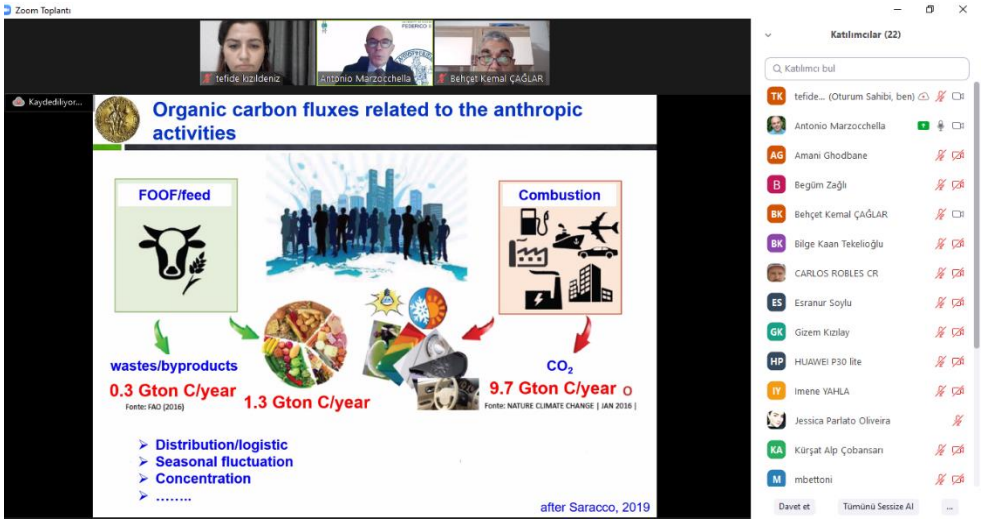

Zoom Toplantı
CARLOS ROBLES CR
Kadriye Yurtaslan
Kaydediliyor...
Simbología
La Guaria
Piedras Blancas
La Palma
Chacarita
Rancho Quemado
Cantones
Golfito
Osa
N
Agroforestry
Monocrop
2017
INOGO
2019
TEC | Tecnológico de Costa Rica
Katılımcılar (12)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
CARLOS ROBLES CR
Amani Ghodbane
Imene YAHLA
Jessica Parlato Oliveira
Davet et
Tümünü Sessize Al
Sohbet
mbettoni gönderilen Herkes
Hola
Benden şuraya: Herkes
hola profesora Marcelle. Bienvenida
Mesajlarınızı kimler görebilir? Kaydetme Açık
Kime: Herkes
Mesajı buraya yazın...

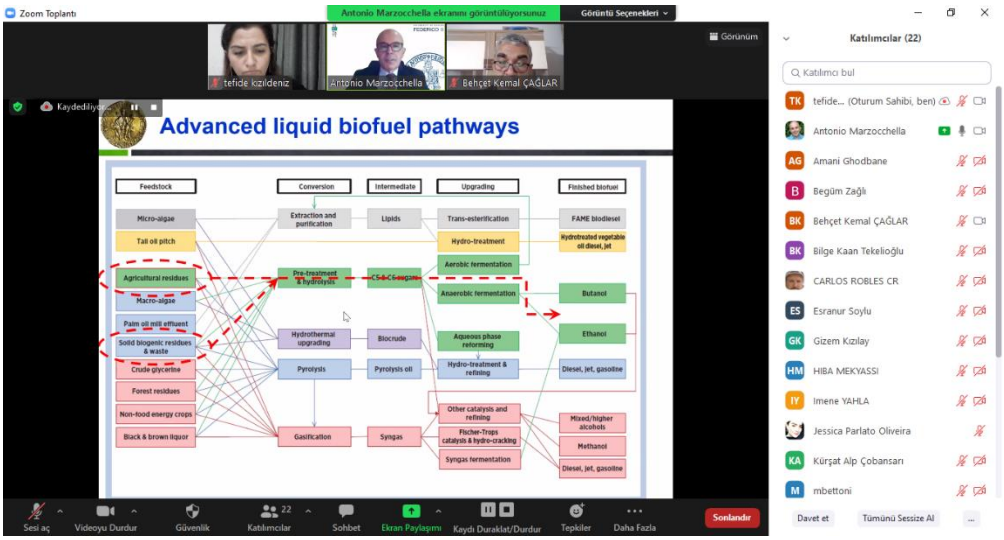

Zoom Toplantı
CARLOS ROBLES CR
Kadriye Yurtaslan
Kaydediliyor...
Simbología
La Guaria
Piedras Blancas
La Palma
Chacarita
Rancho Quemado
Cantones
Golfito
Osa
N
Agroforestry
Monocrop
2017
INOGO
2019
TEC | Tecnológico de Costa Rica
Katılımcılar (12)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
CARLOS ROBLES CR
Amani Ghodbane
Imene YAHLA
Jessica Parlato Oliveira
Davet et
Tümünü Sessize Al
Sohbet
mbettoni gönderilen Herkes
Hola
Benden şuraya: Herkes
hola profesora Marcelle. Bienvenida
Mesajlarınızı kimler görebilir? Kaydetme Açık
Kime: Herkes
Mesajı buraya yazın...

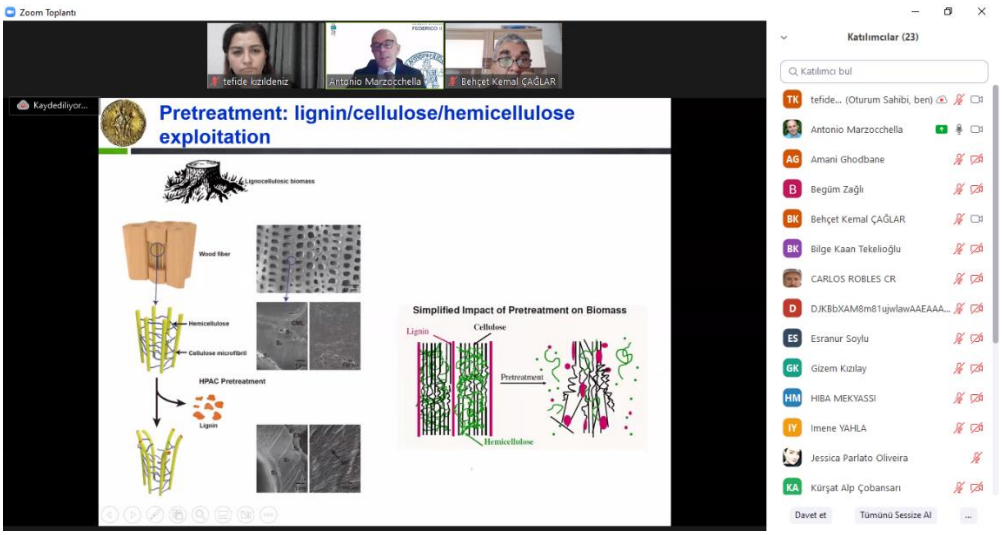

Zoom Toplantı
CARLOS ROBLES CR
Kadriye Yurtaslan
Kaydediliyor...
Diagnóstico y Población Meta
Escolaridad
Área de uso de suelo
Katılımcılar (14)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
CARLOS ROBLES CR
Amani Ghodbane
Bilge Kaan Tekelioğlu
Esranur Soylu
Imene YAHLA
Jessica Parlato Oliveira
Kadriye Yurtaslan
LABDAOUI
mbettoni
nestor.alor
Samsung SM-A536E
Taha Enes Eker
Zehra Çetin
Davet et
Tümünü Sessize Al

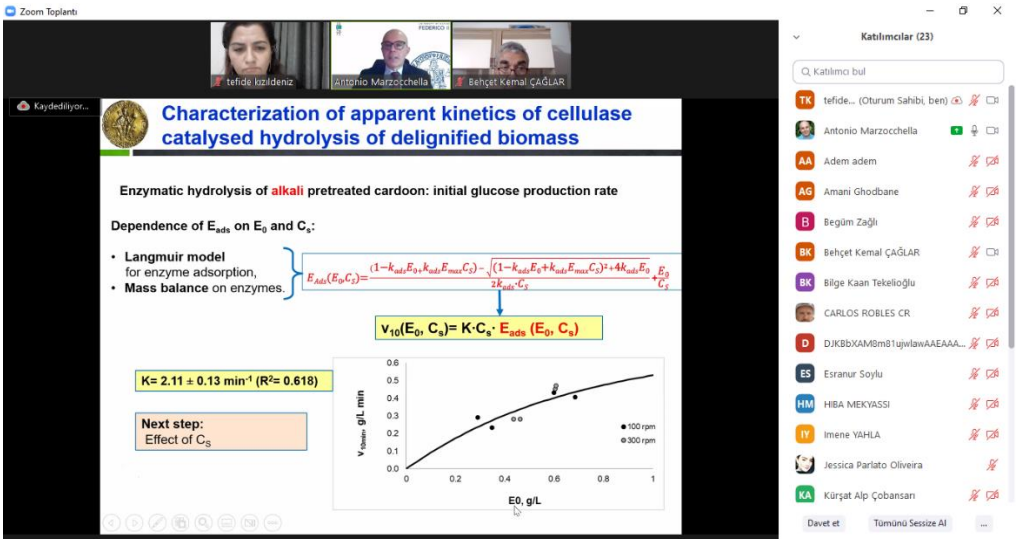

Zoom Toplantı
tefide kizildeniz
CARLOS ROBLES CR
mbettoni
Kadriye Yurtaslan
LABDAOUI
Katılımcılar (16)
PROYECTO
TRANSFORMANDO EL PAISAJE PRODUCTIVO DE LA PENINSULA DE OSA
OSACOOP R.L.
AGROFORESTAL
MONOCULTIVO

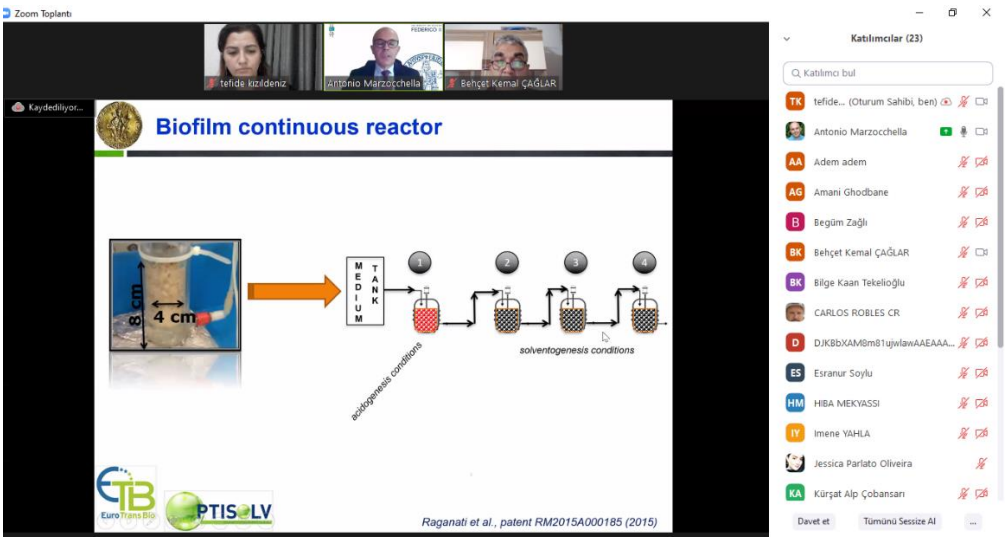

Zoom Toplantı
Katılımcılar (21)
Università degli Studi di Napoli Federico II
1st International Congress on Agricultural Sciences and Veterinary
BIOTECHNOLOGY PROCESSES AT THE BIOPROCESS ENGINEERING LABORATORY OF THE UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
Antonio Marzocchella
November 20, 2022
Dip. Ingegneria Chimica, Materiali e Produzione Industriale
Bioprocess Engineering Laboratory
http://wpage.unina.it/biop.eng.lab/home.htm

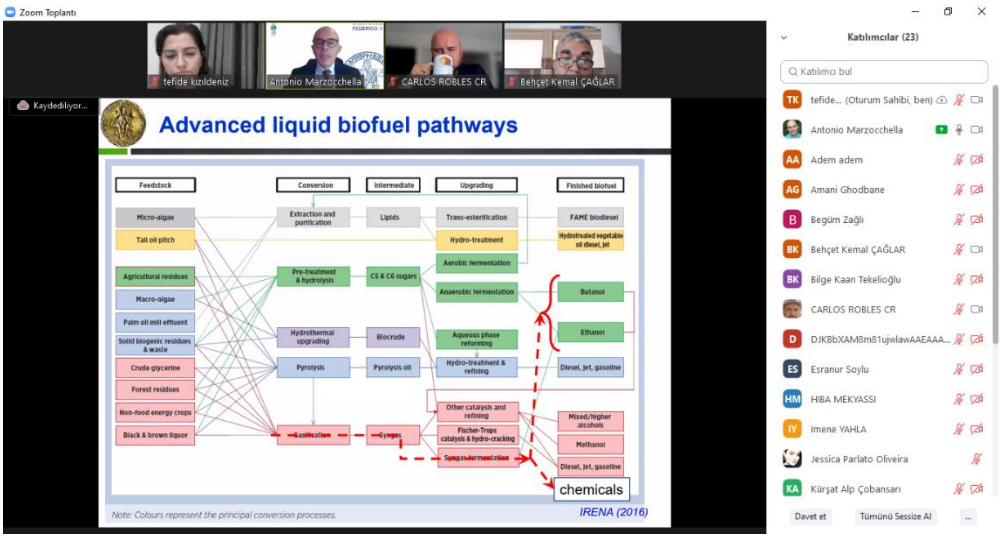

Zoom Toplantı
Katılımcılar (22)
Organic carbon fluxes related to the anthropic activities
FOOF/feed
Combustion
wastes/byproducts
0.3 Gton C/year
1.3 Gton C/year
CO2
9.7 Gton C/year
Distribution/logistic
Seasonal fluctuation
Concentration
.....
after Saracco, 2019

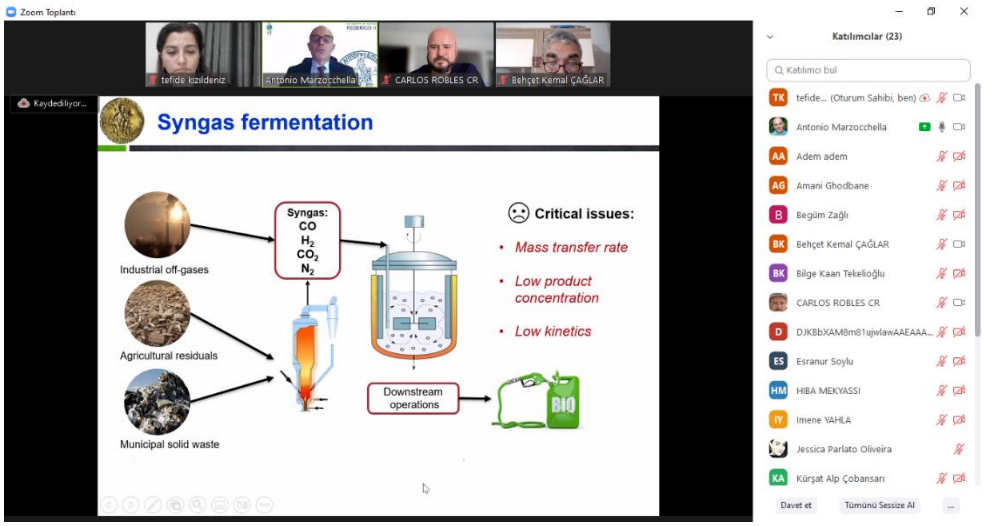

Zoom Toplantı
Antonio Marzocchella ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Advanced liquid biofuel pathways
Feedstock
Conversion
Intermediate
Upgrading
Finished biofuel
Micro-algae
Tall oil pitch
Agricultural residues
Macro-algae
Palm oil mill effluent
Solid biogenic residues & waste
Crude glycerine
Forest residues
Non-food energy crops
Black & brown liquor
Extraction and purification
Pre-treatment & hydrolysis
Hydrothermal upgrading
Pyrolysis
Gasification
Lipids
C5&C6 sugars
Biocrude
Pyrolysis oil
Syngas
Trans-esterification
Hydro-treatment
Aerobic fermentation
Anaerobic fermentation
Aqueous phase reforming
Hydro-treatment & refining
Other catalysis and refining
Fischer-Tropsch catalysis & hydro-cracking
Syngas fermentation
FAME biodiesel
Hydrotreated vegetable oil diesel, jet
Butanol
Ethanol
Diesel, jet, gasoline
Mixed/higher alcohols
Methanol
Diesel, jet, gasoline
Katılımcılar (22)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Antonio Marzocchella
Amani Ghodbane
Begüm Zağlı
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Esranur Soylu
Gizem Kızılay
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Kürşat Alp Çobansarı
mbettoni
Davet et
Tümünü Sessize Al
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır

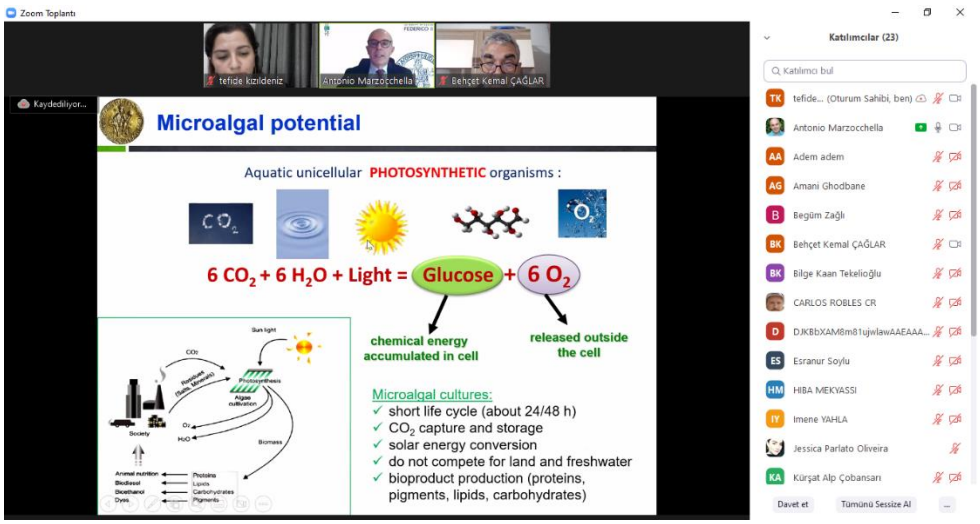

Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Pretreatment: lignin/cellulose/hemicellulose exploitation
Lignocellulosic biomass
Wood fiber
Hemicellulose
Cellulose microfibril
HPAC Pretreatment
Lignin
Simplified Impact of Pretreatment on Biomass
Lignin
Cellulose
Pretreatment
Hemicellulose
Katılımcılar (23)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Antonio Marzocchella
Amani Ghodbane
Begüm Zağlı
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
DJKBbXAM8m81ujwlawAAEAAA...
Esranur Soylu
Gizem Kızılay
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Kürşat Alp Çobansarı
Davet et
Tümünü Sessize Al

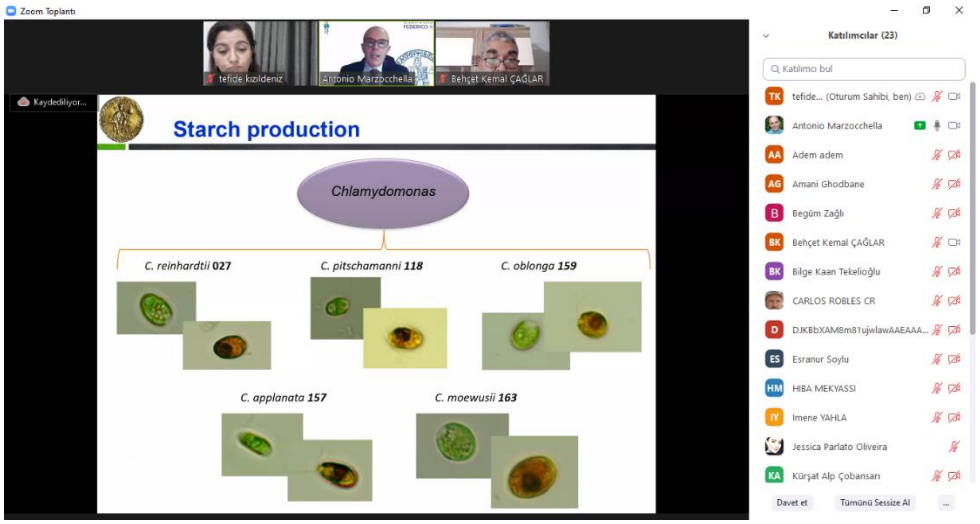

Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Characterization of apparent kinetics of cellulase catalysed hydrolysis of delignified biomass
Enzymatic hydrolysis of alkali pretreated cardoon: initial glucose production rate
Dependence of E_{ads} on E_0 and C_s:
Langmuir model for enzyme adsorption,
Mass balance on enzymes.
$E_{Ads}(E_0,C_s)=\frac{(1-k_{ads}E_0+k_{ads}E_{max}C_s)-\sqrt{(1-k_{ads}E_0+k_{ads}E_{max}C_s)^2+4k_{ads}E_0}}{2k_{ads}\cdot C_s}\cdot\frac{E_0}{C_s}$
$V_{10}(E_0, C_s)= K\cdot C_s\cdot E_{ads}(E_0, C_s)$
K= 2.11 ± 0.13 min-1 (R2= 0.618)
Next step:
Effect of Cs
V_{10min} g/L min
E0, g/L
100 rpm
300 rpm
Katılımcılar (23)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Antonio Marzocchella
Adem adem
Amani Ghodbane
Begüm Zağlı
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
DJKBbXAM8m81ujwlawAAEAAA...
Esranur Soylu
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Kürşat Alp Çobansarı
Davet et
Tümünü Sessize Al

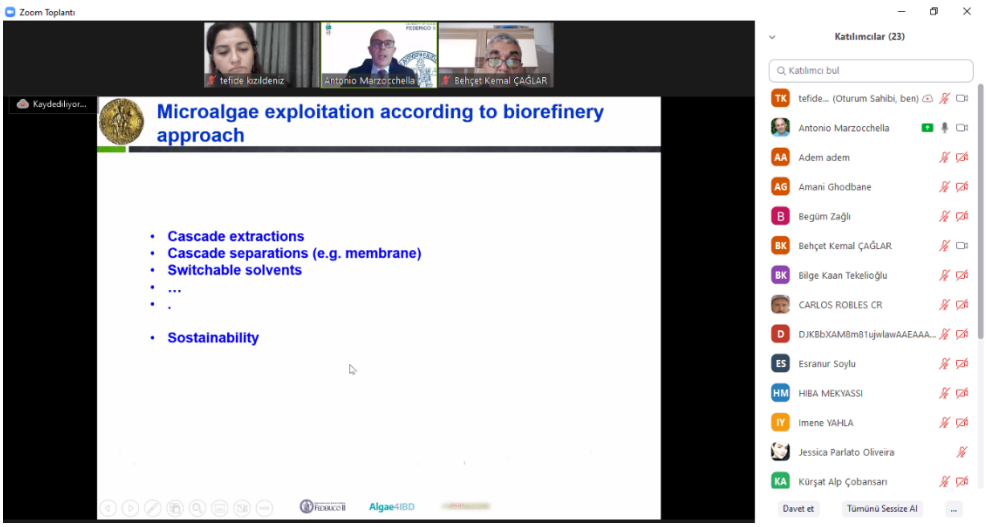

Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Biofilm continuous reactor
8 cm
4 cm
MEDIUM
TANK
1
2
3
4
acidogenesis conditions
solventogenesis conditions
Raganati et al., patent RM2015A000185 (2015)
Katılımcılar (23)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Antonio Marzocchella
Adem adem
Amani Ghodbane
Begüm Zağlı
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
DJKBbXAM8m81ujwlawAAEAAA...
Esranur Soylu
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Kürşat Alp Çobansarı
Davet et
Tümünü Sessize Al


Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
CARLOS ROBLES CR
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Advanced liquid biofuel pathways
Feedstock
Conversion
Intermediate
Upgrading
Finished biofuel
Micro-algae
Tall oil pitch
Agricultural residues
Macro-algae
Palm oil mill effluent
Solid biogenic residues & waste
Crude glycerine
Forest residues
Non-food energy crops
Black & brown liquor
Extraction and purification
Pre-treatment & hydrolysis
Hydrothermal upgrading
Pyrolysis
Gasification
Lipids
CS & C6 sugars
Biocrude
Pyrolysis oil
Syngas
Trans-esterification
Hydro-treatment
Aerobic fermentation
Anaerobic fermentation
Aqueous phase reforming
Hydro-treatment & refining
Other catalysis and refining
Fischer-Tropsch catalysis & hydro-cracking
Syngas fermentation
FAME biodiesel
Hydrotreated vegetable oil diesel, jet
Butanol
Ethanol
Diesel, jet, gasoline
Mixed/higher alcohols
Methanol
Diesel, jet, gasoline
chemicals
Note: Colours represent the principal conversion processes.
IRENA (2016)
Katılımcılar (23)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Antonio Marzocchella
Adem adem
Amani Ghodbane
Begüm Zağlı
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
DJKBbXAM8m81ujwlawAAEAAA...
Esranur Soylu
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Kürşat Alp Çobansarı
Davet et
Tümünü Sessize Al


Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
CARLOS ROBLES CR
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Syngas fermentation
Industrial off-gases
Agricultural residuals
Municipal solid waste
Syngas:
CO
H_2
CO_2
N_2
Downstream operations
BIO
Critical issues:
Mass transfer rate
Low product concentration
Low kinetics
Katılımcılar (23)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Antonio Marzocchella
Adem adem
Amani Ghodbane
Begüm Zağlı
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
DJKBbXAM8m81ujwlawAAEAAA...
Esranur Soylu
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Kürşat Alp Çobansarı
Davet et
Tümünü Sessize Al

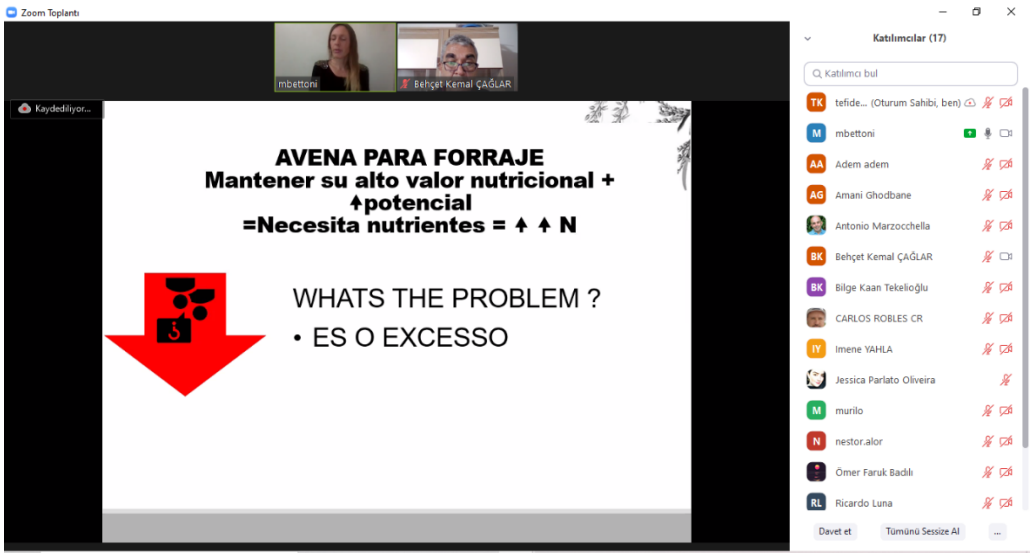

Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Microalgal potential
Aquatic unicellular PHOTOSYNTHETIC organisms :
6 CO2 + 6 H2O + Light = Glucose + 6 O2
chemical energy accumulated in cell
released outside the cell
Microalgal cultures:
short life cycle (about 24/48 h)
CO2 capture and storage
solar energy conversion
do not compete for land and freshwater
bioproduct production (proteins, pigments, lipids, carbohydrates)
Katılımcılar (23)
Katılımcı bul
Davet et
Tümünü Sessize Al


Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Starch production
Chlamydomonas
C. reinhardtii 027
C. pitschamanni 118
C. oblonga 159
C. applanata 157
C. moewusii 163
Katılımcılar (23)
Katılımcı bul
Davet et
Tümünü Sessize Al

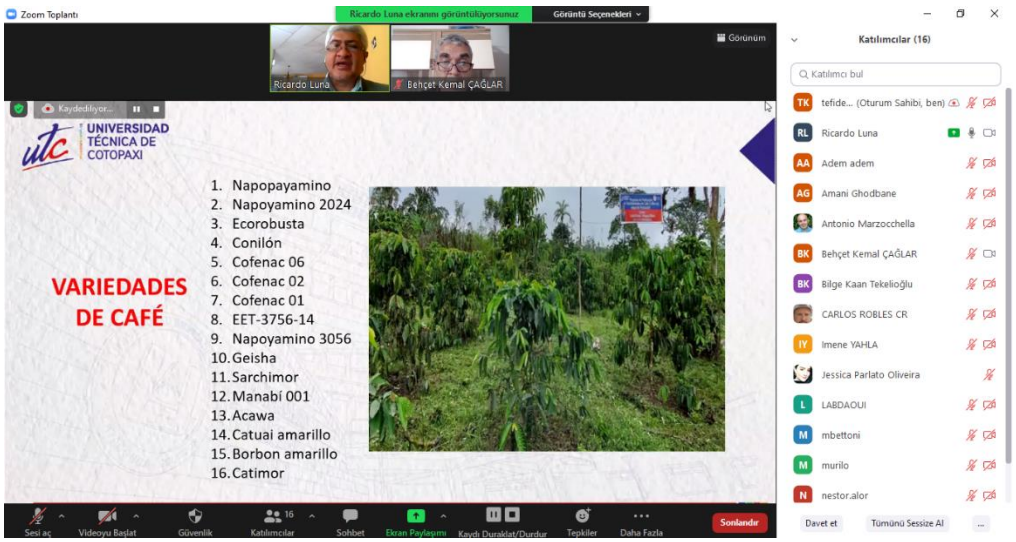

Zoom Toplantı
tefide kizildeniz
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Microalgae exploitation according to biorefinery approach
Cascade extractions
Cascade separations (e.g. membrane)
Switchable solvents
...
.
Sostainability
Algae4IBD
Katılımcılar (23)
Katılımcı bul
Davet et
Tümünü Sessize Al


Zoom Toplantı
tefide kizildeniz
Behçet Kemal ÇAĞLAR
mbettoni
Görünüm
Katılımcılar (20)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
mbettoni
Adem adem
Amani Ghodbane
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Esranur Soylu
HIBA MEKYASSI
Imene YAHLA
Jessica Parlato Oliveira
Luis Godoy
Naeem Yasir
Davet et
Tümünü Sessize Al
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır


Zoom Toplantı
mbettoni ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Universidade Tuiuti Do Paraná
Faculdade de Ciências Exatas Tecnologia
Curso de Agronomia
Biometrics parameters of white oat as affected by plant growth-promoting microorganisms (PGPMs)
Jéssica Regina Parlato De Oliveira*1, Ana Catarina Ceccon Bonierski2, Tefide Kizildeniz3, Marcelle Michelotti Bettoni4
Katılımcılar (20)
Sonlandır


Zoom Toplantı
Kaydediliyor...
AVENA PARA FORRAJE
Mantener su alto valor nutricional + potencial
=Necesita nutrientes = N
WHATS THE PROBLEM ?
• ES O EXCESSO
Katılımcılar (17)
murilo
Sonlandır

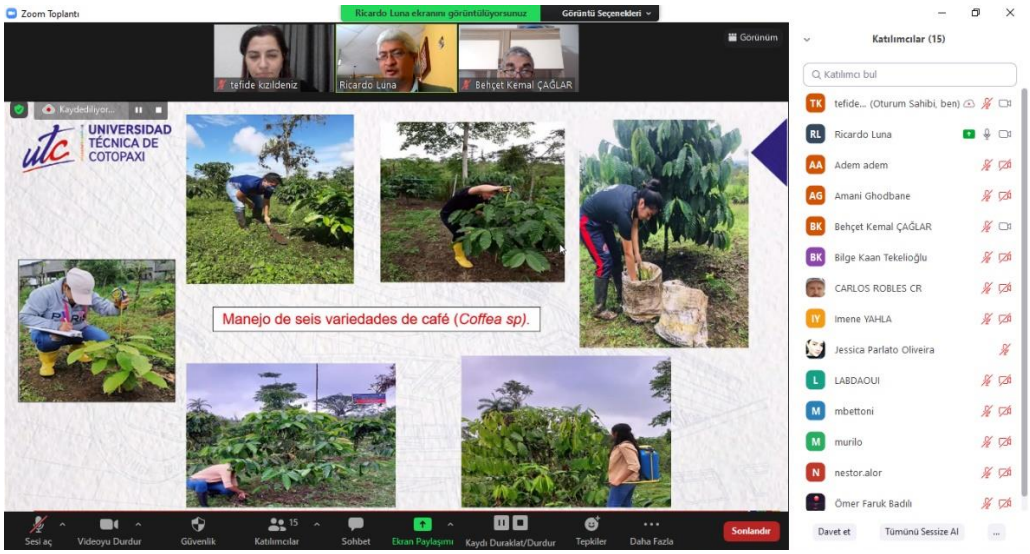

Zoom Toplantı
tefide kızıldeniz
Ricardo Luna
Behçet Kemal ÇAĞLAR
UNIVERSIDAD TÉCNICA DE COTOPAXI
Campus Matriz
Campus La Maná
Campus Salache
Katılımcılar (16)
Katılımcı bul
tefide... (Oturum Sahibi, ben)
Ricardo Luna
Adem adem
Amani Ghodbane
Antonio Marzocchella
Behçet Kemal ÇAĞLAR
Bilge Kaan Tekelioğlu
CARLOS ROBLES CR
Imene YAHLA
Jessica Parlato Oliveira
LABDAOUI
mbettoni
murilo
nestor.alor
Davet et
Tümünü Sessize Al

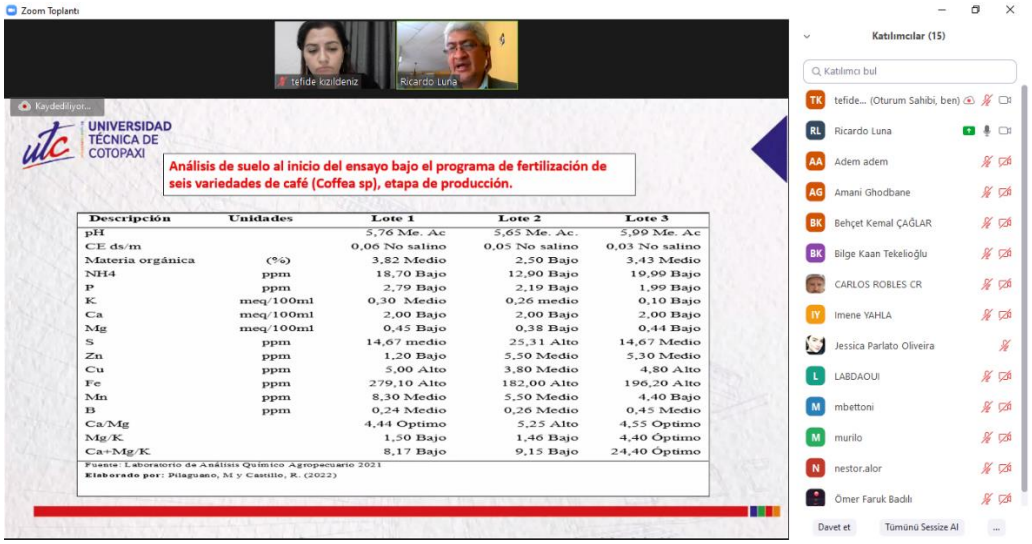

Zoom Toplantı
Ricardo Luna ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
Ricardo Luna
Behçet Kemal ÇAĞLAR
UNIVERSIDAD TÉCNICA DE COTOPAXI
VARIEDADES DE CAFÉ
1. Napopayamino
2. Napoyamino 2024
3. Ecorobusta
4. Conilón
5. Cofenac 06
6. Cofenac 02
7. Cofenac 01
8. EET-3756-14
9. Napoyamino 3056
10. Geisha
11. Sarchimor
12. Manabí 001
13. Acawa
14. Catuai amarillo
15. Borbon amarillo
16. Catimor
Sesi aç
Videoyu Başlat
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır
Katılımcılar (16)
Davet et
Tümünü Sessize Al


Zoom Toplantı
Ricardo Luna
UNIVERSIDAD TÉCNICA DE COTOPAXI
EFECTO DE LA FERTILIZACIÓN DE LAS VARIEDADES DE CAFÉ ECOROBUSTA, NAPOPAYAMINO Y CONILÓN (Coffea conephora) EN LA ETAPA DE PRODUCCIÓN
Katılımcılar (16)
Davet et
Tümünü Sessize Al


Zoom Toplantı
Ricardo Luna ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
Ricardo Luna
mbettoni
Ana Catarina
Ecuador: país de los cafés especiales
MUCHAS GRACIAS
Ricardo Augusto Luna Murillo
Luis Alberto Godoy Montiel
Ana Lucia Espinoza Coronel
Maria Julieta Cedeño Aristega
Kleber Augusto Espinosa Cumbay
Katılımcılar (16)
Sonlandır

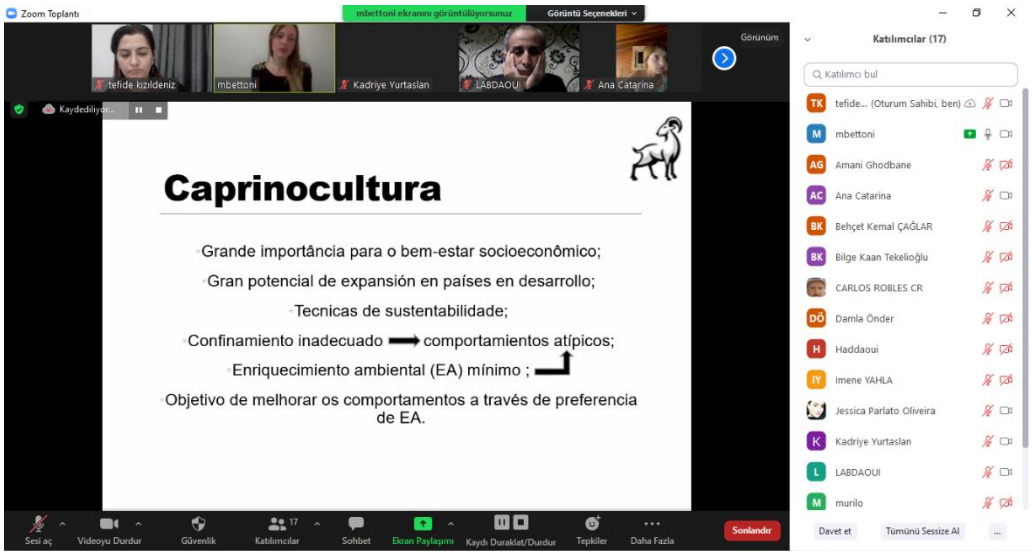

Zoom Toplantı
mbettoni ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
mbettoni
Kadriye Yurtaslan
LABDAOUI
Universidade Tuiuti Do Paraná
Faculdade De Ciências Exatas E Tecnologia
Curso De Agronomia
Preferencias de cabras Boer para objetos de enriquecimiento ambiental.
Ana Catarina Ceccon Bonierski [*1], Jéssica Regina Parlato de Oliveira [2], Lígia Valéria do Nascimento [3], Tefide Kizildeniz [4], Marcelle Michelotti Bettoni [5]
[1,2,3] Universidade Tuiuti do Paraná, Rua Sydnei Antonio Rangel Santos, 238, CEP 82.010-330, Curitiba, PR, BRASIL
[4] Niğde Ömer Halisdemir University, Facultad de Ciencias y Tecnologías Agrícolas, Departamento de Ingeniería de Biosistemas, 51240, Niğde , TÜRKİYE
[5] Consultor Independiente - Curitiba, Paraná- Brasil
Katılımcılar (17)
Sonlandır

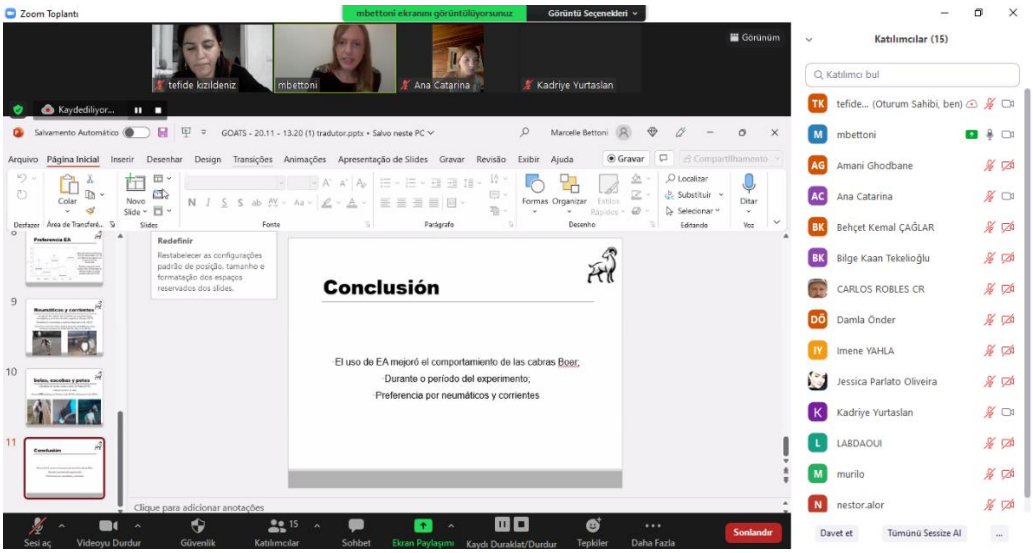

Zoom Toplantı
Ricardo Luna ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
Ricardo Luna
Behçet Kemal ÇAĞLAR
UNIVERSIDAD TÉCNICA DE COTOPAXI
Manejo de seis variedades de café (Coffea sp).
Katılımcılar (15)
Sonlandır

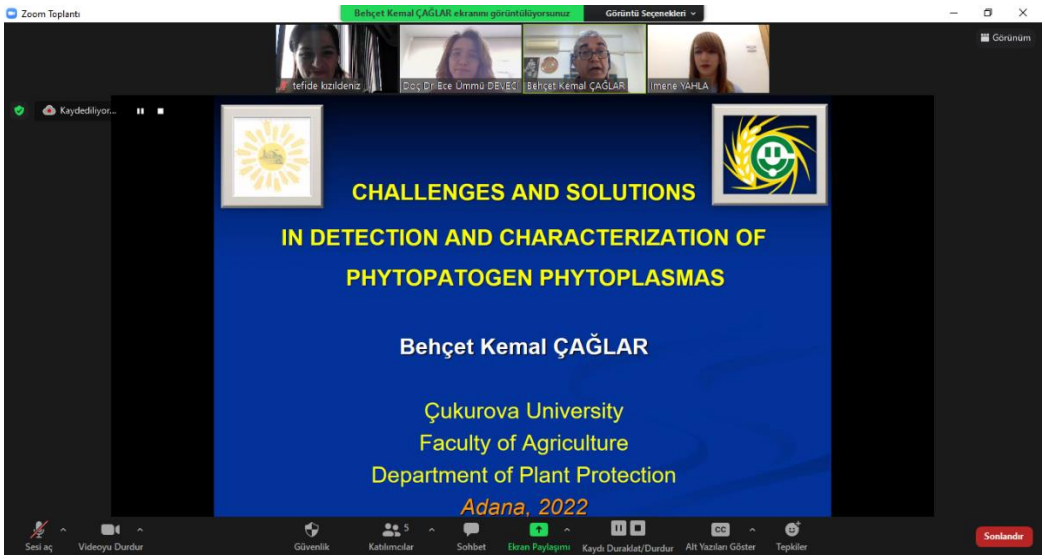


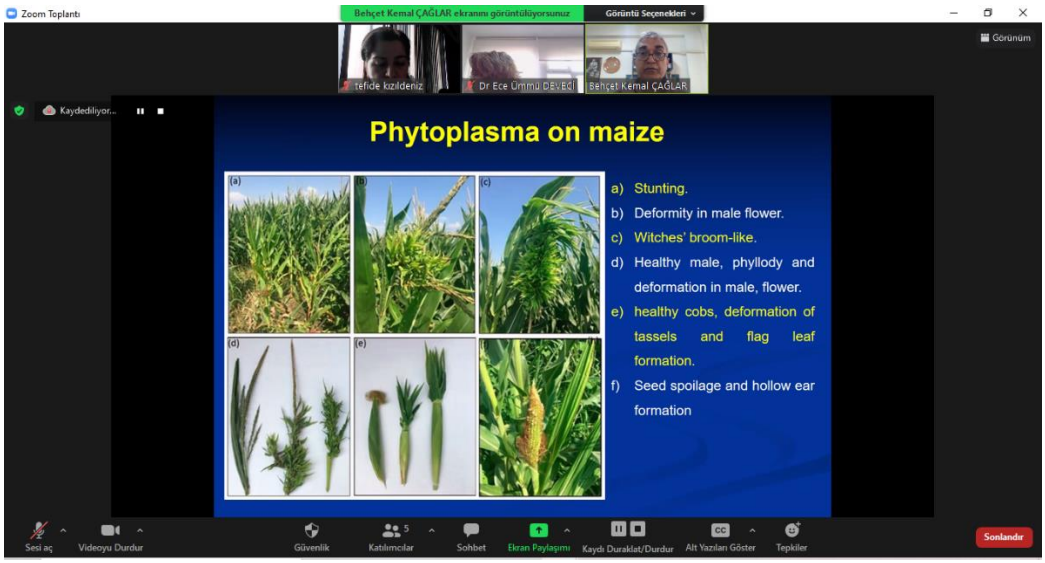
Descripción	Unidades	Lote 1	Lote 2	Lote 3
pH		5,76 Me. Ac	5,65 Me. Ac.	5,99 Me. Ac
CE ds/m		0,06 No salino	0,05 No salino	0,03 No salino
Materia orgánica	(%)	3,82 Medio	2,50 Bajo	3,43 Medio
NH4	ppm	18,70 Bajo	12,90 Bajo	19,99 Bajo
P	ppm	2,79 Bajo	2,19 Bajo	1,99 Bajo
K	meq/100ml	0,30 Medio	0,26 medio	0,10 Bajo
Ca	meq/100ml	2,00 Bajo	2,00 Bajo	2,00 Bajo
Mg	meq/100ml	0,45 Bajo	0,38 Bajo	0,44 Bajo
S	ppm	14,67 medio	25,31 Alto	14,67 Medio
Zn	ppm	1,20 Bajo	5,50 Medio	5,30 Medio
Cu	ppm	5,00 Alto	3,80 Medio	4,80 Alto
Fe	ppm	279,10 Alto	182,00 Alto	196,20 Alto
Mn	ppm	8,30 Medio	5,50 Medio	4,40 Bajo
B	ppm	0,24 Medio	0,26 Medio	0,45 Medio
Ca/Mg		4,44 Optimo	5,25 Alto	4,55 Optimo
Mg/K		1,50 Bajo	1,46 Bajo	4,40 Optimo
Ca+Mg/K		8,17 Bajo	9,15 Bajo	24,40 Optimo

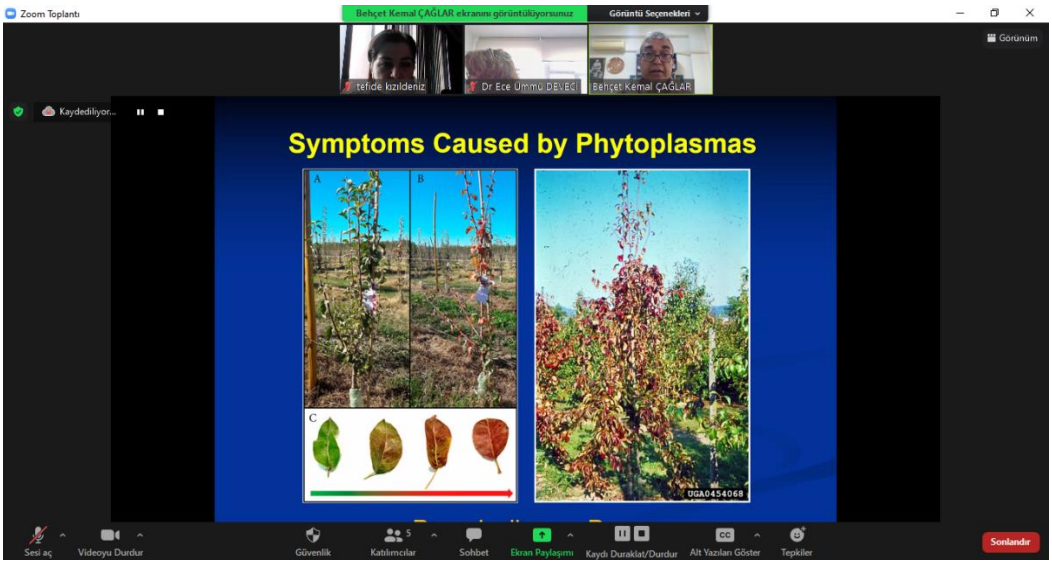
Fuente: Laboratorio de Análisis Químico Agropecuario 2021
Elaborado por: Pilaguano, M y Castillo, R. (2022)



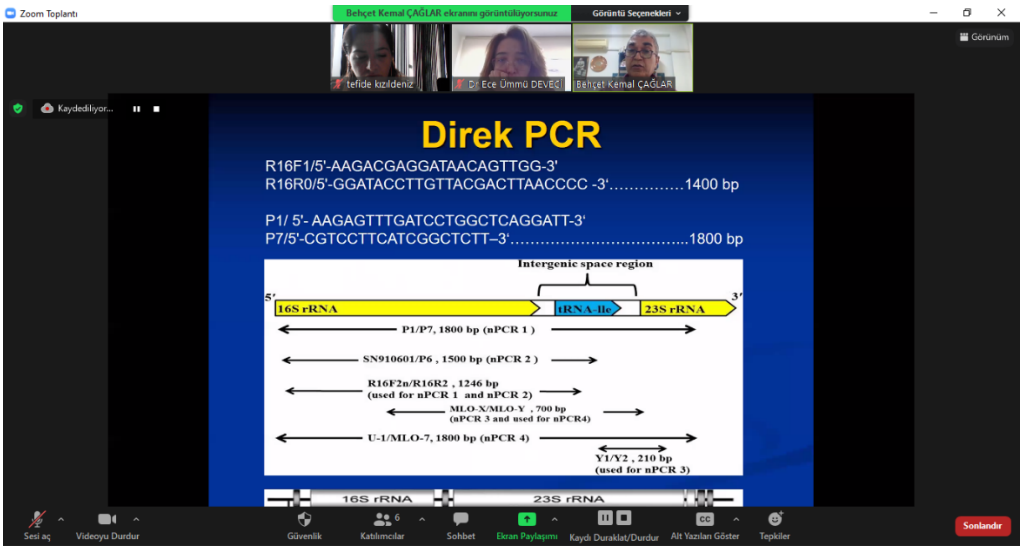


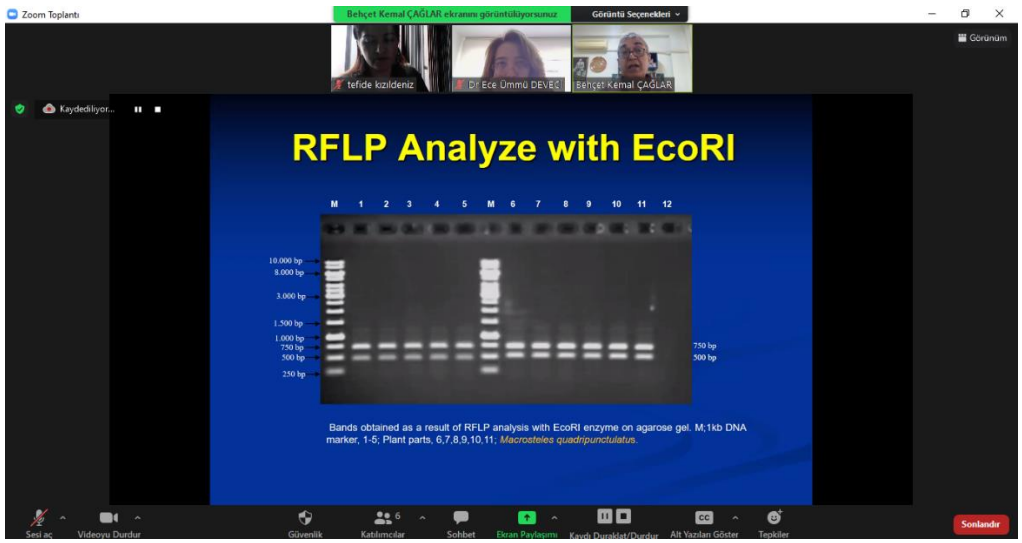

Zoom Toplantı
Behçet Kemal ÇAĞLAR ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Doç.Dr.Ece Ümmü DEVECİ
Behçet Kemal ÇAĞLAR
İmene YAHLA
Kaydediliyor...
CHALLENGES AND SOLUTIONS
IN DETECTION AND CHARACTERIZATION OF
PHYTOPATOGEN PHYTOPLASMAS
Behçet Kemal ÇAĞLAR
Çukurova University
Faculty of Agriculture
Department of Plant Protection
Adana, 2022
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır

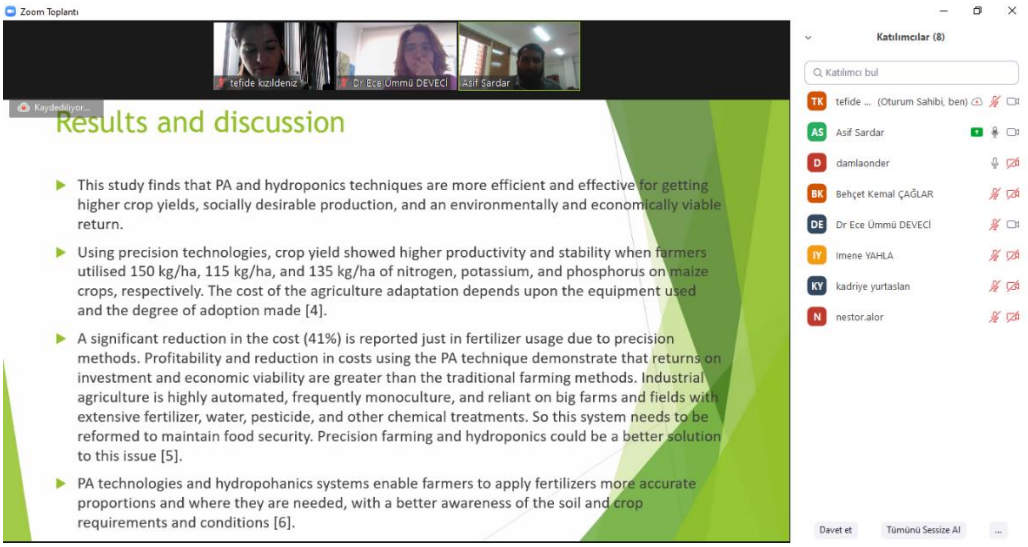

Zoom Toplantı
Behçet Kemal ÇAĞLAR ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Phytoplasma on maize
a) Stunting.
b) Deformity in male flower.
c) Witches' broom-like.
d) Healthy male, phyllody and deformation in male, flower.
e) healthy cobs, deformation of tassels and flag leaf formation.
f) Seed spoilage and hollow ear formation
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır

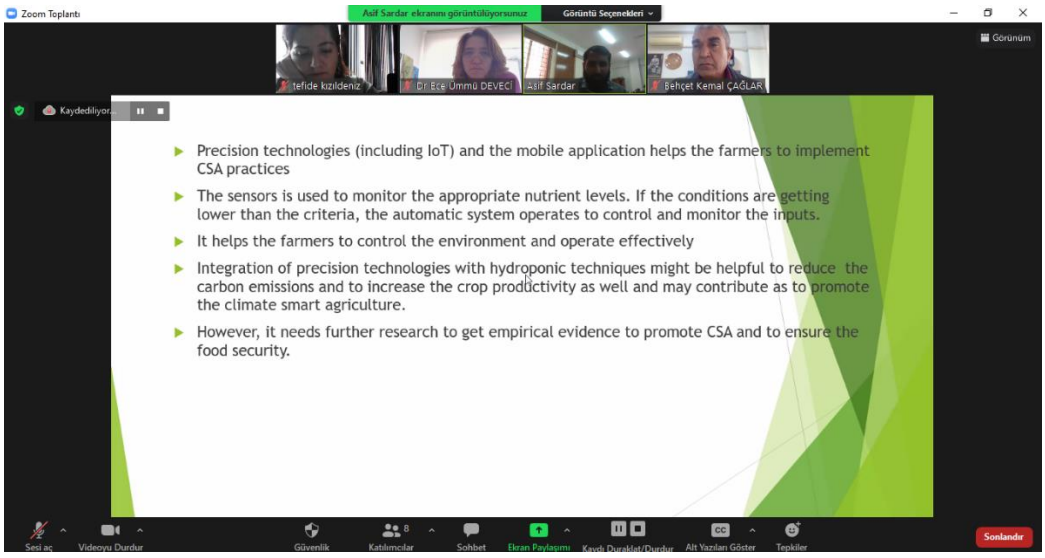

Zoom Toplantı
Behçet Kemal ÇAĞLAR ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Symptoms Caused by Phytoplasmas
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır

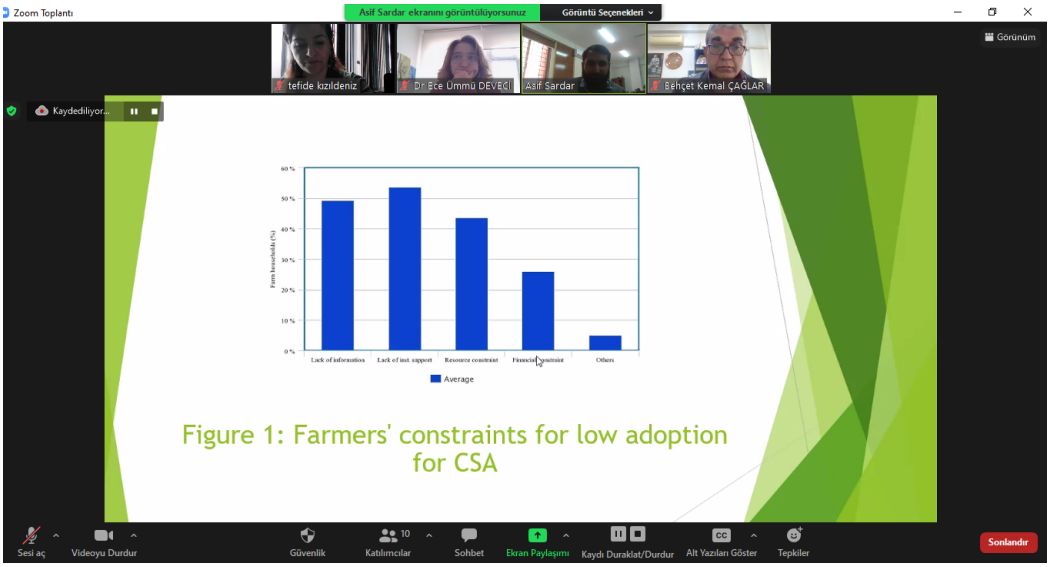

Zoom Toplantı
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Phytoplasma on Rose
Resim Türkiye
Katılımcılar (5)
tefide ... (Oturum Sahibi, ben)
Behçet Kemal ÇAĞLAR
İmene YAHLA
Dr Ece Ümmü DEVECİ
kadriye yurtaslan
Davet et
Tümünü Sessize Al

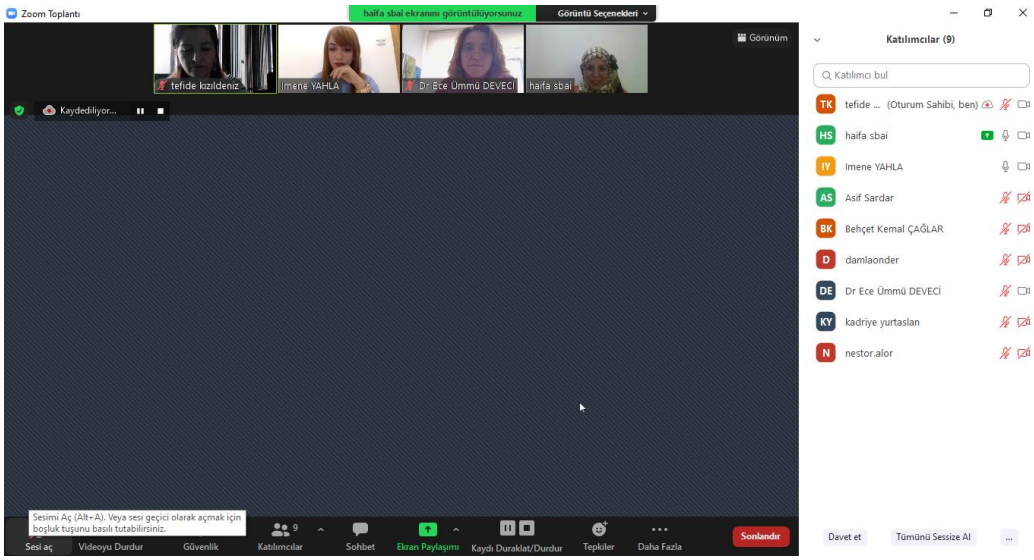

Zoom Toplantı
Behçet Kemal ÇAĞLAR ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Direk PCR
R16F1/5'-AAGACGAGGATAACAGTTGG-3'
R16R0/5'-GGATACCTTGTTACGACTTAACCCC -3'.....1400 bp
P1/ 5'- AAGAGTTTGATCCTGGCTCAGGATT-3'
P7/5'-CGTCCTTCATCGGCTCTT–3'.....1800 bp
Intergenic space region
5'
16S rRNA
tRNA-Ile
23S rRNA
3'
P1/P7, 1800 bp (nPCR 1)
SN910601/P6 , 1500 bp (nPCR 2)
R16F2n/R16R2 , 1246 bp
(used for nPCR 1 and nPCR 2)
MLO-X/MLO-Y , 700 bp
(nPCR 3 and used for nPCR4)
U-1/MLO-7, 1800 bp (nPCR 4)
Y1/Y2 , 210 bp
(used for nPCR 3)
16S rRNA
23S rRNA
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır

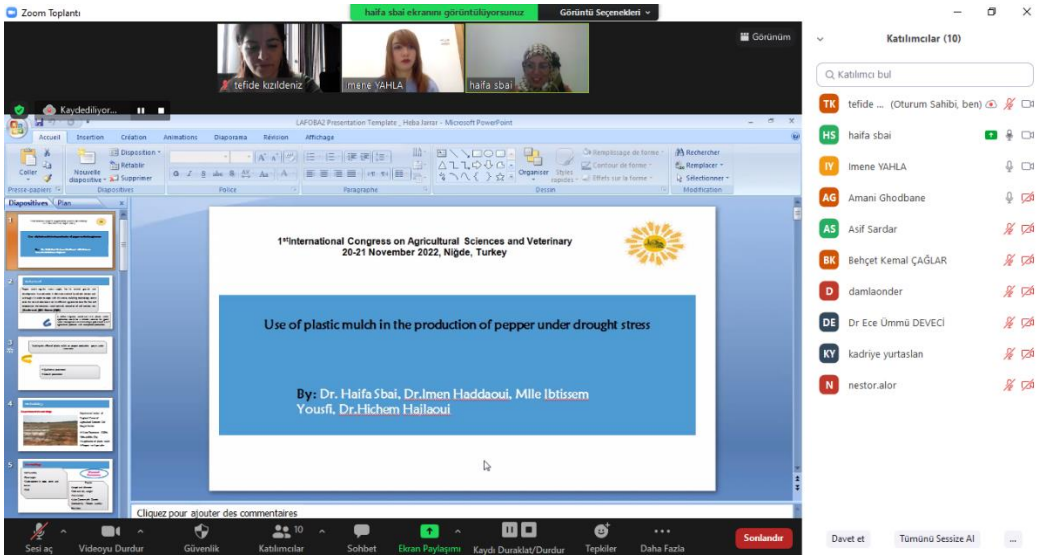

Zoom Toplantı
Behçet Kemal ÇAĞLAR ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Behçet Kemal ÇAĞLAR
Kaydediliyor...
RFLP Analyze with EcoRI
M 1 2 3 4 5 M 6 7 8 9 10 11 12
10.000 bp
8.000 bp
3.000 bp
1.500 bp
1.000 bp
750 bp
500 bp
250 bp
750 bp
500 bp
Bands obtained as a result of RFLP analysis with EcoRI enzyme on agarose gel. M;1kb DNA marker, 1-5; Plant parts, 6,7,8,9,10,11; Macrosteles quadripunctulatus.
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır


Zoom Toplantı
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Asif Sardar
Kaydediliyor...
Results and discussion
This study finds that PA and hydroponics techniques are more efficient and effective for getting higher crop yields, socially desirable production, and an environmentally and economically viable return.
Using precision technologies, crop yield showed higher productivity and stability when farmers utilised 150 kg/ha, 115 kg/ha, and 135 kg/ha of nitrogen, potassium, and phosphorus on maize crops, respectively. The cost of the agriculture adaptation depends upon the equipment used and the degree of adoption made [4].
A significant reduction in the cost (41%) is reported just in fertilizer usage due to precision methods. Profitability and reduction in costs using the PA technique demonstrate that returns on investment and economic viability are greater than the traditional farming methods. Industrial agriculture is highly automated, frequently monoculture, and reliant on big farms and fields with extensive fertilizer, water, pesticide, and other chemical treatments. So this system needs to be reformed to maintain food security. Precision farming and hydroponics could be a better solution to this issue [5].
PA technologies and hydropohanics systems enable farmers to apply fertilizers more accurate proportions and where they are needed, with a better awareness of the soil and crop requirements and conditions [6].
Katılımcılar (8)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
Asif Sardar
damlaonder
Behçet Kemal ÇAĞLAR
Dr Ece Ümmü DEVECİ
İmene YAHLA
kadriye yurtaslan
nestor.alor
Davet et
Tümünü Sessize Al


Zoom Toplantı
Asif Sardar ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Asif Sardar
Behçet Kemal ÇAĞLAR
Kaydediliyor...
Precision technologies (including IoT) and the mobile application helps the farmers to implement CSA practices
The sensors is used to monitor the appropriate nutrient levels. If the conditions are getting lower than the criteria, the automatic system operates to control and monitor the inputs.
It helps the farmers to control the environment and operate effectively
Integration of precision technologies with hydroponic techniques might be helpful to reduce the carbon emissions and to increase the crop productivity as well and may contribute as to promote the climate smart agriculture.
However, it needs further research to get empirical evidence to promote CSA and to ensure the food security.
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır


Zoom Toplantı
Asif Sardar ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Görünüm
tefide kızıldeniz
Dr Ece Ümmü DEVECİ
Asif Sardar
Behçet Kemal ÇAĞLAR
Kaydediliyor...
60 %
50 %
40 %
30 %
20 %
10 %
0 %
Lack of information
Lack of inst. support
Resource constraint
Financial constraint
Others
Average
Figure 1: Farmers' constraints for low adoption for CSA
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır


Zoom Toplantı
haifa sbai ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
Imene YAHLA
Dr Ece Ümmü DEVECİ
haifa sbai
Kaydediliyor...
Katılımcılar (9)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
haifa sbai
Imene YAHLA
Asif Sardar
Behçet Kemal ÇAĞLAR
damlaonder
Dr Ece Ümmü DEVECİ
kadriye yurtaslan
nestor.alor
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır
Davet et
Tümünü Sessize Al


Zoom Toplantı
haifa sbai ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kizildeniz
imene YAHLA
haifa sbai
Kaydediliyor...
Katılımcılar (10)
1st International Congress on Agricultural Sciences and Veterinary
20-21 November 2022, Niğde, Turkey
Use of plastic mulch in the production of pepper under drought stress
By: Dr. Haifa Sbai, Dr.Imen Haddaoui, Mlle Ibtissem Yousfi, Dr.Hichem Hajlaoui
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Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
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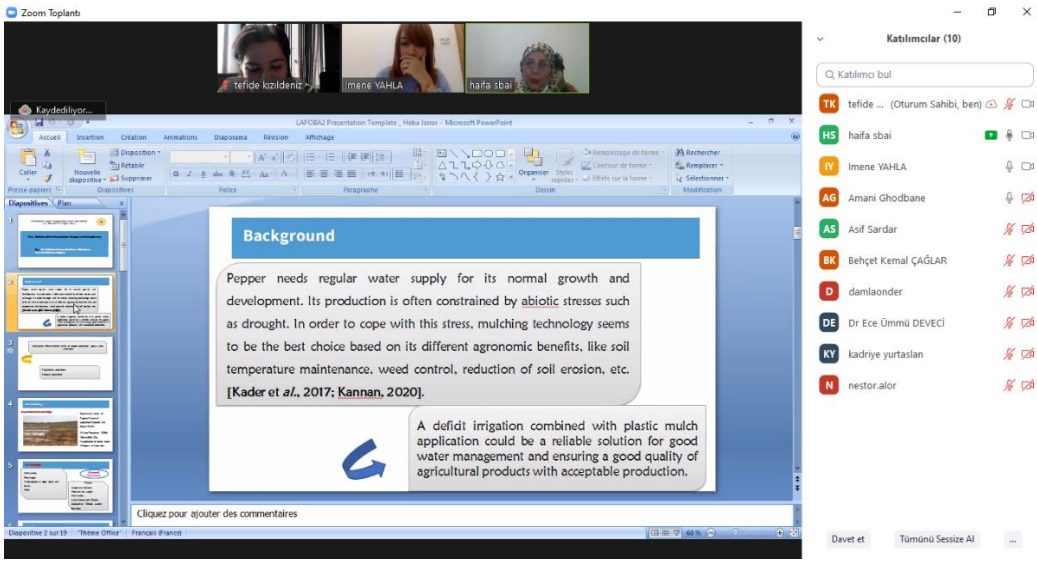
Tepkiler
Daha Fazla
Sonlandır
Davet et
Tümünü Sessize Al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haifa sbai
Kaydediliyor...
Katılımcılar (10)
Background
Pepper needs regular water supply for its normal growth and development. Its production is often constrained by abiotic stresses such as drought. In order to cope with this stress, mulching technology seems to be the best choice based on its different agronomic benefits, like soil temperature maintenance, weed control, reduction of soil erosion, etc. [Kader et al., 2017; Kannan, 2020].
A deficit irrigation combined with plastic mulch application could be a reliable solution for good water management and ensuring a good quality of agricultural products with acceptable production.
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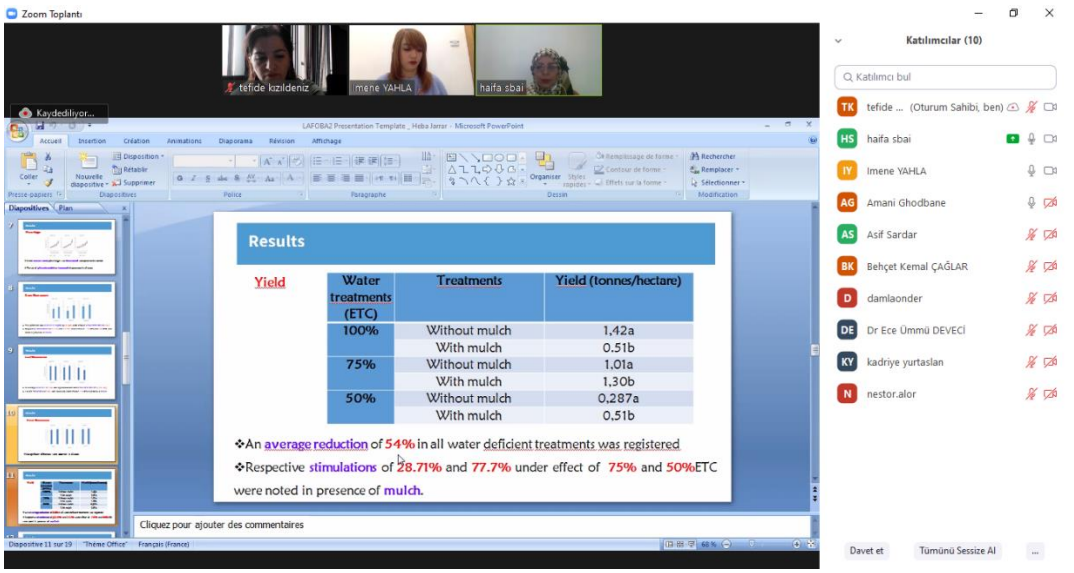
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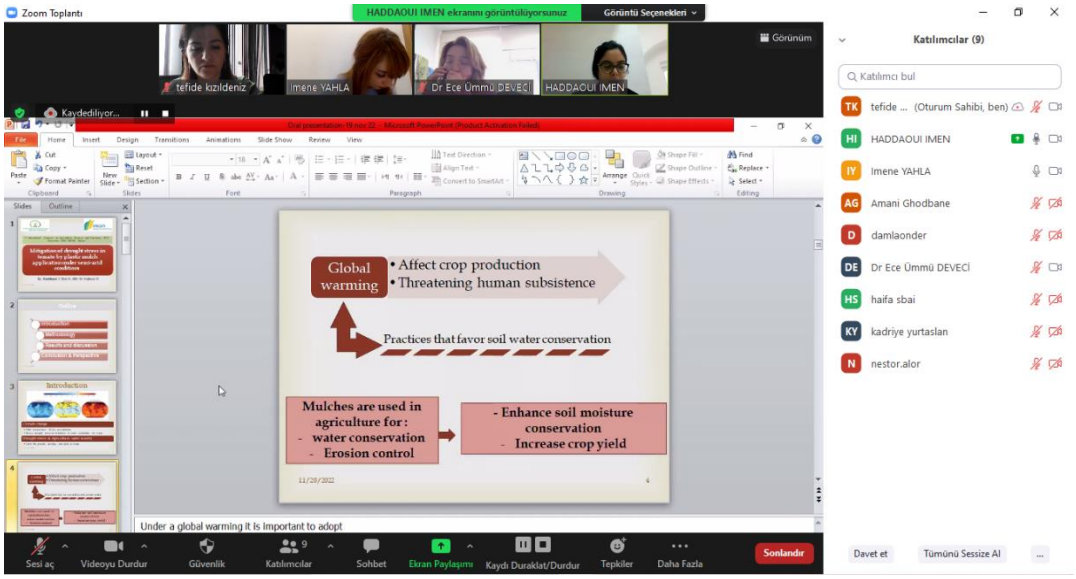
haifa sbai
Katılımcılar (10)
Results
Yield
Water treatments (ETC)
Treatments
Yield (tonnes/hectare)
100%
Without mulch
1,42a
With mulch
0.51b
75%
Without mulch
1,01a
With mulch
1,30b
50%
Without mulch
0,287a
With mulch
0,51b
An average reduction of 54% in all water deficient treatments was registered
Respective stimulations of 28.71% and 77.7% under effect of 75% and 50%ETC were noted in presence of mulch.
Cliquez pour ajouter des commentaires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HADDAOUI IMEN ekranını görüntülüyorsunuz
Görüntü Seçenekleri
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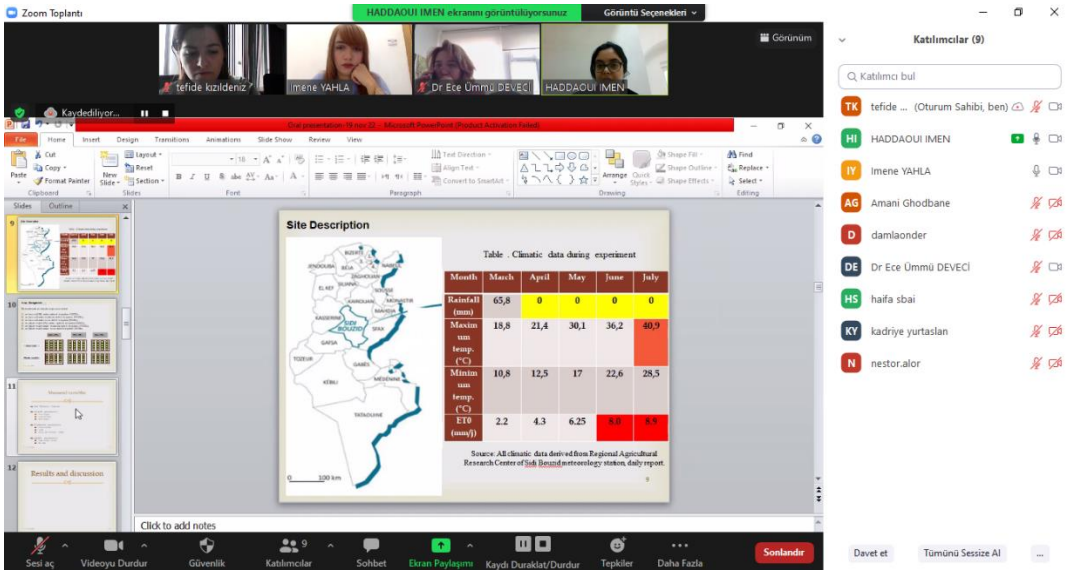
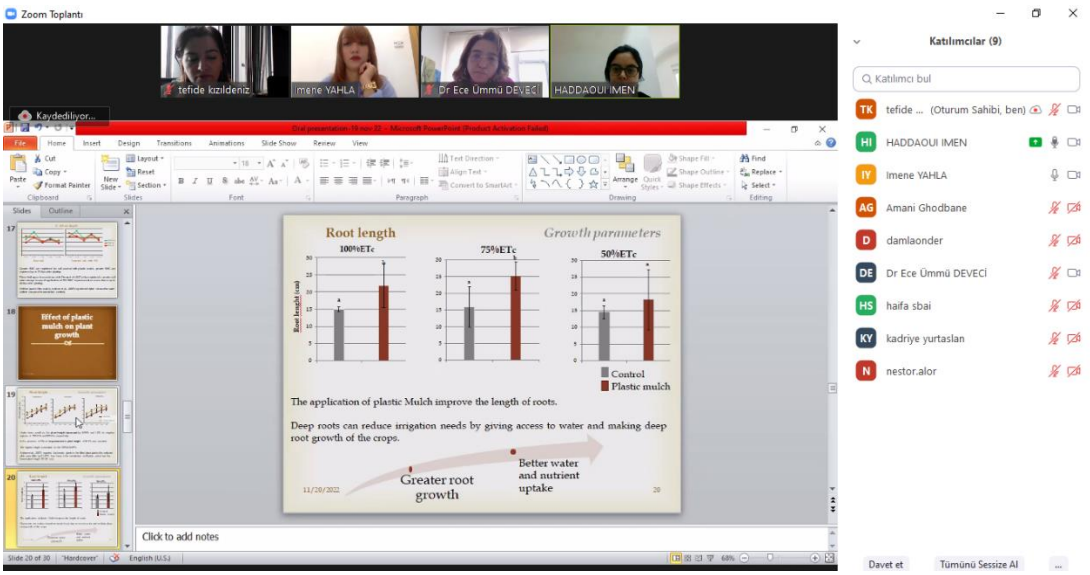
Dr Ece Ümmü DEVECİ
HADDAOUI IMEN
Katılımcılar (9)
Global warming
• Affect crop production
• Threatening human subsistence
Practices that favor soil water conservation
Mulches are used in agriculture for :
- water conservation
- Erosion control
- Enhance soil moisture conservation
- Increase crop yield
Under a global warming it is important to adopt
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır


Zoom Toplantı
HADDAOUI IMEN ekranını görüntülüyorsunuz
Görüntü Seçenekleri
Katılımcılar (9)
Site Description
Table . Climatic data during experiment
Month
March
April
May
June
July
Rainfall (mm)
65,8
0
0
0
0
Maximum temp. (°C)
18,8
21,4
30,1
36,2
40,9
Minimum temp. (°C)
10,8
12,5
17
22,6
28,5
ET0 (mm/j)
2.2
4.3
6.25
8.0
8.9
Source: All climatic data derived from Regional Agricultural Research Center of Sidi Bouzid meteorology station, daily report.
Click to add notes
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Tepkiler
Daha Fazla
Sonlandır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imene YAHLA
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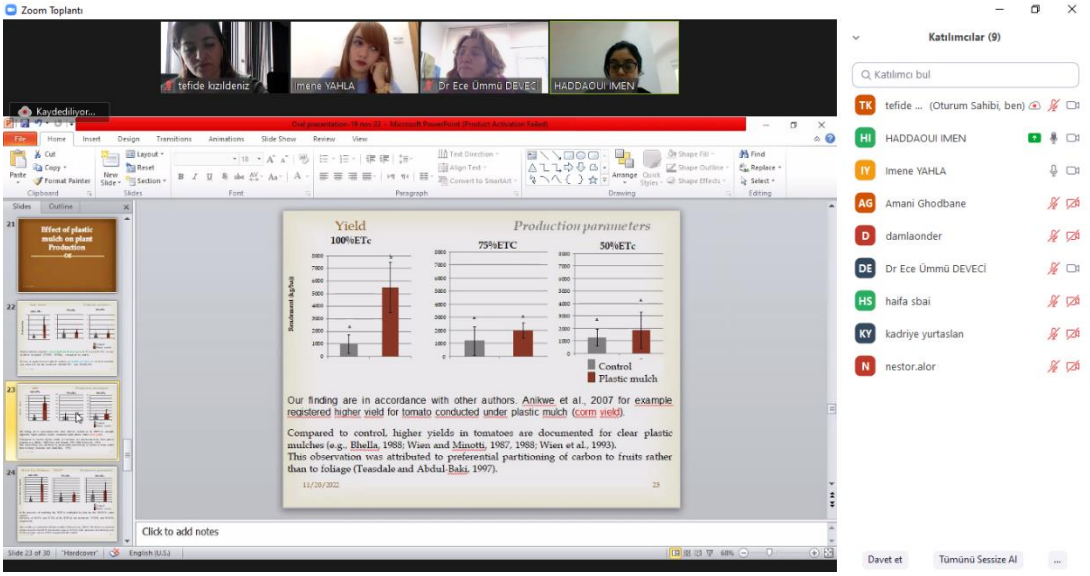
HADDAOUI IMEN
Katılımcılar (9)
Root length
Growth parameters
100%ETc
75%ETc
50%ETc
Control
Plastic mulch
The application of plastic Mulch improve the length of roots.
Deep roots can reduce irrigation needs by giving access to water and making deep root growth of the crops.
Greater root growth
Better water and nutrient uptake
Click to add notes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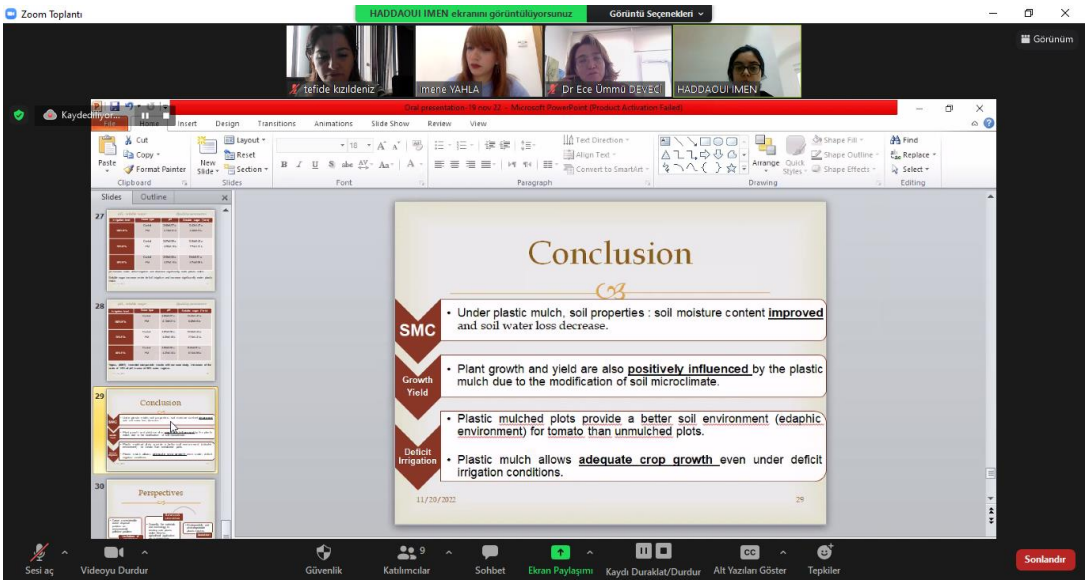
Katılımcılar (9)
Yield
Production parameters
100%ETc
75%ETC
50%ETc
Control
Plastic mulch
Our finding are in accordance with other authors. Anikwe et al., 2007 for example registered higher yield for tomato conducted under plastic mulch (corn yield).
Compared to control, higher yields in tomatoes are documented for clear plastic mulches (e.g., Bhella, 1988; Wien and Minotti, 1987, 1988; Wien et al., 1993).
This observation was attributed to preferential partitioning of carbon to fruits rather than to foliage (Teasdale and Abdul-Baki, 1997).
Click to add notes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HADDAOUI IMEN ekranını görüntülüyorsunuz
Görüntü Seçenekleri
tefide kızıldeniz
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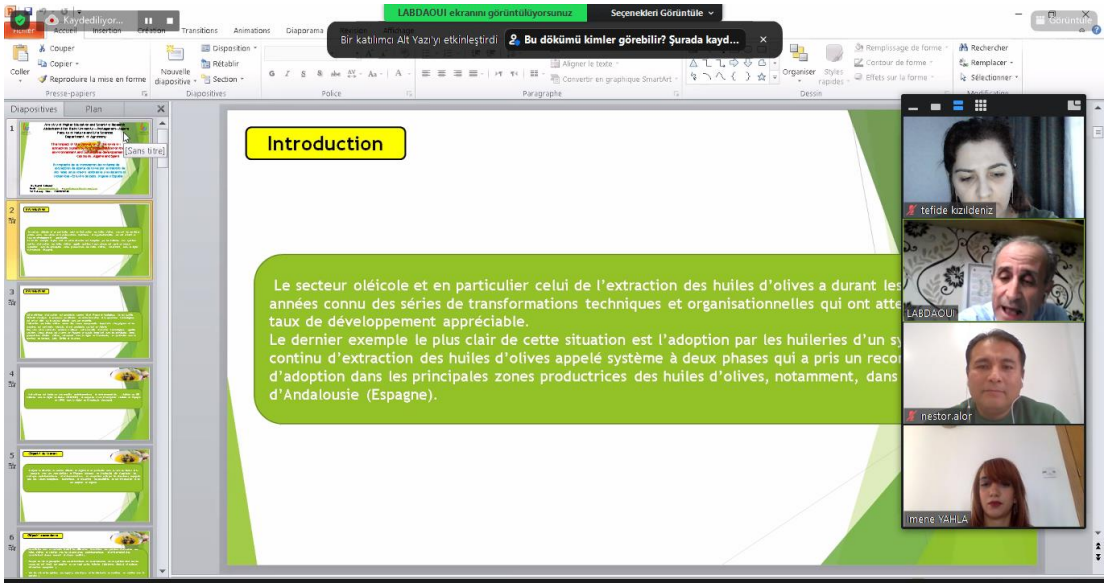
HADDAOUI IMEN
Conclusion
SMC
Under plastic mulch, soil properties : soil moisture content improved and soil water loss decrease.
Growth Yield
Plant growth and yield are also positively influenced by the plastic mulch due to the modification of soil microclimate.
Deficit Irrigation
Plastic mulched plots provide a better soil environment (edaphic environment) for tomato than unmulched plots.
Plastic mulch allows adequate crop growth even under deficit irrigation conditions.
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Sohbet
Ekran Paylaşımı
Kaydı Duraklat/Durdur
Alt Yazıları Göster
Tepkiler
Sonlandır


Introduction
Le secteur oléicole et en particulier celui de l'extraction des huiles d'olives a durant les
années connu des séries de transformations techniques et organisationnelles qui ont atte
taux de développement appréciable.
Le dernier exemple le plus clair de cette situation est l'adoption par les huileries d'un s
continu d'extraction des huiles d'olives appelé système à deux phases qui a pris un reco
d'adoption dans les principales zones productrices des huiles d'olives, notamment, dans
d'Andalousie (Espagne).
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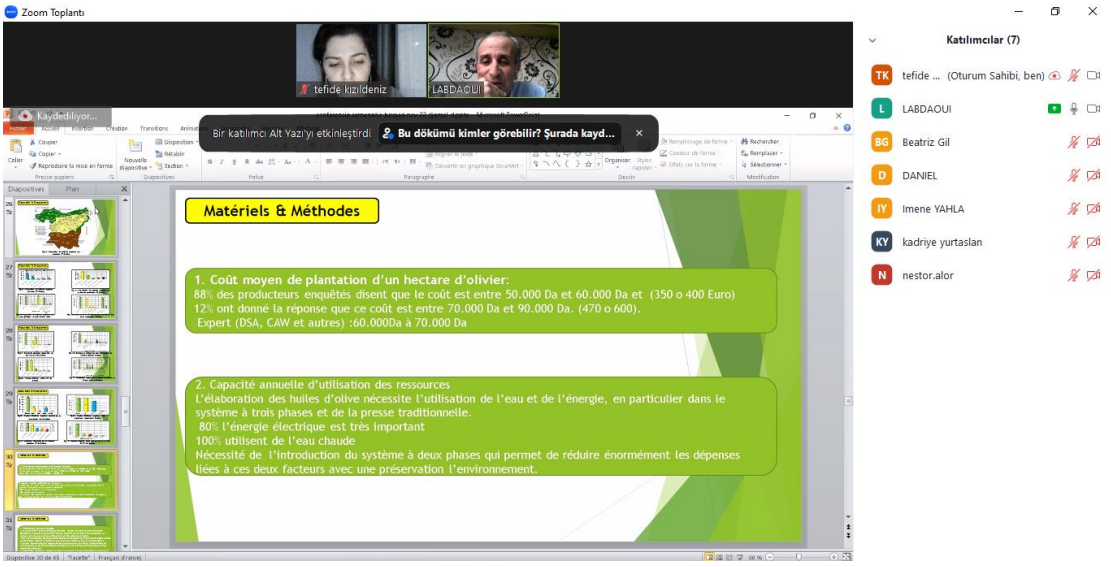
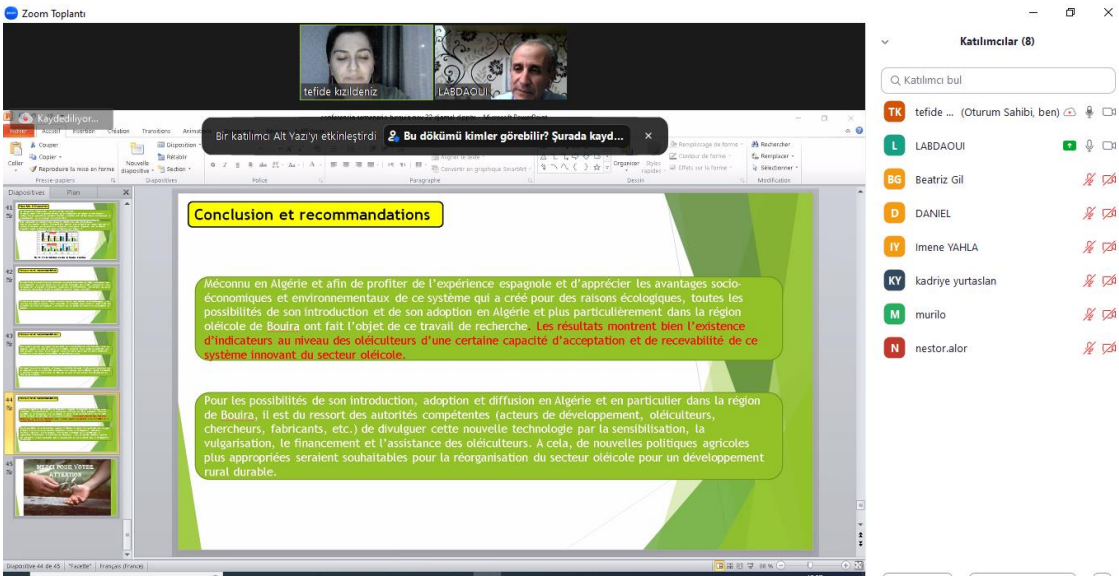
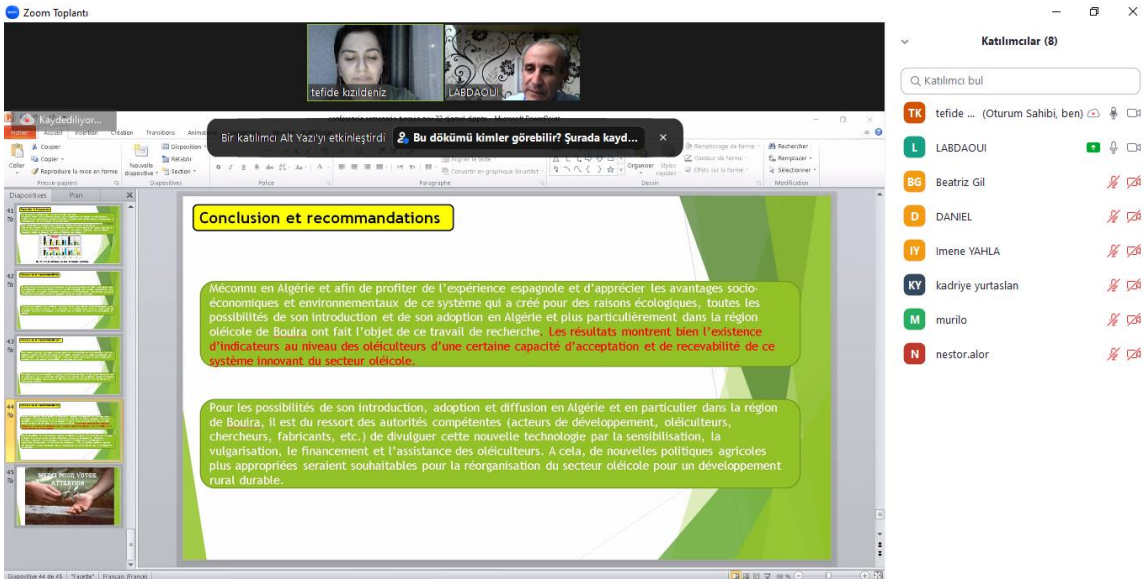

Zoom Toplantı
Katılımcılar (7)
Matériels & Méthodes
1. Coût moyen de plantation d'un hectare d'olivier:
88% des producteurs enquêtés disent que le coût est entre 50.000 Da et 60.000 Da et (350 o 400 Euro)
12% ont donné la réponse que ce coût est entre 70.000 Da et 90.000 Da. (470 o 600).
Expert (DSA, CAW et autres) :60.000Da à 70.000 Da
2. Capacité annuelle d'utilisation des ressources
L'élaboration des huiles d'olive nécessite l'utilisation de l'eau et de l'énergie, en particulier dans le
système à trois phases et de la presse traditionnelle.
80% l'énergie électrique est très important
100% utilisent de l'eau chaude
Nécessité de l'introduction du système à deux phases qui permet de réduire énormément les dépenses
liées à ces deux facteurs avec une préservation l'environnement.


Zoom Toplantı
Katılımcılar (8)
Conclusion et recommandations
Méconnu en Algérie et afin de profiter de l'expérience espagnole et d'apprécier les avantages socio-
économiques et environnementaux de ce système qui a créé pour des raisons écologiques, toutes les
possibilités de son introduction et de son adoption en Algérie et plus particulièrement dans la région
oléicole de Bouira ont fait l'objet de ce travail de recherche. Les résultats montrent bien l'existence
d'indicateurs au niveau des oléiculteurs d'une certaine capacité d'acceptation et de recevabilité de ce
système innovant du secteur oléicole.
Pour les possibilités de son introduction, adoption et diffusion en Algérie et en particulier dans la région
de Bouira, il est du ressort des autorités compétentes (acteurs de développement, oléiculteurs,
chercheurs, fabricants, etc.) de divulguer cette nouvelle technologie par la sensibilisation, la
vulgarisation, le financement et l'assistance des oléiculteurs. A cela, de nouvelles politiques agricoles
plus appropriées seraient souhaitables pour la réorganisation du secteur oléicole pour un développement
rural durable.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Katılımcılar (8)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
LABDAOUI
Beatriz Gil
DANIEL
Imene YAHLA
kadriye yurtaslan
murilo
nestor.alor
Bir katılımcı Alt Yazı'yı etkinleştirdi
Bu dökümü kimler görebilir? Şurada kayd...
Conclusion et recommandations
Méconnu en Algérie et afin de profiter de l'expérience espagnole et d'apprécier les avantages socio-économiques et environnementaux de ce système qui a créé pour des raisons écologiques, toutes les possibilités de son introduction et de son adoption en Algérie et plus particulièrement dans la région oléicole de Bouira ont fait l'objet de ce travail de recherche. Les résultats montrent bien l'existence d'indicateurs au niveau des oléiculteurs d'une certaine capacité d'acceptation et de recevabilité de ce système innovant du secteur oléicole.
Pour les possibilités de son introduction, adoption et diffusion en Algérie et en particulier dans la région de Bouira, il est du ressort des autorités compétentes (acteurs de développement, oléiculteurs, chercheurs, fabricants, etc.) de divulguer cette nouvelle technologie par la sensibilisation, la vulgarisation, le financement et l'assistance des oléiculteurs. A cela, de nouvelles politiques agricoles plus appropriées seraient souhaitables pour la réorganisation du secteur oléicole pour un développement rural durable.


Zoom Toplantı
nestor.alor ekranını görüntülüyorsunuz
Seçenekleri Görüntüle
Görüntüle
tefide kizildeniz
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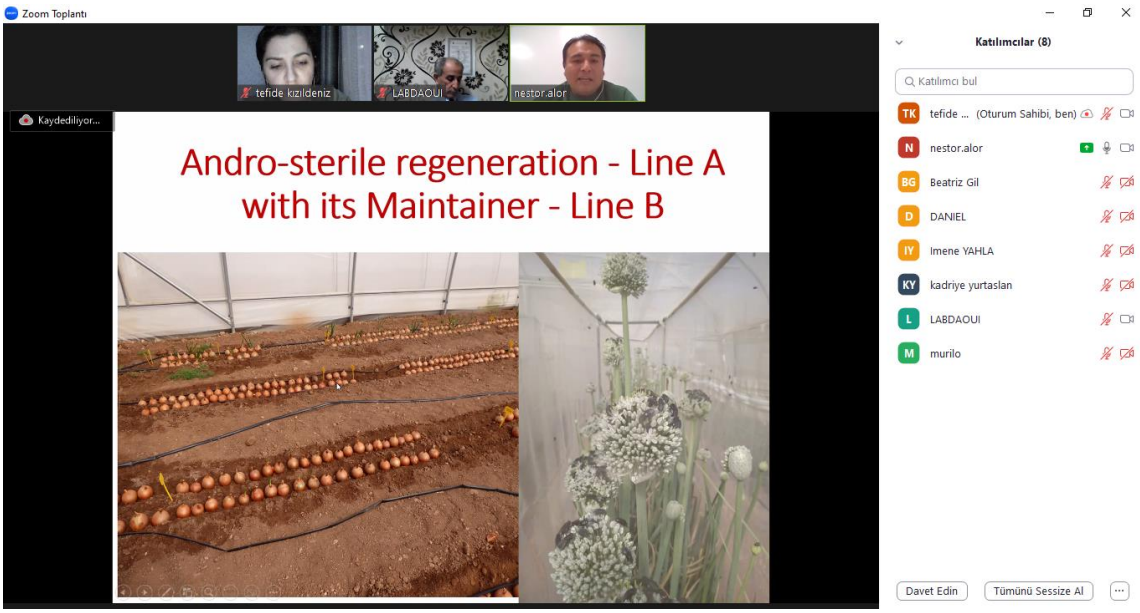
Katılımcılar (8)
Katılımcı bul
Hybrid seed development of onion (Allium cepa L.) through the use of male sterility and maintainer lines
Introduction
Onion is a global cultivated species and offers us the possibility of taking advantage of heterosis and hybrid vigor to increase productivity.
Current onion breeding programmes are developing hybrids with the male-sterile cytoplasm S, which interacts with a fertility restoring nuclear gen-Ms (Jones and Clarke, 1943). After the discovery of the cytoplasmic male sterility gene, onion is being produced worldwide in both long-day and short-day varieties.
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Ekran Paylaşımı
Reaksiyonlar
Uygulamalar
Beyaz Tahtalar
Daha fazla
Sonlandır
Davet Edin
Tümünü Sessize Al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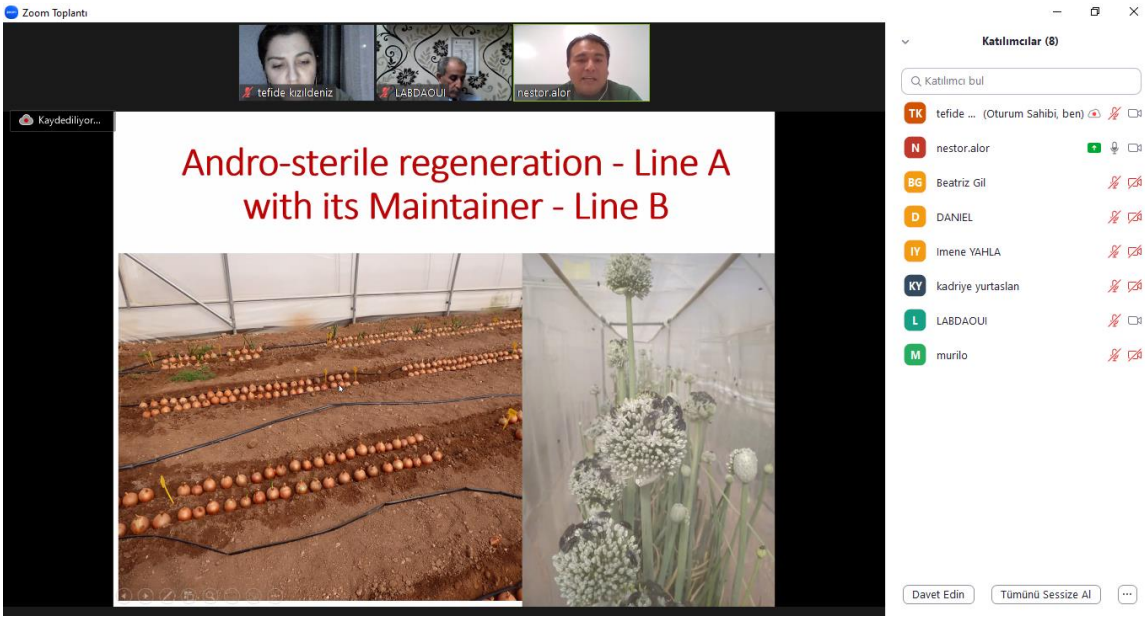
Katılımcılar (8)
Katılımcı bul
Andro-sterile regeneration - Line A with its Maintainer - Line B
Davet Edin
Tümünü Sessize Al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Kaydediliyor...
Andro-sterile regeneration - Line A
with its Maintainer - Line B
Katılımcılar (8)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
nestor.alor
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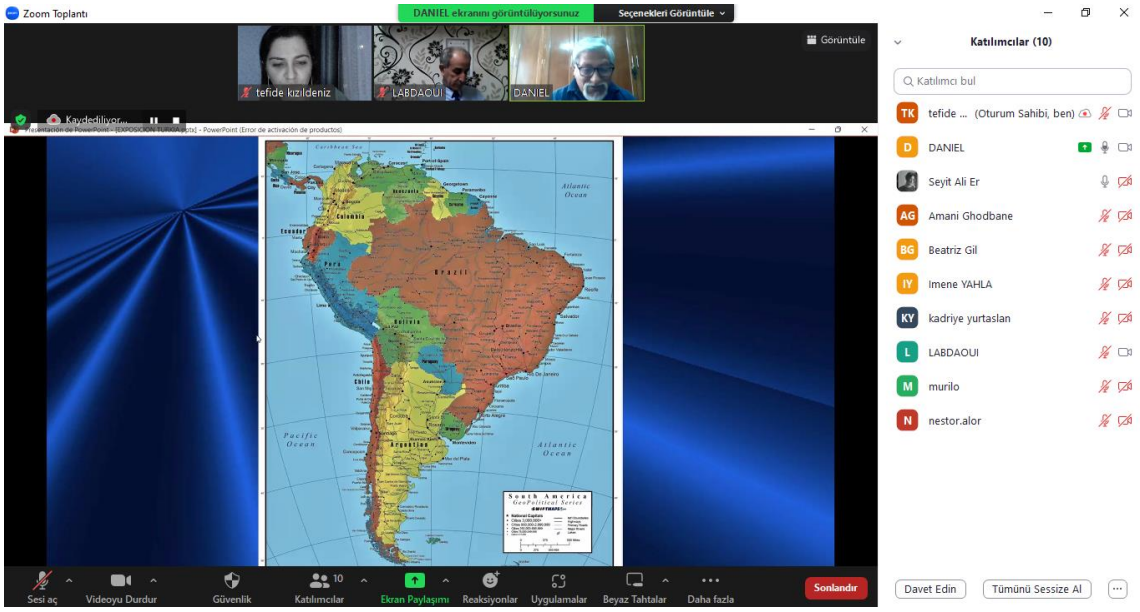
kadriye yurtaslan
LABDAOUI
murilo
Davet Edin
Tümünü Sessize Al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Seçenekleri Görüntüle
Görüntüle
tefide kizildeniz
LABDAOUI
DANIEL
Katılımcılar (10)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
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Videoyu Durdur
Güvenlik
Katılımcılar
Ekran Paylaşımı
Reaksiyonlar
Uygulamalar
Beyaz Tahtalar
Daha fazla
Sonlandır
Davet Edin
Tümünü Sessize Al


Zoom Toplantı
DANIEL ekranını görüntülüyorsunuz
Seçenekleri Görüntüle
Görüntüle
tefide kizildeniz
LABDAOUI
DANIEL
UNIVERSIDAD NACIONAL JORGE BASADRE GROHMANN DE TACNA
Proyecto de Investigación:
"USO DE LA BIOTECNOLOGÍA PARA EL MEJORAMIENTO GENÉTICO Y DESARROLLO DE CAPACIDADES EN EL MANEJO DE ALPACAS (Vicugna pacos) EN LA ZONA ALTO ANDINA DE TACNA
TEMA: "CARACTERIZACIÓN DE LA POBLACION DE ALPACAS DE LA COMUNIDAD DE MAURE DE LA PROVINCIA DE TARATA- REGION TACNA"
Katılımcılar (10)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
DANIEL
Seyit Ali Er
Amani Ghodbane
Beatriz Gil
Imene YAHLA
kadriye yurtaslan
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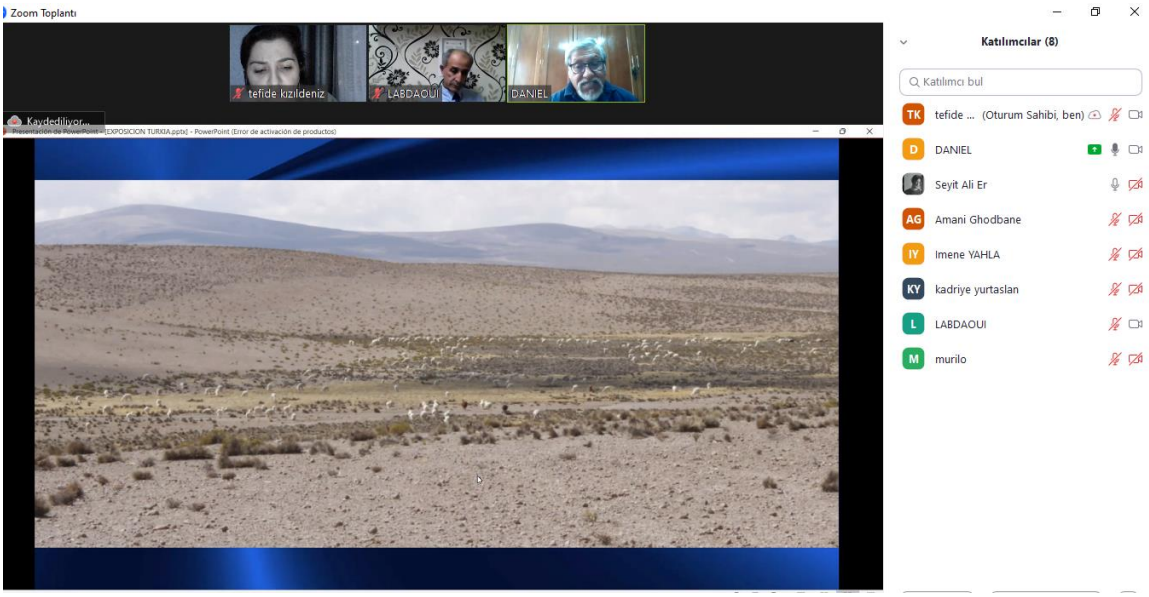
Sesi aç
Videoyu Durdur
Güvenlik
Katılımcılar
Ekran Paylaşımı
Reaksiyonlar
Uygulamalar
Beyaz Tahtalar
Daha fazla
Sonlandır
Davet Edin
Tümünü Sessize Al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Katılımcılar (8)
Katılımcı bul
tefide ... (Oturum Sahibi, ben)
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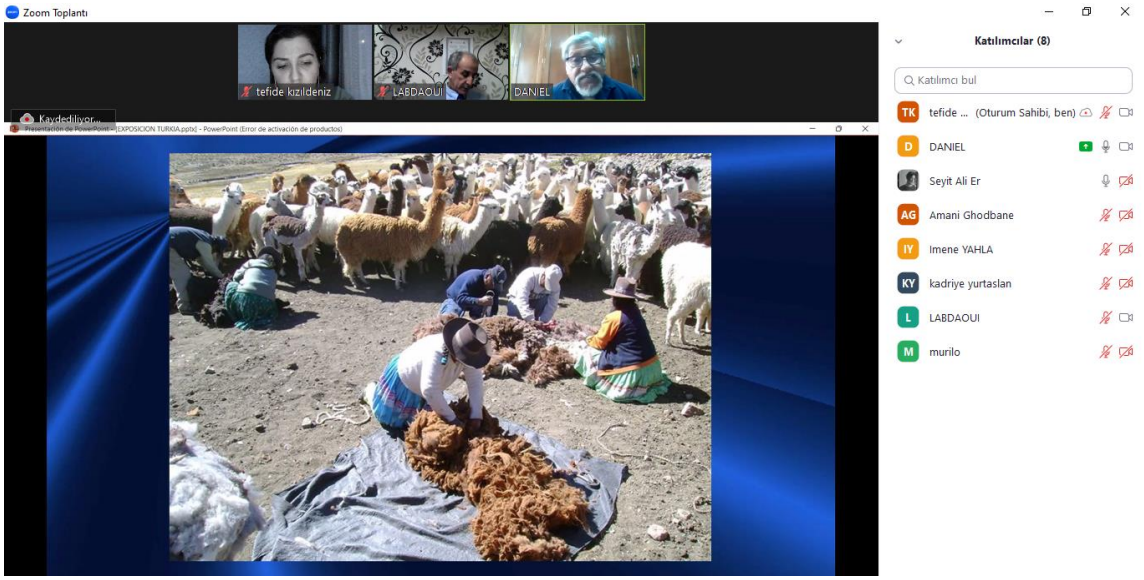
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Katılımcılar (8)
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tefide ... (Oturum Sahibi, ben)
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Seyit Ali Er
Amani Ghodbane
Imene YAHLA
kadriye yurtaslan
LABDAOUI
murilo

CONGRESS PROGRAM

PLENARY SESSION

20.11.2022 SUNDAY / Session-1

Turkey Time (GMT+3:00) İSTANBUL: 09.00-10.35

Zoom ID: / Passcode:

https://us06web.zoom.us/j/81540455361?pwd=ZEh4UU56VEY1c0p2Tkl6Z0VhWFpZQT09

ID: 815 4045 5361

Password: 421540

HEAD OF SESSION: Dr. Anas Al Kaddour (The UK) Taseer Ahmad (PAKISTAN)			
Time	**Authors**	**Affiliation**	**Presentation title**
09.00-09.15	Dr. Sigfrido ROMEO	Food and Agriculture Organization of the United Nations Subregional Office for the Pacific Islands (FAO SAP)	Agricultural practices in Samoa Island: Samoa Food Systems Pathway 2030. Transforming food systems for a resilient and healthy Samoa where no one is left behind
09.20-09.35	Dr. Bilge Kaan TEKELİOĞLU	Ceyhan Faculty of Veterinary Medicine, Çukurova University, TURKEY	Disasters, Animal Health & Veterinary Services
09.40-09.55	Ulviye KUMOVA Melis ÇELIK GÜNEY G. Tamer KAYAALP	Department of Animal Science, Faculty of Agriculture, University of Cukurova, Adana 01330, TURKEY	Investigation of Colony Performance Characteristics of Queen Bees Obtained via Larva Transfer in Sustainable Beekeeping in the Mediterranean Region
10.00-10.15	Luziana HOXHA Kejsi ÇALLIKU	Agricultural University of Tirana, Faculty of Biotechnology and Food, Str. Pajsi Vodica, Koder Kamez, 1029, Tirana, ALBANIA	The role of biopreservation in improving the quality of some traditional fermented products of plant origin
10.20-10.35	Anas AL KADDOUR	University of South Wales, The UK	Economic Analyses of Potato Value Chain and Seed System in Northwest Syria

20.11.2022 SUNDAY / Session-2

Turkey Time (GMT+3:00) İSTANBUL: 10.40-12.00

Zoom ID: / Passcode:

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ID: 815 4045 5361

Password: 421540

HEAD OF SESSION: Dr. Thomas Parkinson (The UK) Muhammad Yasir Naeem (TURKEY)			
Time	**Authors**	**Affiliation**	**Presentation title**
10.40-10.55	Damla ÖNDER	Department of Biology, Faculty of Arts and Sciences, Suleyman Demirel University, Isparta, 32260, TURKEY	Antioxidant Variations during Flower Development of Rosa damascena
11.00-11.15	Bakhtiyar BABASHLI	National aviation academy, Aerospace Faculty, Aerospace Environmental Monitoring, Baku, AZERBAIJAN	Smart Farming Applications on Agriculture
11.20-11.35	Cevher ÖZDEN	Akdeniz University, Faculty of Engineering, Computer Engineering, Cukurova University, Faculty of Agriculture, Agricultural Economy, TURKEY	Convolutional Neural Networks for Time Series Analysis in Agriculture
11.40-11.55	Tefide KIZILDENİZ	Department of Biosystems Engineering, Faculty of Agricultural Sciences and Technologies, Niğde Ömer Halisdemir University, 51200, Niğde TURKEY	Possible minimization the process of producing seedlings from cuttings by temperature manipulation and stimulation of mycorrhizal root activity in hydroponic vertical farming systems

20.11.2022 SUNDAY / Session-3

Turkey Time (GMT+3:00) İSTANBUL: 13.00 - 14.35

Zoom ID: / Passcode:

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ID: 815 4045 5361

Password: 421540

HEAD OF SESSION: Muhammad Abbas Khan (PAKISTAN) Amani Ghodbane (GERMANY)			
Time	Authors	Affiliation	Presentation title
13.00-13.15	Imen HADDAOUI Haifa SBAI Marwa ALIBI Hichem HAJLAOUI	Regional Agricultural Research Centre of Sidi Bouzid, TUNISIA	Mitigation of drought stress in tomato by plastic mulch application under semi-arid conditions
13.20-13.35	Turana MAMMADOVA Resul SULEYMANOV	Azerbaijan State Agricultural University, AZERBAIJAN	Effect of two different condition on life table parameters of two-spotted spider mite (Tetranychus urticae Koch, 1836) on soybean (Glycine max L. Merr) variety Ezra
13.40-13.55	Muhammad Abbas Khan Muhammad Yasir Naeem Arshad Mehmood Malik Maria Fayyaz	National Center of Industrial Biotechnology, PMAS Arid Agriculture University Rawalpindi, PAKISTAN	A Critical Review on Health Promoting Benefits of Sana Makki (Senna Alexendrina)
14.00-14.15	Muhammad Abbas Khan Muhammad Yasir Naeem Arshad Mehmood Malik Maria Fayyaz	National Center of Industrial Biotechnology, PMAS Arid Agriculture University Rawalpindi, PAKISTAN	Medicinal Potential, Health Benefits and Bioactivity of Mentha piperita L. (Peppermint)
14.20-14.35	Funda ŞAHİN İlker POLAT Yusuf YANAR	Department of Plant Protection, Faculty of Agriculture, Tokat Gaziosmanpaşa University, Tokat, TURKEY	Efficacy of native Beauveria bassiana and Metarhizium brunneum isolates against the Colorado potato beetle, Leptinotarsa decemlineata (Say) (Coleoptera: Chrysomelidae)

20.11.2022 SUNDAY / Session-4

Turkey Time: 17.00-

Zoom ID: / Passcode:

https://us06web.zoom.us/j/81540455361?pwd=ZEh4UU56VEY1c0p2Tkl6Z0VhWFpZQT09

ID: 815 4045 5361

Password: 421540

HEAD OF SESSION: Dr. Tefide Kızıldeniz (TURKEY)			
Time	**Authors**	**Affiliation**	**Presentation title**
17.00-17.15	Francisco CONDORİ TİNTAYA Edwin Pino VARGAS Príncipe Tacora VILLEGAS	Universidad Nacional Jorge Basadre Grohmann, Tacna-PERÚ	Soil Loss Due to Water Erosion on Semi-Arid Slopes of the Cairani-Camilaca Sub-Basin
17.20-17.35	Carlos-ROBLES- ROJAS Ricardo Salazar DIAZ	Instituto Tecnologico de Costa Rica (ITCR-TEC) - Agrobusinnes-Agronegocios - Economia Agricola - Contabilidad Agropecuaria, COSTA RICA	Transforming the productive landscape of the Osa Peninsula, through the regenerative economy
17.40-17.55	Jéssica Regina Parlato de Oliveira Ana Catarina Ceccon Bonierski Tefide Kizildeniz Marcelle Michelotti Bettoni	Universidade Tuiuti do Paraná, Rua Sydnei Antonio Rangel Santos, 238, CEP 82.010-330, Curitiba, PR, BRAZIL	Biometrics Parameters of Plant Growth-Promoting Microorganisms in Forage White Oat Cultivation
18.00-18.15	Antonio Marzocchella	Department of Chemical Engineering, Materials and Industrial Production (DICMaPI) Universita degli Studi di Napoli Federico II, ITALY	Biotechnology Processes at the Bioprocess Engineering Laboratory of the Universita degli Studi di Napoli Federico II
18.20-18.35	Ricardo Augusto Luna MURILLO Luis Alberto Godoy MONTIEL Ana Lucia Espinoza CORONEL Maria Julieta Cedeño ARISTEGA Kleber Augusto Espinosa CUNUHAY	Universidad Técnica de Cotopaxi, Extensión La Maná Coordinación de la Unidad de Investigación Ave. Los Almendros y Pujili, ECUADOR	Agronomic response of six varieties of robusta coffee (*Coffea canephora*) with fertilization

19.20-19.35	Ana Catarina Ceccon Bonierski Jéssica Regina Parlato de Oliveira Lígia Valéria do Nascimento Marcelle Michelotti Bettoni	Universidade Tuiuti do Paraná, Rua Sydnei Antonio Rangel Santos, 238, CEP 82.010-330, Curitiba, PR, BRAZIL	Preferences Boer Female Goats for Environmental Enrichment Objects
19.40-19.55	Marcelle Michelotti Bettoni Jéssica Regina Parlato de Oliveira João Victor Wojcik Ana Catarina Ceccon Bonierski Tefide Kizildeniz	Agronomia da Faculdade de Ciências Exatas e de Tecnologia, Universidad Tuiuti del Paraná, BRAZIL	Effect of Biostimulants on Potato Late Blight
20.00-20.15	Marcelle Michelotti Bettoni Jean Fellipe Eruchiki Giovani João Karachenski Rafael Kudlawiec Jéssica Regina Parlato de Oliveira Ana Catarina Ceccon Bonierski Tefide Kizildeniz	Agronomia da Faculdade de Ciências Exatas e de Tecnologia, Universidad Tuiuti del Paraná, BRAZIL	Cabbage productivity as a function of the application of a biostimulant based on triacotanol
20.20-20.35	Marcelle Michelotti Bettoni Giovani João Karachenski Rafael Kudlawiec Jean Fellipe Eruchiki João Victor Wojcik Jéssica Regina Parlato de Oliveira Ana Catarina Ceccon Bonierski Tefide Kizildeniz	Agronomia da Faculdade de Ciências Exatas e de Tecnologia, Universidad Tuiuti del Paraná, BRAZIL	Cabbage Productivity as a Function of the Application of a Biostimulant based on Seaweed Extract, Amino Acids and Nutrients

21.11.2022 MONDAY / Session-5

Turkey Time (GMT+3:00) İSTANBUL: 09.00-12.00

Zoom ID: / Passcode:

https://us06web.zoom.us/j/89931567621?pwd=bkhwTlRtZ1Y3QnUweVVwcG53aitPUT09

ID: 899 3156 7621

Password: 594297

HEAD OF SESSION: Dr. Ece Ümmü DEVECİ (TURKEY) Maria Fayyaz (PAKISTAN)			
Time	**Authors**	**Affiliation**	**Presentation title**
09.00-09.15	Behçet Kemal ÇAĞLAR	Çukurova University, Faculty of Agriculture, Department of Plant Protection. Adana, TURKEY	Challenges and Solutions in Detection and Characterization of Phytopathogen Phytoplasmas
09.20-09.35	Behçet Kemal ÇAĞLAR	Çukurova University, Faculty of Agriculture, Department of Plant Protection. Adana, TURKEY	Global Warming and Effects on Plant Pathogenic Phytoplasmas
09.40-09.55	Asif SARDAR Arshad Mahmood MALIK Aneela AFZAL Sidra JAVED Muhammad Jehanzeb Masud CHEEMA	National Center of Industrial Biotechnology (NCIB), PMAS Arid Agriculture University Rawalpindi, PAKISTAN	Integrating climate-smart agriculture for food security using hydroponics and precision technologies
10.00-10.15	Özgecan MADENLI Ece Ümmü DEVECI	Niğde Ömer Halisdemir University, Faculty of Engineering, Department of Environmental Engineering, Niğde, TURKEY	Phosphorus Recovery Methods as Vivianite from Wastewater
10.20-10.35	Imene YAHLA Ali RIAZI	Laboratory of Beneficial Microorganisms, functional food and health, Abdelhamid Ibn Badis University, Mostaganem, ALGERIA	The Evaluation of anti-cancer effect of Lepidium sativum seeds extract in vivo
10.40-10.55	Haifa SBAI Imen HADDAOUI Ibtissem YOUSFI Hichem HAJLAOUI	Regional Center for Agricultural Research of Sidi Bouzid, 9100, TUNISIA	Use of plastic mulch in the production of pepper under drought stress
11.00-11.15	Kadriye YURTASLAN	Department of Plant Production and	Viroid and Viroid Diseases Causing

		Technologies, Faculty of Agricultural Sciences and Technologies, Niğde Ömer Halisdemir University, 51200, Niğde TURKEY	Economic Damage to Plants
11.20-11.35	Tunahan USLU	Department of Biosystems Engineering, Faculty of Agricultural Sciences and Technologies, Niğde Ömer Halisdemir University, 51200, Niğde TURKEY	Global Carbon Trading and its Role in the Agricultural Sector

21.11.2022 MONDAY / Session-6

Turkey Time (GMT+3:00) İSTANBUL: 17.00-19.00

Zoom ID: / Passcode:

https://us06web.zoom.us/j/89931567621?pwd=bkhwTlRtZ1Y3QnUweVVwcG53aitPUT09

ID: 899 3156 7621

Password: 594297

HEAD OF SESSION: Tefide Kızıldeniz (TURKEY)			
Time	**Authors**	**Affiliation**	**Presentation title**
17.00-17.15	Djamel LABDAOUİİ Hadj Smaha DJILLALI Mohamed LARID Ana Cristina GOMEZ MUNEZ	University of Abdelhamid Ben Badis – Mostaganem, ALGERIA	The impact of the innovation of the olive oil extraction system by the two-phase method on the environment and sustainable development. Case study: Algeria and Spain
17.20-17.35	Dr. Nestor Alor ROMERO	NEIKER-Basque Institute for Agricultural Research and Development-BRTA, Vitoria, SPAIN	Hybrid seed development of onion (Allium cepa L.) through the use of male sterility and maintainer lines
17.40-17.55	Dr. Daniel GANDARILLAS	Faculty of Veterinary, Universidad Nacional Jorge Basadre Grohman, PERU	Characterization of the Population of Alpacas in the Community of Maure in the Province of Tarata-Tacna Region
18.00-18.15	Rafael Kudlawiec Marcelle Michelotti Bettoni Vivyan Justi Conceição Jean Fellipe Eruchiki Giovani João Karachenski Lucas Bernaski Tefide Kizildeniz	Universidade de São Paulo, Escola Superior de Agricultura Luiz de Queiroz, Departamento de Produção Vegetal - LPV Avenida Pádua Dias, 11 - Piracicaba/SP, BRAZIL	Impact of Amino Acids and Nutrients-Contented Biostimulant on the Cauliflower

CONTENTS

ABSTRACT

Agricultural practices in Samoa Island: operationalizing the Samoa Food Systems Pathway 2030. Transforming food systems for a resilient and healthy Samoa where no one is left behind

Dr Sigfrido Romeo[1 2]
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In 2019, the UN Secretary-General called all state members for a Food Systems Summit and engagement process to unleash the power of food and also deliver further progress on all 17 UN Sustainable Development Goals (SDGs). Food has been recognized as mean to bring together families, communities and nations. Food also underpins different cultures, livelihoods and relationship with the surrounding natural resources. In reinforcing this understanding, people have been called to convene and participate in Food Systems Summit Dialogues to identify the most context-centered ways to make their food systems stronger and equitable; ultimately driving progress in all of the SDGs.

Food Systems Summit Dialogues are an opportunity for contributing in shaping pathways leading to sustainable food systems and also indicate the way forward to make these a reality for all. Outcomes of Food Systems Summit Dialogues have been adopted for developing national food systems pathways aiming at setting up sustainable food systems within the context in which they took place.

Within this background, since 2021, the Independent State of Samoa has developed its Food Systems Pathway 2030, encompassing the following actions for achieving food, nutritional security and affordable healthy diets.

• Transform the agriculture sector to boost local production
• Strengthen the enabling environment for the sustainable development of food systems
• Improve evidence-based knowledge and understanding of food systems and their components
• Strengthen food policy and regulatory systems to facilitate a shift towards sustainable consumption patterns
• Promote the consumption and availability of local traditional foods
• Enhance nutrition education and promote healthy consumption patterns in the community and in the context of the whole food system
• Promote the use of traditional knowledge to boost nature-positive production and sustainable agricultural practices
• Strengthen extension services for improved knowledge and collaboration amongst farmers, fishers and other key players of the food industry
• Improve environmental protection policy and regulatory measures including moni- toring and evaluation of policy and regulatory impacts
• Facilitate effective engagement of stakeholders including vulnerable groups in food system dialogues
• Promote the role of women and youth in agricultural activities and food value chains
• Enhance the role of communities and culture in developing the food systems and equitable livelihoods
• Build climate resilient practices and resources for agriculture development
• Adopt social protection measures in response to the impact of shocks in food supply and consumption

FAO SAP in coordination with government authority and development partners in Samoa engages in supporting the operationalization of this pathway for transforming food systems aiming at a resilient and healthy country where no one is left behind.

Keywords: FAO, Food Systems Summit, Samoa, Food Security, Food Systems Pathway 2030

The Role of Biopreservation in Improving the Quality of Some Traditional Fermented Products of Plant Origin

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Nowadays, consumers are particularly aware of health concerns related to food additives; the health benefits of "natural" and "traditional" foods, processed without added chemical preservatives, are becoming more and more attractive. Fermentation is known as one of the oldest conservation techniques for various foods such as vegetables, fruits, fish, meat, etc. This paper focuses on some traditional fermented cucumbers, white cabbage, green pepper, eggplant and green tomatoes, as well as the role that biopreservation plays in improving the quality. In this study, samples Capsicum annuum L. var. grossum, Brassica rapa L. var. rapa L., Cucumis sativus L., Solanum melongena L. and Lycopersicon lycopersicum L., were collected in 2022 in Tirana region, Albania. Fresh samples and pickled were observed for the physico-chemical parameters: moisture, total acidity, pH, fat, protein, carbohydrates, energy; vitamin C; colour, water activity. Total phenolic content was determined according to Folin – Ciocalteu method, total flavonoid content was measured by aluminium chloride colorimetric assay, and antioxidant activity were determined by means of two DPPH and ABTS tests. The results showed that the pickled products showed a better nutritional profile compared to the raw ones. Moreover, the study showed that fermentation as a processing technique seems to improve the activity and bioavailability of natural phytochemicals. The content of total polyphenols resulted from 8.41 to 107.59 mg gallic acid equivalent/100 g. The highest values were presented by samples eggplant and tomato. It is noted that fermentation caused an increase in values from 1.07 to 2.50 times, highlighting the positive role that this process has in these products. The content of total flavonoids was 4.95-75.37 mg catechin equivalent/100 g. Based on such findings, we can recommend the production and consumption of pickles as vegetable-based products with improved characteristics, which can significantly contribute in the food industry. The data of this paper can serve, among others, to supplement the literature, and it is of particular importance since fermented foods mean tradition, rituals and agro-economic and socio-cultural features of the society. We recommend further work on issues related to quality and safety aspects of fermented foods, as well as the role of biofortification as an interesting technique in improving the quality of fermented foods.

Keywords: biofortification, quality, vegetables, pickled, traditional fermented food

The Impact of the Innovation of the Olive Oil Extraction System by the Two-phase Method on the Environment and Sustainable Development. Case study: Algeria and Spain

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In the Mediterranean Basin, the olive growing sector has a great effect on the rural economy, the regional heritage, and the environment. Based on an investigation conducted respectively on a sample of two olive oil growing areas (Bouira in Algeria and Cordoba in Spain), a comparative study has been the subject of a diagnosis of the state of the olive oil factories, their functioning mode, their impact on the quality of oil, the recovery of waste (pomace and margins) that they produce on the environment, as well as the prospects of adoption of a two-phase extraction system which is considered as ecological. The results have shown that in the region of Cordoba, the adoption of this model by olive oil factories since the 1990s has witnessed unprecedented progressive evolution which has a tendency to generalize. Although this system is within the scope of technologies called "clean ", and because of the lack of popularization and consciousness-raising, it is still unknown in the zone of Bouira in Algeria. The research has also shown that we should move towards the use of innovatory and more appropriate techniques to allow the production of quality oil, water and energy saving, reduction of pollution from the source, and have to be increasingly used by the factories concerned with environmental issues, and desirous of keeping their share in the market. Therefore, it is necessary for the producers to become conscious of the sustainable development of the sector

Keywords: Olive tree, Olive-oil, extraction’s methods, two-phase system, diffusion, environment and socio-economic study.

Effect of Two Different Condition on Life Table Parameters of Two-spotted Spider Mite (Tetranychus urticae Koch, 1836) on Soybean (Glycine max L. Merr) Variety Ezra

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This research was studied in the climatic laboratories of the Department of Plant Protection of the Azerbaijan State Agricultural University. The biology of *T.urticae* was studied on Ezra soybean variety. For this, was used leaf disk method. During the research record the developmental stages of the eggs, larvae, protonymphs, deutonyms, quiescent intervals and egg productivity of two-spotted spider mite. The research was carried out under two different conditions (26.16±0.04 °C, 58.14±0.06 RH and 31.61±0.03 °C, 50.99±0.06 RH). Total developmental period (combined larval, nymphal and quiescent period) was 16.55±0.23 days for females and 14.04±0.30 days for males at 26.16±0.04 °C, 58.14±0.06 RH. Reaching maturity in males was 9.80±0.19 days, and 12.60±0.09 days in females. In the conditions of 31.61±0.03°C, 50.99±0.06 RH, the percentage of hatching was lower and the percentage of egg laying was 3.6% higher than in other condition. Total life period at 26.16±0.04 °C, 58.14±0.06 RH in males was 26,20±0,31 days, in famales 28,69±0,20 days. Oviposition period at 31.61±0.03 °C, 50.99±0.06 RH was 8,12±0,20 days, it was a day shorter than other condition.

Keywords: Ezra, post- oviposition period, hatching percentage, nymphochrysalis, deutochrysalis, teleochrysalis, egg productivity

The Evaluation of Anti-cancer Effect of Lepidium sativum Seeds Extract in Vivo

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Lepidium sativum or garden cress has been used widely in different parts of the world for its wide therapeutic application. The main objective of this research is to evaluate the anticancer effect of *Lepidium sativum* L. seeds ethanolic extract which has multiple medicinal properties. Our experimentation was carried out on 25 Swiss albino mice, divided into 4 groups, which were given daily oral administration of a carcinogen (sodium nitrite Na NO2) for 6 months. Of which two experimental groups were treated with doses of 50mg/kg, 200 mg/kg of L. sativum seeds extract respectively for the entire period of exposure to the carcinogen, and one group was treated with 50mg/kg during the sixth month only, as well as positive controls group. At the end of the experiment, mice were sacrificed, then livers were used for pathological anatomy. The obtained results showed a significant variation in the relative weights of the mice and livers of the groups exposed to the carcinogen; notable changes in the biochemical and hematological parameters studied. Histological examination revealed that the carcinogen causes tumour necrosis and liver damage in the positive control group. On the other hand, the treatment with the ethanolic extract of Lepidium sativum seeds proved its effective preventive and curative effects against this tumour.

Keywords: *Lepidium sativum*, seeds, cancer, liver, pathological anatomy

Efficacy of Native Beauveria bassiana and Metarhizium brunneum Isolates Against the Colorado potato beetle, Leptinotarsa decemlineata (Say) (Coleoptera: Chrysomelidae)

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The efficacy of two *Beauveria bassiana* isolates (BB-1 and BB-3) and a *Metarhizium brunneum* isolate (ORP-13) were tested on potato beetle [*Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae)] adults under laboratory and greenhouse conditions simultaneously. The novelty of this study is the *B. bassiana* strains of the fungus were isolated from naturally infected adults of the pest which were collected in potato fields in Tokat province, besides tested in combination with the *B. bassiana* isolates and a native *M. brunneum* (ORP-13) isolate. To determine the efficacy of the isolates and the combination of these isolates on adults, single-concentration response tests were performed with 1 × 108 conidia/ml using the spraying method. A commercial formulation of *Beauveria bassiana* (Nostalgist, Bayer) was used as a positive control. According to the results of the single-concentration response test under laboratory conditions, the 9th and 11th days were found to be statistically significant, and the BB-3 isolate showed the highest mortality rate (96%) on the 11th day. The LT50-LT90 values of Nostalgist, BB-1, BB-3, ORP-13 and Combination applications for the 11th day were calculated as 12,623-34.128, 8.544- 11,612, 9.046-10.619, 13.169-21.184 and 8.520-11.020, respectively. According to the single-dose study conducted under greenhouse conditions, the highest mortality rate was observed in BB-1 isolate (80%), and the difference between BB-1 and BB-2 applications was statistically insignificant. These results show that *M. brunneum* isolate (ORP-13) and the commercial formulation (Nostalgist) has no mortality effect on potato beetle adults and native *B. bassiana* isolates BB-1 and BB-3 can be used successfully in control of this pest.

Keywords: *Leptinotarsa decemlineata*, *Beauveria bassiana*, *Metarhizium brunneum*, biological control, entomopathogenic fungi

Viroid and Viroid Diseases Causing Economic Damage to Plants

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Viroids are the smallest known plant pathogens and have been identified in many economically important plant cultures. Their structures consist of small, low molecular weight, circular, single-stranded RNA (246-401 nucleotides long) molecules without envelope protein. Viroids are subviral pathogens that have autonomous replication in their hosts due to their lack of ability to encode proteins necessary for their biological functions. The causative viroids are in two families, *Pospiviroidae* (with central conserved region, CCR) and *Avsunviroidae* (without central conserved region) proliferating in the nucleus. The hosts of viroids include vegetables, ornamentals, and perennial woody plants. Viroids can be easily transported mechanically with contaminated agricultural equipment. It can also be spread by seeds, pollen, insects and vegetative propagation materials. Taxonomically, 32 viroid species are currently recognized by the International Committee on Virus Taxonomy (ICTV). Many plant species are known as natural hosts of viroids. Symptoms induced by viroids in susceptible hosts include the whole plant; stunting, in leaves; epinasty, wrinkling, mosaic, chlorosis, mottling, on the trunk; shortening and thickening of the bark; pitting, gumming, in flowers; different parts of the same plant have different colours, in fruits; detrimentally affects size, colour and also appears as deformation, in seeds; developmental arrest (developmental abortion) and defective formation/deformity of the nodules in other organs. Molecular methods such as Polymerase Chain Reaction (PCR) are used in the diagnosis of viroids. Since viroids are composed of RNAs and do not contain a protein coat, it is not possible to use rapid immunological methods such as Enzyme-Linked Immunosorbent Assay (ELISA) for their diagnosis. As a result, it is very important to detect plant pathogens early in order to take quick action against the negativities caused by viroids in the plant. This can help prevent the further spread of diseases, as well as delays and limitations in the import and export of plant materials. The most effective management strategy against many viral diseases on grapevines is to use healthy production material, to obtain viroid-free plants by tissue culture method or to eradicate the infected by testing the cultivars and rootstocks grown for grafting in production for these factors.

Keywords: Viroids, Viroid diseases, PCR method

Hybrid Seed Development of Onion (Allium cepa L.) Through the Use of Male Sterility and Maintainer Lines

*[1] Néstor Alor, [2] Beatriz Gil, [3] Rosario Zegarra, [4] Nelly Arévalo

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Onion is a global cultivated species and offers us the possibility of taking advantage of heterosis and hybrid vigour to increase productivity. Being an allogamous cross-pollinated crop, it has a wide variability for selection in: shape and size of bulbs, colour of layers, cycles, earliness, vernalization for flowering, uniformity in maturity and so on. Current onion breeding programmes are developing hybrids with the male-sterile cytoplasm *S*, which interacts with a fertility restoring nuclear gen-*MS*. Following the identification of the cytoplasmic male sterility gene, onion is being produced worldwide in both long-day and short-day varieties. The manufacture of hybrid onion seed is a highly successful business as long as one works with the system of androsterility or cytoplasmic male sterility (CMS), which is the inability of anthers to manufacture fertile pollen, therefore, any seed produced results only from cross-pollination, and is therefore an important tool when producing hybrid seed. For the output of F1 hybrid seed, an A-line with the genetic constitution S-*msms* (androsterile) is needed, to ensured that no self-fertilization occurs. This line A (S-*msms*) is crossed with maintainer B-lines (N-*msms*) which are fertile and will perpetuate the male sterility to the offspring having the following genetic constitution: S-*msms*. In 2020, 11 hybrids were selected that stood out for their characteristics of earliness, shape and size of the bulb, as well as colour of the layers, etc. The trials were carried out in Spain in the Autonomous Communities of Castilla La Mancha (Ciudad Real and Albacete), La Rioja (Calahorra), Navarra (Ablitas and Buñuel), Granada (Zújar/Val de Rubio) and also in Portugal (Alcochete/Montijo). From the specific combinatorial aptitude of the experimental hybrids and their subsequent selections, three precommercial hybrids were obtained, which will be tested in growers fields at a commercial level in Castilla La Mancha, Granada and Navarra. At the beginning, there were 50 initial experimental crosses, later three promising hybrids have been selected, (18CC04, 18CC40 and 18CC50), from the experimental phase to the precommercial phase, and they were selected for their good specific combining ability in several terms as: yield, earliness, spherical globular shape and brown skin with a lot of layers; also they have high consistency with a long conservation in store and diseases tolerance.

Keywords: Onion, hybrid seed development, *Allium cepa L.*, male sterility

Global Warming and Effects on Plant Pathogenic Phytoplasmas

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Global warming is the rose in the temperature on the earth's surface as an outcome of the greenhouse influenced by the gases released into the atmosphere by humans. The reason for this is the consumption of fossil fuels, industrial and agricultural activities, and the increase in the amount and density of greenhouse gases in the atmosphere. Climate changes occur as a consequence of global warming. Abnormalities and variations in precipitation, desertification, floods, drought, typhoons, storms, and tornadoes are all indicators of climate change. Climate changes, which are a result of global warming, cause changes plant fauna at different latitudes, causes alterations in agroclimatic zones, leading host plants to move into new regions and the formation of novel disease complexes. and the life cycles of vector insects that transmit plant pathogenic phytoplasmas that cause diseases in plants. As a result of all these changes, phytoplasma diseases that occur in newly opened areas for agricultural activities cause yield losses. Climate change causes new areas to be opened to agricultural activities, new plant cultures to be grown, vector insects feeding on these plants to reach new areas and new plant diseases to emerge. As it is known that plant diseases, their prevalence and severity arise from three influence factors as such host plant, the environmental circumstances and pathogen. As a result of the prolongation of the active periods of the vector insects, the vector feeds on a greater number and variety of plants and transmits phytoplasma to a greater number of plants. Phytoplasmas are obligatory intracellular parasites of plant phloem tissue as well as economically considerable plant infections spread by phloem-feeding insects. Due to the increase in plant diversity as a result of global warming, phytoplasmas will spread to new and wider areas as vector insects will feed on a greater number and variety of plant species. In addition, the temperature levels and the amount of CO2 affect the interactions of phytoplasmas with vector insects, the multiplication of phytoplasmas in the vector body and the latent period of pathogen. The resulting climate change will also affect the timing, preference and effectiveness of chemical, physical and biological control measures in the control methods against diseases and disease management. Plant disease management will become increasingly difficult when a broad analysis of the influence of global climate change on disease control is undertaken, especially when new plant species enter to new area. For this reason, effective plant protection strategies suitable for new conditions should be produced with the integration of all control methods.

Keywords: Phytoplasmas, Global warming, Disease triangle

Challenges and Solutions in Detection and Characterization of Phytopathogen Phytoplasmas

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Phytoplasmas are obligate intracellular parasitic pathogens that restricted in the phloem of host plants and can multiply in vector insects that transmit them from plant to plant. Phytoplasmas are pathogens of agriculturally important plants that cause various symptoms depending on their virulence, plant species and environmental conditions and the most widespread in subtropical and tropical area. Plant pathogenic phytoplasmas are transmitted from plant to plant by vectors a such families Cicadellidae, Fulgoridae, and Psyllidae and they both survive and replicate in their vectors. Phytoplasmas infect approximately more than 1000 plant species and cause a wide variety of symptoms in these plants. Among the symptoms it causes, the most common ones are phyllody and virulence. Vector insects belonging to these families feed on the phloem of infected plants. As a result of feeding, they take the phytoplasma into their body and then transmit agents to healthy plants where they can be fed. Phytoplasmas have not been isolated alive since they were discovered and they could not be cultured in vitro media because they are obligate parasites. Since they cannot be isolated and cultured live, difficulties still remain in their detection and characterization. Therefore, classical diagnostic techniques including symptomology and antibiotics as such tetracycline application were used. Phloem tissue sections taken from plants suspected to be contaminated with phytoplasma were also examined. In later years, accurate identification of various phytoplasma races and species was achieved by using more sensitive molecular techniques such as Polymerase chain reaction (PCR) and Restriction Fragment Length Polymorphism (RFLP) based on the genetic features of the phytoplasmas. Thanks to the recently developed modern techniques, the infection levels of phytoplasma can be measured and quantitative PCR and bioimaging can effectively measure the amount of phytoplasma in the plant. All tissue part of the infected plants including phloem tissue (leaf, branch, stem, root etc.) are used to detect and characterize of plant pathogenic phytoplasmas. In addition, vector insects carrying the agent are also used individually as material. DNA isolation is carried out from all these plant parts using the CTAB method and commercial kits. As a result, for the accurate and reliable diagnosis and characterization of phytopathogen phytoplasmas, more meticulous and clean work should be done in DNA isolation and even isolation kits should be used if possible. The methods used by previous researchers must be questioned and optimized in your own laboratory. After the use of universal and nested primers during PCR studies, specific primers should be used if possible for more reliable and accurate results. During the genome assembly and mapping process, necessary precautions should be taken to prevent host DNA contamination. Particular care should be taken during BLAST and phylogenetic analysis. Due to the lack of an effective control method against obligate intracellular pathogens such as phytoplasmas, the results obtained must be evaluated well in order to diagnose phytoplasma correctly and to control them effectively.

Keywords: Phytoplasmas, Polymerase chain reaction (PCR), CTAB method, commercial kits, Phloem tissue

Mitigation of Drought Stress in Tomato by Plastic Mulch Application Under Semi-arid Conditions

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Currently, climate change marked by high temperature and low precipitations creates severe drought condition and consequently an imbalance in water availability for crops. Drought stress limits crop growth, development, and crop yield. The use of plastic mulch (PM) as soil cover has numerous benefits in agricultural production. Crop water necessities were investigated at three levels (50, 75, and 100% ETc), and soil cover transaction were polyethylene transparent PM and no mulch (bare soil: BS). The findings demonstrated that using the PM reduced the negative consequences of a water shortage by enhancing numerous measured parameters (plant high; root length; stem, root and leaf moisture contents; yield; WUE; fruit number; fruit length and diameter; fresh and dry weight of fruits; fruit juice content). The objective of the current research is to evaluate the role of plastic mulch (PM) in mitigating drought stress in tomato cultivated under semi-arid conditions. Our findings indicate that covering the soil with plastic may be more effective in reducing the detrimental effects of water stress on tomato.PM raised crop output by enhancing yield and water use efficiency (WUE) as compared to BS.

Keyword: Plastic mulch application, drought stress, climate change

Possible Minimization the Process of Producing Seedlings from Cuttings by Temperature Manipulation and Stimulation of Mycorrhizal Root Activity in Hydroponic Vertical Farming Systems

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The classical vegetative propagation rooting method takes periods of 3 to 6 weeks, which can extend up to 9 to 10 months. Mycorrhiza is the name given to fungi that have developed a symbiosis relationship with the roots of some plants. These promote plant and root development, increase flowering and plant sowing performance, provide early emergence, minimize saplings shock during transplanting, saplings deaths, the number of diseased and weak saplings, protect the plant against stress and increase its resistance. On the other hand, the temperature is also manipulating the rooting stage of the cuttings in terms of accelerating the rooting. In order to emergence of root callus, the cuttings are treated to soilless aseptic hydrated media at 25–27 °C during 3-4 weeks, while spatial temperature of cuttings (bud-breaking buds) under 2-4 °C is maintained. The process is accelerated by adding the mycorrhizal biotic factor as well as the temperature factor. This method can be adapted to both woody, semi-woody and mild cuttings (also saplings that are difficult or impossible to produce with cuttings). The aims and objectives of the project are to shorten the rooting process of the vine cuttings to less than 3 weeks. The development studies are carried out to develop a disease-free, saplings production technology with strong root systems in 3-4 weeks, and the development of a saplings' growing unit that enables the use of this technology for the commercialization of the studied technology continues. Possible minimization the process of producing seedlings from cuttings by temperature manipulation and stimulation of mycorrhizal root activity in hydroponic vertical farming systems can be developed for abiotic and biotic factors (temperature and mycorrhizal interaction). With this study, much more plant products (saplings) can be adapted and produced in a short time with less cost, and both technologies will be developed and economic income will be obtained.

Keywords: Hydroponic vertical farming systems, saplings, temperature, mycorrhiza

Agronomic Response of Six Varieties of Robusta Coffee (Coffea canephora) with Fertilization

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Coffee is a stimulant plant with a wide range of ecological adaptation, which has allowed its presence in many parts of the world. It has increased due to its new forms of coffee consumption, particularly the appearance of soluble coffee and the emergence of decaffeinated coffee due to its greater aptitude for the extraction of caffeine. Coffee is as important as water, it is the most consumed beverage, it is prepared from roasted and ground seeds, harvested from coffee trees, name given to the plants of any of the 104 species of the genus Coffea, being the most important globally: arabica coffee and robusta coffee. Coffee cultivation in Ecuador has both economic, social and ecological value. In the ecological order, the importance of coffee lies in the wide adaptability of coffee plantations to the different agro-ecosystems of the four regions of the country: Coast, Highlands, Amazon and Galapagos Islands. Despite the economic, social, and environmental importance of coffee growing for a large number of Ecuadorian families, it has always been maintained as a marginal activity, detached from its own economic logic, although it has survived as an economic activity in some areas. This situation hinders the insertion of Ecuadorian coffee growers in the new world trend: producing quality coffee in greater volume and at lower cost. The research was carried out in the periods April-August 2021 and October 2021-February 2022. Robusta coffee varieties (*Coffea canephora*) were with the following codes CF-06 ; EET375611 ; COF 01 ; NP 2024 ; COF 02 ; NP 3051, the fertilization plan was: 100% inorganic fertilization (210 g/plant); 1000 kg ha organic fertilization (402.50 g/plant) ; 1500 kg ha organic fertilization (502.50 g/plant) ; 2000 kg organic fertilization (611.26 g/plant). A Randomized Complete Block Design (RCBD) was employed with a total of 120 plants. The variables under study were: soil analysis, plant height (cm), stem diameter (cm), leaf circumference and leaf analysis of coffee varieties. A soil analysis was carried out at the beginning to determine the availability of nutrients in the soil and thus carry out a study of the nutritional needs of the crop. Subsequently, the formulas to be applied to each clone and consequently to each of the experimental units were prepared. Ammonium nitrate, magnesium sulfate (granular), potassium chloride (murate), di-ammonium phosphate (DAP), bioabor (BBQ) and dolomite lime were used. One of the limitations presented for the development and production of the coffee crop is the acidity of the soil, in addition Cenicafé in 2016 clarifies that the concentrations of soluble aluminum-Al^{3+} and manganese-Mn^{2+} in acid soils can acquire levels that are often toxic to plants, in addition to altering the activities of existing microorganism populations that act in the mineralization of organic matter and transform nitrogen and sulfur, on the other hand phosphorus is reduced by creating insoluble compounds with iron-Fe and Al^{3+} and thus ceases to be available to plants. The agronomic response of the coffee crop with the fertilization program in the production stage resulted in the highest averages in plant height, variety NP2024 with the 100% conventional treatment: in stem diameter and leaf circumference the NP2024 variety with the 1500 kg ha treatment.

Keywords: Robusta coffee, fertilization

Phosphorus Recovery Methods as Vivianite from Wastewater

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Phosphorus (P) is one of the vital elements for living things. P is used in DNA and RNA for energy transfer, especially in the genetic processes of living things. In addition, it plays an active role in energy transfer in photosynthesis in plants. P element, which is so important for life, is used as fertilizer in the agriculture sector of 95% of the world. It is finite and irreplaceable due to the mining of phosphorus, that is, the extraction of phosphorus rocks. Therefore, there is a need to turn to sustainable phosphorus production practices. Establishing a cycle with the recovery of nutrients closes the cycle and returns organic, inorganic, and mineral compounds to agriculture. Organic wastes and wastewater are the most important sources of nutrient recovery. Worldwide, it is predicted that the total waste generated by humans will meet only 22% of the phosphorus demand. More than 80% of nitrogen and 50% of phosphorus in wastewater comes from urine. Wastewater treatment targets the current system; It is the removal of organic debris, suspended particles, nutrients, and pathogens from wastewater before discharging wastewater into receiving environments. Vivianite is preferred because of its economical, applicable, and easy accessibility to Fe sources. In this context, in this study, vivianite production methods from wastewater, parameters affecting vivianite production, and its applicability was discussed. Vivianite is an iron phosphate mineral found in lake sediments and soil in an oxygen-free, Fe-rich environment. Additionally, it is commonly found in digested sludge and activated sludge as a potential source of phosphate recovered from wastewater treatment plants. Vivianite production methods include biomineralization, chemical precipitation, anaerobic digestion and electrochemical crystallization. P shortage is a pressing issue that has attracted worldwide attention. Vivianite recovery from sewage sludge and wastewater provides a feasible solution to this problem. This technique converts the pollutant P into the lucrative and environmentally friendly substance vivianite. Vivianite synthesis has substantial benefits over standard P recovery procedures in terms of low chemical cost, high recovery efficiency, and value-added products.

Keywords: Vivanite, Phosphorus, Wastewater

Impact of Amino Acids and Nutrients-Contented Biostimulant on the Cauliflower

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Climate, latitude, longitude, seasons of the year soil type, water availability, and mineral nutrition are all elements that influence crop yield and quality. Cauliflower (*Brassica oleracea* var. botrytis) is a very productive variety that allows to cultivate throughout whole year in Brazil. Boron insufficiency creates serious issues in cauliflower, which is extremely susceptible to this micronutrient shortfall, which provides numerous benefits in cauliflower, including those associated to flowering and nutrition, which have a direct impact on quality and eventual production. Additionally, boron is engaged in a variety of physiological functions affecting calcium metabolism, solute translocation, sugar metabolism, and both auxin and protein synthesis. The biostimulant has a systemic feature that allows it to stimulate many sites at various points throughout the plant, maximizing the productive features in accordance with the favourable physiological outcomes that take place in the plant by intervening in the cascade of signals and triggering or silencing a number of routes. The aim of this study was to assess the use of an amino acid-based biostimulant in conjunction with a nutrient complex with a high calcium and boron content in the development of cauliflower. The experiment was completely randomized, using four treatments and three repetitions. *Brassica oleracea* var. botrytis 'Barcelona' seedlings of cauliflower were transplanted directly to 15 days advanced prepared soil in Parana, Brasil. The foliar treatment was applied as the biostimulant product in 0.50, 0.75 and 1.0 mL L^{-1}, in addition to the control (0 mL L^{-1}) without the addition of the biostimulant. At the end of the cycle (96 DAT), 4 central plants per plot were evaluated. In terms of yield, the results were comparable to those achieved in broccoli cultivars (*Brassica oleracea* var. itálica) applied with an amino acid-based biostimulant. These linear increases may interpret by the increased availability of amino acids to plants, which can contribute in the production of numerous chemicals, affecting plant growth directly. Furthermore, the findings might be associated to the amino acid alanine, whose interacts in the pyruvate pathway, the source of proteins that assist in plant developmental processes. The detected improvements in fresh mass can be attributed to a rise in the biggest diameter of the stem, that is a yield-influencing characteristic. As a results, the foliar usage of biostimulant Calmax® (OMEX) has a significant impact on the growth of cauliflower crops. All yield and growth parameters demonstrated the maximum efficacy at the dose of 1.00 mL L-1.

Keywords: Cauliflower, Biostimulant, Boron

Transforming the Productive Landscape of The Osa Peninsula, Through the Regenerative Economy

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1. Introduction

The Osa Peninsula is located on the southeast coast of the Pacific Ocean, made up of the districts of Sierpe and Bahia Drake de Osa, as well as Puerto Jiménez de Golfito. These cantons have a very low human development index, being among the poorest cantons in Costa Rica. Currently, more than 60% of the palm oil (*Elaeis guineensis*) that is produced in Costa Rica comes from these two cantons, being the oil palm monoculture one of the main landscapes in the territory, carrying this productive model, a series of problems economic, social and environmental. In an effort to build a sustainable human development and environmental management strategy for this territory, in 2017 Stanford University, through the Osa-Golfito Initiative, identified, together with palm producers, a new production model The concerted model consists of diversifying the cultivation of oil palm with other species of commercial value, such as cocoa, musaceae and wood, in such a way that through regenerative agriculture, biodiversity and profitability of production systems are promoted**.** The diversified production systems of the 16 selected farms were designed and implemented, where training was established for the beneficiaries in good agricultural practices (development of bio-inputs, reproduction of efficient microorganisms, training pruning, maintenance and sanitation, among others). As a result, at least the establishment of 16 diversified production systems that promote regenerative agriculture, a design and installation of a forced hybrid solar thermal system for the fermentation and drying of cocoa and vanilla that allows standardizing the process conditions for both products without affecting their chemical and sensory quality and a commercial strategy developed for agro-industrialized products where favourable international markets are identified. Support productive diversification to increase economic resilience, through regenerative agriculture, sustainable agribusiness and fair trade.

Keywords: Osa Peninsula, regenerative economy

Integrating Climate-Smart Agriculture for Food Security Using Hydroponics and Precision Technologies

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Precision agriculture is based on information, technology, and decision support systems for improving productivity and profitability in farm management system. It works on the principles and practices of identification, analysis, and managing spatial and temporal variability linked to sustainable agricultural production systems. Hydroponics technology works on the principle of precision supply of essential nutrients to plants for getting maximum yield and by controlling climatic factors. These PA technologies support hydroponics systems due to judicious application of all farm inputs and control of their effective management at farm level. Due to precision input supplies, the products produced in hydroponics systems are homogeneous in quantitative and qualitative variables. Due to this, the prices fetched by the hydroponics products are multiples of the market as compared to their close substitutes. Therefore, the study identifies challenges in the applications of precision agriculture technologies like yield monitors, variable-rate technologies, and proximal soil sensors (e.g., electromagnetic induction, visible-near infrared spectroscopy, and dielectric sensors) in hydroponics systems and aims to evaluate how this technology can improve food security and safety through the efficiency of hydroponics and increase its market size. This technology not only lowers labour costs and increases productivity in hydroponics systems, but it will also be widely adopted for food safety and security in the country. This study finds that PA and hydroponics techniques are more efficient and effective for getting higher crop yields, socially desirable production, and an environmentally and economically viable return. Using precision technologies, crop yield showed higher productivity and stability when farmers utilised 150 kg/ha, 115 kg/ha, and 135 kg/ha of nitrogen, potassium, and phosphorus on maize crops, respectively. A significant reduction in the cost (41%) is reported just in fertilizer usage due to precision methods. Profitability and reduction in costs using the PA technique demonstrate that returns on investment and economic viability are greater than the traditional farming methods. The primary purpose of PA technologies and hydroponics systems adoption is to maximize agriculture production while minimizing input usage and reducing environmental degradation. This study finds that the adoption of PA technologies and hydroponics systems help the farmer to improve the yield through utilizing the resources wisely, balancing inputs, and effective utilization of resources only when and where they are required. Therefore, PA practices and hydroponics systems provide the best sustainable solution to cope with the environmental challenges and to ensure food security as well.

Keywords: Hydroponics system, Precision agriculture technology, food security

Use of Plastic Mulch in the Production of Pepper Under Drought Stress

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Several agronomic management tips have been implemented to promote plant tolerance to abiotic stresses like water stress. In order to cope with this stress, mulching technology seems to be the best choice based on its different agronomic benefits, like soil temperature control, soil erosion prevention, weed control, etc. Pepper plants were cultivated on soil covered or not by transparent plastic mulch, under different water stress (100%, 75% ETc and 50% ETc). During the assay, some growth parameters such as height plant and spad index were measured. Results showed that water stress affected negatively several parameters such as plant height, root length; water content, yield, chlorophyll content, fruit dimensions and certain fruit physicochemical parameters such as juice content, ethylene content and electrical conductivity. Plastic mulching has been shown to be effective in soil water retention, pepper productivity and quality (large and long fruit). Thus, it increased other fruit quality parameters such as soluble sugar content and electrical conductivity. The goal of this research was to study the role of plastic mulch in enhancing the growth of pepper plants subjected to drought stress.

Keywords: Pepper, drought stress, plastic mulch

Soil Loss Due to Water Erosion on Semi-Arid Slopes of the Cairani-Camilaca Sub-Basin

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Environmental problems, such as soil degradation in Peru, is a silent issue, ignored by political actors related to the sector; due to the fact that the importance of the soil as a natural resource to guarantee food security, mainly for the high Andean communities of the country, is not being valued in its fair dimension; however, reality shows us that environmental deterioration is a real, serious threat that endangers current and future food security. There are many studies in Peru and the world on the negative effects produced by erosive phenomena, such as that of Mazuela, (2013), Alvarado et al., (2007), Rosas & Gutierrez, (2016) etc., who maintain that, erosion is a problem related to high pressure in the use of soils, poor agricultural practices and irresponsible anthropic action. In this sense, the erosive problems in the highlands of the Tacna region; It is not precisely because of the high rainfall; but due to poor management of irrigation water, steep slopes and lack of policies for the use, management and exploitation of the soil resource. In this context, it was observed that the yields of the main crops such as: potato, corn, oregano, alfalfa, compared to past decades have been significantly reduced, which contrasts with the statement of Burbano-Orjuela, (2016). On the other hand, the loss of the productive capacity of the soil due to erosion has generated a social problem translated into a migratory process from the inter-Andean valleys, towards the coastal valleys and a large part to the city of Tacna. For this reason, in the present study the objective was to measure erosion in the Cairani-Camilaca sub-basin with the Universal Soil Loss Equation (EUPS) has been applied. The Cairani-Camilaca sub-basin is a tributary of the Locumba River basin, with altitudes that vary from 2,000 to 4,600 meters above sea level. Current water erosion, as well as potential in the Cairani-Camilaca sub-basin, are located within mild erosion (< 10 t/ha/year), which involves 31% of the surface, and moderate (10 – 50 t/ha/year) represents 68%. In general terms, the highest levels of current erosion are on the Camilaca flank with an average of 15.5 t/ha/year, compared to the Cairani flank where the average erosion is 10.3 t/ha/year. The highest values of potential erosion were observed on the Camilaca flank with an average of 22.5 t/ha/year, compared to Cairani, which showed a value of 18.9 t/ha/year. This variation could be explained by the fact that Camilaca has steeper slopes (average 83%), compared to Cairani (average 66%); on the other hand, in Camilaca conservation practices are not very common, compared to Cairani, where conservation is periodic, up to 2 times a year. In this regard, the field information shows shallow soils (<30 cm), mostly sandy loam texture soils, low organic matter content (<3%), high percentage of textural modifier, physical characteristics typical of eroded soils, which translates into low productive capacity of the soil. The water erosion levels determined in the Cairani-Camilaca sub-basin, on average correspond to the moderate level (current erosion 10.68 t/ha/year) and potential erosion 18.20 t/ha/year); however, these values may be higher if the hydric erosion produced by irrigation water and wind erosion are considered, which are evident, but which are not considered in this study.

Keywords: Water erosion, Cairani-Camilaca Sub-Basin, Peru

Antioxidant Variations during Flower Development of Rosa damascena

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Rosa damascena Mill. known as the oil-bearing rose is a member of *Rosaceae* family and it is cultivated worldwide due to its economic value. Because they are essential for plant reproduction and evolutionary growth, flowers are among the most significant plant organs. Enzymatic antioxidant and non-enzymatic antioxidant variants shed light on the probable roles of antioxidants and the functions of antioxidant enzymes in flower development control. *R. damascena* Mill. var. trigintipetale's six-year-old oil-bearing rose bushes flowers were selected in the early morning (06:00-08:00) from a plantation in Ardıçlı village in Isparta, Türkiye. For the extraction of CAT and SOD, petal samples (10 g) were ground in liquid nitrogen, homogenised in 25 mL of 100 mM ice-cold 50 mM sodium phosphate (pH 6.4) with 0.5 g of polyvinylpolypyrrolidone. The test tubes were applied to a fluorescent light for 15 minutes before measuring absorbance at 560 nm with a spectrophotometer (Shimadzu UV-1280). SOD activities were identified as the degree of enzyme activity that consequence in a 50% decrease in SOD-inhibitable NBT reduction. The CAT activities were evaluated use the technique recommended by Chance and Maehly (1955). All analyses were carried out in three replicates. Using the SPSS Statistics 22.0 program, the outcomes were submitted to analysis of variance (ANOVA) (IBM, Armonk, NY, USA). To discriminate between means, the least significant differences (LSD, $p \leq 0.05$) were utilized. The mean standard deviation was applied to express all data V. The highest SOD and CAT activity was observed at stage I while H2O2 content reached its maximum at stage III. SOD and CAT activities decreased drastically from stage I to stage II. SOD activity continuously decreased during flower development, but CAT activity increased from stages II to III and its activity decreased from stages III to V. The H2O2 content increased significantly in stages II and III, while it decreased significantly in the late blooming stages (Stage IV and V). The maximum H2O2 content was recorded at stage III (444.5 µmol g-1) and the least was recorded at stage V (328.5 µmol g-1). The current study was carried out to investigate antioxidant differences, including enzymatic antioxidant variants, in the flowers of *Rosa damascena* harvested at 5 developmental stages. The purposes of this research were evaluating the non-enzymatic and enzymatic antioxidant activities in oil-bearing roses in order to discover the many physiological parameters responsible for blooming.

Keywords: Antioxidant variations, *Rosa damascene*, Flower development

Effect of Biostimulants on Potato Late Blight

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Potato is the most important in the world, its higher efficiency in response to the addition of nutrients without individual response, having high areas of use for food production. However, they are alternatives, in the current context, to agrotoxics, due to the high value they reached and through environmental means. Biostimulant products can be a solution, as they can increase plant resistant of disease n, for example. Thus, the objective of this work was to evaluate the effect of biostimulant with *Bacillus amiloliquefaciens* or sea seed *Ascophylum nodosum*, applied in the groove planting and hilling on industrial potato. The experimental design was completely randomized, with three series x 4, with two different application methods, in addition to the standard producer. The experiment was carried out in the municipality of Araucária PR. At 1 day after the transplant were 26. were characteristic features. Regardless of the management, the biostimulants used had a positive effect on late blight, compared to the control. The biostimulants with sea seed extract and Bacillus, applied in the groove and hilling present a trend of more promising results, suggesting that the experiment is repeated and that an economic analysis is carried out. Visual monitoring was carried out regarding the phytosanitary aspect, with an assessment of the incidence of late blight at 93 DAP, obtained by counting the number of attacked plants in each experimental unit. There was no artificial inoculation of the pathogen *Phytophthora infestans*. The results were submitted to analysis of variance and the treatment effects had their means compared by the Tukey test at 5% probability, when significant. The use of *Bacillus amyloliquefaciens* YTB1407 increased the resistance of sweet potato to fungal diseases caused by *Fusarium solani* (root rot) and *Ceratocystis fimbriata* (black rot). Regarding the seaweed extract, A. nodosum, although it has not demonstrated an in vitro effect against the phytopathogen *Alternaria solani*, in pepper and tomato plants, it induced defence mechanisms, reducing the severity of the disease. It is concluded that with the use of *Bacillus amiloliquefaciens* biostimulants and *Ascophylum nodosum* seaweed extract, in potato for industry, combined or not, regardless of the management, they confer greater resistance of the plants to late blight. Their combination, applied in the furrow and in the pile, present a trend of more promising results, suggesting that the experiment be repeated and that an economic analysis be carried out.

Keywords: Potato late blight, Biostimulants, Potato

Biometrics Parameters of Plant Growth-Promoting Microorganisms in Forage White Oat Cultivation

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Oat (*Avena sativa* L.) produces high yields of nutritious forage, with high productive potential. There are several factors that affect the productivity and quality of forage oats, such as the nutritional status of the plant. Nitrogen is an important component that is essential for all crops, however its excessive use is responsible for several environmental problems (eutrophication, salinization, atmospheric contamination) that they have and economic. An alternative solution is to increase the efficiency of nutrient absorption, in order to reduce the use of fertilizers, which can be achieved with the inoculation of plant growth-promoting microorganisms (PGPM) or beneficial. They have different mechanisms of action, the main ones being: biocontrol, biostimulant (producing substances that are not nutrients, but favouring plants) and biofertilizer (increasing the availability of nutrients). The bacteria *Azospirillum* and *Rhizobium* are examples of rhizosphere PGPM, which colonize the roots. In a pastoral agroecosystem, biological nitrogen fixation (BNF) associated with the roots of forage plants is an important step in the N cycle and diazotrophic bacteria may play an important role in the supply of this nutrient to plants, since the nitrogen supply via FBN can improve the productivity and nutritional value of forages. Within this context, the objective of this work was to evaluate biometrics parameters of forage white oat to inoculants of plant growth-promoting microorganisms. For the study, seeds the forage white oat (*Avena sativa*), annual winter, was utilized with based in the estimate calc for obtain 70 kg ha-¹ of seeds or six plants bot-¹ in final stand. The seeds were separated in two parts. One part do not received inoculation and the other, received. The second part was inoculated with 120 ml ha-¹ of inoculant Isolate C15 (Biostart®), composed of plant growth-promoting microorganisms (PGPM) with: *Azospirillum*, *Pseudomonas*, *Saccharomyces* and *Rhizobium*). The experimental design consisted of 5 repetitions (pot, n=5) and 2 treatments: -PGPM: control or without plant-growth promoting microorganisms; +PGPM: with inoculants at plant-growth promoting microorganisms. The basal fertilizer was he same: 19 kg ha-1 of N, 19 kg ha-1 of K and 53 kg ha-1 of P. For irrigation, was applied water for maintaining 60% field. The first cut occurred at 26 days after sowing (DAS), with approximately 30 cm in height, leaving the plants with 10 cm, to simulate the effect of grazing. At 10 days after the first cut (at 36 DAS), with the same height (30 cm), the second cut was performed, starting at 10 cm from the ground (grazing height). At the moment was evaluated the biometrics parameters: plant height (cm), shoot fresh mass and shoot dry mass (g). The results did not show any significant difference ($p>0.05$) between ponds with or without the use of plant growth-promoting microorganisms (PGPM). There is not enough evidence to show that the differences found in biometrics parameters in white oat forage (*Avena sativa*) cultivation are due to the application of the inoculants of plant growth-promoting microorganisms.

Keywords: PGPM, White oat, *Avena sativa* L., Biometric parameters

Preferences Boer Female Goats for Environmental Enrichment Objects

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Small ruminants such as goats and sheep are of great importance for the socioeconomic well-being, especially of people living in underdeveloped countries. Goat farming has great potential for expansion in development countries, but it is necessary to adopt techniques aimed at sustainable. Properly managed confinement systems are highly productive; however, some animals may develop atypical behaviours resulting from stress. Environmental enrichment is one of the animal welfares tools that can minimize this problem, through the introduction of elements that refer to the environment of origin of the species. However, in order to obtain effective results, as there are many different types of objects, it is necessary to understand which ones are preferred or which generate aversion for a certain animal group. There are few studies focused on the selection of the type of enrichment for small ruminants. Within this context, the objective of this work was to evaluate the preference of Boer goats, raised in confinement, for objects used as environmental enrichment, improving their behaviour. During the experimental period, the diet and management did not change, the experimental design consisted of 5 repetitions (goats, n=5) and 5 treatments, or objects, namely: tires, ball, chains, pots (with stones) and brushes. The objects were provided all together and unlimited, for four weeks. Two suspended tires were used, a ball suspended with a rope at 50 cm from the height of the animal, two chains suspended at the same height as the ball, two plastic pots (capacity of 1 L) loose on the floor containing stones; and wall mounted brushes. During enrichment, the time that each animal spent on the objects was computed, over an hour, three times a week, always in the afternoon, at 3 p.m. The sum of the times of each animal was computed at the end of the period and calculated as a percentage in relation to the total hours, and these averages (n=5) were used to represent the data, being called preference. The Boer female goats preference (%) for same objects types used in the enrichment behavioural was statistically significant (p= 0.046), for Friedman's Test. The greatest preference, in absolute values, was observed for tires (median = 40.00%), with values between 20.00 and 61.54%, with an interquartile range of 6.67, where 50% of data are concentrated. In second place, in absolute values, but statistically equal to the tires, are the chains (median= 33.33%), which varied between 15.38% and 40.00%. The ball, statistically, was only inferior to the tires, having the same preference as chains (median=15.40%), brushes (median=7.70%) and pots (median=0.00%), and these 3 objects had rejection or no interaction. with at least one of the goats, since the minimum value and Q1 were zero. Although the use of chains is not common in enrichment work with goats, the object proved to be interesting, and its preference, in addition to movement, can be explained by the noise and possibility of biting, attributes considered attractive to goats according to De Paula et al., (2018). The ball, brush and pot enrichments did not differ from each other, as well as the currents, but were statistically inferior to the tire. The use of environmental enrichment with the different objects, improved the behaviour of female goats of the Boer breed, while they were present in the stall, with greater preference for tires and chains.

Keywords: Boer female goats, Environmental enrichment objects

Smart Farming Applications on Agriculture

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Recently a new “smart farming” has been widely applied, which makes agricultural land more efficient and effective through higher management. Smart agriculture is an agricultural activity resulting from the application of smart technologies and approaches in the management and development of agricultural fields. The increase in the total world population (8 billion) allows us to predict that the area of land used for agriculture will be very seriously reduced in the coming years. İnefficient harvesting, poor planning, unpredictable weather conditions, irrigation systems and other problems are the most important reasons for the decline in food production. The latest technology in the Internet of Things (IoT) smart systems, "Smart Farming" is often used. Each crop field has a set of requirements that can be measured both qualitatively and quantitatively in smart research. In this regard, the study and application of machine systems in agriculture is already widely used and contributes to increasing yields. The adaptability and ability of certain plant species is determined by several important factors for smart farming, including nutrients, soil, pests, and irrigation. Determining deep learning algorithms requires analysing decades of field data to analyse crop yields in different climates and new traits learned in the process. This information will allow us to predict which genes will give the plant beneficial traits and allow agronomists to study evaporative processes, soil moisture and temperature to understand ecosystem dynamics and barriers to agriculture. Water management in agriculture affects the hydrological, climatic and agronomic balance. Accurate yield forecasting is one of the most important topics in agriculture. Monitoring, forecasting, navigation, various scientific research, etc. in remote sensing applications using sensors. The key position of weather in the development of agriculture affects yields, so several studies have been carried out to find out the impact of weather on smart farming applications in artificial intelligence. In smart farming, Spandana reported all the problems faced by the farmer with the soil due to climate change, aspects affecting evapotranspiration, plant growth factors, soil problems, connecting various sensors to the controller, how to collect sensor data and store data in the cloud using the capabilities of the IoT. With this information, and depending on climate change, soil moisture levels, soil type, soil and water quality, farmers can decide what type of crop is suitable for a given area and how much fertilizers (nitrogen, phosphorus and potassium content) will be able to determine. As a result, the impact of these approaches on water conservation and crop production was collected, and it was concluded that the application of smart irrigation technologies to large varieties of food crops such as tomatoes and potatoes around the world will create more production opportunities in the future. Elements used in the agricultural sector are carried out via the Internet, such as diagnosis of crop diseases, analysis of soil fertility and erosion, irrigation, seed quality, fertilizer and pesticide control. In this article what information can be obtained using artificial intelligence in smart agriculture, the importance, advantage and new possibilities of using machine learning methods have been discussed. With the use of IoT in agriculture, it can be used in many areas such as monitoring, irrigation, pest control, harvesting and etc. Yield forecasting, planting dates, yield data and crop rotation are some of the valuable information that controls next season's crop rotation.

Keywords: Smart farming, Agriculture, Internet of Things (IoT)

Characterization of the Population of Alpacas in the Community of Maure in the Province of Tarata-Tacna Region

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The study of the population structure of alpacas allows the identification of useful characters or parameters in improvement plans, to establish monitoring and evaluation indicators of animal populations according to the geographical space they inhabit and to quantify their productive potential. There is limited information regarding the characterization of the alpaca population at the level of peasant communities. Therefore, this research work was carried out in the Altondina community of Maure in the province of Tarata-Tacna, from August to December 2015, in order to determine the structure of the herd, according to species and breed, for which the phenotypic evaluation of 1712 animals belonging to 18 families from the annexes of: Kallapuma and Mamuta; through a survey application and observation of frequencies and proportions of the herd, to then analyse the data expressed in percentages through Chi-square. Obtaining the following results: The average number of animals per family was 17.66 ± 6.41; herd composition according to class: adults 41.4%, female tuis 12.2%, female offspring 13.9%, adults 7.7%, male tuis 10.4% and male offspring 14.3% ($P \geq 0.05$); the composition according to race: suri 7.3% and huacaya 92.7% ($P \leq 0.01$). Concluding that in this area of the altiplano there is a considerable population of alpacas, and they are within the parameters established in livestock production.

Keyword: Alpacas, Huacaya, Tacna

Convolutional Neural Networks for Time Series Analysis in Agriculture

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Agriculture is one of the most important sectors for all countries around the world. Especially for developing countries like Turkey, agriculture poses more important share in national economy and employment. The nature of agricultural production has certain uncertainties and open to many external factors like climate, diseases and fluctuating product prices. It is now always taken for granted that the products that have been sold at high prices to continue to generate high income for the next production year. Cobweb theorem is a well-known economic model that explains why prices are subject to periodic fluctuations. Therefore, many researches have been carried out to predict the food prices for the coming year in order to provide prior information to producers. Most of the previous studies have employed statistics regression models like ARIMA, SARIMA for the time series analysis of agricultural product prices. Scientific world has been blessed with the recent development of deep learning models. Especially the state-of-the-art performance of Convolutional Neural Networks are quite noteworthy. These models are primarily used to solve computer vision tasks like object detection and classification. In the recent years, their usage for regression problems has been a hot topic in the recent years. There are dozens of variants of convolutional neural networks and some of them are suitable for time series analysis. They can be used for anomaly detection and regression prediction in time series. In this study, we will demonstrate how to use CNN models for univariate and multivariate time series forecasting of agricultural product prices. The code will be presented during conference.

Keywords: Convolutional Neural Networks, Time Series Analysis, Food Prices

Investigation of Colony Performance Characteristics of Queen Bees Obtained via Larva Transfer in Sustainable Beekeeping in the Mediterranean Region

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Colonies of honeybees (*Apis mellifera* L.) are beneficial insects that contribute to a country's agricultural productivity as well as provide people with useful bee products. The contributions that nations make to their economy are significant in this regard. The growth rate of the colony depends on the genetics of the queen, the queen's age, the genetics of the bee that mate with the queen, the queen's quality. For this reason, the selection of breeding colonies gains importance in queen bee breeding. Honey yield is directly related to colony population strength. The present study was conducted at Cukurova University, Faculty of Agriculture, Department of Animal Science, in the Beekeeping Unite, between 2018 October and 2019 February-July. Colonies were fed supplementary diets during October 2018 and February 2019. These feeding diets were applied in 3 groups (Group A: Bee Food + Powdered Sugar/1:3, Group B: Soy Meal+Milk Powder+Bee Food/2:2:3, Group C: Control) for 3 weeks. 120 colonies (3 groups x 4 larval transfer x10 colonies) were selected randomly in March 2019 from breeding colonies. In the period of March-July 2019, brood surface areas and adult surface area of the research group colonies were recorded with a camera every 21 days, and the estimated number of frames of brood and adult bees. The colonies were taken to Tufanbeyli region for honey production on 10 June 2019. In these colonies, honey was harvested between 22-30 July 2019. The number of frames of adult bees, the number of frames of brood, the adult surface area, the brood surface area, and honey yield were tested in the randomized complete block design with 10 replications. The average the brood surface area in research production colonies was determined as 9863.03±675.21 number/colony. When the difference between the groups has been examined, it is seen that the best group is Group B (Soya Flour+Milk Powder+Bee Feed). The average the number of frames of brood in research production colonies (number/colony) was determined as 4.62±0.28. When the difference between the groups has been examined, it is seen that the best groups are Group A (Bee Feed + Powdered Sugar) and Group B (Soya Flour+Milk Powder+Bee Feed) ($p<0.05$). When the difference between the transfers has been examined, it is seen that the best transfer is number 1 ($P<0.05$). The average the adult surface area in research production colonies was determined as 18433.93±1323.54 number/colony. When the difference between the groups has been examined, it is seen that the best group is Group B (Soya Flour+Milk Powder+Bee Feed) ($P<0.05$). The average the number of frames of adult bees in research production colonies was determined as 7.11±0.43 (number/colony). When the difference between the groups has been examined, it is seen that the best groups are Group A (Bee Feed + Powdered Sugar) and Group B (Soya Flour+Milk Powder+Bee Feed) ($P<0.05$). When the difference between the transfers has been examined, it is seen that the best transfer is number 1 ($P<0.05$). The average honey yields of research production colonies were determined as 17.01±1.63 (kg/colony). When the difference between the groups has been examined, it is seen that the best groups are Group A (Bee Feed + Powdered Sugar) and Group B (Soya Flour+Milk Powder+Bee Feed) ($P<0.05$). When the difference between the transfers has been examined, it is seen that the best transfer is number 1 ($P<0.05$). Under the Cukurova conditions, beekeepers' work with degenerated, unproductive bee genotypes results in a decline in honey yield, the loss of colonies, and financial loss. Technically, producing queen bees from breeder bee genotypes adapted to the area and providing them to local beekeepers will boost the region's agricultural and beekeeping industries.

Keywords: Colonies of honeybees, *Apis mellifera* L., Larva transfer

A Critical Review on Health Promoting Benefits of Sana Makki (Senna alexendrina)

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Currently with the discovery of modern drugs and their significance, natural products-based drugs are also looked for their potency in treating various microbial and other infections. *Senna alexandrina* is an evergreen shrub grown throughout the year. It has antimicrobial and anti-inflammatory properties. It is commercially grown in Pakistan, India, Sudan, and Egypt. It has been used in Indian conventional medicine for its good pharmacological effects. The objective of current review is to discuss the chemical components, uses and potential effects on human health of senna plant.

Keywords : *Senna alexendrina*, pharmacology, phytochemistry, inflammatory, human health

Medicinal Potential, Health Benefits and Bioactivity of Mentha piperita L. (Peppermint)

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Mentha piperita L. (Peppermint) is a medicinal plant that has gotten a lot of attention from the industrial sector (food and pharmaceutical) because of its wide range of health benefits. Since peppermint is a single ingredient that is commonly used in conventional medicines around the world for a variety of health problems. With the assistance of this review paper, an effort has been made to investigate the nutritive, biochemical, and health potentials of Mentha piperita. In this study, we discussed the key basic components found in Mentha piperita, as well as their behavior against various diseases such as antimicrobial and nervous system actions. They have cardiovascular and hypotensive benefits, as well as antitumor activity and nutritional benefit. In conclusion, this plant is a simple goal for scientists and researchers to investigate, and the materials that have been tested should be used to deter human diseases.

Keywords: *Mentha piperita*, peppermint, medicines, health benefits and disorders

Disasters, Animal Health & Veterinary Services

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Veterinary disaster science or veterinary disasterology is one of the significant research topics that have received more attention in recent years. This may be due to the fact that little is known about the links between disasters, animal diseases in disasters, sustainable animal welfare, public health, and the control of diseases and zoonoses. Disasters can negatively affect human and animal health and disrupt the daily life. Depending on the magnitude, it may affect the societies more deeply with its secondary effects on the economy and trade, which may be permanent in the medium-long term. The faster transportation of men and animal with the side effect of globalization allowed to move faster and as a result increased the population density and frequency in some regions and also led to an increase in the trade of animals and products. Undoubtedly, those most affected by disasters are children, the elderly, and women. More than 80 % of infections have been reported in children less than 2 years of age. This review is aiming to focus on evaluation and observation of animal health and veterinary services and related studies in natural disasters.

Keywords: Animal Health, Disasters, Veterinary Services

Cabbage Productivity as a Function of the Application of a Biostimulant based on Seaweed Extract, Amino Acids and Nutrients

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The current agricultural scenario requires changes that mitigate the effects of environmental impacts and reduce the dependence of the activity on nitrogenous fertilizers, which were responsible for the great increase in the cost of agricultural production in recent years. In this sense, products such as biostimulants, based on seaweed extract, amino acids, humic substances, or microorganisms, can increase the plant's efficiency in absorbing nutrients, requiring less inputs. Therefore, the present study aimed to evaluate the effect of foliar application of biostimulant based on seaweed extract Ascophyllun nodosum L., amino acids and nutrients in cabbage. The experiment was conducted in a completely randomized experimental design, with four treatments and three replications, using the cabbage cultivar Astro Plus. The treatments consisted of foliar applications of biostimulant based on seaweed extract, amino acids and nutrients at doses 0.75; 1.50 and 3.0 ml L^{-1}, in addition to the control treatment (producer's standard), which follows all the recommendations for the culture. The use of the biostimulant based on Ascophyllun nodosum L., amino acids and nutrients influenced positively the cabbage cultivation, proving to be an alternative for the culture. Therefore, a dose of 3.0 ml L^{-1} is recommended.

Keywords: Sustainable agriculture, *Brassica oleraceae*, Alternative products, Foliar fertilization, Vegetables

Cabbage Productivity as a Function of the Application of a Biostimulant based on Triacotanol

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The use of new technologies for the cultivation of vegetables has been implemented significantly in recent years, due to the great demand for healthier foods. Likewise, concern for the environment is the center of global discussion, as climate change is directly affecting agriculture. Therefore, the search for alternatives that generate increases in quality and productivity in the field, with less environmental impact, is recommended. Among the alternatives, biostimulant products may be an option, as they improve the nutritional efficiency of plants, reducing the use of chemical fertilizers, in addition to having their base with substances of natural origin. Second a Regulation (EU) 2019/1009, biostimulant is a:" fertilizing product the function of which is to stimulate plant nutrition processes independently of the product's nutrient content with the sole aim of improving one or more of the following characteristics of the plant or the plant rhizosphere: i) nutrient use efficiency, ii) tolerance to abiotic stress, iii) quality traits, or iv) availability of confined nutrients in the soil or rhizosphere". Triacontanol (TRIA), a saturated long-chain alcohol, is a natural growth regulator found in epicuticular waxes, which acts as a biostimulant. In this sense, the objective of the present work was to evaluate the effect of biostimulants based on triacotanol on cabbage. The experiment was completely randomized, using two treatments and three repetitions. Brassica oleracea var. capitata 'Astrus Plus' seedlings of cabbage were transplanted directly to 15 days advanced prepared soil in Parana, Brazil, was carried out on March 25, 2022, using a spacing of 0.70 m between rows and 0.40 m between plants. The foliar treatment was applied as the biostimulant product (+Biostimulant= product based on triacontanol, with foliar application at 1,5 ml L^{-1} at 45 DAT and 1,0 mL L^{-1} at 60 DAT) and control (-Biostimulant= without addition of the biostimulant). The commercial product used was Revigor (Aqua®), composing of 100 g L^{-1} of triacontanol. At 104 DAT, 4 central plants per plot were evaluated for the average yield (t ha^{-1}). The analysis of the variable average yield indicated that there was a significant difference between the treatments ($p<0.004$). The foliar application with biostimulant of triacontanol (+Bioestimulant=60.6±7.1 t ha^{-1}) increased 16% the average yield in comparation of with biostimulation (-Bioestimulant= 52.6±5.1 t ha^{-1}). This experiment shows that the foliar application of a triacontanol-based biostimulant can satisfy the nutritional needs of vegetables, minimize the environmental impact of fertilization, obtain high productivity and avoid excessive application of fertilizers. It was concluded that the foliar application with biostimulant based on triacontanol had a positive effect on the cabbage crop on compared without application.

Keywords : Sustainable agriculture, Alternative products, Foliar fertilization, Triacotanol

Global Carbon Trading and its Role in the Agricultural Sector

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Carbon footprint is the sum of cumulative greenhouse gas emissions caused directly or indirectly by human activities. Derived from the concept of ecological footprint, carbon footprint is a concept closely related to climate change and human impact. The main source of emissions based on human activities and consumption is carbon emissions resulting from energy production. Since the carbon footprint increases especially due to the energy obtained using fossil fuels, it can be reduced by optimizing the use of energy and obtaining the energy used from renewable sources. Carbon Economy, on the other hand, is seen as the most effective way to control, reduce and finance sustainable development the greenhouse gases that have emerged as a rapidly growing multi-billion-dollar international market and are now called "carbon". Carbon is given an economic value because it pollutes the air. In this context, the fastest growing market in the world is carbon economy and carbon trade. Today, people, companies and/or governments trade carbon. Agriculture is very important in carbon trade as it is a carbon sink area. The aim of this study includes all kinds of work and thought order to obtain a new and environmentally friendly economic income method or model for our country from the economic role we call the already formed carbon market when the policy is followed in accordance with the developing world standards in terms of global changes. Because of this result, in order to reach the result and be productive of the stated purpose in the study, many resources and foreign practices that can serve as an example, as well as all kinds of methods that take into account the market balances are discussed. In addition, the materials foreseen as a result of the research that can contribute to the progress of the application were used. In this study, the subjects were evaluated in terms of global climate change. The applicability of the agricultural sector, on the other hand, should start with the collection of carbon emission data based on the production regions of the product types in order to determine the current situation, and then projects and R&D studies should be put into practice in order to reduce it in the light of the data obtained. There are some standards set for carbon and it is quite effective on the price. For example, if the carbon is in the "Gold Standard", its price can be doubled. The carbon market, which also has retailers and wholesalers, operates like other exchanges. For example, there are various carbon indices and prices in the London and Chicago Stock Exchanges, and prices are constantly changing according to supply and demand. States have made various agreements for a solution and have introduced some new rules to reduce the derivatives of carbon, which is defined as a harmful emission. These rules have created new sectors and fields. It has a great impact on agricultural products, as it is a sink area for the resulting carbon trade. Selling our remaining carbon burning rights as a result of the techniques, plans and modernization stages we have already used to produce agricultural products and imposing on the products with R&D studies and inspections, and the development of the agricultural sector with an income that can come from there can also be used to subsidize a more liveable world and as a result, agriculture sector can be moved to a more sustainable and environmentally friendly phase.

Keywords : Carbon, Carbon trading, Carbon footprint, Agriculture

FULL TEXT

Preferences Boer Female Goats for Environmental Enrichment Objects

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1. Introduction

Small ruminants such as goats and sheep are of great importance for the socioeconomic well-being, especially of people living in underdeveloped countries. Goat farming has great potential for expansion in development countries, but it is necessary to adopt techniques aimed at sustainable. Properly managed confinement systems are highly productive; however, some animals may develop atypical behaviours resulting from stress (Gomes et al., 2018). Environmental enrichment is one of the animal welfares tools that can minimize this problem, through the introduction of elements that refer to the environment of origin of the species (Oliveira et al., 2015). However, in order to obtain effective results, as there are many different types of objects, it is necessary to understand which ones are preferred or which generate aversion for a certain animal group (Volpato, 2007). There are few studies focused on the selection of the type of enrichment for small ruminants. In the case of goats, there are studies with dairy goats (Boe et al., 2012; Guy et al., 2013; Oliveira et al., 2015; de Paula et al., 2018; Kakarash et al., 2021) and goat kids (Tölü et al., 2015). Within this context, the objective of this work was to evaluate the preference of Boer goats, raised in confinement, for objects used as environmental enrichment, improving their behaviour.

2. Materials and Methods

The experiment was carried out at the Experimental Farm of Universidade Tuiuti do Paraná (UTP), in Paraná, Brazil (25° 43" S, 49° 06" W and 911 m sea), in May 2022, using 5 females goats, aged 10,4 ± 0,5 months. During the experimental period, the diet and management did not change, the experimental design consisted of 5 repetitions (goats, n=5) and 5 treatments, or objects, namely: tires, ball, chains, pots (with stones) and brushes. The objects were provided all together and unlimited, for four weeks. Two suspended tires were used, a ball suspended with a rope at 50 cm from the height of the animal, two chains suspended at the same height as the ball, two plastic pots (capacity of 1 L) loose on the floor containing stones; and wall mounted brushes. The choice of these materials was based on studies by Oliveira et al., (2015) and Gomes et al., (2018). During enrichment, the time that each animal spent on the objects was computed, over an hour, three times a week, always in the afternoon, at 3 p.m. The sum of the times of each animal was computed at the end of the period and calculated as a percentage in relation to the total hours, and these averages (n=5) were used to represent the data, being called preference. Data were inspected for normality and non-parametric tests were subsequently selected for analysis. Friedman tests were used to compare of preference for object type used in the enrichment behavioural. Where there was a significant Friedman test result, post hoc analysis with LSD was conducted ($p< 0.05$). Data are presented either as boxplots showing the median and interquartile range from 25th (Q1) to 75th (Q3) percentile or mean and standard deviation in the results text.

3. Results and discussion

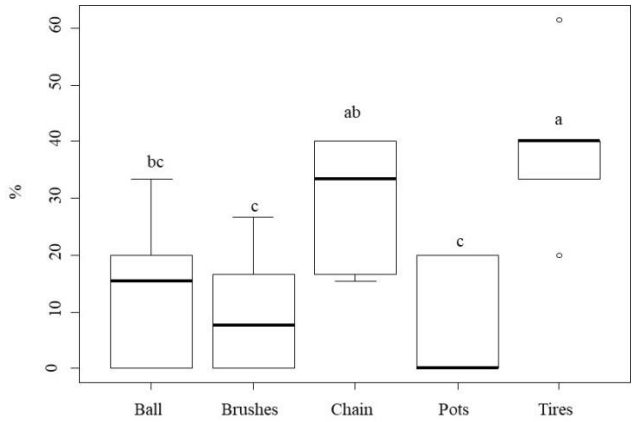
The Boer female goats preference (%) for same objects types used in the enrichment behavioural was statistically significant ($p= 0.046$), for Friedman's Test (Figure 1).

These data are presented in the form of a box-plot, showing the maximum and minimum values obtained, the interquartile interval, between the 1st quartile (Q1= lower base of the rectangle) and 3rd quartile (Q3= upper part of the rectangle), median (line contained in the rectangle) and out liars (points) of the different objects.

The greatest preference, in absolute values, was observed for tires (median = 40.00%), with values between 20.00 and 61.54%, with an interquartile range of 6.67, where 50% of data are concentrated. In second place, in absolute values, but statistically equal to the tires, are the chains (median= 33.33%), which varied between 15.38% and 40.00%.

The ball, statistically, was only inferior to the tires, having the same preference as chains (median=15.40%), brushes (median=7.70%) and pots (median=0.00%), and these 3 objects had rejection or no interaction. with at least one of the goats, since the minimum value and Q1 were zero.

Figure 1: Box plot of Boer female goats (n= 5) preference (%) for different objects of environmental enrichment (E.A.). Curitiba-PR, 2022. *Means followed by the same lowercase letter do not differ from each other by the LSD test ($p<0.05$).



The ball and the pots also showed the same interquartile range and Q3 (20.00%), differing in relation to the maximum value (ball= 33.00%; pots= 20.00%). The brushes had a maximum value of 26.70%, with the interquartile range equal to Q3 (16.70%). For tires, according to Savage (2013), who explains that these animals like objects that stimulate their investigative behaviour and present cognitive challenges. Kakarash et al., (2021) justify the preference for tires for their mobility, causing animals to spend more time playing with them. This mobility also happened in the suspended chains, which did not differ statistically from the tires, and may be one of the factors that contributed to greater interaction.
Although the use of chains is not common in enrichment work with goats, the object proved to be interesting, and its preference, in addition to movement, can be explained by the noise and possibility of biting, attributes considered attractive to goats according to De Paula et al., (2018). The preference for current was also observed in Guy et al. (2013), who analysed greater interaction and exploration through movements and being chewable. The ball, brush and pot enrichments did not differ from each other, as well as the currents, but were statistically inferior to the tire. Difficulty in biting was pointed out by De Paula et al. (2008) as one of the causes of the lower interaction between the goats and the ball, which may also explain the pots. Still, the same researchers attribute the lower interaction with the ball to the absence of noise. The preference for brushes was observed by Gomes et al. (2018) and Kacarash et al. (2021), who report that self-cleaning behaviour is natural and frequent in goats, aiming at the prevention and elimination of ectoparasites. However, in the present study, brushing did not occur during the observation periods, however, it is known that it was an accepted object due to its wear after one week of use.

4. Conclusion

The use of environmental enrichment with the different objects, improved the behaviour of female goats of the Boer breed, while they were present in the stall, with greater preference for tires and chains.

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Economic Analyses of Potato Value Chain and Seed System in Northwest Syria

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1. Introduction

In Syria, the demand for potato food products is increasing (FAO and WFP, 2019), potato is one of the major cash and income-generating crops in terms of supply chain, productivity, marketing, and calorie supply (Emmanuel et al., 2016). In Northwest Syria (NWS), potato is an important food security and a hunger reliever crop. More than half of the country's potato production comes from this region (CRS, 2016). In overall production methods, great quality seed is considered a necessary for high output (Forbes et al., 2020). The cost and quality of seed potato tubers and the agricultural inputs represent a high percentage of the total production cost (Aheisibwe et al., 2015). Seed potato tubers are accounting for more than 40-50% of the total production cost (Janssens et al., 2013). The main problems farmers facing are poor quality and high cost of seed tubers, they also tend to have difficulties in marketing their seed potato tubers because of the lack of storing facilities. Very few farmers in NWS have access to quality seed tubers through the General Organization for Seed Multiplication (GOSM), non-governmental organizations or private sector. Before the crisis in 2011, the potato seed system in Syria was often characterized as formal system that reflects the cooperation between GOSM and private sector under the National Potato Program (NPP) and contributed to a great development in local production of different grades of potato seeds through a several multiplication techniques, starting from tissue culture, glass, and net houses. The contribution also extended to varieties importation, testing, multiplication, certification, storage, and marketing. Consequently, Syria was partially self-sufficient country, in terms of seed tubers production, thus, saved a big amount of foreign currency that was previously spent on seed tubers importation from the European countries.

2. Materials and Methods

The design of questions (Quantitative and qualitative) was based upon the main actors involved in potato seed VC. KIIs (including input suppliers (potato seed importers, agro-pharmacies, fuel suppliers); Governmental/public entities (Local councils, Agriculture offices and GOSM); Farmers who buy potato seed for planting; local potato seed traders; NGOs/charity association and Service providers of seed potato cold storage), FGDs conducted by the host NGOs in several locations in Syria. After completing data collection, the records will be exported from KoBo to Excel to be cleaned. The Statistical Package for Social Sciences software (SPSS) will be used to analyse qualitative data. Open question data, interview and focus group data will be analysed thematically. For each type of respondent, answers to each of the questions from KIIs and FGDs will be summarized, and findings will be drawn into a paper. As a hypothesis and from research team prospective, the seed potato supply chain in Syria before 2011 used to follow the following diagram:

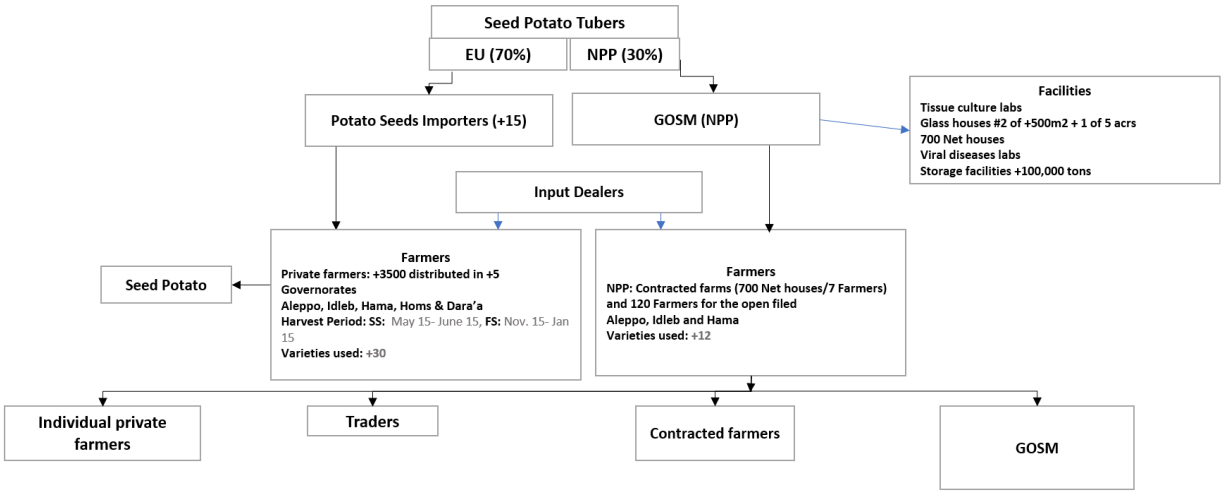

Figure 1: Seed potato value chain in Syria before 2011 from researcher's perspective

3. Results and discussion

After 11 years of devastating conflict, the country turned into a net importer of potato seed tubers, with dwindling production of cereals, fruit, and vegetables. Potato output in the country is currently around two-thirds of what it was pre-crisis, owing mostly to the scarcity and high cost of seed tubers, as well as all other essential inputs, and the resulting reduction in planted area. The informal seed system prevails, accounting for 80% of total potato seed production in this region. In which thousands of small-scale farmers produce seed potatoes, and most of the low production can be attributable to the usage of few quality seed tubers. Furthermore, seed potato supply has yet to be taken up by regional governments and commercial seed corporations, and hence has been disregarded. The legal framework for a formal seed tuber supply chain and certification scheme was implemented at a low level by the new established GOSM in North Syria due to financial limitations. This system is covering around 15% of the region's need of certified seed potatoes. Further, due to the gap in seed quality control, the incidence of diseases has become serious and need due attention. It is noticed that there is a decrease in the production and availability of potato, the export stopped in the last 11 years, and the self-sufficiency ratio decreased under whole of Syria, as well. The certification scheme is traditional and below standards due to the limitations in laboratories, glass, and net houses. Because quality control and certification are lacking, farmers are hesitant to pay higher amounts for seed potatoes because they cannot be certain that they are obtaining the genuine article, also due to the limited extension services, farmers are not applying recommended improved agricultural practices. Furthermore, because of lack of adequate storage facilities, inaccessibility to the market, insufficient processing facilities, and customer exploitation through exaggerated price, the post-harvest losses are significant. Thus, the growth of the potato seed industry is a key priority of development agencies, local governments, researchers and civil society groups.

4. Conclusion

By undertaking this research, the researcher aimed to provide a clear mapping and analysis of seed potato value chain in Northwest Syria, through studying production (yields, cost of cultivation, productivity, efficiency) and its marketing to final customers. Highlight the importance of the use of tissue culture technologies, as well as the fast multiplication technique, true potato seed production, to enhance potato value chain competitiveness. It will also examine the underlying factors (bottlenecks/challenges) inhibiting the chain from achieving higher productivity and identify points for interventions that would support the further development of the seed potato sector in Northwest Syria.

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Integrating Climate-Smart Agriculture for Food Security Using Hydroponics and Precision Technologies

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1. Introduction

Precision agriculture is based on information, technology, and decision support systems for improving productivity and profitability in farm management system (Martinho and Guiné, 2021). It works on the principles and practices of identification, analysis, and managing spatial and temporal variability linked to sustainable agricultural production systems. Hydroponics technology works on the principle of precision supply of essential nutrients to plants for getting maximum yield and by controlling climatic factors (Lal et al., 2011). These PA technologies support hydroponics systems due to judicious application of all farm inputs and control of their effective management at farm level. In Pakistan, hydroponics technology is tested and then adopted at private farms. Due to precision input supplies, the products produced in hydroponics systems are homogeneous in quantitative and qualitative variables (Sardar et al., 2021). Due to this, the prices fetched by the hydroponics products are multiples of the market as compared to their close substitutes. Therefore, the study identifies challenges in the applications of precision agriculture technologies like yield monitors, variable-rate technologies, and proximal soil sensors (e.g., electromagnetic induction, visible-near infrared spectroscopy, and dielectric sensors) in hydroponics systems and aims to evaluate how this technology can improve food security and safety through the efficiency of hydroponics and increase its market size. This technology not only lowers labour costs and increases productivity in hydroponics systems, but it will also be widely adopted for food safety and security in the country.

2. Materials and Methods

We reviewed published literature such as research papers, book chapters, and reports. We filtered only those research papers that were published in peer-reviewed journals and that covered adoption and challenges regarding hydroponics and precision technologies in Pakistan.

3. Results and discussion

This study finds that PA and hydroponics techniques are more efficient and effective for getting higher crop yields, socially desirable production, and an environmentally and economically viable return. Using precision technologies, crop yield showed higher productivity and stability when farmers utilised 150 kg/ha, 115 kg/ha, and 135 kg/ha of nitrogen, potassium, and phosphorus on maize crops, respectively. The cost of the agriculture adaptation depends upon the equipment used and the degree of adoption made. A significant reduction in the cost (41%) is reported just in fertilizer usage due to precision methods. Profitability and reduction in costs using the PA technique demonstrate that returns on investment and economic viability are greater than the traditional farming methods. Industrial agriculture is highly automated, frequently monoculture, and reliant on big farms and fields with extensive fertilizer, water, pesticide, and other chemical treatments. So this system needs to be reformed to maintain food security. Precision farming and hydroponics could be a better solution to this issue (Lipper et al., 2014). PA technologies and hydroponics systems enable farmers to apply fertilizers more accurate proportions and where they are needed, with a better awareness of the soil and crop requirements and conditions (Khoza et al., 2019).

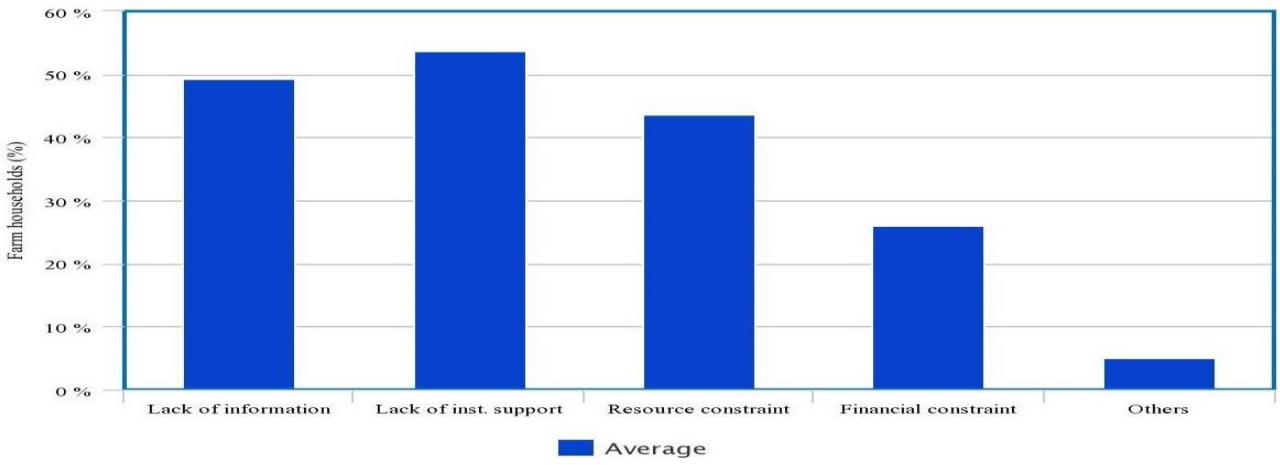

Figure 1: **Farmers' constraints for low adoption of precision agriculture technologies**

4. Conclusion

Precision agriculture (PA) and hydroponics provide an economically friendly solution for developing smart farming. PA is an interdisciplinary approach that seeks to identify, analyse, and manage temporal and spatial variability related to crop production within the fields to maximize productivity, profitability, and sustainability while protecting the environment. The primary purpose of PA technologies and hydroponics systems adoption is to maximize agriculture production while minimizing input usage and reducing environmental degradation. The objective of this paper is to review the literature about PA adaptation techniques and hydroponics systems implications, socioeconomic impacts, financial and economic viability, and gender implications. Published data, case studies, and published reports were investigated to get reliable information. This study finds that the adoption of PA technologies and hydroponics systems help the farmer to improve the yield through utilizing the resources wisely, balancing inputs, and effective utilization of resources only when and where they are required. Many factors—like technical skills, age, and resource constraints—hinder the adoption of precision technologies and hydroponic systems among farmers. Most of the adapters are male because the technology market is dominated by male farmers. Therefore, PA practices and hydroponics systems provide the best sustainable solution to cope with the environmental challenges and to ensure food security as well.

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Smart Farming Applications on Agriculture

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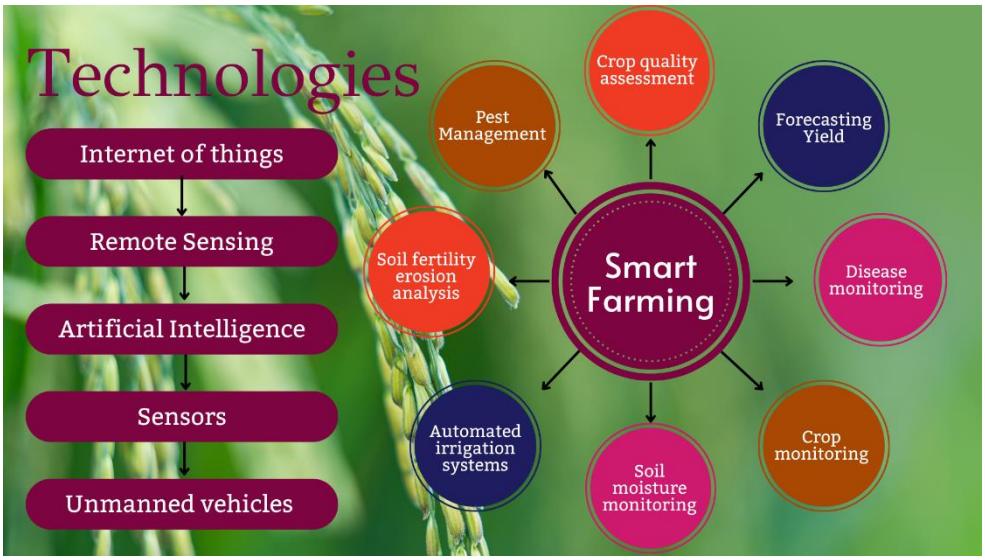
1. Introduction

Recently a new “smart farming” has been widely applied, which makes agricultural land more efficient and effective through higher management. Smart agriculture is an agricultural activity resulting from the application of smart technologies and approaches in the management and development of agricultural fields. The increase in the total world population (8 billion) allows us to predict that the area of land used for agriculture will be very seriously reduced in the coming years. İnefficient harvesting, poor planning, unpredictable weather conditions, irrigation systems and other problems are the most important reasons for the decline in food production. The latest technology in the İnternet of Things (IoT) smart systems, "Smart Farming" is often used. Each crop field has a set of requirements that can be measured both qualitatively and quantitatively in smart research. Accurate location analysis is essential for planning economical and efficient crop production. İn addition to growing the same crop on all existing agricultural land, it is possible to grow different types of crops. İn this regard, the study and application of machine systems in agriculture is already widely used and contributes to increasing yields.

2. Applications

The adaptability and ability of certain plant species is determined by several important factors for smart farming, including nutrients (Ban et al., 2020), soil (Fares et al. 2013), pests (Susilawati, 2022), and irrigation (Abuzanouneh et al., 2022). Determining deep learning algorithms requires analysing decades of field data to analyse crop yields in different climates and new traits learned in the process. This information will allow us to predict which genes will give the plant beneficial traits and allow agronomists to study evaporative processes, soil moisture and temperature to understand ecosystem dynamics and barriers to agriculture. Water management in agriculture affects the hydrological, climatic and agronomic balance. Accurate yield forecasting is one of the most important topics in agriculture. As shown in Figure 1, a number of remote sensing studies have used smart farming.

Figure 1: Smart Farming



3. Discussion

Monitoring, forecasting, navigation, various scientific research, etc. in remote sensing applications using sensors. The key position of weather in the development of agriculture affects yields, so several studies have been carried out to find out the impact of weather on smart farming applications in artificial intelligence. Several studies by Himangshu Das (Das et al., 2018), which are quite accurate and focus on weather, climate and smart agriculture have shown that precipitation forecasting anticipates the rainy season and mainly requires better use of rainfall and temperature for the rainy season. İn smart farming, Spandana (Spandana and Pabboju, 2019) reported all the problems faced by the farmer with the soil due to climate change, aspects affecting evapotranspiration, plant growth factors, soil problems, connecting various sensors to the controller, how to collect sensor data and store

data in the cloud using the capabilities of the IoT. With this information, and depending on climate change, soil moisture levels, soil type, soil and water quality, farmers can decide what type of crop is suitable for a given area and how much fertilizers (nitrogen, phosphorus and potassium content) will be able to determine. Sami Thuile (Touil et al., 2022) discussed various smart and traditional irrigation water reduction methods - soil moisture sensor controllers, evaporation controllers, rain sensors, optical sensors, etc. used. As a result, the impact of these approaches on water conservation and crop production was collected, and it was concluded that the application of smart irrigation technologies to large varieties of food crops such as tomatoes and potatoes around the world will create more production opportunities in the future. Further research is needed to evaluate the cost-effectiveness of the irrigation method under study. Haldi and Ronald (Widianto et al., 2022) conducted a systematic review of Smart Farming to improve productivity. The author reviewed 67 papers on artificial intelligence research focusing on current trends in smart farming and discussed several yield-boosting factors in areas such as weather, soil, irrigation, unmanned aerial vehicles (UAVs), pest control, weed control, and fight against diseases.

The IoT is widely used in the collection, processing and integration of data in many areas and remote sensing is of particular importance in these processes. Crop monitoring using advanced technologies such as artificial intelligence and smart sensors, disease and quality assessment (Kumar Verma et al., 2022), soil moisture measurement (Tripathi et al., 2012) are performed to predict yields and sustainable growth. Smart sensors and the IoT (Ullo and Sinha, 2021) are transforming traditional farming practices into smart farming, helping farmers around the world expand their capabilities. Elements used in the agricultural sector are carried out via the Internet, such as diagnosis of crop diseases, analysis of soil fertility and erosion, irrigation, seed quality, fertilizer and pesticide control.

4. Conclusion

In this article what information can be obtained using artificial intelligence in smart agriculture, the importance, advantage and new possibilities of using machine learning methods have been discussed. The IoT is considered the backbone of smart farming technology, as it integrates all the components of smart systems not only in agriculture but also in other applications. With the use of IoT in agriculture, it can be used in many areas such as monitoring, irrigation, pest control, harvesting and etc. Data mining is a new and rapidly growing field of smart farming, using machine learning to provide farmers with multiple solutions for various applications in the agricultural industry. Yield forecasting, planting dates, yield data and crop rotation are some of the valuable information that controls next season's crop rotation. Although smart agriculture still has several big data challenges that need to be comprehensively addressed, it opens up new possibilities for early predictions in solving common problems.

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Global Warming and Effects on Plant Pathogenic Phytoplasmas

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1. Introduction

Global warming is the rose in the temperature on the earth's surface as an outcome of the greenhouse influenced by the gases released into the atmosphere by humans. In other words, it is the rise of the Earth's temperature. The reason for this is the consumption of fossil fuels, industrial and agricultural activities, and the increase in the amount and density of greenhouse gases in the atmosphere. Climate changes occur as a consequence of global warming. Abnormalities and variations in precipitation, desertification, floods, drought, typhoons, storms, and tornadoes are all indicators of climate change. Climate changes, which are a result of global warming, cause changes plant fauna at different latitudes, causes alterations in agroclimatic zones, leading host plants to move into new regions and the formation of novel disease complexes. (Hunjan and Lore, 2020) and the life cycles of vector insects that transmit plant pathogenic phytoplasmas that cause diseases in plants. For example, the prolongation of the active period of vector insects, the increase in plant diversity, the movement of plant species and vector insects feeding on these plants to different latitudes result in the emergence of new phytoplasmas in previously non-existent regions. Climate change may lead to the emergence of new pathogen strains that impair pathogen development, host-pathogen interactions, and disease resistance of host plants. As a result of all these changes, phytoplasma diseases that occur in newly opened areas for agricultural activities cause yield losses.

2. Materials and Methods

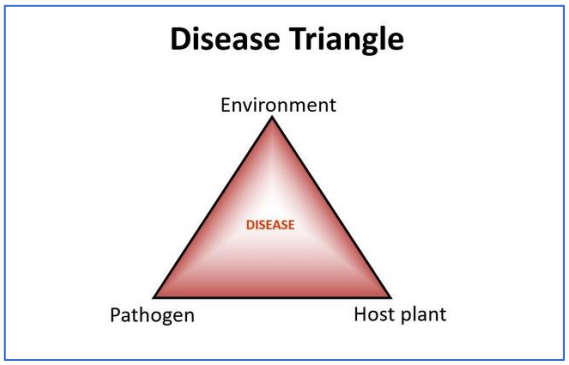
Among the factors that cause global warming are increased use of fossil fuels, destruction of forest areas, increasing livestock farming and release of more carbon dioxide CO_2 into the atmosphere. Some gases such as CO_2, methane, nitrous oxide and fluorinated gases accumulated in the Earth's atmosphere function like greenhouse glass, absorbing sunlight and preventing it from seeping back into space. As a result, the temperature of the atmosphere increases and the climate changes on the earth. Climate change causes new areas to be opened to agricultural activities, new plant cultures to be grown, vector insects feeding on these plants to reach new areas and new plant diseases to emerge.

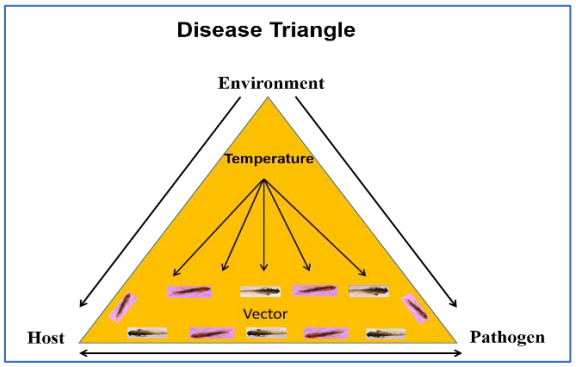
As it is known that plant diseases, their prevalence and severity arise from three influence factors as such host plant, the environmental circumstances and pathogen (Figure 1.) (Steven A., 2018). In this disease triangle, vector insects and prolongation of active periods of vector insects are of particular importance (Figure 2.). As a result of the prolongation of the active periods of the vector insects, the vector feeds on a greater number and variety of plants and transmits phytoplasma to a greater number of plants.

Phytoplasmas are obligatory intracellular parasites of plant phloem tissue as well as economically considerable plant infections spread by phloem-feeding insects (Hogenhout, 2009). Plant pathogenic phytoplasmas are spread from plant to plant by insects of the families Cicadellidae (leafhoppers), Fulgoridae (planthoppers), and Psyllidae (jumping plant lice), and the host range of phytoplasmas is dependent on the insect vector's eating habits (Weintraub and Beanland, 2006). Due to the increase in plant diversity as a result of global warming, phytoplasmas will spread to new and wider areas as vector insects will feed on a greater number and variety of plant species. In addition, the temperature levels and the amount of CO_2 affect the interactions of phytoplasmas with vector insects, the multiplication of phytoplasmas in the vector body and the latent period of pathogen. Due to the different temperature and CO_2, phytoplasma agents multiply in the vector faster, become infective in a short time and transferred to new plants quickly. Sometimes this situation can be reversed for different phytoplasmas.

Figure 1: Triangle of Plant Disease

Figure 2: Plant disease triangle and vector insects





3. Results and discussion

As a result of global warming, climates are changing at different latitudes from south to north on Earth. As a result of global warming, climates are changing at different latitudes on Earth from south to north. These climate changes bring about some changes as such the change and expansion of agricultural production areas, the change of region of different plant species, the arrival of vector insects that feed on these plants and transmit phytoplasma diseases to new areas, the prolongation or shortening of the active periods of vectors. In the areas where all these changes occur, the habitual agricultural production habits are changing, and it has become necessary to develop methods of struggle against previously unknown and subsequently emerging diseases. Until all this confusion is understood, serious yield losses occur due to negativities and plant diseases.

4. Conclusion

The resulting climate change will also affect the timing, preference and effectiveness of chemical, physical and biological control measures in the control methods against diseases and disease management. Plant disease management will become increasingly difficult when a broad analysis of the influence of global climate change on disease control is undertaken, especially when new plant species enter to new area. For this reason, effective plant protection strategies suitable for new conditions should be produced with the integration of all control methods (Zayan, 2019).

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Challenges and Solutions in Detection and Characterization of Phytopathogen Phytoplasmas

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1. Introduction

Phytoplasmas are obligate intracellular parasitic pathogens that restricted in the phloem of host plants and can multiply in vector insects that transmit them from plant to plant. Phytoplasmas are pathogens of agriculturally important plants that cause various symptoms depending on their virulence, plant species and environmental conditions and the most widespread in subtropical and tropical area. Plant pathogenic phytoplasmas are transmitted from plant to plant by vectors a such families Cicadellidae, Fulgoridae, and Psyllidae and they both survive and replicate in their vectors (Bertamini, et al., 2004; Weintraub and Beanland, 2006). Phytoplasmas infect approximately more than 1000 plant species and cause a wide variety of symptoms in these plants. Among the symptoms it causes, the most common ones are phyllody and virulence (Lee, et al., 2000). Vector insects belonging to these families feed on the phloem of infected plants. As a result of feeding, they take the phytoplasma into their body and then transmit agents to healthy plants where they can be fed. Hence, the host range of phytoplasma depending on the feeding habit of insect vectors. Phytoplasmas have not been isolated alive since they were discovered and they could not be cultured in vitro media because they are obligate parasites. Since they cannot be isolated and cultured live, difficulties still remain in their detection and characterization. Therefore, classical diagnostic techniques including symptomology and antibiotics as such tetracycline application were used. Phloem tissue sections taken from plants suspected to be contaminated with phytoplasma were also examined (Doi et al., 1967). In later years, accurate identification of various phytoplasma races and species was achieved by using more sensitive molecular techniques such as Polymerase chain reaction (PCR) and Restriction Fragment Length Polymorphism (RFLP) based on the genetic features of the phytoplasmas (Chen; et al., 1992). Thanks to the recently developed modern techniques, the infection levels of phytoplasma can be measured and quantitative PCR and bioimaging can effectively measure the amount of phytoplasma in the plant (Christensen et al., 2004).

2. Materials and Methods

All tissue part of the infected plants including phloem tissue (leaf, branch, stem, root ect.) are used to detect and characterize of plant pathogenic phytoplasmas. In addition, vector insects carrying the agent are also used individually as material. DNA isolation is carried out from all these plant parts using the CTAB method (Ahrens and Seemüller, 1992) and commercial kits. The total DNAs obtained are considered as target nucleic acids and amplified by direct and nested PCR method using many diverse primer pairs, dNTPs, Taq green buffer and Taq DNA polymerase. If the PCR products obtained by PCR and visualized by electrophoresis have the molecular weight expected from the primer pair used, these PCR products are sequenced with two side using reverse and forward primers. The resulting DNA sequences were edited and assembled utilization MEGA 7 (Kumar et al., 2016). The obtained sequences are compared to those of phytoplasmas using the National Center for Biotechnology Information's Basic Local Alignment Search Tool (BLASTn) system (https://www.ncbi.nlm.nih.gov/).Sequences from the 16S rRNA gene are subjected to in silico RFLP analyses with the iPhyClassifier appliance (Zhao et al., 2009). Additionally16S rDNA, different gene sequences are also used in RFLP analysis to examine and identify of the phytoplasma confirmed. The DNA sequences obtained at the end of all studies are subjected to phylogenetic analysis and the phylogenetic relationship of phytoplasma with other phytoplasmas is revealed.

3. Results and discussion

The fact that there are many factors affecting the symptoms caused by disease agents, and therefore, symptomatic diagnosis alone is not sufficient. The difficulties encountered during laboratory studies can be listed as follows. The ratio of DNA belonging to the phytoplasma agent in the total NA obtained from DNA isolation work is less than 2% of the total DNA. For this reason, the targeted region on the phytoplasma DNA cannot be reproduced sufficiently and easily. There are many primer pairs used together (Heinrich et al. 2001). Among these, non-specific PCR amplifications, amplification of the DNA of the plant host, or other issues occasionally occurred. For

example, extra bands of various sizes in addition to the band of the predicted size using the P1/P6 primer pair (Siddique et al., 2001). The same negative situations are encountered with the use of P1/P7 primer pair. On the other hand, there are errors in the concentration of compounds used in PCR assays and deficiencies in the sequences of PCR products obtained by using Taq DNA Polymerase enzymes that do not have proof reading activity. Incomplete and incorrect results in phylogenetic analyses obtained by using the DNA sequences of a single gene. All these negativities make the accuracy of the results obtained from the studies questionable

4. Conclusion

As a result, for the accurate and reliable diagnosis and characterization of phytopathogen phytoplasmas, more meticulous and clean work should be done in DNA isolation and even isolation kits should be used if possible. The methods used by previous researchers must be questioned and optimized in your own laboratory. After the use of universal and nested primers during PCR studies, specific primers should be used if possible for more reliable and accurate results. During the genome assembly and mapping process, necessary precautions should be taken to prevent host DNA contamination. Particular care should be taken during BLAST and phylogenetic analysis. Due to the lack of an effective control method against obligate intracellular pathogens such as phytoplasmas, the results obtained must be evaluated well in order to diagnose phytoplasma correctly and to control them effectively.

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Transforming the Productive Landscape of the Osa Peninsula, Through the Regenerative Economy

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1. Introduction

The Osa Peninsula is located on the southeast coast of the Pacific Ocean, made up of the districts of Sierpe and Bahia Drake de Osa, as well as Puerto Jiménez de Golfito. These cantons have a very low human development index, being among the poorest cantons in Costa Rica.

Currently, more than 60% of the palm oil (*Elaeis guineensis*) that is produced in Costa Rica comes from these two cantons, being the oil palm monoculture one of the main landscapes in the territory, carrying this productive model, a series of problems economic, social and environmental.

In an effort to build a sustainable human development and environmental management strategy for this territory, in 2017 Stanford University, through the Osa-Golfito Initiative, identified, together with palm producers, a new production model The concerted model consists of diversifying the cultivation of oil palm with other species of commercial value, such as cocoa, musaceae and wood, in such a way that through regenerative agriculture, biodiversity and profitability of production systems are promoted.

The implementation of this project will contribute to the dimensions of 3D Economic Development and Decarbonization, in their respective actions: (37) implement triple helix alliances, (34) promotion of export sophistication, (41) improve agricultural practices, (42) develop sustainable agribusiness, and (43) improve forestry practices.

This project, in addition to establishing, together with producers, diversified production systems in the field, aims to design and implement a post-harvest management center with self-sufficient energy for vanilla and cocoa that serves to generate a marketing strategy where identify favourable international markets. Contributing in this way, with SO 6 of the Territorial Economic Strategy for an Inclusive and Decarbonized Economy 2020-2050, which proposes to generate new green jobs that promote the transition to a 3D economy.

2. Materials and Methods

The diversified production systems of the 16 selected farms will be designed and implemented, where training will be established for the beneficiaries in good agricultural practices (development of bio-inputs, reproduction of efficient microorganisms, training pruning, maintenance and sanitation, among others).

Table 1. Objectives

General objective of the project: Support productive diversification to increase economic resilience, through regenerative agriculture, sustainable agribusiness and fair trade.
Result 1: Establishment of at least 16 diversified production systems that promote regenerative agriculture.
Result 2: Design and installation of a forced hybrid solar thermal system for the fermentation and drying of vanilla and cocoa that allows standardizing the process conditions for both products without affecting their chemical and sensory quality.
Result 3: A commercial strategy developed for agro-industrialized products where favourable international markets are identified.

Figure 1 Production Model

3. Results and discussion

At least the establishment of 16 diversified production systems that promote regenerative agriculture. A design and installation of a forced hybrid solar thermal system for the fermentation and drying of cocoa and vanilla that allows standardizing the process conditions for both products without affecting their chemical and sensory quality.

A commercial strategy developed for agro-industrialized products where favourable international markets are identified.

4. Conclusion

This research hopes to improve the agroforestry systems in the Osa area, in addition to generating greater socioeconomic stability for the members of the Cooperative.

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Convolutional Neural Networks for Time Series Analysis in Agriculture

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1. Introduction

Agriculture is one of the most important sectors for all countries around the world. Especially for developing countries like Turkey, agriculture poses more important share in national economy and employment. The nature of agricultural production has certain uncertainties and open to many external factors like climate, diseases and fluctuating product prices. It is now always taken for granted that the products that have been sold at high prices to continue to generate high income for the next production year. Cobweb theorem is a well-known economic model that explains why prices are subject to periodic fluctuations. Therefore, many researches have been carried out to predict the food prices for the coming year in order to provide prior information to producers. Most of the previous studies have employed statistics regression models like ARIMA, SARIMA for the time series analysis of agricultural product prices. Scientific world has been blessed with the recent development of deep learning models. Especially the state-of-the-art performance of Convolutional Neural Networks are quite noteworthy. These models are primarily used to solve computer vision tasks like object detection and classification. In the recent years, their usage for regression problems has been a hot topic in the recent years. There are dozens of variants of convolutional neural networks and some of them are suitable for time series analysis. They can be used for anomaly detection and regression prediction in time series. In this study, we will demonstrate how to use CNN models for univariate and multivariate time series forecasting of agricultural product prices. The code will be presented during conference.

2. Materials and Methods

Material

Data preparation and pre-processing are important initial steps before using CNN like architectures. These networks require data to be prepared in a certain structure. For this demonstration purpose, we will be using contrived time series to represent food prices. Let's assume that we have monthly apple prices that linearly rises as shown Table 1 below. Please note that these are contrived values to enable us to focus on model rather than economic analysis.

Table 1. Monthly Apple Prices in TL

Months	January	February	March	April	May	June	July	August	September	October	November	December
Prices	10	20	30	40	50	60	70	80	90	100	110	120

This table needs to be designed in input/output pattern in a way that time series can be used as input and the next time step as output (Table 2). A special function written for this purpose will be demonstrated in the representation.

Table 2. Data preparation

inputs			output
10	20	30	40
20	30	40	50
30	40	50	60
60	70	80	90
90	100	110	120
100	110	120	?

We will be using the following contrived multiple input time series for the multivariate analysis.

Table 3. Monthly Apple and Orange Prices in TL

Months	January	February	March	April	May	June	July	August	September	October	November	December
Apple	10	20	30	40	50	60	70	80	90	100	110	120

Orange	**15**	**25**	**35**	**45**	**55**	**65**	**75**	**85**	**95**	**105**	**115**	**125**

Similar to the first univariate time series, these values need to be converted into time steps. For instance, if we choose three time steps, the time series can be shown in this matrix [[10 15 25], [20 25 45], [30 35 65], [40 45 85], [50 55 105], [60 65 125], [70 75 145], [80 85 165], [90 95 185]]. And the initial inputs become [[10, 15], [20, 25], [30, 35]] and the output is 65.

Method

A typical Convolutional Layer in CNN has the following input shape (batch size, input dim, channels). The key thing for time series analysis is the channels attributes, which determines the input size. Conv2D is used for image inputs, which means that input image has 2 dimension and multiple channels like RGB, Conv3D is used for video inputs, which means that input video has additional time axis different from images. We have to use Conv1D for time series analysis as the input data whether it is univariate or multivariate consists of two main dimensions, one is the data itself another is the time. In Conv1D, kernel needs to slide through one direction along time component of the data, what is needed for time series analysis. The following simple model is constructed and used for both univariate and multivariate analysis. The important thing to notice here is that the shape of the input which model expects as input for each sample, (number of time steps and number of features). The CNN model views the data as a sequence over which convolutional read operation will be performed like a one-dimensional image. The Conv1D layer consists of 64 filter map and a kernel size of 2. Adam version of stochastic gradient descent is used during learning phase optimized by mean squared error (MSE) loss function.

```
model = Sequential()
model.add(Conv1D(filters=64, kernel size=2, activation='relu', input shape=(n_steps, n_features)))
model.add(MaxPooling1D(pool_size=2))
model.add(Flatten())
model.add(Dense(50, activation='relu'))
model.add(Dense(1))
model.compile(optimizer='adam', loss='mse')
```

3. Results and discussion

In this section, the models are trained for 1000 epochs both for univariate and multivariate time analysis. In fact, the model structure is quite simple which consists of 1 Conv1D, 1 MaxPooling and 1 Dense layer. In real world applications, the architecture normally contains many convolutional operations and can be even supported with pre-trained models. Despite the simplicity of the model in this study, the results are quite satisfying.

Table 4. Results of univariate and multivariate time series analysis

Time Series Analysis	**Expected value**	**Output of the model**
Univariate	130	130.91481
Multivariate	245	246.77997

It should be noted that CNN models have a stochastic nature in evaluation. Therefore, the model could produce different outcomes at each run. But the outcomes will be close to each other, and the error will not be big enough to make a difference in the performance of the models. Multiple prediction can be made and the average of the outcomes can be used for evaluating the performance in any case.

4. Conclusion

In this paper, the performance and availability of Convolutional Neural Networks are discussed for univariate and multivariate time series analysis. The results of the model are quite satisfying for both use cases despite the simple structure of the network. This shows the potential of the CNN architecture for solving various regression tasks. This study can be expanded on multi-step multiple input time series as well.

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Antioxidant Variations during Flower Development of *Rosa damascena*

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1. Introduction

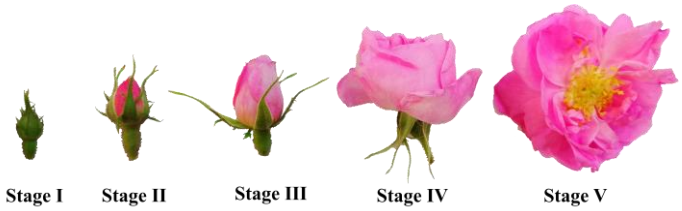
Rosa damascena Mill. known as the oil-bearing rose is a member of Rosaceae family and it is cultivated worldwide due to its economic value. Because they are essential for plant reproduction and evolutionary growth, flowers are among the most significant plant organs. Enzymatic antioxidant and non-enzymatic antioxidant variants shed light on the probable roles of antioxidants and the functions of antioxidant enzymes in flower development control. The purposes of this research were evaluating the non-enzymatic and enzymatic antioxidant activities in oil-bearing roses in order to discover the many physiological parameters responsible for blooming.

2. Materials and Methods

2.1. Plant material

R. damascena Mill. var. *trigintipetale*' s six-year-old oil-bearing rose bushes flowers were selected in the early morning (06:00-08:00) from a plantation in Ardıçlı village in Isparta, Türkiye. For the five developmental flowering stages such as stage I, buds closed; stage II, sepals still starting to separate; stage III, sepals separated and colour appropriating more intensive; stage IV, partly opened flowers; and stage V, totally opened flowers, pools of samples were collected in accordance with opening state of the sepals and petals (Fig 1.). Measurements were performed with frozen samples, and outcomes were explained as fresh weight (FW) basis.

Fig 1. The study employed five phases of growth of an oil-bearing rose blossom (Önder et al., 2022).



2.2. Antioxidant enzyme activities and H_2O_2 content assay

For the extraction of CAT (catalase) and SOD (superoxide dismutase), petal samples (10 g) were ground in liquid nitrogen, homogenised in 25 mL of 100 mM ice-cold 50 mM sodium phosphate (pH 6.4) with 0.5 g of polyvinylpolypyrrolidone. The homogenate was centrifuged at 20.000 x *g* for 20 min at 4 °C and the consequence supernatants were applied directly for assay. The Giannopolitis and Ries approach was applied to assess SOD activity (1977). 3 ml of mix contained 50 mM sodium phosphate buffer (pH 7.8), 2 mM riboflavin,75 µM nitro blue tetrazolium (NBT), 50 mM sodium carbonate, 13 mM methionine, 0.1 mM EDTA and 100 µL of the enzyme extract. The test tubes were applied to a fluorescent light for 15 minutes before measuring absorbance at 560 nm with a spectrophotometer (Shimadzu UV-1280). SOD activities were identified as the degree of enzyme activity that consequence in a 50% decrease in SOD-inhibitable NBT reduction. The CAT activities were evaluated use the technique recommended by Chance and Maehly (1955). 100 µl of enzyme extract and 2.9 ml of sodium phosphate buffer (50 mM, pH 7.0) including 40 mM H_2O_2 were combined in a 3 ml reaction mix. For 3 minutes, the absorbance of H_2O_2 (ε_{240}= 36 M^{-1} cm^{-1}) decreased at 240 nm. One unit of CAT was identified as one minute of H_2O_2 breakdown. All antioxidant enzyme activities were defined by protein concentration; every activity consequence is the mean of three replications. The protein content was defined following Bradford procedure (Bradford, 1976). H_2O_2 content was defined according to the procedure of Velikova et al. (2000). Samples (1g) were homogenised in 10 mL of 0.1% TCA and centrifuged at 13.000 x *g* for 20 min at 4 °C. The mixture included 0.5 mL of 10 mM phosphate buffer (pH 7.0), 0.5 mL of the extract and 1 mL potassium iodide (1 M) the reaction was developed for 1h in darkness. The absorption of the mix was evaluated at the wavelength 390 nm by usage

spectrophotometer (Shimadzu UV-1280), and water was applied as viewless. The H_2O_2 content was expressed as μmol g^{-1} FW.

All analyses were carried out in three replicates. Using the SPSS Statistics 22.0 program, the outcomes were submitted to analysis of variance (ANOVA) (IBM, Armonk, NY, USA). To discriminate between means, the least significant differences (LSD, $p \leq 0.05$) were utilized. The mean standard deviation was applied to express all data.

3. Results and discussion

The changes in the content of hydrogen peroxide (H_2O_2) and the activity of superoxide dismutase (SOD), and catalase (CAT) were studied in the petals during the five different flowering developmental stages of the oil-bearing rose. The highest SOD and CAT activity was observed at stage I while H_2O_2 content reached its maximum at stage III. SOD and CAT activities decreased drastically from stage I to stage II. SOD activity continuously decreased during flower development, but CAT activity increased from stages II to III and its activity decreased from stages III to V. The H_2O_2 content increased significantly in stages II and III, while it decreased significantly in the late blooming stages (Stage IV and V). The maximum H_2O_2 content was recorded at stage III (444.5 μmol g^{-1}) and the least was recorded at stage V (328.5 μmol g^{-1}).

4. Conclusion

The current study was carried out to investigate antioxidant differences, including enzymatic antioxidant variants, in the flowers of *Rosa damascena* harvested at 5 developmental stages. This research can be utilized to further understand the probable involvement of H_2O_2 and antioxidant enzymes in floral development control in oil-bearing roses.

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Characterization of the Population of Alpacas in the Community of Maure in the Province of Tarata-Tacna Region

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1. Introduction

Peru is the main world producer of alpaca fiber and its derived products; This situation is due to the larger population of this species. There are two breeds of alpacas, the so-called Huacaya breed has a spongy-looking fleece, with shorter fibers, similar to the fleece of Corriedale sheep, which gives the animal a more voluminous appearance. The Suri breed presents very long fibers that are organized in curls that fall down the sides of the body, similar to what is observed in Lincoln breed sheep; this gives the animal an angular appearance (FAO, 2005). In the llama, two varieties of llamas can be recognized, the Q'ara or peeled, which is characterized by little development of fiber in the body, in addition to the absence of fiber in the face and legs. The Ch'aku or lanuda is the least common and has a greater amount of fiber in the body (Wheeler, 1991).

The study of the population structure of alpacas allows the identification of useful characters or parameters in improvement plans, to establish monitoring and evaluation indicators of animal populations according to the geographical space they inhabit and to quantify their productive potential. There is limited information regarding the characterization of the alpaca population at the level of peasant communities.

The present research work in the Altondina community of Maure in the province of Tarata-Tacna, from August to December 2015, in order to determine the structure of the herd, according to species and breed.

2. Materials and Methods

The research work was carried out with animals belonging to the annexes of Mamuta, Kallapuma, Conchachiri and Challapalca of the Maure community of the district and province of Tarata, Tacna region. The demographic methodology called Population structure used in sheep and alpacas was used (Hick et al., 2019). In total, 1712 animals were sampled between alpacas and llamas from the four annexes of the community from a total of 9 families, of which data was taken individually from all the animals that make up the herds.

The interpretation of the data was carried out through descriptive statistics: averages, standard deviation and variability coefficient, the differences between the proportions of classes and sex, was determined by means of the chi-square statistical test, processed by means of the SAS statistical software.

3. Results and discussion

The number of South American camelids sampled in the community of Maure in the district and province of Tarata, were 1712 animals, with an average of 428 per family, with a dispersion of 91.2 and C.V. of 0.2.

There are no works related to this work, however, in communities in the circumlocution area of Puno where livestock is complementary to agricultural activities, each producer has an average of 17.7 alpacas (Condemayta 2016). However, there is wide variability in livestock ownership as indicated by the FAO (2005).

The distribution by species of South American camelids by annex of the community of Maure gave us the following results: Mamuta: 98.8% of alpacas of the Huacaya breed, 1.2% of alpacas of the Suri breed, 79.2% of llamas of the Ch'aku breed and 20.8% llamas of the Q'ara race; Kallapuma: 100% alpaca of the Huacaya breed, llamas of the Ch'aku breed 75.4% and llamas of the Q'ara breed 24.6%; Conchachire: Huacaya alpacas 99.6%, Suri alpacas 0.4% and Ch'aku breed llamas 100%; Challapalca: 100% alpacas of the Huacaya breed, Ch'aku llamas 96.4% and Q'ara llamas 3.6%.

The gender distribution according to the species of South American camelids in the Maure community was male alpacas a total of 75.15% compared to male llamas which was 24.85%, in the case of female alpacas it was 78.42% and female llamas of 21.58%. The distribution of South American camelids according to age in the Maure community was 74.10% adult alpacas and 71.13% calves, 25.90% adult llamas and 28.87% calves.

The cattle raising system in rural communities is characterized by the formation of "macrofamilies" of animals made up of several species, in which alpacas are part of this livestock in greater or lesser numbers. Similar results were reported by Bustinza (2001), conducting a study in the high Andean communities of Apurímac, indicating that they have a herd made up not only of alpacas, but also of other species. Under these situations, the alpacas suffer from quality and present some congenital anomalies, but they constitute material to carry out scientific research and plan programs framed towards the improvement of this livestock.

4. Conclusion

Concluding that in this area of the altiplano there is a considerable population of alpacas with a phenotypic frequency of variable colours that constitute the alpaca germplasm.

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The Impact of the Innovation of the Olive Oil Extraction System by the Two-Phase Method on the Environment and Sustainable Development. Case Study: Algeria and Spain

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1. Introduction

The dissemination of knowledge as well as the transfer of technology are among the strategies necessary for the development of any sector. It is essential that the increase in production goes without saying with sustainable development. Analysing the relationship between technic and economics, or between technical evolution and economic development, necessitates creativity. This concept in economics is defined according to Schumpeter (1934) as being a historic and permanent alteration in a company's production process. The olive farming business has a significant impact on the rustic economy, local history, and the environment in the Mediterranean Basin. Based on research conducted on a pattern of two olive oil growing region (Bouira in Algeria and Cordoba in Spain), comparative research has been the subject of an identification of the status of the olive oil factories, their operating mode, their effect on the quality of oil, the recovery of waste (pomace and margins) that they manufacture on the environment, also the expectation of adopting an ecologically sound two-phase extraction system.

2. Materials and Methods

This research addresses a socio-economic and environmental study of a specific innovation of a technical nature through a new non-polluting method of extracting olive oils called "two-phase system" in the wilaya of Bouira (Algeria) and compare the results obtained with those of other research carried out in the province of Cordoba in Andalusia (Spain) with the aim of studying the possibilities of its diffusion in the event of its adoption in the region object of our study.

Table 1. Ranking of potential wilayas according to the number of oil mills

Ranking	Wilayas	Number of oil mills				
		Discontinuous System		Continuous System	Total	%
		Traditional	Semi-automatic	Three Phases		
1	Tizi ouzou	350	29	96	475	27.7
2	Bedjaia	214	123	90	427	24.9
3	Bouira	42	81	88	211	12.3
4	Jijel	83	32	36	151	8.8

Fig 1: Map of the geographical location of the wilaya of Bouira

Fig 2 : Evolution of the olive-growing area in Algeria (MADR, 2015)

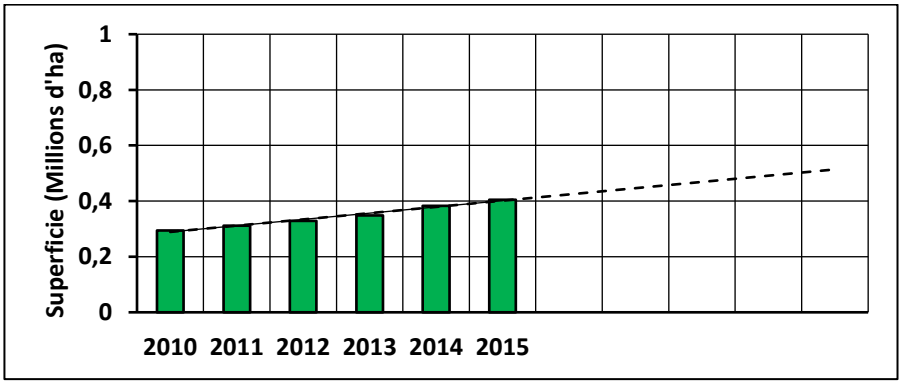


Fig. 3: Olive and olive oil production in Algeria (MADR, 2015)

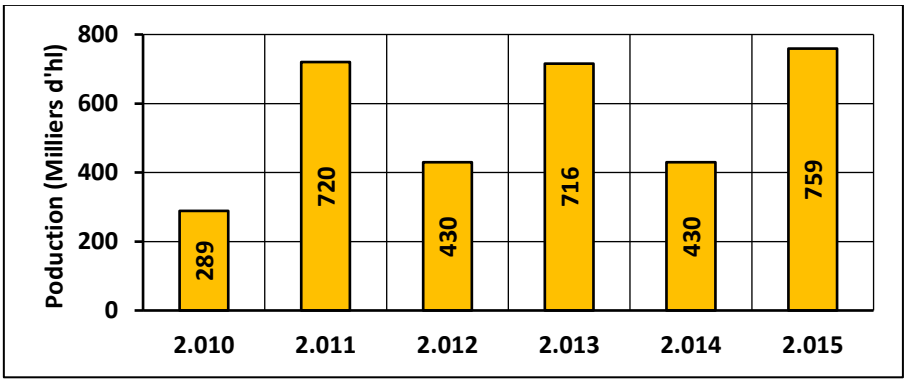
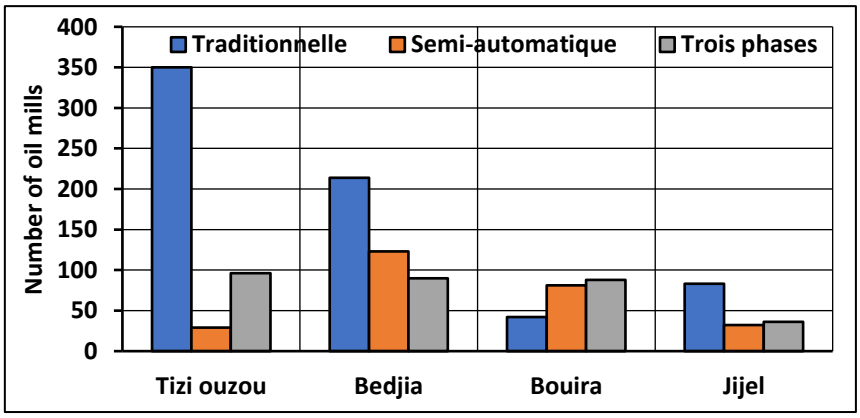


Fig 4 : Distribution of oil mills according to the extraction system



3. Results and discussion

Table 1. Ranking of potential wilayas according to the number of oil mills
These figures appearing on the table 1, above clearly show that the wilaya of Bouira with 211 oil mills is ranked third in Algeria.
• 45 oil mills using the traditional batch press system.
• 86 oil mills operate using the semi-automatic discontinuous process.
• 76 oil mills use the three-phase continuous system
Figure 1: According to data from the Ministry of Agriculture and Fisheries (MAP, 2015), the total arboreal area of Algeria is around 929642 ha (Olive trees, Palm trees, Citrus etc. where the total olive-growing area is estimated at 404,784 ha and which is clearly increasing following the various State incentives through the National Agricultural Development Program (PNDA) which encouraged farmers to plant this crop.
Figure 2: perfectly shows a continuous growth of the planted area of this species, which justifies that the olive growers in particular in the potential production areas have become aware of the value that this crop provides in several aspects such as the increase in their income, soil protection against water erosion and job creation
Figure 3: It is clearly observed that the quantities produced of fruits intended for the extraction of olive oils are clearly higher than those produced for the table olive, which justifies that Algeria and in particular in the Center and East regions are olive oil production zones compared to the western zone where the production is intended for the production of table olives.
Figure 4: We notice that it is the traditional and semi-automatic technique that dominates

4. Conclusion

According to the findings of this study, the unique character of the two-phase oil extraction technology in the growth of the olive industry has resulted in a very high rate of dissemination in Spain (Cordoba). This was due to two sorts of demand: one tendential for clean technology and the other cyclical tied to a period of drought and pollution concerns in Andalusia. Unknown in Algeria (Bouira), this new technology that does not produce vegetable water and saves water is totally respectful of the environment.

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Soil Loss Due to Water Erosion on Semi-Arid Slopes of the Cairani-Camilaca Sub-Basin

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1. Introduction

Environmental problems, such as soil degradation in Peru, is a silent issue, ignored by political actors related to the sector; due to the fact that the importance of the soil as a natural resource to guarantee food security, mainly for the high Andean communities of the country, is not being valued in its fair dimension (Rubio.J, 2015); however, reality shows us that environmental deterioration is a real, serious threat that endangers current and future food security (Semarnat, 2009). There are many studies in Peru and the world on the negative effects produced by erosive phenomena, such as that of Mazuela, (2013), Alvarado et al., (2007), Rosas & Gutierrez, (2016) etc., who maintain that erosion is a problem related to high pressure in the use of soils, poor agricultural practices and irresponsible anthropic action. In this sense, the erosive problems in the highlands of the Tacna region; It is not precisely because of the high rainfall; but due to poor management of irrigation water, steep slopes and lack of policies for the use, management and exploitation of the soil resource. In this context, it was observed that the yields of the main crops such as: potato, corn, oregano, alfalfa, compared to past decades have been significantly reduced, which contrasts with the statement of Burbano-Orjuela, (2016). On the other hand, the loss of the productive capacity of the soil due to erosion has generated a social problem translated into a migratory process from the inter-Andean valleys, towards the coastal valleys and a large part to the city of Tacna. For this reason, in the present study the objective was to measure erosion in the Cairani-Camilaca sub-basin; for which, the Universal Soil Loss Equation (EUPS) has been applied, a method developed by (Wischmeier, W. H., and Smith, 1958) and modified by Fournier, 1960 and Arnoldus, 1978 cited in (Gvozdenovich, 2016).

2. Materials and Methods

Scope of study: The Cairani-Camilaca sub-basin is a tributary of the Locumba River basin, with altitudes that vary from 2,000 to 4,600 meters above sea level. The climate is typical of semi-arid regions, with average values of T° max. and min. 15.5°C and 3.4 °C respectively, and extreme values of -2 to -3 °C, in the months of June, July and August. The average annual rainfall is 172 mm, 94% of which occur in the months of December, January, February and March. Morphologically, the sub-basin expresses an EXORREIC drainage, due to the fact that its drained waters flow into the Ilabaya River, which is a tributary of the Locumba River. According to the Gravilius coefficient (Cg=1.65) it corresponds to an OBLONG shape. The total area of the sub basin is 76.53 km2 and a perimeter of 114.04 km; characterized by a topography of steep slopes (> 75°) in the upper and lower areas of the profile, both on its left (Cairani) and right (Camilaca) flanks, and inclined slopes (10°-15°) in the middle areas of Cairani and Camilaca respectively. Regarding the use of the soil, 2,448 hectares are oriented to develop crops, and they are located both on the left and right flanks of the valley. The most important crops are oregano, potato, corn and beans.

Determination of soil loss due to water erosion: The method called Universal Soil Loss Equation of Wischmeier and Smith (1978) was applied, whose mathematical equation considers five factors: Where A is the Dependent Variable: Soil Loss (t/ha/year), independent variables: Erosivity (R), Erodibility (K), Slope (S), Slope length (L), Vegetation cover (C) and Soil conservation practices (P) (Delgado, 2020).

$$A = R. K. S. L. C.P.$$

Erosivity Factor (R): Rainfall information for 55 years (1964 to 2019) was used; From which, the R factor was estimated by the modified Fournier Index (IMF) method (Arnoldus, 1978), cited in (Echeverri and Moncayo, 2010), and (Besteiro and Delgado, 2011). Erodibility factor (K), was determined based on the physical-chemical results of 36 soil samples (texture, structure and organic matter) and was calculated by solving the equation of Williams et al. (1990) cited in (Flores López et al., 2003). Slope factor and slope length (LS), this factor was determined by the method indicated by Colín et al. (2013). Plant cover factor (C); this factor was obtained by applying the methods proposed by, (Parado et al., 2016). Soil conservation practices factor (P): It was completed by the methods indicated in the Agricultural Manual Nº 537 of (Wischmeier and Smith, 1978).

3. Results and discussion

Current water erosion, as well as potential in the Cairani-Camilaca sub-basin, are located within mild erosion (< 10 t/ha/year), which involves 31% of the surface, and moderate (10 – 50 t/ha/year) represents 68%. In general terms, the highest levels of current erosion are on the Camilaca flank with an average of 15.5 t/ha/year, compared to the Cairani flank where the average erosion is 10.3 t/ha/year.
Regarding potential water erosion, the maximum values were 45.7 t/ha/year, the minimum 7 t/ha/year, a mean of 20.9 t/ha/year, with a standard deviation of 10, 9 tons/ha/year. According to the scale cited by (Gaitán et al., 2017) these values correspond to a moderate level of erosion. Like current erosion, potential erosion showed heterogeneity with CV=52%.

The highest values of potential erosion were observed on the Camilaca flank with an average of 22.5 t/ha/year, compared to Cairani, which showed a value of 18.9 t/ha/year. This variation could be explained by the fact that Camilaca has steeper slopes (average 83%), compared to Cairani (average 66%); on the other hand, in Camilaca conservation practices are not very common, compared to Cairani, where conservation is periodic, up to 2 times a year.

According to (Huerta and Loli, 2014), the levels of erosion indicated are above the permissible values established by the FAO (0.4 – 1.8 t/ha/year), other authors such as Stutzel, 2019 cited by (Gaitán et al., 2017) maintain that this limit could be from 1 to 2 t/ha/year; therefore, erosion values above the permissible values ultimately reduce the productive capacity of the soils of the sub-basin. In this regard, the field information shows shallow soils (<30 cm), mostly sandy loam texture soils, low organic matter content (<3%), high percentage of textural modifier, physical characteristics typical of eroded soils, which translates into low productive capacity of the soil.

4. Conclusion

The water erosion levels determined in the Cairani-Camilaca sub-basin, on average correspond to the moderate level (current erosion 10.68 t/ha/year) and potential erosion 18.20 t/ha/year); however, these values may be higher if the hydric erosion produced by irrigation water and wind erosion are considered, which are evident, but which are not considered in this study.

The levels of erosion determined, currently for the Cairani-Camilaca sub-basin, have a real impact on the productive capacity of the soils and have a direct socio-economic effect and may be the central reason for the migration processes, not only of people young people, but of entire families, to develop agricultural activities in coastal valleys and non-agricultural economic activities mainly in the city of Tacna.

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Efficacy of Native Beauveria Bassiana and Metarhizium Brunneum Isolates Against the Colorado Potato Beetle, Leptinotarsa Decemlineata (Say) (Coleoptera: Chrysomelidae)

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1. Introduction

The Colorado potato beetle, *Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae), is one of the most harmful pests, inflicting significant crop losses on potato and eggplant. (Polat et al., 2022).

Various studies have confirmed that *Metarhizium* and *Beauveria* species, which are entomopathogenic fungi, are highly effective against this pest, but their biological activities may vary according to climatic conditions and the strain characteristics such as virulence of the isolate. (Wraight et al., 2007; Dragonova et al., 2008; Kryukov et al., 2012). Some researchers argue that the use of entomopathogenic fungi in combination with other bioagents is more effective in the biological control of potato beetle (Furlong and Groden; 2001; Wraight and Ramos, 2005; Akhanaev et al., 2017).

In this study, the efficacy of *two Beauveria bassiana* (BB-1 and BB-3) and *Metarhizium brunneum* isolates (ORP-13) were tested on potato beetle [*Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae)] adults under laboratory and greenhouse circumstances simultaneously. The novelty of this study is the *B. bassiana* isolates were isolated from naturally infected adults of the beetles which were collected in potato fields in Tokat province.

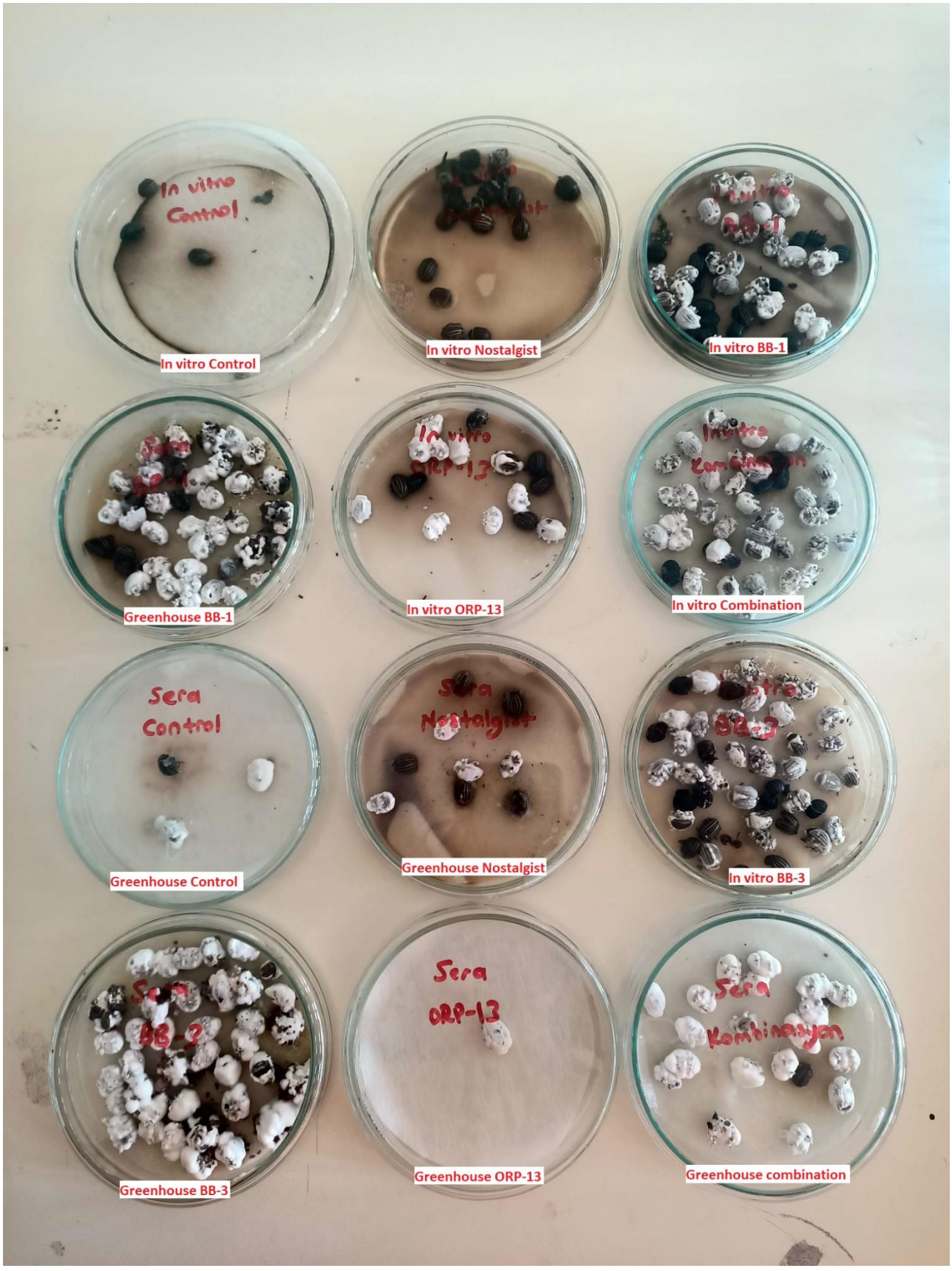
2. Materials and Methods

Each of the entomopathogenic fungal isolate was tested singly and in combination on the beetle adults. To determine the efficacy of the isolates and the combination of them, single-concentration response tests were performed with 1 × 108 conidia/ml using the spraying method. A commercial formulation of *Beauveria bassiana* (Nostalgist, Bayer) was used as a positive control.

3. Results and discussion

According to the results of the single-concentration response test under laboratory conditions, significant difference was observed on mortality rates of the treatments at the 9th and 11th days of incubation. The BB-3 isolate showed the highest mortality rate (96%) on the 11th day post-inoculation. The estimated LT50-LT90 values of Nostalgist, BB-1, BB-3, ORP-13 and Combination at the 11th day post-inoculation were calculated as 12,623-34.128, 8.544- 11,612, 9.046-10.619, 13.169-21.184 and 8.520-11.020, respectively. According to the single-dose study conducted under greenhouse conditions, the highest mortality rate was observed in BB-1 isolate (80%), and the difference between BB-1 and BB-2 applications was statistically insignificant.

Figure 1: Insect mortality and signs of mycosis (fungal growth on the cadavers) at 14 days post inoculation



4. Conclusion

These results show that *M. brunneum* isolate (ORP-13) and the commercial formulation (Nostalgist) were not having much effect on potato beetle adults. On the other hand, *B. bassiana* isolates BB-1 and BB-3 can be used successfully in control of colorado potato beetles.

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Use of Plastic Mulch in the Production of Pepper Under Drought Stress

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1. Introduction

Several agronomic management tips have been implemented to promote plant tolerance to abiotic stresses like water stress. In order to cope with this stress, mulching technology seems to be the best choice based on its different agronomic benefits, like soil temperature control, soil erosion prevention, weed control, etc. (Kader et *al.*, 2017; Kannan, 2020). Thus, the goal of this research was to study the role of plastic mulch in enhancing the growth of pepper plants subjected to drought stress.

2. Materials and Methods

The experiment was conducted in open field in the experimental station of regional center pf agricultural research of sidi bouzid. Pepper plants were cultivated on soil covered or not by transparent plastic mulch, under different water stress (100%, 75% ETc and 50% ETc). During the assay, some growth parameters such as height plant and spad index were measured. At harvest, yield was determined in addition to some qualitative fruit characteristics like length, diameter, juice pH.

3. Results and discussion

Results showed that water stress affected negatively several parameters such as plant height, root length, water content, yield, chlorophyll content, fruit dimensions and certain fruit physicochemical parameters such as juice content, ethylene content and electrical conductivity. Plastic mulching has been shown to be effective in soil water retention, pepper productivity and quality (large and long fruit). Thus, it increased other fruit quality parameters such as soluble sugar content and electrical conductivity.

4. Conclusion

Plastic mulching seems to be a successful approach for alleviating water shortages in pepper plant, but further biochemical analysis is required.

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Mitigation of Drought Stress in Tomato by Plastic Mulch Application Under Semi-Arid Conditions

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1. Introduction

Currently, climate change marked by high temperature and low precipitations creates severe drought condition and consequently an imbalance in water availability for crops. Drought stress limits crop growth, development, and crop yield (Mahadeen, 2014). The use of plastic mulch (PM) as soil cover has numerous benefits in agricultural production (i.e. raises crop yields by improving moisture conservation…) (Kwabiah, 2004; Ban et al., 2009; Kumar and Lal, 2012). The objective of the current research is to evaluate the role of plastic mulch (PM) in mitigating drought stress in tomato cultivated under semi-arid conditions.

2. Materials and Methods

The experiment was completed on the experimental plot of the Regional Agricultural Research Center of Sidi Bouzid. Crop water necessities were investigated at three levels (50, 75, and 100% ETc), and soil cover transaction were polyethylene transparent PM and no mulch (bare soil: BS).

3. Results and discussion

Under water shortage irrigation systems, fruit weight, soil moisture, aggregate soluble solids and plant height were reduced, while the rest of the measured characteristics rose. In addition, severe deficit irrigation (irrigation with 50%ETc) affects root length and moisture contents of different parts of the plant. With the application of PM, measurements revealed that the mulched plots had greater soil moisture content than the BS plots, which influenced growth, qualitative, and yield metrics positively. The findings demonstrated that using the PM reduced the negative consequences of a water shortage by enhancing numerous measured parameters (plant high; root length; stem, root and leaf moisture contents; yield; WUE; fruit number; fruit length and diameter; fresh and dry weight of fruits; fruit juice content).

4. Conclusion

Our findings indicate that covering the soil with plastic may be more effective in reducing the detrimental effects of water stress on tomato.PM raised crop output by enhancing yield and water use efficiency (WUE) as compared to BS. These results are promising since PM contributes to conserving soil moisture, have improved the growth and the agricultural production of the plant even under deficit irrigation and is able to increase the tolerance of tomato to drought stress under semi-arid conditions.

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The Evaluation of Anti-Cancer Effect of Lepidium Sativum Seeds Extract in Vivo

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1. Introduction

Lepidium sativum (garden cress) is a Brassicaceae family member that has been utilized for ages for medicinal and culinary uses. Different parts of this plant have antioxidant, antiasthmatic, anti-inflammatory, antihypertensive, immunomodulatory, hepatoprotective, and hypoglycaemic characteristics (Yahla et al., 2021).

Besides, cancer is a severe public health issue that affects both developed and developing countries and can result in mortality. Our objective is to find natural products having anticancer properties. Cancer cells often infiltrate and kill healthy cells. These cells are born as a result of an imbalance within the body, and cancer can be treated by correcting this imbalance. As a result, the current study was designed to assess the anticancer effects of L. sativum seeds extract on hepatic carcinoma in mice.

2. Materials and Methods

2.1. *Lepidium sativum* seeds extraction

Seeds of *L. sativum* were purchased from local market of Mostaganem, Algeria and preserved in airtight containers. A Soxhlet apparatus was used for extraction. 100 g of dried seeds were reduced into dust then 1 L of ethanol was putted in. The extraction was lasted for 8-10 h till the dissolution of the solvent components that are soluble. After filtration, a rotary evaporator (Buchi, Switzerland; temp: 60°C; pressure: 175 mbar) was used to evaporate the solvent to yield semi solid mass. The acquired extract was collected and kept at 4°C until usage.

2.2. Animal model

Male Swiss albino's mice weighting between 20 and 30 g, obtained from Pasteur institute of Algiers, Algeria were used in this study. Mice were fed a standard diet (Animal Food, Bouzereah, Algiers, Algeria) and tap water ad libitum for two weeks in an air-conditioned room at 22 ± 1°C and 55 ± 10% relative humidity with regular 12 h-dark-light cycle for stabilizing all metabolic conditions. This experiment was agreed by the Algerian Ethics Committee for Research on Animals of Abdelhamid Ibn Badis University of Mostaganem (ECRA/AIBUM).

2.3. Anti- cancer effect

Sodium nitrite (Na $N0_2$) was solubilized in distilled water and administered orally to mice in rate of 3 g/kg daily for six months for cancer induction. The mice are divided into 4 groups, each group contains 6 mice. The weight was recorded during the time of the experiment: the treatment was completed for a term of 6 months as follows.

- Group1: Mice in this group receive a dose of 3g/kg of $NaNo_2$ solution, with a daily gavage of 5ml/kg/day and a dose of 50mg/kg of *Lepidium sativum* seeds extract for 6 months.
- Group2: Mice in this group receive a dose of 3g/kg $NaNo_2$ with a daily gavage of 5ml/kg/day and 200mg/kg of *Lepidium sativum* seeds extract for 6 months.
- Group3 (positive controls): mice in this group receive a dose of 3g/kg $NaNo_2$, with a daily gavage of 5ml/kg/day for 6 months.
- Group4 (curative): mice in this group receive a dose of 3g/kg $NaNo_2$ for 5 months, and a dose of 50mg/kg of *Lepidium sativum* seeds extract during the sixth month of the experiment.

At the conclusion of the experimentation, mice were killed, blood was gathered for determination of tumor markers determination and livers were collected of Histological examination.

3. Results and discussion

3.1. Effect of sodium nitrite on mice livers:

The following figure (Fig1) shows the effect of carcinogen (Na $N0_2$) on the liver structure of mice of group 03 (control). The carcinogen causes alterations in the liver tissue. After six months of treatment, tumor necrosis (Fig. 1 A) and lipid vacuoles that characterize fatty liver disease (Fig. 1 C) appear. Fatty liver disease occurs when fat accumulates in the liver. It is frequently observed in hepatocytes as vacuoles (Tougeron, 2014). Neutrophil infiltration is also observed, which indicates the installation of an inflammatory response (Fig. 1 B). As we see a large number of hepatocytes in necrosis (Hepatocyte proliferation) (Fig. 1 C).

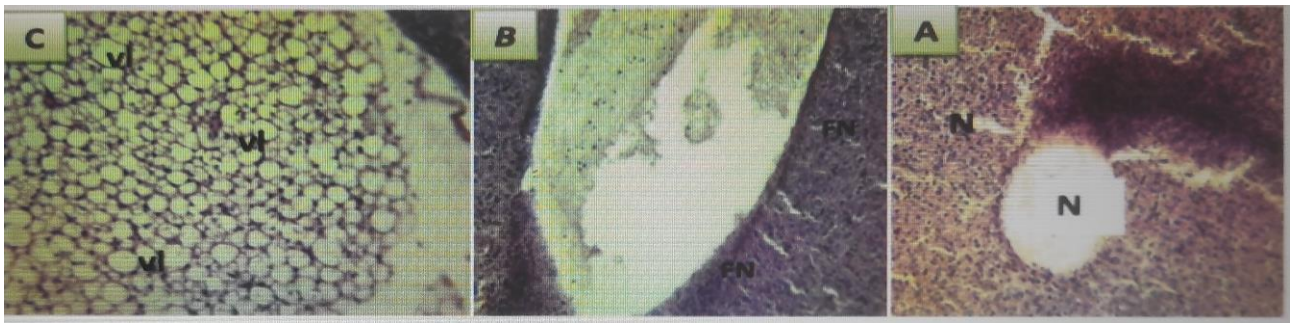

Figure 1: Histologic analysis of mice livers of group 3 showing Na NO_2 induced liver cancer.

3.2. Effect of Lepidium sativum seeds extract on liver induced cancer:

Figure 2 shows the histological liver structure of mice treated with carcinogen followed by *L. sativum* seeds extract. After six months of treatment, no alteration in liver structure was observed in both group 01 mice treated with 50mg/kg of ethanoic extract (Fig. 2 A) and group 02 mice treated with 200mg/kg of ethanolic extract (Fig. 2 B).On the other hand, histological analysis of mice treated with 50mg/kg of ethanoic extract in the last month of the experiment shows the presence of an appearance of lipid vacuoles that characterize fatty liver disease (Fig. 24C) and the presence of liver inflammation (Fig. 2D).

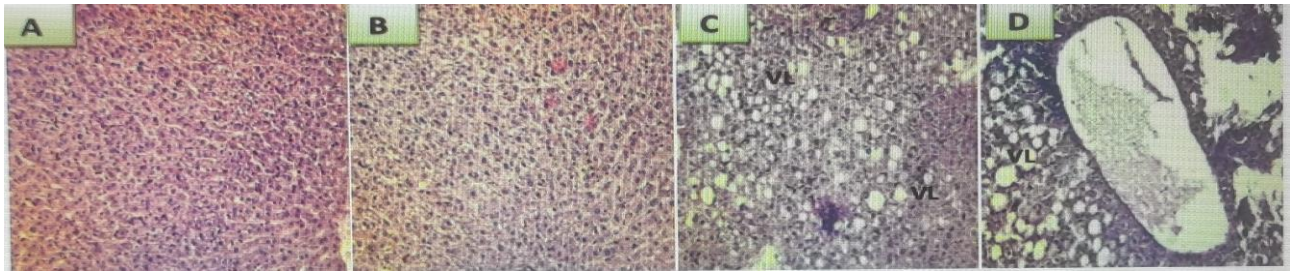

Figure 2: Histologic analysis of mice livers of group 1 (A), group 2 (B) and group 4 (D).

4. Conclusion

According to the findings, the carcinogen promotes tumour necrosis and liver injury in the affirmative control group. Treatment with an ethanolic extract of Lepidium sativum seeds, on the other hand, demonstrated excellent preventative and curative benefits against this malignancy.

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Biometrics Parameters of Plant Growth-Promoting Microorganisms in Forage White Oat Cultivation

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1. Introduction

Oat (*Avena sativa* L.) produces high yields of nutritious forage, with high productive potential. There are several factors that affect the productivity and quality of forage oats, such as the nutritional status of the plant. Nitrogen is an important component that is essential for all crops, however its excessive use is responsible for several environmental problems (eutrophication, salinization, atmospheric contamination) that they have (Bijay-Singh et Craswell, 2021) and economic. Economically, the pandemic and the conflict between Russia and Ukraine led to a sudden increase in fertilizers and depletion of stocks, directly impacting agricultural production (Evangelista et al., 2021). Therefore, an alternative solution is to increase the efficiency of nutrient absorption, in order to reduce the use of fertilizers, which can be achieved with the inoculation of plant growth-promoting microorganisms (PGPM) or beneficial. They have different mechanisms of action, the main ones being: biocontrol, biostimulant (producing substances that are not nutrients, but favouring plants) and biofertilizer (increasing the availability of nutrients) (dos Santos Lopes et al., 2021).

The bacteria *Azospirillum* and *Rhizobium* are examples of rhizosphere PGPM, which colonize the roots. In a pastoral agroecosystem, biological nitrogen fixation (BNF) associated with the roots of forage plants is an important step in the N cycle and diazotrophic bacteria may play an important role in the supply of this nutrient to plants, since the nitrogen supply via FBN can improve the productivity and nutritional value of forages (BRASIL et al., 2005). Within this context, the objective of this work was to evaluate biometrics parameters of forage white oat to inoculants of plant growth-promoting microorganisms.

2. Materials and Methods

The experiment was carried out at the greenhouse, of Universidade Tuiuti do Paraná (UTP), in Paraná, Brazil (25° 43" S, 49° 06" W and 911 m sea), of June in August 2021, with average temperature at 13.9ºC, 13.4 ºC and 14.5 ºC. For the study, seeds the forage white oat (*Avena sativa*), annual winter, was utilized with based in the estimate calc for obtain 70 kg ha-¹ of seeds or six plants bot-¹ in final stand. The seeds were separated in two parts. One part doesn't received inoculation and the other, received. The second part was inoculated with 120 ml ha-¹ of inoculant Isolate C15 (Biostart®), composed of plant growth-promoting microorganisms (PGPM) with: *Azospirillum, Pseudomonas, Saccharomyces* and *Rhizobium*). Used pots with capacity of 3 L filled with crushed stone and geotextile blanket, to ensure adequate drainage of water from the bovine substrate. The composition of these subtract was Ca= 3.9%; 0.5% Total S; Fe= 1.0%; P= 0.9%; N= 2.0%; MS= 25.3%; B= 31.5 mg/Kg-¹; Cu= 71.5 mg/Kg-¹; Mg= 1,35%; Mn= 281.6 mg/Kg-¹; Zn= 243.1 mg Kg-¹; Organic matter= 257 g Kg-¹; pH= 8.9; cow dung = 80% and Organic material= 20%.

The experimental design consisted of 5 repetitions (pot, n=5) and 2 treatments: -PGPM: control or without plant-growth promoting microorganisms; +PGPM: with inoculants at plant-growth promoting microorganisms. The basal fertilizer was he same: 19 kg ha^{-1} of N, 19 kg ha^{-1} of K and 53 kg ha^{-1} of P. For irrigation, was applied water for maintaining 60% field. The first cut occurred at 26 days after sowing (DAS), with approximately 30 cm in height, leaving the plants with 10 cm, to simulate the effect of grazing. At 10 days after the first cut (at 36 DAS), with the same height (30 cm), the second cut was performed, starting at 10 cm from the ground (grazing height). At the moment was evaluated the biometrics parameters: plant height (cm), shoot fresh mass and shoot dry mass (g). For shoot dry mass, the shoot fresh mass was in a forced circulation oven at 65º C f, at 72 hours, then was weighed. The experiments performed with 5 replicates with 6 seedlings per replicate. Data were analysed using One-way ANOVA. For to verify significant differences between the means of the two treatments (n=5) analysed, the data were submitted to Independent T-test ($p<0.05$). All the data are presented in mean ± standard deviation.

3. Results and discussion

The biometrics parameters of white oat forage are presented in Table 1.

Table 1. Biometrics parameters of a white oat forage (*Avena sativa*) cultivation, at 36 days after sowing (DAS), submitted to treatment with plant-growth promoting microorganisms (+PGPM) and without plant growth-promoting microorganisms (-PGPM) (data are mean ± standard deviation (n=5)). Curitiba-PR, 2022. * ^{ns} statistically non-significant by T-test ($p<0.05$).

Treatments	Plant height (cm)	Shoot fresh mass (g plant-^{1})	Shoot dry mass (g plant-^{1})
-PGPM	33.4±5.6	12.7±5.4	2.2±0.9
+PGPM	34.2±4.0	13.4±4.7	2.4±0.9
Mean	33.8±4.87	13.1±5.1	2.3±0.9
p-value	0.78^{NS}	0.82 ^{NS}	0.62 ^{NS}

This means that the results did not show any significant difference ($p>0.05$) between ponds with or without the use of plant growth-promoting microorganisms (PGPM). According to the results obtained a general mean of plant height was 33.8 cm (S.D; ± 4.9 cm), with 36 DAS, (in the second cut). The same results were observed for dos Santos et al. (2021) testing bacteria in the same culture, for their, the increment in higher plant just occurred at 60 DAS, so it was not possible to observe differences at 36 DAS. Shoot fresh mass, with value range from 12.7 and 13.4 g plant-^{1}, have mean 13.1 g plant-^{1} (S.D. ± 5.1 g plant-^{1}). For shoot dry mass, the same behaviour was observed, with a mean up to 2.3 g plant-^{1} (S.D. ± 0.9 g plant-^{1}).Such results can be explained by the short period of evaluation, since other studies show that differences with the inoculated treatments are detected from 60 DAS (dos Santos et al., 2021) and by the inhibition of bacterial colonization and/or its fixation capacity, caused by excess N (Carvalho et al., 2014). In the present work, high levels of N from the substrate used, with a high concentration of organic matter, may have affected the expected interaction between the plant and the plants bacteria. Therefore, biological N fixation is only effective in situations of deficiency of this element and is only detected after 60 DAS in white oat forage, which may explain the non-observance of differences between treatments with inoculants.

4. Conclusion

There is not enough evidence to show that the differences found in biometrics parameters in white oat forage (*Avena sativa*) *cultivation* are due to the application of the inoculants of plant growth-promoting microorganisms.

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Viroid and Viroid Diseases Causing Economic Damage to Plants

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1. Introduction

Viroids are the smallest known plant pathogens and have been identified in many economically important plant cultures. Their structures consist of small, low molecular weight, circular, single-stranded RNA (246-401 nucleotides long) molecules without envelope protein (Zhang, 2018; Flores et al., 2005; Ding, 2009). Viroids are subviral pathogens that have autonomous replication in their hosts due to their lack of ability to encode proteins necessary for their biological functions. The classification of these pathogens was first made by Koltunow and Rezaian (1989). The causative viroids are in two families, *Pospiviroidae* (with central conserved region, CCR) and *Avsunviroidae* (without central conserved region) proliferating in the nucleus. The hosts of viroids include vegetables, ornamentals, and perennial woody plants. Viroids can be easily transported mechanically with contaminated agricultural equipment. It can also be spread by seeds, pollen, insects and vegetative propagation materials. Taxonomically, 32 viroid species are currently recognized by the International Committee on Virus Taxonomy (ICTV) (Venkataraman et al., 2021; Martelli, 2017; Şevik, 2015).

2. Materials and Methods

Diener and Raymer, in a study on diseased potatoes in 1967, determined that the cause of potato spindle tuber disease was not a virus. They isolated low molecular weight RNAs from diseased potatoes instead of virus particles and determined that PSTVd (*Potato spindle tuber viroid*) was the causative agent of potato spindle tuber disease. Thus, for the first time, the term viroid has been used to describe pathogens that do not have a protein coat, are different from viruses, consist of small molecule, single-stranded RNA (Venkataraman et al, 2021; Şevik, 2015; Eker, 2009). Many plant species are known as natural hosts of viroids. Symptoms induced by viroids in susceptible hosts include the whole plant; stunting, in leaves; epinasty, wrinkling, mosaic, chlorosis, mottling, on the trunk; shortening and thickening of the bark; pitting, gumming, in flowers; different parts of the same plant have different colours, in fruits; detrimentally affects size, colour and also appears as deformation, in seeds; developmental arrest (developmental abortion) and defective formation/deformity of the nodules in other organs (Flores et al., 2021). Molecular methods such as Polymerase Chain Reaction (PCR) are used in the diagnosis of viroids. Since viroids are composed of RNAs and do not contain a protein coat, it is not possible to use rapid immunological methods such as Enzyme-Linked Immunosorbent Assay (ELISA) for their diagnosis (Mühlbach et al., 2003).

3. Results and discussion

Polymerase chain reaction (PCR)-based approaches for identifying viroid infections in various crops have been developed (Narayanasamy, 2011). Visvader and Symons (1985) demonstrated that both moderate and severe *Citrus exocortis viroid* (CEVd) isolates include a diverse combination of sequence variations, and analysis of three phenotypically distinct PSTVd isolates gave comparable results. Additional research has been conducted to describe the structure of ASBVd, *Citrus dwarfing viroid* (CDVd), *Grapevine yellow speckle viroid* (GYSVd), *Hop latent viroid* (HLVd), and *Hop stunt viroid* (HSVd) populations (Owens, 2008). As a result, viroids causing economic damage should be detected by these methods and precautions should be taken as soon as possible.

4. Conclusion

As a result, it is very important to detect plant pathogens early in order to take quick action against the negativities caused by viroids in the plant. This can help prevent the further spread of diseases, as well as delays and limitations in the import and export of plant materials. The most effective management strategy against many viral diseases on grapevines is to use healthy production material, to obtain viroid-free plants by tissue culture method or to eradicate the infected by testing the cultivars and rootstocks grown for grafting in production for these factors.

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The Role of Biopreservation in Improving the Quality of Some Traditional Fermented Products of Plant Origin

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1. Introduction

Consumers are more conscious of health risks associated to food additives; the health benefits of "natural" and "traditional" foods, prepared without the use of chemical protective, are becoming increasingly appealing. Fermentation is known as one of the oldest conservation techniques for various foods such as vegetables, fruits, fish, meat, etc. It causes unique and desirable changes in flavour, texture and colour that occur over time in fermented food. Fermented pickles are products of lactic acid fermentation formed by the influence of microorganisms present in the environment, and their production and consumption have a long history worldwide (Behera et al., 2020). Foods benefit from fermentation in numerous ways: (i) food preservation as a result of pH changes and the existence of antimicrobials such as bacteriocins, organic acids and ethanol; (ii) changes in taste and texture, enriching the organoleptic properties; and (iii) private benefits depending on the food matrix and kind of fermentation, such as rising nutrient bioavailability or eliminating undesirable compounds such as toxic compounds and antinutrients. This paper focuses on some traditional fermented foods, as well as the role that biopreservation plays in improving the quality of pickled cucumbers, white cabbage, green pepper, eggplant and green tomatoes.

2. Materials and Methods

In this study, samples were taken randomly from the region of Tirana, Albania in 2022. The raw materials were *Capsicum annuum L. var. grossum, Brassica rapa L. var. rapa L., Cucumis sativus L., Solanum melongena L.* and *Lycopersicon lycopersicum L.* Sample codes were for raw plants: Cur, GPr, EPr, Tr, CBr and pickled: Cup, GPp, Epp, Tp, CBp.Changes in physico-chemical parameters: moisture, soluble solids, total acidity, pH, fat, protein (AOAC, 2000). The colour of the samples was analyzed by the CIE Lab system which included L*, a* and b* values expressing respectively the 'brightness', 'green-red' and 'blue-yellow'. The measurement of water activity was done by the Retronic portable meter, and after at least 45 min we did the reading directly. activity, vitamin C (AOAC, 2016) were observed in the fresh sample after the fermentation process. Total phenolic content was determined according to the adapted Folin – Ciocalteu method, total flavonoid content was measured by aluminium chloride colorimetric assay, and antioxidant activity were determined by means of two DPPH and ABTS tests (Hoxha et al., 2021).

3. Results and discussion

It was found that the fresh and fermented samples analysed in this study had significantly different physico-chemical characteristics.

Table 1. The composition of raw and pickled samples, salt, colour and aw values

Samples	ENERC (kJ)	WATER (g)	PROT (g)	FAT (g)	ASH (g)	CHOT (g)	pH	TA (g)	Vit C (mg)	NaCl (g)	L*	a*	b*	aw
CUr	67	95.6	1.02	0.05	0.52	2.81	6.07	0.12	25.2	na	71.55	-3.21	0.04	0.88
GPr	101	94.2	1.01	0.5	0.46	3.83	6.35	0.07	47.3	na	72.30	-3.78	1.87	0.88
EPr	131	92.1	1.48	0.6	0.88	4.94	5.46	0.29	56.3	na	69.24	-0.56	-3.57	0.89
Tr	79	95.1	0.41	0.13	0.42	3.94	4.50	0.44	52.8	na	75.75	0.28	5.51	0.90
CBr	119	92.6	0.94	0.15	0.58	5.73	6.71	0.23	45.0	na	84.14	0.48	6.55	0.92
CUp	59	94	0.7	0.09	2.61	2.6	3.46	0.60	18.2	1.75	72.65	-0.73	-0.01	0.88
GPp	116	91.7	1.06	0.7	2.31	4.23	3.54	1.00	35.0	1.75	72.98	0.91	1.94	0.94
EPp	130	91	1.39	0.8	2.27	4.54	3.16	1.12	38.2	1.98	70.48	-0.31	-2.66	0.88
Tp	66	94.1	0.48	0.3	2.39	2.73	4.08	0.68	37.3	1.88	75.29	-0.76	-1.26	0.87
CBp	107	91.9	1.11	0.2	2.07	4.72	3.07	1.37	41.6	1.98	79.07	3.40	0.06	0.94

The content of total polyphenols resulted from 8.41 to 107.59 mg GAE/100 g. The highest values were presented by samples EP and T. It is noted that fermentation caused an increase in values from 1.07 to 2.50 times, highlighting the positive role that this process has in these products. The content of total flavonoids was 4.95-75.37 mg CE/100 g. The highest values were presented by samples EP and T. It is observed that fermentation caused an increase in values from 1.23 to 2.69 times. Antioxidant activity, by means of the DPPH test average values of % inhibition 2.33-41.56 % were obtained, while by means of the ABTS test average values of % inhibition 8.09-84.35 % were obtained. Fermentation contributed positively to the values of antioxidant activity by underwent an increase of 1.36-3.12 times and 1.28-3.05 times for DPPH and ABTS, respectively. The highest values showed EP and T, this was in correlation with the values found for polyphenols and total flavonoids.

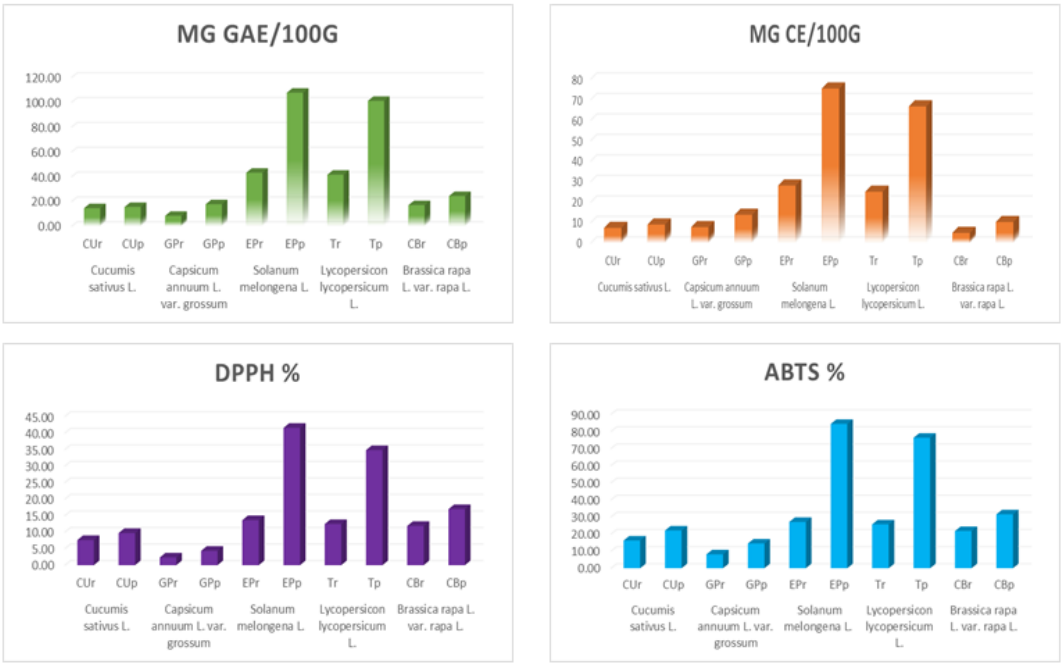

Figure 1: The total content of polyphenols, flavonoids and antioxidant activity of raw and pickled samples

4. Conclusion

The results showed that the pickle products showed a better profile compared to the raw ones, from which we can recommend the production and consumption of pickles as vegetable-based products with improved characteristics, promoting good health and that can significantly contribute to the food industry. The study showed that fermentation as a processing technique seems to improve the activity and bioavailability of natural phytochemicals. The data of this paper can serve, among others, to supplement the literature, and it is of particular importance since fermented foods mean tradition, rituals, and agro-economic and socio-cultural features of society. We recommend further work on issues related to quality and safety aspects of fermented foods as well as the role of biofortification as an interesting technique in improving the quality of fermented foods. Also, the integration in future studies would be of interest in terms of design in the food industry based on advanced techniques such as genomics, proteomics and metabolomics, together with laboratory automation and microorganism's selection techniques. with high performance.

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Effect of Biostimulants on Potato Late Blight

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1. Introduction

Potato is the most important in the world, its higher efficiency in response to the addition of nutrients without individual response, having high areas of use for food production (Filgueira, 2012). However, they are alternatives, in the current context, to agrotoxics, due to the high value they reached and through environmental means. Biostimulant products can be a solution, as they can increase plant resistant of disease n, for example. Thus, the objective of this work was to evaluate the effect of biostimulant with *Bacillus amiloliquefaciens* or sea seed *Ascophylum nodosum*, applied in the groove planting and hilling on industrial potato. The experimental design was completely randomized, with three series x 4, with two different application methods (groove and/or hilling biostimulants, or not., in addition to the standard producer. The experiment was carried out in the municipality of Araucária PR. At 1 day after the transplant were 26. were characteristic features. Regardless of the management, the biostimulants used had a positive effect on late blight, compared to the control. The biostimulants with sea seed extract and Bacillus, applied in the groove and hilling present a trend of more promising results, suggesting that the experiment is repeated and that an economic analysis is carried out.

2. Materials and Methods

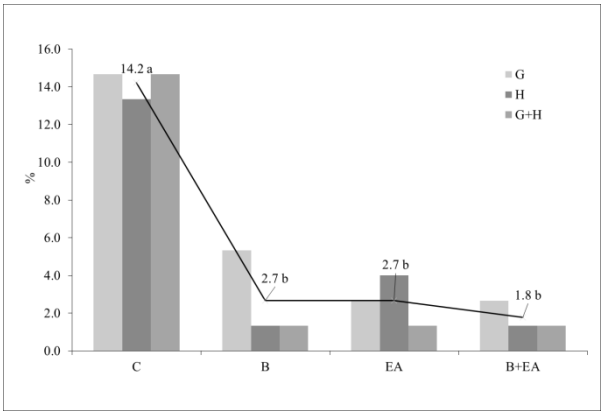
The experiment was carried out in the metropolitan region of Curitiba, in Araucária-PR (25º36'55.5´´S, 49º27´59.4´´W and 897 m altitude). The soil of the experimental area is alic yellow red latosol with a clayey texture. Soil preparation was carried out 15 days in advance, using the subsoiler, limestone was applied to correct the soil, depending on the chemical analysis carried out previously. At the time of planting, a rotary was used to leave the soil loose, we also used the milling machine to open the planting furrows, spaced at 80 cm between rows and with a depth of 20 cm. On the day of planting, fertilization was performed according to the chemical analysis of the soil. The seed potatoes, of the industry type, of the cultivar Markies, with approximately 55g, were distributed along the furrows. The experimental design was completely randomized, with three replications, in a 3 x 4 factorial scheme, with 3 forms of nutritional management (groove (G), hilling (H) and both (S+H)) and 4 sources of fertilization (control (producer standard); product based on *Bacillus amiloliquefaciens* (B); product based on seaweed extract (EA); product based on *Bacillus amiloliquefaciens* and product based on seaweed extract (B+EA). The commercial products applied were: Biomex Plus (B) (19.3% of P; 17% of K, in addition to *Bacillus amiloliquefaciens*, strain FZB42) and Primer Bio Zn (P) (20% of *Ascophylum nodosum* algae extract and 40 .5% Zn). For the control treatment (C) or producer standard, the following were used: 25 g of Regent; 250 g of approved; 25 g of Sperto and 250 ml of Kasumim. The experimental area consisted of 12 planting lines, each line being subdivided into 3 equal parts of 5 m (or the equivalent of 25 plants) corresponding, totalling 36 plots, in a total area of 9.30 m x 15 m. Visual monitoring was carried out regarding the phytosanitary aspect, with an assessment of the incidence of late blight at 93 DAP, obtained by counting the number of attacked plants in each experimental unit. There was no artificial inoculation of the pathogen *Phytophthora infestans*. The results were submitted to analysis of variance and the treatment effects had their means compared by the Tukey test at 5% probability, when significant. The statistical program used was Sisvar®.

3. Results and discussion

At 93 days after planting, the incidence of late blight on the plants was evaluated and there was no interaction between the factors (Figure 1). However, product sources affected the incidence, regardless of fertilization management. The highest incidence was observed in the control (producer pattern), with 14.2%, with the other products being inferior and without differing between them. The results obtained are in agreement with the literature. Studies with *B. amyloliquefaciens* proved to present secondary metabolites that can be applied in the

biocontrol of plant pathogens (Arguelles-Arias et al., 2009, Wang et al., 2020). From the environmental point of view, there is no doubt about the gains obtained, even without production increases

Figure 1: Incidence of late blight in potato plants, depending on the application of biostimulants at different times. *C: Control; B: product based on *Bacillus amiloliquefaciens*; EA: product based on seaweed extract; B+EA: product based *on Bacillus amiloliquefaciens* and product based on seaweed extract; G: groove; H: hilling; G+A: groove and hilling. Means followed by the same letter do not differ from each other by the Tukey test at the 5% level. ** significant at 1% probability level ($p < 0.01$); *significant at 5% probability level ($0.01 =< p < 0.05$) and ns: not significant.



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The bacteria *B. subtilis* and *B. amyloliquefaciens* were effective in controlling foliar diseases caused by three economically important species of *Alternaria spp*. (Ali et al., 2016). The use of *Bacillus amyloliquefaciens* YTB1407 increased the resistance of sweet potato to fungal diseases caused by *Fusarium solani* (root rot) and *Ceratocystis fimbriata* (black rot) (Wang et al., 2020). Regarding the seaweed extract, *A. nodosum*, although it has not demonstrated an in vitro effect against the phytopathogen *Alternaria solani*, in pepper and tomato plants, it induced defence mechanisms, reducing the severity of the disease (Ali et al., 2019). In an experiment with potatoes, testing conventional fertilizers, microbial fertilizers (from *B. subtilis* and *B. amyloliquefaciens*) and a combination of both, the yields obtained with Bacillus were equal compared to plots of chemical fertilizers applied in warmer conditions, and lower in conditions cooler (Uysa and Kantar, 2020). Likewise, there was no difference in PT in S+A-C, however, no reductions were observed, and an economic analysis could mean some difference, however, it was not performed. From the environmental point of view, there is no doubt about the gains obtained, even without production increases.

4. Conclusion

It is concluded that with the use of *Bacillus amiloliquefaciens* biostimulants and *Ascophylum nodosum* seaweed extract, in potato for industry, combined or not, regardless of the management, they confer greater resistance of the plants to late blight. Their combination, applied in the furrow and in the pile, present a trend of more promising results, suggesting that the experiment be repeated and that an economic analysis be carried out.

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Cabbage Productivity as a Function of the Application of a Biostimulant based on Triacotanol

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1. Introduction

The use of new technologies for the cultivation of vegetables has been implemented significantly in recent years, due to the great demand for healthier foods. Likewise, concern for the environment is the center of global discussion, as climate change is directly affecting agriculture (von Uexkull & Buhaug, 2021). Therefore, the search for alternatives that generate increases in quality and productivity in the field, with less environmental impact, is recommended. Among the alternatives, biostimulant products may be an option, as they improve the nutritional efficiency of plants, reducing the use of chemical fertilizers, in addition to having their base with substances of natural origin. Second a Regulation (EU) 2019/1009, biostimulant is a: ”fertilising product the function of which is to stimulate plant nutrition processes independently of the product's nutrient content with the sole aim of improving one or more of the following characteristics of the plant or the plant rhizosphere: i) nutrient use efficiency, ii) tolerance to abiotic stress, iii) quality traits, or iv) availability of confined nutrients in the soil or rhizosphere”(European parliament, 2019). Triacontanol (TRIA), a saturated long-chain alcohol, is a natural growth regulator found in epicuticular waxes (Naeem et al., 2012), which acts as a biostimulant. Increased in different stages of growth has increased the final productivity of vegetables such as tomato (Khan et al., 2006) and crops as rice (Chen et al., 2002) and ginger (Singh et al., 2012). In this sense, the objective of the present work was to evaluate the effect of biostimulants based on triacotanol on cabbage.

2. Materials and Methods

The experiment was completely randomized, using two treatments and three repetitions. *Brassica oleracea* var. capitata ‘Astrus Plus’’ seedlings of cabbage were transplanted directly to 15 days advanced prepared soil in Parana, Brazil, was carried out on March 25, 2022, using a spacing of 0.70 m between rows and 0.40 m between plants. The foliar treatment was applied as the biostimulant product (+Biostimulant= product based on triacontanol, with foliar application at 1,5 ml L^{-1} at 45 DAT and 1,0 mL L^{-1} at 60 DAT) and control (-Biostimulant= without addition of the biostimulant). The treatments were applied at 15-day durations beginning 45 days after transplantation (DAT). The commercial product used was Revigor (Aqua®), composing of 100 g L^{-1} of triacontanol. At 104 DAT, 4 central plants per plot were evaluated for the average yield (t ha^{-1}). Data were analysed using Independent T-test ($p<0.05$) for to verify significant differences between the means of the two tratamentos (n=12, 3 replicas x 4 plants).

3. Results and discussion

The analysis of the variable average yield indicated that there was a significant difference between the treatments ($p<0.004$). The results are presented in Figure 1.

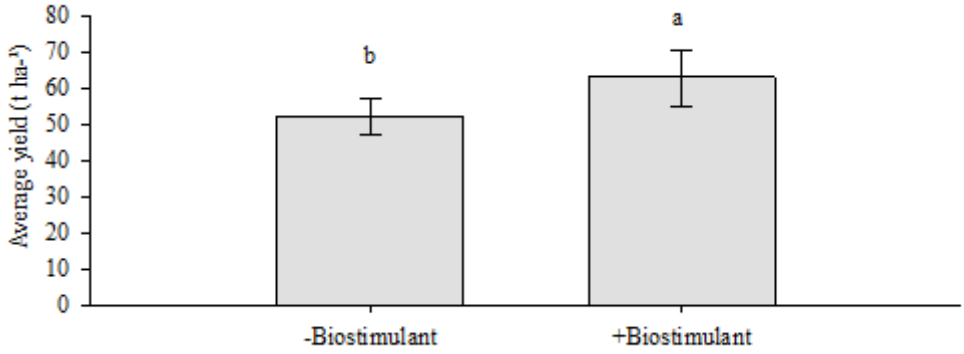

Figure 1. Average yield (t ha^{-1}) cabbage cultivation, at 104 days after sowing (DAS), submitted to treatment with bioestimulant with Triacontanol (+Bioestimulant) and without bioestimulant (-Bioestimulant). Curitiba-PR, 2022.

*Different letter(s) indicate significant difference between treatments by Independent T-test ($p<0.05$). Bars represent the mean values ± SE

The foliar application with biostimulant of triacontanol (+Bioestimulant=60.6±7.1 t ha-¹) increased 16% the average yield in comparation of with biostimulation (-Bioestimulant= 52.6±5.1 t ha-¹). This result corroborates with the increased in the final productivity of several crops such as rice, tomato and ginger (Chen et al., 2002; Khan et al., 2006; Singh et al., 2012) These results can be explained by the increase in photosynthetic activity, promoted by TRIA, and greater absorption of nutrients such as N, P and K (Khan et al., 2006)
This experient shows that the foliar application of a triacontanol-based biostimulant can satisfy the nutritional needs of vegetables, minimize the environmental impact of fertilization, obtain high productivity and avoid excessive application of fertilizers

4. Conclusion

It was concluded that the foliar application with biostimulant based on triacontanol had a positive effect on the cabbage crop on compared without application.

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Cabbage Productivity as a Function of the Application of a Biostimulant based on Seaweed Extract, Amino Acids and Nutrients

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1. Introduction

The cabbage crop is cultivated in small areas and requires a lot of manpower, being, for the most part, conducted by family farming. Biostimulants are defined by many authors as natural or synthetic substances, derived from the mixture of two or more plant bioregulators or these with other substances (amino acids, nutrients and vitamins), which can be applied directly to plants or in seed treatment (du Jardin, 2015). Many bioestimulants have amino acid and exist different types, which may be essential (leucine, isoleucine, methionine, phenylalanine, arginine, histidine, tryptophan, valine, threonine, and lysine) are synthesized only by plants or, non-essential (alanine, β-alanine, asparagine, cysteine, glutamine, aspartic acid, glycine, proline, serine, and tyrosine) are synthesized by both plants and humans (Kumar et al., 2017)

Amino acids, in addition to being precursors of various physiological processes, together with nutrients, form small electrically neutral molecules, quickly absorbed and incorporated into plant metabolism, without the need for the plant to spend energy to synthesize it (Shafie et al., 2021). Biostimulants based on seaweed extracts are also widely commercialized, with the use of the brown seaweed *Ascophyllum nodosum* being predominant in agriculture. This specie is rich in substances that act as growth regulators (cytokinins, auxins, gibberellins and betaines), and macro and micronutrients (Dapper et al., 2014), stimulating different processes in the plant, helping in its growth, product quality and better plant yield (Khan et al., 2009). The use of seaweed extract and amino acids (isolated) in cauliflower showed positive results in relation to the control. Amino acid foliar application gave the highest values of: leaf area, perimeter, diameter, K and N% in the curds, %N in the leaf and the % of protein in the curds. Seaweed extract gave the highest values of: plant height, number of leaves and curds perimeter (Abd AL-Hseen et al., 2020). Combination of *Ascophyllum nodosum* extracts with amino acids on broccoli plants increased physiological parameters and chlorophyll content under water stress conditions conditions (Kałużewicz et al., 2017).

In this sense, the objective of the present work was to evaluate the effect of biostimulant based on the seaweed extract *Ascophyllun nodosum* L associated, amino acids and nutrients on the productivity of cabbage.

2. Materials and Methods

The experiment was completely randomized, using two treatments and three repetitions. *Brassica oleracea* var. capitata 'Astrus Plus' seedlings of cabbage were transplanted on March 25, 2022, using a spacing of 0.70 m between rows and 0.40 m between plants. The transplant ocurred directly to 15 days advanced prepared soil in Parana, Brazil. The treatment was: with application of biostimulant (+Biostimulant) and without application of biostimulant (-Biostimulant). The foliar application was used for biostimulant (1.5 mL L^{-1} of commercial product) with beginning 45 days after transplantation (DAT) at 88 DAT, applied every 15 days. The commercial product used was Thorak Bio Evolution (Nitrobrás®), consisting of: 32 g L^{-1} of seaweed extract *Ascophyllum Nodosum*, amino acids and a complex of nutrients (N, P, K, B, Cu, Mn, Mo, Ni and Zn). At the end of the cycle (104 DAT), 4 central plants per plot were evaluated for the average yield (t ha^{-1}). Data were checked for normality with the (Kolmogorov–Smirnov, $p > 0.05$). It confirmed that the data were not normally distributed, so a non-parametric Mann–Whitney U test ($p<0.05$) for two independent samples was applied.

3. Results and discussion

The average yield (t ha^{-1}) of cabbage 'Astrus Plus' between ponds with or without the use of bioestimulant was statistically significant ($p<0.05$), for Mann–Whitney U test (Figure 1).

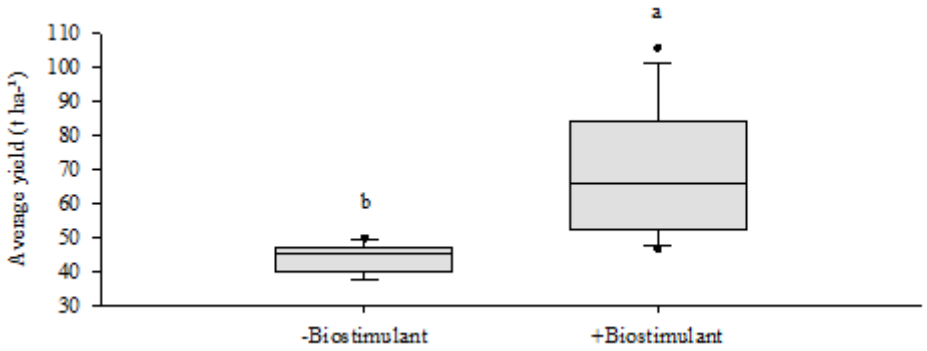

Figure 1. Average yield (t ha-¹) of cabbage, at 104 days after transplant (DAT), submitted to treatment with bioestimulant (+Bioestimulant) and without bioestimulant (-Bioestimulant). Curitiba-PR, 2022. *Means were compared by Mann-Whitney U-test. Values with different superscripts differ significantly ($p < 0.05$).

These data are presented in the form of a box-plot, showing the maximum and minimum values obtained, the interquatile interval, between the 1st quartile (Q1= lower base of the rectangle) and 3rd quartile (Q3= upper part of the rectangle), median (line contained in the rectangle) and out liers (points) of the different objects.
The greatest average yield (t ha-¹) was observed for +Bioestimulant (median = 66.1 t ha-¹), with values between 50.0 and 105.7 t ha-¹, with an interquartile interval of 21.6 2 t ha-¹. For -Bioestimulant (median = 45.6 t ha-¹), presented the minimum and maximum values of 37.7 e 47.0 t ha-¹, respectively. The combination of Ascophyllum nodosum extracts with amino acids in broccoli plants increased physiological parameters and chlorophyll content, which may explain an increase in productivity, as observed in this experiment. Another explanation may be associated with the similar effect to vegetables promoted by the seaweed (Khan et al., 2009).
Reaching a broader market would be an important achievement, showing that they are not only an alternative to conventional fertilization, as in addition to presenting themselves as the most ecological option, they also have great potential when combined with mineral fertilization (Stasio et al., 2017).

4. Conclusion

It was concluded that the foliar application with biostimulant based on seaweed extract, amino acids and nutrients had a positive effect on the cabbage crop on compared without application.

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A Critical Review on Health Promoting Benefits of Sana Makki (Senna Alexendrina)

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Introduction

Medicinal herbs have an essential role in illness treatment in economically depressed areas of the world. Some of these therapeutic herbs, like mint and basil, undergone extensive research. However, several therapeutic plants, like *Asparagus aethiopicus* L. and *Citrullus colocynthis* L., and *Senna Alexendrina* Mill., have received little attention, particularly in terms of their phytochemical composition and bioactivity.

Senna alexandrina commonly known as Alexandrian Senna, is a multiple character's medicinal plant that belongs to the Caesalpiniaceae and is found in the climatic zones (Tropical and sub-tropical) of the world (Asian region, Africa, and Mexico) (Săvulescu *et al.*, 2018). India, Sudan, Egypt, Pakistan, China, and Korea are among the countries where commercial production is practiced. It's commonly utilized in traditional medicine for a various benefit. All parts of these plants have good pharmacological effects. Senna plant products include leaflets, clusters, and fruits. Pharmacological effects of senna include laxative, purgative, antipyretic, and diuretic actions (Balasankar et al., 2013). The best and most desirable form of the medicine is produced by the little shrub Senna alexandrina, which reaches a height of about 2 feet. The plant body consist of upright stem, plain, and pale green, branches are long and spread each having four or five inch long leaflets, lanceolate or obovate, and have a thick gooey, sweetish flavor, with yellow tiny flowers. The containers are typically rectangular in shape, roughly 2 inches length by 7/8 inches wide, and contain 6 seeds. (Dziedzic and Hudson, 1984).

India, Sudan, and Egypt are the three primary manufacturers and exporters of senna leaves and pods products. including over 22,000 hectares of cultivated land, and total production of 12,744,070 kg (28,095,865 lbs) during 2016-17. India became largest *S. alexandrina* producer in the region (Goraya and Ved, 2017; TRADESTAT, 2018). India imports more than 70% to the major parts of the world that includes Asian, European, and USA states. Pakistan is endowed with abundant natural resources, different biological zones, and a flora that includes over 6000 plant species. Medicinal plants are naturally grown in various ecological regions around Pakistan, and some species are also cultivated on a modest basis. Temperatures range below zero in the mountains to 50 degrees in the plains of the south. In Pakistan, more than 6000 plant species have been identified, with more than 1000 of them being used as medicinal and fragrant plants. Senna is grown for medical purposes in Pakistan, and its pods and seeds are used to treat blood detoxification and gastrointestinal distress (Ahmed *et al*., 2016).

Plants can be grown in a variety of climates, from the drier to temperate to tropical. Such plants are grown preferably a sandy loam that is deep, well-drained, and somewhat fertile, as well as full sun. Salinity inhibits germination, while older plants are salt-tolerant. *Senna alexandrina* can't stand being w*et a*ll the time or being irrigated heavily. The plant is often produced as an agricultural product, but it can be allowed to stand for another 2 to 3 years to continue producing. It provides flowers and fruits across the year (Huxley and Griffiths, 1992). The soil and water factors have a significant impact on yields. Under rain-fed circumstances, the average annual output in India is around 700 kg of leaves and 100 kg of pods per hectare. The production of leaves and pods under irrigation is around 1400 kg/ha and 150 kg/ha, respectively. Despite the fact that sennoside content is higher when plants are stressed, reasonable irrigation and fertilization lead to higher leaf and total sennoside yields (Grubben and Denton, 2004).

Biological names:

1) *Cassia acutifolia* Delile

2) *Cassia Senna* L.

3) *Senna angustifolia* (Vahl) Batka

4) *Alexendrian Senna* (English)

Climate and Soil

In rural places with a subtropical climate, this plant can reach a height of one metre. As winter approaches, the tree loses its leaves. The plant grows best in well-drained, sandy loam lateritic soils with a pH of 7-8.5, however, rich farms and irrigated crops promote faster growth and larger yields. It prefers a habitat that is always warm and dry. Crop loss could occur even if water is retained in fields for a short time.

Botany

It is an evergreen perennial that spends 110–130 days in the field. Compound leaves with 5-8 pairs of 2.5 cm x 1.5 cm oval-lanceolate leaflets make up the plant's compound leaves, which also have a flush of blooming stems that appear 60–70 days after planting in both the axillary and subterminal locations. After 90 days, the large, bright yellow blossoms give rise to medium-sized pods (3.5cm–6.5cm 1.5cm). Each has 5-8 flat, yellowish seeds. Most of the crop is self-pollinated.; however, insects may cause significant outcrossing (20%).

Table 1. Taxonomic classification

Kingdom	Plantae-plants, planta, vegetal plants
Subkingdom	Viridiplantae- green plants
Infrakingdom	Streptophyta – land plants
Superdivision	Embryophyta
Division	Tracheophyte – vascular plants, tracheophytes
Subdivision	Spermatophytina – spermatophytes, seed plants, phanerogames
Class	Magnoliopsida
Superorder	Rosanae
Order	Fabales
Family	Fabaceae – peas, legumes
Genus	Senna Mill

Integrated Taxonomic Information System – Report (2007-2010)

Types of senna

There are 500 species in the genus Senna, 26 of which are Cassia species and contain free-form or glycoside anthracene derivatives. Cassia angustifolia (Indian senna) and Cassia acutifolia (Alexandrian senna) are acknowledged as official in many pharmacopoeias due to their laxative effects and widespread availability. The remaining species having laxative activity include Cassia fistula, Cassia Obovata, Cassia dentate, Cassia sofara, Cassia sieberiana, Cassia podocarpa, and Cassia alata.

History and tradition

Senna is used only therapeutically in the 9th century A.D. by Arabian clinicians. It has a significant history of usage as a cathartic in traditional Arabic and European medicine. The leaves were steeped, and the tea was consumed for its powerful gastrointestinal effect. An unexpected development can occur since it's frequently impossible to measure the quantity of active compounds in tea. Thanks to the development of standardised commercial dose forms, these concentrates are now marketed in liquid, powder, and tablet form in over-the-counter laxatives. Sena and Cassia, two Hebrew and Arabic words that signify "peeled back" in reference to the plant's

peelable bark, were combined to create the name. (Tripathi, 1999). Natural Cassia angustifolia was identified growing in and around Makkah, the revered and historic city located in the centre of the former province Hijaz. As per "Magic and Medicine of Plants," Caliph Harun al-Rashid called renowned Christian Arab physician Mesue the Elder in the ninth century CE. Mesue brought senna plants, which are native to North and East Africa, and they were used to treat the Caliph's constipation. Senna was used as an activator of bowel movements in Baghdad after Mesue the Elder's arrival. Native Americans were aware of senna's laxative qualities and used it to treat fevers instead (Mushtaq et al., 2010).

Phytochemistry:

The anthraquinone components sennoside (A, B, C, and D), flavonoids, saccharides, naphthalene derivatives, phytosterols, essential oils, and flavonoids, as well as tannins, wax, polymers, mineral salts, and mucilage, are all present in senna. Senna fruit and leaf both contain dianthrone glycosides, which are their active components (hydroxyanthracene glycosides). Aloe emodin Bruneton and rhein 8-glucosides are also present, albeit in negligible levels. The pharmacologically active substances found in the leaves of this plant include kaempferol, tinnevellin glycoside, aloe emodin, D-3-O-methylinositol, apigenin-6,8-di-C-glycoside, and emodin-8-O-beta-D-glucopyranoside (Wu et al., 2007). Quercimeritrin, rutin and scutellarein, are the main phenolic constituents of the plant (Ahmed *et al.,* 2016). Peels of Senna alexandrina have some vital elements i.e., iron 0.23% and very small rate of nickel (ni) and zinc (zn) by 0.01% chromium (cr) 0.10%, magnesium (mn) are determined by using x-ray fluorescence (Abdallh, 2019).

Senna leaves contain free and mixed forms of anthraquinone derivatives. Dianthrone glycosides are present in senna (1.5 percent to 3 percent). Two crystalline glucosides called sennoside A and B have been found in the leaves and pods. Sennosides A and B, Sennosides C and D, and Rhein dianthrones are all sennosides (rhein aloe-emodin heterodianthrones). Numerous significant sennosides have been discovered, and each one seems to enhance the laxative effect. The herb also contains trace amounts of free anthroquinones such rhein, aloe-emodin, and chrysophanol, as well as their glycosides (Abdallh, 2019). Examples of flavonols include isorhamnetin and kaempferol. The glycosides 6-hydroxymusizin and tinnevellin have been identified. Other components of senna include chrysophanic acid, 2-hydroxybenzoic acid, saponin, resin, mannitol, sodium potassium tartrate, and trace amounts of essential oil. Eastern and Western countries both utilise senna to treat constipation. The plant includes 2% polysaccharides and 10% granules, the majority of which are galactose, arabinose, rhamnose, and galacturonic acid. Other carbohydrates include sucrose, pinitol, glucose, mannose, and fructose. Senna contains two flavonols called isorhamnetin and kaempferol. (Abdallh, 2019).

Uses:

In folk medicine Senna was functional for curing different ailments as it shows Anthelmintic, Anti-dysenteric, Anti-hepatotoxic, Anti-leukemic, Anti-herpetic, Anti-hepatotoxic Anti-spasmodic, Antibacterial (staphylococci and Bacillus Coli), antiviral (El-Morsy, 2013), antifungal (Microsporumaudouini, etc.), neuroprotective properties (Borrelli *et al*., 2000) and hepatoprotective. It also had carminative, cathartic, expectorant, mutagenic, trypsin inhibitory, purgative, vermifuge (Duke *et al*., 2008), diuretic, colon cleansing, and body detoxification effects (Balasankar *et al*., 2013). The dried leaf of senna is employed as a purgative. 1-2 grammes of the leaf powder are administered with hot water when someone has constipation or stomach distention. Among the numerous commercial herbal products are Sarivadyasava oil, Pancasakara churna, Nimbadi churna, Kasisadi ghrita, Maha vishgarbha thailam, Kohl, Correctol Herbal Tea, Senna concentration, Senokot, Spolax, Periderm granules, Virechni, Ex-lax mild, Herblax, and Dulcolax (Anonymous, 2003).

Role in oxidative stress:

S. alexandrina, sometimes known as Alexandrian senna, is a multifunctional medicinal herb with laxative properties (Săvulescu *et al*., 2018). Senna may be a potential antihyperglycemic drug for the treatment of diabetes mellitus, particularly type 2 diabetes, according to studies on its antidiabetic and hypoglycemic effects. In various animal models, extracts from various sections of the senna plant revealed significant hypoglycemic effects. Sennoside-A, sennoside-B, and saponin are anthraquinone glycosides that have antihyperglycemic properties (Singh *et al.,* 2013). Rutin and other flavonols have been shown to have anti-diabetic properties. Senna extract contains large amounts of these glycosides, saponin and rutin (Delfan *et al*., 2016 ; Ghorbani, 2017). *Senna alexandrina* is also utilized to decrease blood lipid levels in some areas of Iran. Senna aqueous extract improves metabolic irregularities and oxidative stress associated with diabetes in rats, as well as reducing chronic hyperglycemia-related problems (Osman *et al*., 2017). Different solvent extracts of *S. alexandrina* can inhibit these enzymes in vitro investigations on the anti-diabetic benefits of senna (Boaduo *et al*., 2014). However, few studies

have been conducted to determine the effect of *S. alexandrina* supplementation on hepatic steatosis, hyperlipidemia, and oxidative stress caused by a high-fat diet.

Anti-fungal activity of Senna

Senna is well-known for its ability to fight fungal infections and DNA from *E. coli* bacteria. Sennosides, a chemical component, disrupt the digestive system and cause diarrhea. Senna has an effect on *E. coli* cells, produces DNA cuts, and works against fungal infections (Jalwal and Middha, 2017).

Anti-inflammatory effect:

Wang *et al*. (2020) reported that *S. alexandrina* is generally used for its prominent role in digestive irregularities and anti-inflammatory, free radicals scavenging qualities, with many qualities regarding protection against carcinogenic heavy metals, which is abundant and common cause of hepatotoxicity such as cadmium still not known, according to study conducted by researchers. Over the course of four weeks, they investigated the induced liver damage in rats caused by cadmium chloride (CdCl2) and treated with *S. alexandrina* extract (SAE). Four groups were made and three of them treated differently keeping one group as control. Treatments are SAE+$CdCl_2$, SAE 100 mg/kg, $CdCl_2$, 0.6 mg/kg. Cadmium levels in hepatic tissue, total bilirubin levels and blood transaminase were all measured as indications of proper performance of liver.

Oxidative stress indices [malondialdehyde (MDA), nitrate/nitrite (NO), and glutathione (GSH)], antioxidant molecules [catalase (CAT), superoxide dismutase (SOD) and nuclear factor erythroid 2-related factor 2 (Nrf2), glutathione-derived enzymes, (TNF-α) (IL-1β) and histological changes to the liver were observed. Prior to CdCl2, SAE treatment reduced cadmium accumulation in liver tissue and blood liver function markers. Pre-treatment of the extract reduced the histological changes in the liver produced by CdCl2 exposure and inhibited oxidative, inflammatory, and apoptotic effects. By boosting Nrf2 expression, against hepatotoxicity caused by cadmium chloride extract of Senna A can be used.

Role in curing constipation :

Congestion is a medical disease where the patient has trouble or pain when pooping. Studies show that S. Alexandrina is one of the best therapeutic herbs for treating digestive problems and constipation (Parsaei et al., 2016). Most people who experience persistent constipation would prefer use over-the-counter laxatives than consult a doctor. Chronic constipation is frequently treated with senna alexandrina at a frequency of 12 g per day (Nimrouzi and Zarshenas, 2019). In its evaluation report, the European Medicines Agency identified two circumstances in which senna formulations had a long history of use. To begin with, senna is advised for the short-term therapy of intermittent constipation. Second, before clinical procedures for colon cleansing, bowel preparation is strongly advised (Werner and Merz, 2007).

Skin Care

Tannins and essential oils found in senna foliage assist to lessen redness and swelling. They can be made into a compress to use to burn wounds, and they have a strong antibacterial effect. Senna contains ethanol and acetone compounds that fight acne-causing germs. Senna increases cell regeneration and collagen formation while decreasing sebum production (Balasankar et al., 2013).

Colon Cleanse

Senna is frequently used to cleanse the intestines prior to diagnostic procedures such as colonoscopies. Cleansing the colon is thought to improve nutrient absorption and overall colon health (Singh, 1992).

Anti-Parasitic

Senna can also be used as a vermifuge to kill parasites and remove worms from the digestive tract. It works much better when coupled with other anthelmintic herbs (those used to cure roundworms), such as ginger or fennel. Because of Senna's potent effect, these herbs promote regularity and minimize the likelihood of bowel cramping (Balasankar *et al*., 2013).

Irritable bowel syndrome treatment (IBS)

Linear stomach pain is a symptom of irritable bowel syndrome (IBS) or irritable bowel disease (IBD). Indications include erratic bowel motions (diarrhea, constipation, or both). The pain typically begins after eating and

disappears after a bowel movement. Condition include cramping, fluid discharge, and an inadequate feeling of fullness. Due to its laxative qualities, senna may aid in managing the symptoms of irritable bowel syndrome (IBS). Senna may trigger colon spasms, which may compel the faeces to move outside the body, but the exact method by which it does this is uncertain. (Balasankar *et al*., 2013).

Weight Loss

Senna weight loss usually entails using the medication for longer than the suggested two weeks and potentially taking more than the 17.2 mg daily dosage. Senna consumption refers to the overuse of this plant, which might result in significant consequences. According to Drugs.com, an anorexia nervosa patient consumed up to 100 senna pills each day. When you take more than the prescribed amount, you risk getting nephrocalcinosis, or too much calcium in the kidneys, finger clubbing, a malformation of the fingers, and osteoarthropathy, a bone and joint condition, as this patient did (Balasankar *et al*., 2013).

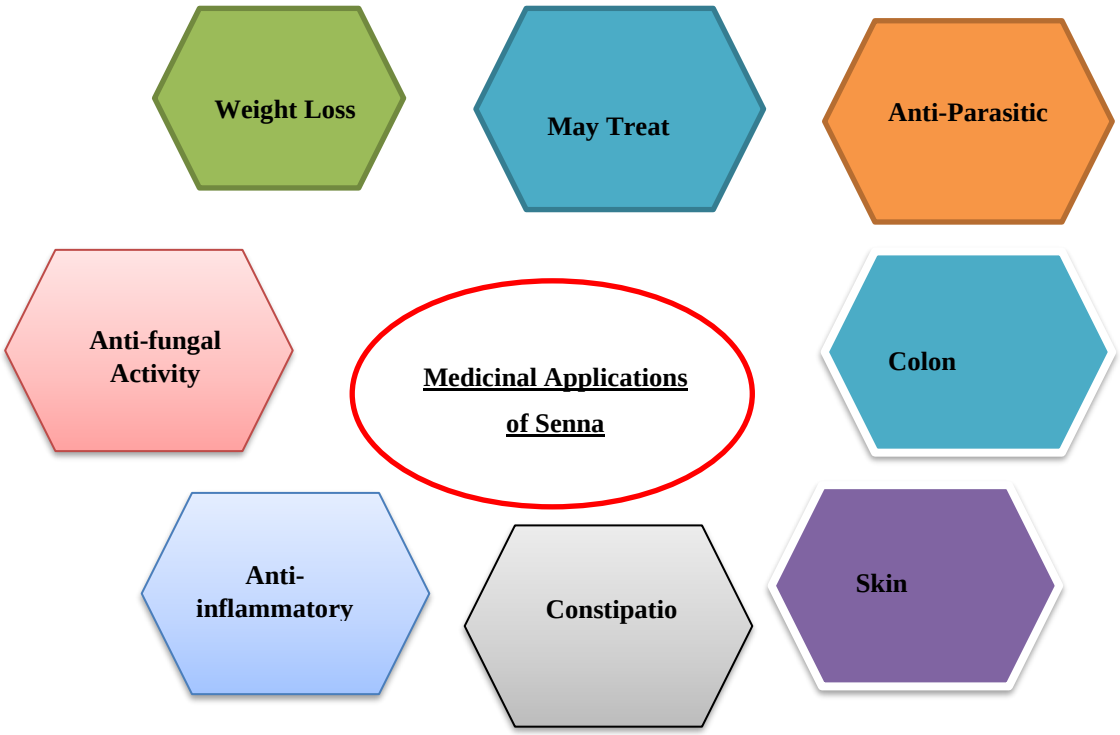

Figure 1. Different health benefits S. Makki

Food application :
The EU's consumption history has been developed. As a result, the plant's leaves and fruits aren't considered unique in food supplements because of their pungent smell and bitter taste (EU Food Catalogue, 2019).

Conclusion

Overall review study conclude that *S. Alexandrina* showed immense diversity regarding their metabolites such as phenolic contents, antioxidants, anti-fungal, antibacterial behavior. For the sack of disease control S.Makki can play major role in pharmaceutical industry to use as a source of natural products. Further research and investigation are required to unravel further significance and clinical investigation of this important medicinal plant. Although different significant mechanism should be described to grow pharmaceutically important plant efficiently.

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Medicinal Potential, Health Benefits and Bioactivity of Mentha piperita L. (Peppermint)

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Introduction

Today population across the globe mainly depend directly or indirectly on traditional remedies for their basic health disorders along with the primary food needs. These traditional medicines mainly involve plant material extracts and mostly aqueous solutions, which can be prepared by heating or soaking plant materials and has prevailed basic healthcare form ancient times. *Mentha piperita* L. (Peppermint) is significant therapeutic herb belongs to family Lamiaceae. It is also known as the oldest herbal plant almost first explained by Carolus Linnaeus in 1753. M. piperita is considered among the hoariest curative plants in human history also famous in almost in every culture (Egyptian, Roman and Greek cultures) since ancient times. (Xu et al, 2003) In present era, due to the multidimension uses of M. piperita, its consumption is astounding. Due to the presence of various constituents and compounds obtained from this plant and the essential oil extracted from its various portions has enormous use in our daily life areas like pestisides, cosmetics, confectionary pharmaceuticals beverages (Yang et al., 2010). The reality that many everyday products such as baked goods, beauty products, verbal hygienic products, meds, insecticides, and as a flavor enhancer in toothpastes, gum, and refreshments, include some compounds and constituents from the dehydrated and fresh plants of mint, as well as their essential oils, demonstrates the plant's economic importance (Patel et al., 2007).

Besides medicinal potentials it uses as flavoring agent and as a single ingredient in dinners. Action of *M. piperita* as a traditional therapy or substitute remedy that includes: bilious problems, stomach ache, gastritis, intestinal cramp, antiviral, antibacterial, antifungal inflammation, fustian, hard cell of the bile duct, gall-bladder and gastro-intestinal region, antimicrobial activity and respiratory diseases (Capecka et al., 2005).

Distribution

The peppermint plant is native to Europe and extensively spread out in farming all over across the globe. It is wildly originated occasionally with its inheritance. It is an offensive species in Australia, the Galapagos Islands, New Zealand and United States.

Phytochemical Properties

Various studies show that essential oil extracted from peppermint plant are mainly composed of different secondary metabolites. Peppermint chemical constituents are varying from in leaves and other parts also mainly depend on plant maturity, processing environments, geographical conditions and variety as well (Xu et al, 2003). According to a study conducted by (de Almeida Muradian et al, 1998) fresh leaves of peppermint (Brazil) comprised of 940–1016 retinol equivalents RE $100g^{-1}$ β-carotene. The evidence also shows that chlorophylls, carotenoids, ascorbic acids and tocopherols were also reported in various concentration in peppermint oil (Capecka et al., 2005).

Nutrient Contents

Various studies and researches show that mineral contents from mint foliage are additional wide-range and relating to that of vitamins. Dried peppermint leaves contain major minerals are as g per kg: Potassium 33, Calcium 15.3, Magnesium 5.8 and small quantity of sodium, with lesser quantities as mg kg^{-1} of iron 239.0, Manganese 188.0, Zinc 51.0, and Copper 12.0. Minor quantities as µg g^{-1} of Chromium 941.0, iodine 325.0 and Selenium 147.0 are also existing (Zimna and Piekos, 1988, Lozak et al., 2002).

Antioxidant Properties

Essential oil (Eos) use as natural antioxidants has recently attracted more attention. The oxidant species can be produces in the body as a result of different metabolic process and the excess of nitric oxide production may cause failure or damage of different vital organs in our body, thus antioxidant pathways activated in order to neutralize

these harmful responses (Nathan et al., 2013). Mint is an important medicinal plant and also rich source of many vital antioxidants. Schmidt et al., (2015) mentioned that EOS extracted from mint herb has antiradicals functions with respect to DPPH and hydroxyl (OH−) radicals, while it is also stated by some researchers that the extracted essential oils possess radical scavenger activity against the ABTS radical (Yang et al., 2010). In order for mint to serve as an antioxidant, phenolic chemicals like rosmarinic acid and flavonoids like hesperidin, naringin, luteolin, and eriocitrin must be present in the leaves (Dorman et al., 2009).

Anti-bacterial Properties

Due to the widespread use of medicinal plants in conventional traditional treatments, secondary metabolites from botanicals are now of significant interest as anti-microbial mediators (Mahboubi and Kazempour 2014). Currently, scientists and researchers working on different infectious illnesses, the compounds extracted from peppermint are increasingly interests (Mucciarelli et al., 2007). The essential oils and aqueous solutions from peppermint plant showed excellent anti-microbial action against the following bacteria: *Proteus vulgaris, Staphylococcus aureus, Streptococcus faecalis, Escherichia coli, Streptococcus pyogenes, Salmonella pullorum, Yersinia enterocolitica Comamonas terrigena, Acinetobacter sp, Shigella dysenteriae Serratia marcescens, Mycobacterium avium, Salmonella typhi, Lactobacillus bulgaricus, Streptococcus thermophiles, Staphylococcus pyogenes, Enterobacter aerogenes, and Escherichia coli* (Bohnert et al., 2016). It has been also shown by various studies that mint oil along with menthol having slight anti-bacterial action against Gram-positive and negative bacteria (Shaikh et al., 2014). According to (Inouye et al., 2001) stated the main respirational pathway pathogens *Staphylococcus aureus Haemophilus influenzae, Streptococcus pyogenes and Streptococcus pneumoniae* were found susceptible to peppermint oil and to its component's menthol and menthone. From research analysis it appears peppermint can become a major novel target for synthesis of various plant derived drugs against a large spectrum of multi-drugs resistance bacteria.

Anti-headache Activity

Herbal remedies have been a mainstay of headache therapy since the dawn of civilization (Levin, 2012). The best approach for treating headaches is to include peppermint and its derivatives in a regular diet. Gobel et al. (1994) discussed the advantages of combining peppermint and eucalyptus oil to treat headaches in patients. While Levin also noted comparable outcomes (Maliakal and Wanwimolruk, 2001).

Nervous system Actions

The and peripheral nervous system along with central nervous system function can be affected by the action of peppermint plant. Atta and Alkofahi during 1998 studied the painkilling mode of actions on an ethanoic quotation of peppermint plant on Swiss rats. Retaining 0.7 percent acetic acid vaccinated to prevail upon the ache observed by squirming. The rats were 1st cured for 30 minutes with 200 or 400 mg/kg (oral dose) of the mint extracts. Squirming movement in mint cured pests remained meaningfully lowered by 38–44 percent related with saline vaccinated controls. Study observed that 400 – 800 mg/kg of EOS vaccinated intraperitoneal in rats meaningfully improve ambulatory actions 10–40 minutes afterwards administration. The elements sequestered from peppermint like pulegone, caryophyllene, 1,8-cineole, menthone, isomenthone, menthol and methyl acetate also meaningfully improved ambulatory behavior (Umezu, 2002; 2003).

Cardiovascular and Hypotensive Effects

The prevention of cardiovascular issues is now accorded top priority in the industrialized countries. Due to the fact that consuming foods with antithrombotic properties on a regular basis offers a simple and manageable method of protection from cardiovascular illnesses, a lot of attention is being paid to diet plans that contain these foods. An investigation done by Lahlou et al. in (2002) showed that essential oils from peppermint plant has an element called pipertenone oxide, which shows positive effect on cardiovascular system and slow down the heart rat which seems to independently be occurring.

Antitumor Activity

A study carried out by Ohara and Matsuhisa (2002) in which edible plants (120) were screened for anti-tumour encouraging activities against Okadaic acid (OA) and non-12-O-tetradecanoylphorbol13-acetate (TPA)-type promoter that promotes tumor creation by deterring protein phosphatase-2A activity. Among eight plants the peppermint plant was the only one plant that showed up strong activity (85% to 100%) in overwhelming the action of okadaic acid.

Therapeutic Uses

Presently, the oils from peppermint plant have become most measured agent as treatment for a human disorder (Alankar, 2009). Its extract is mostly employed in the culinary industry as a flavoring ingredient in addition to medicinal purposes. Menthol is the most beneficial of all the chemical constituents that were recovered and refined

from mint oils, and it is often used to treat respiratory congestion (Eccles, 2003), headache pain, and skeletal muscles problems (Patel et al., 2007). The recommended peppermint oil dose for adults is 0.2 to 0.4 mL three times per day in enteric-coated capsules (Khanna et al., 2014).

Conclusion

Peppermint is the most popular single ingredient and traditional herb around the world and contain strong position in market in future. It has numerous advantages in both the medical and other fields like cosmetics, toiletries, and flavoring etc. also to other sides that having a solid links with health: straddling from the food sector to insecticides and repellents. In this current review the nutritive, phytochemical and health potential of peppermint are considered. Additionally, more study is needed to examine the cellular and molecular mechanisms underlying peppermint's well-known effects on the human body.

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Hybrid Seed Development of Onion (Allium Cepa L.) Through the Use of Male Sterility and Maintainer Lines

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1. Introduction

Onion is a global cultivated species and offers us the possibility of taking advantage of heterosis and hybrid vigour to increase productivity. Being an allogamous cross-pollinated crop, it has a wide variability for selection in: shape and size of bulbs, colour of layers, cycles, earliness, vernalization for flowering, uniformity in maturity and so on. Current onion breeding programmes are developing hybrids with the male-sterile cytoplasm *S*, which interacts with a fertility restoring nuclear gen-*MS* (Jones and Clarke, 1943). Following the identification of the cytoplasmic male sterility gene, onion is being produced worldwide in both long-day and short-day varieties. The manufacture of hybrid onion seed is a highly successful business as long as one works with the system of androsterility or cytoplasmic male sterility (CMS), which is the inability of anthers to manufacture fertile pollen, therefore, any seed produced results only from cross-pollination, and is therefore an important tool when producing hybrid seed. Hybrid seeds production by emasculation and hand pollination is only used for research purposes, as it would not be commercially and economically feasible. Hybrid cultivars are important for improving vegetable output because of their high yield potential, improved quality, early maturity and tolerance to diseases and pests. (Nagaraju *et al.* 2017). Therefore, the objective of the present work was to produce F1 hybrid seed from 50 experimental onions lines.

2. Materials and Methods

For the output of F1 hybrid seed, an A-line with the genetic constitution S-*msms* (androsterile) is needed, to ensured that no self-fertilization occurs. This line A (S-*msms*) is crossed with maintainer B-lines (N-*msms*) which are fertile and will perpetuate the male sterility to the offspring having the following genetic constitution: S-*msms*. As for the C-line or fertile Male line, it should contain the following genetic constitution: Cytoplasm N: N-*MsMs*, N-*Msms*, N-*msms*; Cytoplasm S: S-*Msms*, S-*MsMs*, as described by Mohsin *et al.* 2016. During 2019, 50 experimental crosses were made in order to obtain information on the best crosses that, were selected for further breeding the following year due to their specific combinatorial aptitude. In 2020, 11 hybrids were selected that stood out for their characteristics of earliness, shape and size of the bulb, as well as color of the layers, etc. The trials were carried out in Spain in the Autonomous Communities of Castilla La Mancha (Ciudad Real and Albacete), La Rioja (Calahorra), Navarra (Ablitas and Buñuel), Granada (Zújar/Val de Rubio) and also in Portugal (Alcochete/Montijo). Table 1 below shows the most outstanding experimental hybrids.

Table 1. Selection of 11 experimental hybrids selected in 2020

Crosses		Reference Line A ♀	Reference Line C ♂	Gen.
18CC04	Cic x SJF	1806576E+N	1806589E	F1
18CC12	Cic x SJF	1700352N	1700481N	F1
18CC13	Cic x SJF	1700354N	1700473N	F1
18CC17	Cic x SJF	1806580E	1806589E	F1
18CC20	Cic x SJF	1700358N	1700473N	F1
18CC25	Cic x SJF	1700360N	1700478N	F1
18CC26	Cic x SJF	1806584E	1806594N	F1
18CC35	Cic x SJF	1700368N	1700473N	F1
18CC40	Cic x SJF	1700370N	1700478N	F1
18CC46	Cic x SJF	1700378N	1700473N	F1
18CC50	Cic x SJF	1700378N	1700481N	F1

3. Results and discussion

From the specific combinatorial aptitude of the experimental hybrids and their subsequent selections, three precommercial hybrids were obtained, which will be tested in growers fields at a commercial level in Castilla La Mancha, Granada and Navarra. Table 2 shows the three precommercial hybrids which have been selected because

of their good vigorous plant with dark green foliage and strong leaf, weight that can reach up to 350-450 g each one, good yield, earliness, bulb shape and size, colour of layers, high percentage of bulbs with a single central stem and slim neck and besides some diseases tolerance, as well as the parental lines and the amount of F1 hybrid seed obtained from each hybrid.

Table 2. Selection of three hybrids Precommercial 2021

Gen.	Crosses	Line A ♀	Line C ♂	Weight (kg)
F1	18CC04	2009417N	2009428	14,3
F1	18CC40	2009427N	2009430	9,7
F1	18CC50	2009416N	2009432	23,4

Figure 1. Selection of the best precommercial hybrids

4. Conclusion

At the beginning, there were 50 initial experimental crosses, later three promising hybrids have been selected, (18CC04, 18CC40 and 18CC50), from the experimental phase to the precommercial phase, and they were selected for their good specific combining ability in several terms as: yield, earliness, spherical globular shape and brown skin with a lot of layers; also they have high consistency with a long conservation in store and diseases tolerance.

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Phosphorus Recovery Methods as Vivianite from Wastewater

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1. Introduction

Phosphorus (P) is one of the vital elements for living things. P is used in DNA and RNA for energy transfer, especially in the genetic processes of living things. In addition, it plays an active role in energy transfer in photosynthesis in plants (Sun et al., 2018). P element, which is so important for life, is used as fertilizer in the agriculture sector of 95% of the world. It is finite and irreplaceable due to the mining of phosphorus, that is, the extraction of phosphorus rocks. (Daneshgar et al., 2018). For example, Morocco possesses 75% of the world's phosphorous deposits. This situation creates a sensitivity in agricultural production. Therefore, there is a need to turn to sustainable phosphorus production practices (Cordell and White, 2015). To ensure sustainability in agricultural production; Directing reuse practices from wastes and wastewater and recycling nutrients are alternatives. In this way, for the production of alternative materials to limited resources, the return of nutrients from waste and wastewater to the soil can cycle, improving agricultural production. (McConville et al., 2017). Establishing a cycle with the recovery of nutrients closes the cycle and returns organic, inorganic, and mineral compounds to agriculture. Organic wastes and wastewater are the most important sources of nutrient recovery. Worldwide, it is predicted that the total waste generated by humans will meet only 22% of the phosphorus demand (Mihelcic et al., 2011). More than 80% of nitrogen and 50% of phosphorus in wastewater comes from urine. Wastewater treatment targets the current system; It is the removal of organic debris, suspended particles, nutrients, and pathogens from wastewater before discharging wastewater into receiving environments (Tchobanoglous et al., 2021). In addition, the recovery process of nutrients; is thought that it will reduce the consumption of freshwater resources and increase the environmental and economic motivation of the wastewater treatment plant. There are currently numerous common types for recovering P from wastewater; these methods contain crystallization, adsorption/desorption, acid/alkali leaching and thermochemical processes. Each of these methods has advantages as well as disadvantages. For example, phosphorus recovery by struvite crystallization is widely used and investigated. However, it may not be the most suitable solution for P recovery in itself; It has disadvantages such as difficult working conditions, low-efficiency recovery rate, and products with dense weight (Sena et al., 2021).

Contrary to these methods, phosphorus recovery as vivianite attracts more attention from researchers. Vivianite is preferred because of its economical, applicable, and easy accessibility to Fe sources. In this context, in this study, vivianite production methods from wastewater, parameters affecting vivianite production, and its applicability will be discussed

2. Vivianite Production Methods

Vivianite is an iron phosphate mineral found in lake sediments and soil in an oxygen-free, Fe-rich environment. Additionally, it is commonly found in digested sludge and activated sludge as a potential source of phosphate recovered from wastewater treatment plants (Zhang et al., 2022) .

$$3Fe^{2+} + 2PO_4^{3-} + 8H_2O \rightleftarrows Fe_3(PO_4)_2 \cdot 8H_2O$$

As seen in its chemical formulation, the two main components of vivianite are Fe and P. Fe ions in wastewater usually come from Fe dosing. It is employed as a crystallizing agent in order to recover P and meet wastewater regulations. It has previously been stated that P recovery from wastewater via vivianite formation is a chemical process that may be influenced by a variety of elements such as alkalinity, molar ratio, microorganisms, Fe/P, reaction time, sulphate (S) concentration, temperature and pH value(Zhang et al., 2022).

Various treatment technologies are used to recover P from wastewater to meet the P supply and fertilizer demand. P recovery strategies enrich and accumulate P in wastewater and subsequently produce vivianite in situ. That is, it is divided into two as P enrichment and vivianite formation by various techniques. Ion exchange, electrodialysis capacitive deionization, membrane bioreactors, and anaerobic fermentation are all methods for enriching P. Vivianite production methods include biomineralization, chemical precipitation, anaerobic digestion and electrochemical crystallization.

3. Conclusion

P shortage is a pressing issue that has attracted worldwide attention. Vivianite recovery from sewage sludge and wastewater provides a feasible solution to this problem. This technique converts the pollutant P into the lucrative and environmentally friendly substance vivianite. Vivianite synthesis has substantial benefits over standard P recovery procedures in terms of low chemical cost, high recovery efficiency, and value-added products.

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Impact of Amino Acids and Nutrients-Contented Biostimulant on the Cauliflower

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1. Introduction

Climate, latitude, longitude, seasons of the year soil type, water availability, and mineral nutrition are all elements that influence crop yield and quality (Morais et al., 2012). Cauliflower (*Brassica oleracea* var. botrytis) is a very productive variety that allows to cultivate throughout whole year in Brazil (Filgueira, 2008).

Boron insufficiency creates serious issues in cauliflower, which is extremely susceptible to this micronutrient shortfall (Coutinho et al., 1993), which provides numerous benefits in cauliflower, including those associated to flowering and nutrition, which have a direct impact on quality and eventual production. Additionally, boron is engaged in a variety of physiological functions affecting calcium metabolism, solute translocation, sugar metabolism, and both auxin and protein synthesis (Thakur et al., 2019).

The biostimulant has a systemic feature that allows it to stimulate many sites at various points throughout the plant (Pecha et al., 2012), maximizing the productive features in accordance with the favorable physiological outcomes that take place in the plant by intervening in the cascade of signals and triggering or silencing a number of routes (Oliveira et al., 2017). In addition to serving a structural function, chemicals like amino acids are among the biostimulants that plants naturally create. Since they engage with specific receptors within cell membranes to send signals, they are connected to the production of vitamins, enzymes, hormones, and chlorophyll and cause a number of morphophysiological and biochemical alterations in plant structures (Ryan et al., 2002).

In accordance with the aforementioned source, the aim of this study was to assess the use of an amino acid-based biostimulant in conjunction with a nutrient complex with a high calcium and boron content in the development of cauliflower.

2. Materials and Methods

The experiment was completely randomized, using four treatments and three repetitions. *Brassica oleracea* var. botrytis 'Barcelona' seedlings of cauliflower were transplanted directly to 15 days advanced prepared soil in Parana, Brasil. The foliar treatment was applied as the biostimulant product in 0.50, 0.75 and 1.0 mL L^{-1}, in addition to the control (0 mL L^{-1}) without the addition of the biostimulant. The treatments were applied at 15-day durations beginning 15 days after transplantation (DAT). The commercial product used was Calmax®(OMEX), being composed of (%): 14.60 of Nitrogen (N); 21.80 of Calcium (Ca); 2.90 Magnesium (Mg); 0.15 Manganese (Mn); 0.073 Iron (Fe EDTA); 0.073 Boron (B); 0.058% Copper (Cu EDTA); 0.029 of Zinc (Zn EDTA) and 0.0015 of Molybdenum (Mo); pH (10% solution), 6.0-7.0, specific gravity 1.47-1.51 at 18°C. At the end of the cycle (96 DAT), 4 central plants per plot were evaluated.

3. Results and discussion

In terms of yield, the results were comparable to those achieved in broccoli cultivars (*Brassica oleracea* var. itálica) applied with an amino acid-based biostimulant (Bettoni et al, 2013). These linear increases may interpret by the increased availability of amino acids to plants, which can contribute in the production of numerous chemicals, affecting plant growth directly. Furthermore, the findings might be associated to the amino acid alanine, whose interacts in the pyruvate pathway, the source of proteins that assist in plant developmental processes (Kerbauy, 2008). The detected improvements in fresh mass can be attributed to a rise in the biggest diameter of the stem, that is a yield-influencing characteristic (Monteiro et al., 2010). This may be because water movement and photo assimilate vessels are rising. Furthermore, the conclusions reached for most parameters align with the

literature, indicating that the plant is more responding to greater dosages of amino acid-based biostimulant compounds in general.

4. Conclusion

The foliar usage of biostimulant Calmax® (OMEX) has a significant impact on the growth of cauliflower crops. All yield and growth parameters demonstrated the maximum efficacy at the dose of 1.00 mL L^{-1}.

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Agronomic Response of Six Varieties of Robusta Coffee (Coffea Canephora) with Fertilization

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1. Introduction

Coffee is a stimulant plant with a wide range of ecological adaptation, which has allowed its presence in many parts of the world. It has increased due to its new forms of coffee consumption, particularly the appearance of soluble coffee and the emergence of decaffeinated coffee due to its greater aptitude for the extraction of caffeine. (Ángel, 2013). Coffee is as important as water, it is the most consumed beverage, it is prepared from roasted and ground seeds, harvested from coffee trees, name given to the plants of any of the 104 species of the genus Coffea, being the most important globally: arabica coffee and robust coffee (Ramirez 2017) cited by (Duicela, et al, 2020). Coffee cultivation in Ecuador has both economic, social and ecological value. The social and economic importance is based on the generation of employment for 105,000 producer families; as well as for 700,000 additional families linked to the commercialization, industrialization, transportation and export processes. In the ecological order, the importance of coffee lies in the wide adaptability of coffee plantations to the different agro-ecosystems of the four regions of the country: Coast, Highlands, Amazon and Galapagos Islands. Despite the economic, social and environmental importance of coffee growing for a large number of Ecuadorian families, it has always been maintained as a marginal activity, detached from its own economic logic, although it has survived as an economic activity in some areas. This situation hinders the insertion of Ecuadorian coffee growers in the new world trend: producing quality coffee in greater volume and at lower cost (Alarcó, 2011).

2. Materials and Methods

The research project was carried out in the Experimental Center "Sacha wiwa", owned by the Intercultural Bilingual Unit Jatan Unanchi, located in the parish Guasaganda, canton La Maná, province of Cotopaxi whose geographical location is WGS 84 Latitude 0°48'00. 0 "S, Longitude 79°10'01.2 "W, with an altitude of 500 masl, the climatic conditions were: Average annual temperature 24.00ºC; relative humidity 88%; heliophany 570.30 hours/light/year, precipitation 2761 mm/year. The research was carried out in the periods April-August 2021 and October 2021-February 2022. Robusta coffee varieties (*Coffea canephora*) were with the following codes CF-06 ; EET375611 ; COF 01 ; NP 2024 ; COF 02 ; NP 3051, the fertilization plan was: 100% inorganic fertilization (210 g/plant); 1000 kg ha organic fertilization (402.50 g/plant) ; 1500 kg ha organic fertilization (502.50 g/plant) ; 2000 kg organic fertilization (611.26 g/plant). A Randomized Complete Block Design (RCBD) was employed with a total of 120 plants. The variables under study were soil analysis, plant height (cm), stem diameter (cm), leaf circumference and leaf analysis of coffee varieties. A soil analysis was carried out at the beginning to determine the availability of nutrients in the soil and thus carry out a study of the nutritional needs of the crop. Subsequently, the formulas to be applied to each clone and consequently to each of the experimental units were prepared. Ammonium nitrate, magnesium sulphate (granular), potassium chloride (murate), di-ammonium phosphate (DAP), bioabor (BBQ) and dolomite lime were used.

3. Results and discussion

One of the limitations presented for the development and production of the coffee crop is the acidity of the soil, in addition Cenicafé (2016) clarifies that the concentrations of soluble aluminum-Al^{3+} and manganese-Mn^{2+} in acid soils can acquire levels that are often toxic to plants, in addition to altering the activities of existing microorganism populations that act in the mineralization of organic matter and transform nitrogen and sulphur, on the other hand phosphorus is reduced by creating insoluble compounds with iron-Fe and Al^{3+} and thus ceases to be available to plants.

Soil analysis of coffee varieties (*Coffea canephora*)

Description	Values				
	Lot 1	**Lot 2**	**Lot 3**	**Lot 4**	**Lot 5**
pH	5.90 Me Ac	5.40 Ac RC	5.80 Me Ac	5.60 Me Ac	5.60 Me Ac
Organic material %	4.00 Medio	4.60 Medio	4.60 Medio	3.80 Medio	3.50 Medio
NH_4 ppm	12.00 Bajo	19.00 Bajo	17.00 Bajo	14.00 Bajo	13.00 Bajo
P ppm	6.00 Bajo	6.00 Bajo	5.00 Bajo	7.00 Bajo	4.00 Bajo
K meq/100ml	0.18 Bajo	0.17 Bajo	0.15 Bajo	0.14 Bajo	0.18 Bajo
Ca meq/100ml	3.00 Bajo	3.00 Bajo	4.00 Medio	3.00 Bajo	3.00 Bajo
Mg meq/100ml	0.90 Bajo	0.80 Bajo	1.00 Bajo	0.90 Bajo	0.90 Bajo
S ppm	19.00 Medio	15.00 Medio	11.00 Medio	14.00 Medio	14.00 Medio
Textural Class	Franco	Franco-Arenoso	Franco-Arenoso	Franco	Franco

Source: Soil, Plant Tissues and Water Laboratory INIAP -Pichilingue 2021

The greatest plant height during the period April-August 2021 was obtained in the variety EET-375611 + 2000 kg ha of inorganic + organic fertilizer with 149.00 cm and during the period October 2021 - February 2022 the variety NP-2024 + 100% inorganic fertilization with 179.00 cm. During the period April-August 2021 the largest leaf circumference was in the variety COF-02 +1500 kg ha of inorganic + organic fertilizer with 559.60 cm and in the period October 2021 - February 2022 the variety NP-024 + 100% inorganic fertilization with 585.00 cm.

Plant height (cm); stem diameter (cm) and leaf circumference (cm) of the six coffee varieties (*Coffea canephora*)

Varieties of coffee	Fertilization	1/.						2/.					
		AP (cm)		**DT (cm)**		**CF (cm)**		**AP (cm)**		**DT (cm)**		**CF (cm)**	
COF 06	100% Conv	122,80	a	3,78	a	447,00	a	152,00	a	3,76	a	507,00	a
	1000 kg ha	135,40	a	4,00	a	500,40	a	160,00	a	3,49	a	540,00	a
	1500 kg ha	128,00	a	4,26	a	498,80	a	159,00	a	3,52	a	545,00	a
	2000 kg ha	131,00	a	4,52	a	499,20	a	166,00	a	3,65	a	564,00	a
COF 01	100% Conv	108,50	b	4,05	a	340,00	a	150,00	a	3,60	a	537,00	a
	1000 kg ha	129,00	ab	3,76	a	453,80	a	155,00	a	3,28	a	536,00	a
	1500 kg ha	148,60	a	3,48	a	450,80	a	160,00	a	3,13	a	498,00	a
	2000 kg ha	123,00	ab	3,80	a	429,00	a	171,00	a	3,40	a	566,00	a
NP-2024	100% Conv	128,20	ab	3,60	a	442,20	a	179,00	a	3,43	a	585,00	a
	1000 kg ha	118,20	b	3,40	a	452,40	a	160,00	a	3,39	a	580,00	a
	1500 kg ha	125,20	ab	3,28	a	508,60	a	152,00	a	3,74	a	590,00	a
	2000 kg ha	157,20	a	3,92	a	555,00	a	156,00	a	3,37	a	557,00	a
COF 02	100% Conv	124,00	a	3,84	a	535,40	a	142,00	a	3,55	a	520,00	a
	1000 kg ha	105,00	a	3,48	a	480,20	a	137,00	a	3,34	a	558,00	a
	1500 kg ha	115,40	a	3,94	a	559,60	a	133,00	a	3,14	a	533,00	a
	2000 kg ha	107,00	a	3,64	a	431,60	a	123,00	a	3,39	a	548,00	a
NP-3051	100% Conv	103,00	a	3,24	a	369,00	a	116,00	a	3,11	a	437,00	a
	1000 kg ha	104,40	a	3,02	a	404,40	a	120,00	a	2,94	a	376,00	a
	1500 kg ha	104,80	a	2,70	a	434,60	a	119,00	a	2,87	ab	387,00	a
	2000 kg ha	104,50	a	2,45	a	251,00	a	105,00	a	2,12	b	294,00	a
EET-375611	100% Conv	117,00	a	3,17	b	419,67	ab	155,00	a	3,62	a	556,00	a
	1000 kg ha	131,00	a	3,57	ab	447,00	ab	166,00	a	3,55	a	578,00	a
	1500 kg ha	112,50	a	3,70	ab	384,00	b	168,00	a	3,34	a	498,00	a
	2000 kg ha	149,00	a	4,40	a	535,00	a	174,00	a	3,73	a	569,00	a

1/. Abril-Agosto 2021 **2/. Oct 21- Feb 2022**
AP = Height of plant DT = Stem Diameter (cm)

Leaf analysis of robusta coffee varieties (*Coffea canephora*)

Elements	Varieties of Coffee					
	COF-06	**EET-375611**	**COF-01**	**NP-2024**	**COF-02**	**NP-3051**
Nitrogen (%)	3.47	2.74	2,87	2.66	3.38	2.93
Phosphorus (%)	0.11	0.09	0,10	0.09	0.10	0.10
Potassium (%)	1.63	1.53	1,57	1.41	1.70	1.63

Calcium (%)	0.48	0.42	0,53	0.53	0.57	0.53
Mg (%)	0.26	0.22	0,21	0.22	0.21	0.23
Sulphur (%)	0.12	0.11	0,10	0.10	0.11	0.10
Copper (ppm)	13.00	12.00	11,00	14.00	12.00	11.00
Boron (ppm)	24.26	23.92	60,83	..44.42	32.80	24.70
Iron (ppm)	117.00	94.00	55,00	46.00	38.00	40.00
Zinc (ppm)	5.00	5.00	5,00	6.00	6.00	5.00
Manganese (ppm)	29.00	47.00	39,00	46.00	39.00	29.00

Source: Laboratory AGROLAB (2021)

4. Conclusion

In clones NP-2024 and EET-375611, the 2000kg/ha formula produced the greatest outcomes in all variables studied, with the best averages in plant height, stem diameter and leaf circumference.

The agronomic response of the coffee crop with the fertilization program in the production stage resulted in the highest averages in plant height, variety NP2024 with the 100% conventional treatment: in stem diameter and leaf circumference the NP2024 variety with the 1500 kg ha treatment.

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Effect of Two Different Conditions on Life Table Parameters of Two-Spotted Spider Mite (Tetranychus Urticae Koch, 1836) on Soybean (Glycine Max L. Merr) Variety Ezra

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1. Introduction

Soybean, also known as Glycine max L. Merr., is a member of the Fabaceae family and has long been one of the most significant oil crops farmed for food and forage across the world. About 400 products can be obtained from soybeans. Soybean is one of the five main food plants in the world. Its main advantage is that it is rich in protein. In this way, it replaces foods of animal origin. Soybeans account for 40 percent of the world's demand for vegetable oils. Its grain is used to make soy cheese, milk, flour, confectionery, canned food and other products. If we look at last year's statistics, the total soybean production in the world was 313 million tons. This year, global production is projected to reach 348 million tons. The price of one ton is more than $ 1,000. The world's top five soybean producers are the Brazil, China, India, United States and Paraguay. The United States accounts for more than half of the world's soybeans. The world's largest producer of soybeans are, South America, China, United States of America, India, Europe and other Asian countries (Anderson et al., 2019). According to FAOSTAT (2018), above 348 million tons of soybeans were manufactured worldwide in an area of 1249219.56 km^2. According to 2020, soybean production in Azerbaijan was carried out in 19 regions on an area of 9,300 hectares.

The soybean aphid (Aphis glycines Matsumura) is an arthropod pest that feeds on the leaves of soybeans (Hempitera: Aphididae),carmine spider mite *Tetranychus cinnabarinus (*Acari: Tetranychidae*),* armyworm (*Spodoptera obsolete)* (Lepidoptera: *Noctuidae),* silverleaf whitefly (*Bemisia tabaci*) (Hemiptera: Aleyrodidae), onion thrips (*Thrips tabaci)* (Thysanoptera*:* Thripidae*),* cotton bollworm (*Helicoverpa armigera* Hb.) (Lepidoptera: *Noctuidae*) and the two-spotted spider mite (TSSM) (*Tetranychus urticae* Koch) (Acari: Tetranychidae).

Through stylet-like mouthparts, TSSM feeds on individual plant cell contents on the underside of leaves, curling, producing yellowing and tanning of the leaves.

2. Material and Methods

The research was carried out at the Department of Plant Protection department Azerbaijan State Agriculture University under laboratory condition. Soybean was grown up on 26.83 ± 4.4˚C temperature of and 65.84 ± 7.62 percent relative humidity. For the research were used soybean variety Ezra.

Rearing of the two spotted spider mites. The initial laboratory stock *T.urticae* was collected from leaves of tomato in Ganja-Dashkesen region Goranboy (40° 36′ 27′′N, 46°47′33′′E), Goy gol (40°35′N, 46°18′ E) and Samukh (40°50′N, 46°30′E) on May. The collected adults were examined under binoculars. Following tentative characterization, the uniform culture was employed for mass mite multiplication. Bean foliages were inoculated with *T. urticae* by distributing infested leaves on the foliages, so spider mite migrates to the soybean foliage. Collected mites were cultured on country soybean (Glycine max L.) leaves planted in plastic pots (20 cm diam 20 cm height) and kept under the conditions described above. Infested leaves were removed after 5 days as it is enough time for eggs to hatch and larvae move to bean plants.

Monitoring of the biology of *T.urticae* was carried out at two different condition in climate rooms at 26,16±0,04 °C; 58,14±0,06 RH and 31,61±0,03°C; 50,99±0,06 RH. Development stages was observed with the help of a stereo zoom microscope.

The disk method (Pedigo and Buntin 2000; Naher et al. 2006) is used to monitor the biology of spider mites. Discs made of soybean leaves (3 cm^2) are placed in petri dishes (9 mm in diameter) on wet cotton. Laboratory experiments were carried out in specially designed plastic petri dishes with a diameter of 5 cm. In order to keep the leaf discs fresh for a long time, the bottom parts of the petri dishes are moistened. Cotton and blotting paper were laid on it and leaf discs obtained from the bean plant were placed. In order to prevent the accumulation of moisture in the petri dishes, holes were made in the lids of the petri dishes, and they were covered with to prevent the red spiders from coming out. Ten gravid females were collected from mass culture and transferred to individual leaf discs 1 female/disc for oviposition. After 24 hours, eggs were counted and transferred to leaf discs of 3 cm^2 area using a moistened camel hairbrush and biology studied.

Observations are made twice a day (8:00 in the morning; 4:00 in the afternoon) and record the developmental stages of the eggs, larvae, protonymphs, deutonymphs, quiescent intervals and egg productivity. After the females complete their development, a male is placed in each sample. The eggs laid by each female are recorded daily.

3. Result and discussion

According to the biology study, *T. urticae* went through a larval stage and two nymphal stages, deutonymph and protonymph. Every of these feeding stages was continued by a brief period of dormancy known as teleochrysalis, nymphochrysalis and deutochrysalis. The incubation period was 5.42±0.30 days at 26.16±0.04 °C, 58.14±0.06 RH (Table 1.). The larval stage is 3.12±0.33 days in females and 2.32±0.44 days in males. Hassain A. et al. (2009) reported that under 25±1 °C, 70±10 RH the larval duration of *T. urticae* in Georgan 3 soybean variety was min. 0.89, max. 1.02 days. Also, he reported that the egg yield of Georgan 3 variety was 123 egg/female, while this indicator was 62.46 egg/female for Sahar variety.

Table 1. Under laboratory conditions, the duration of several phases of *T. urticae* (26,16±0,04 °C, 58,14±0,06 RH)

Sr. No.	Stage		Duration (Days)		
			Min.	Max.	Mean ±SD
1	Incubation period (Days)		4	7	5,42±0,30
2	Hatching percentage (%)		81,33	95,77	91,26±0,07
3	Larval period (Days)	Male	1,00	3,00	2,32±0,44
		Female	1,50	4,00	3,12±0,33
4	Nymphocrysalis period	Male	0,20	1,40	0,89±0,55
		Female	0,23	1,50	1,00±0,47
5	Protonymphal period	Male	2,00	3,20	2,77±0,17
		Female	2,50	4,00	3,30±0,19
6	Deutochrysalis period	Male	0,22	1,10	0,70±0,81
		Female	1,00	1,20	1,08±0,06
7	Deutonymphal period	Male	1,05	3,10	2,58±0,29
		Female	2,50	4,00	3,36±0,19
8	Teleocrysalis period	Male	1,00	2,00	1,50±0,27
		Female	1,10	2,40	1,82±0,29
9	Total developmental period (combined larval, nymphal and quiescent period)	Male	7.00	16.08	14.04±0.30
		Female	11,00	20.24	16,55±0,23
10	Adult period	Male	7	12	9,80±0,19
		Female	10	15	12,60±0,09
11	Pre-oviposition period	Female	2	4	2,94±0,35
12	Oviposition period	Female	6	12	9,2±0,22
13	Post- oviposition period	Female	2	8	5,0±0,51
14	Rate of egg laying egg/day		2	13	7,8±0,53
15	Total life period	Male	14,00	28,08	26,20±0,31
		Female	21,00	35,24	28,69±0,20
16	Temperature (°C)		24,8	27,3	26,16±0,04
17	Relative humidity (%)		49,5	52,6	50,14±0,06

Protnymphal period in males was 2.77±0.17 days, in females 3.30±0.19 days. At 25±1 °C, 70±10 RH this stage was 0,89 days on average in Georgen variety (Hassain A. et al. 2009). Total developmental period for male was 14.04±0.30 day, for female it was 16,55±0,23 days. The lifecycle of females was 28.69±0.20 days, while that of males was shorter (26.20±0.31 days) than females. Helmy A. Anber et al. (2020) reported that at 22°C

Table 2. Under laboratory conditions, the duration of several phases of *T. urticae* (31,61±0,03°C, 50,99±0,06 RH)

Sr. No	Stage		Duration (Days)		
			Min.	Max.	Mean ±SD
1	Incubation period (days)		3	5	3,94±0,18
2	Hatching percentage (%)		83,59	93,12	88,46±0,04
3	Larval period (days)	Male	0,20	2,00	0,86±0,99
		Female	1,00	3,00	1,96±0,81
4	Nymphocrysalis period (days)	Male	0,10	1,00	0,61±0,37
		Female	0,15	1,20	0,70±0,60
5	Protonymphal period (days)	Male	1,50	2,20	1,85±0,15

		Female	2,00	3,00	2,54±0,16
6	Deutochrysalis period (days)	Male	0,12	0,50	0,18±1,11
		Female	0,50	1,00	0,76±0.26
7	Deutonymphal period (days)	Male	0,50	2,00	1,16±0,50
		Female	2,00	3,00	2,5±0,16
8	Teleocrysalis period (days)	Male	0,50	1,50	1,00±0,40
		Female	1,00	1,50	1,26±0,16
9	Total development time (combined nymphal, quiescent period and larval) (days)	Male	2,92	9,20	6,10±0,43
		Female	6,65	12,70	9,63±0,35
10	Adult period (days)	Male	5,00	10,00	7,60±0,27
		Female	8,00	13,00	10,6±0,20
11	Pre-oviposition period (days)	Female	1,50	3,00	2,26±0,65
12	Oviposition period (days)	Female	4,50	11,50	8,12±0,20
13	Post- oviposition period (days)	Female	1,50	6,50	4,09±0,95
14	Rate of egg laying egg/day		5	17	11,40±0,43
15	Total life period (days)	Male	7.92	19.20	14,23±0,30
		Female	14.65	25,75	20,85±0,22
16	Temperature (°C)		30,12	32,58	31,61±0,03
17	Relative humidity (%)		47.05	54,50	50,99±0,06

temperature depending on the soybean variety, it was 18.18; 18.88 and 19.18 days. Rate of egg laying within these conditions was 7,8±0,53 egg/day. Egg productivity of females at 30 °C was 8.72 eggs/day, and at 22 °C it was 5.33 eggs/day (Helmy A. Anber 2020).

Part of the research was conducted at 50.99±0.06% humidity and 31.61±0.03 C temperature. Under these conditions incubation period of *T.urticae* was 3.94±0.18 days. Hatching percentage was min. 83.59%, max. 93.12%. Compared to 26.16±0.04 °C, the larval stage was shortened (0.86±0.99) at the 31.61±0.03 temperature. Protonymphal period for male continued 1.50 days, but for female it was 2.00 days. Deutonymphal period was average 1,16±0,50 days. Total developmental period for male was 6,10±0,43 days, for female it was 9,63±0,35 days. The total life period was shorter compared to the results obtained at 26.16±0,04°C temperature. This indicator was 14.23±0.30 days for males and 20.85±0.22 days for females.

4. Conclusion

Total development time (combined nymphal, quiescent period and larval) was 16.55±0.23 days for females and 14.04±0.30 days for males at 26.16±0.04 °C, 58.14±0.06 RH. Reaching maturity in males was 9.80±0.19 days, and 12.60±0.09 days in females. In the conditions of 31.61±0.03°C, 50.99±0.06 RH, the percentage of hatching was lower, and the percentage of egg laying was 3.6% higher than in other condition. Total life period at 26.16±0.04 °C, 58.14±0.06 RH in males was 26,20±0,31 days, in females 28,69±0,20 days. Oviposition period at 31.61±0.03 °C, 50.99±0.06 RH was 8,12±0,20 days, it was a day shorter than other condition.

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Possible Minimization the Process of Producing Seedlings from Cuttings by Temperature Manipulation and Stimulation of Mycorrhizal Root Activity in Hydroponic Vertical Farming Systems

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1. Introduction

The classical vegetative propagation rooting method takes periods of 3 to 6 weeks, which can extend up to 9 to 10 months. Mycorrhiza is the name given to fungi that have developed a symbiosis relationship with the roots of some plants. These promote plant and root development, increase flowering and plant sowing performance, provide early emergence, minimize saplings shock during transplanting, saplings deaths, the number of diseased and weak saplings, protect the plant against stress and increase its resistance.
On the other hand, the temperature is also manipulating the rooting stage of the cuttings in terms of accelerating the rooting. In order to emergence of root callus, the cuttings are treated to soilless aseptic hydrated media at 25–27 °C during 3-4 weeks, while spatial temperature of cuttings (bud-breaking buds) under 2-4 °C is maintained (Kizildeniz et al., 2022).
In order for mycorrhiza to be effective, it must have direct contact with the root (Erzurumlu and Kara, 2014). However, it is not well known how mycorrhiza interact with root callus. The process is accelerated by adding the mycorrhizal biotic factor as well as the temperature factor. This method can be adapted to both woody, semi-woody and mild cuttings (also saplings that are difficult or impossible to produce with cuttings). It is aimed to develop a method for vegetative propagation in much shorter time intervals and to produce healthy, high value-added valuable vine rootstock saplings.

2. Materials and Methods

The aims and objectives of the project are to shorten the rooting process of the vine cuttings to less than 3 weeks. The development studies are carried out to develop a disease-free, saplings production technology with strong root systems in 3-4 weeks, and the development of a saplings' growing unit that enables the use of this technology for the commercialization of the studied technology continues. It is known that by controlling the temperature of two different regions on the same cutting at the same time by preventing shoot formation for root formation and vegetative reproduction from cuttings, vine cuttings are rooted in a short time by manipulating their physiological periods as desired with temperature control. The mycorrhiza (*Funneliformis mosseae, Rhizoglomus intraradices* and *Glomus spp.*) application in addition to temperature manipulation of the root zone. In this way, the rooting process of vine cuttings can be reduced to time intervals of 3 weeks with both temperature, which is an abiotic factor, and mycorrhizal applications, which are biotic factors. These mycorrhizal applications are aimed to be carried out by treating the mycorrhizae on the root part of the vine cuttings.

3. Results and discussion

Possible minimization the process of producing seedlings from cuttings by temperature manipulation and stimulation of mycorrhizal root activity in hydroponic vertical farming systems can be developed for abiotic and biotic factors (temperature and mycorrhizal interaction).

4. Conclusion

With this study, much more plant products (saplings) can be adapted and produced in a short time with less cost, and both technologies will be developed and economic income will be obtained.

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Global Carbon Trading and its Role in the Agricultural Sector

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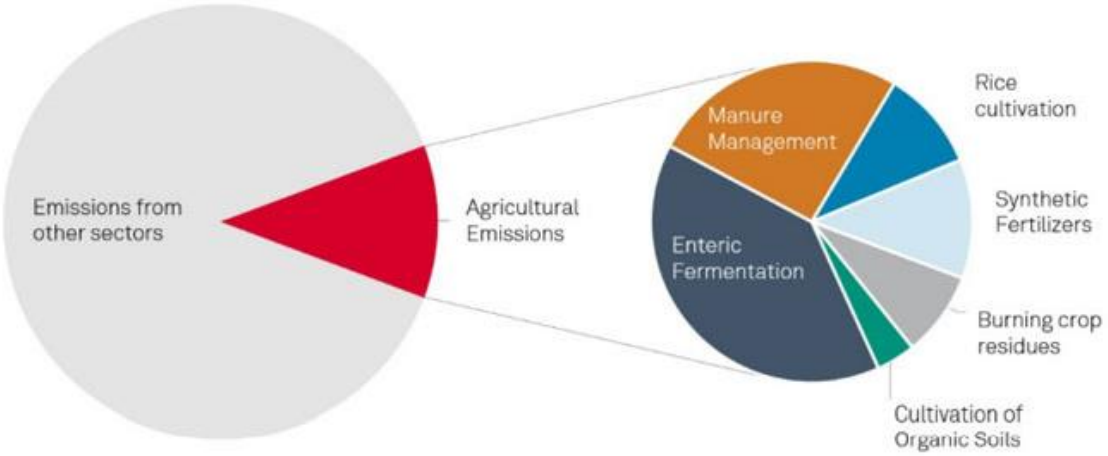
1. Introduction

Carbon footprint is the sum of cumulative greenhouse gas emissions caused directly or indirectly by human activities (Galli et al., 2012). Derived from the concept of ecological footprint, carbon footprint is a concept closely related to climate change and human impact (Wiedmann and Minx, 2007). The main source of emissions based on human activities and consumption is carbon emissions resulting from energy production. Since the carbon footprint increases especially due to the energy obtained using fossil fuels, it can be reduced by optimizing the use of energy and obtaining the energy used from renewable sources. Carbon Economy, on the other hand, is seen as the most effective way to control, reduce and finance sustainable development the greenhouse gases that have emerged as a rapidly growing multi-billion-dollar international market and are now called "carbon" (Linacre et al., 2011). Carbon is given an economic value because it pollutes the air. In this context, the fastest growing market in the world is carbon economy and carbon trade. Today, people, companies and/or governments trade carbon. Agriculture is very important in carbon trade as it is a carbon sink area (Pinto et al., 2010). In carbon trading, countries that buy carbon buy the right to burn carbon (carbon emission). Countries that sell carbon, on the other hand, give up their right to burn carbon. Therefore, the carbon market is an environment created to facilitate the buying and selling of carbon. Thus, businesses and governments that are about to exceed their greenhouse gas emission quotas can purchase carbon credits, which can then be used in projects aimed at combating global warming (Anonim, 2008). The carbon economy and the carbon market are a new type of capital market, as in securities and other goods. However, the goods traded in this market are greenhouse gases measured per ton of carbon dioxide or equivalent (Methane (CH4), Diazot monoxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexa fluoride (SF6)) instead of conventional goods (Linacre et al., 2011). The aim of this study includes all kinds of work and thought order to obtain a new and environmentally friendly economic income method or model for our country from the economic role we call the already formed carbon market when the policy is followed in accordance with the developing world standards in terms of global changes. Today, people, companies and/or governments trade carbon. Agriculture is very important in carbon trade as it is a carbon sink area. With this study, it has been examined to what extent people, companies and/or governments deal with carbon trading today (Pinto et al., 2010; Linacre et al., 2011). The definition of a carbon sink area is natural or man-made systems that absorb and store carbon dioxide from the atmosphere. Forests are the most common type of pharynx. In agricultural products, it is in the group of benefit in the pharynx form, as it converts harmful gases such as carbon dioxide in the air to oxygen into a form useful for the environment and nature. The basic principle here is to bring together carbon trade and agriculture on a common ground, and to ensure that the agricultural sector is a role model that will contribute to the development of the agricultural sector and to use agriculture effectively in transforming our world into a more liveable form for future generations. In practice, it is necessary to reveal data on how much carbon the products produced basically emit. Afterwards, it should be predicted that the carbon emission per tree/product/kg in the process from the production stage to the last stage of the determined product can be achieved by which applications can reach data below the determined standard data. Because of this result, in order to reach the result and be productive of the stated purpose in the study, many resources and foreign practices that can serve as an example, as well as all kinds of methods that take into account the market balances are discussed. In addition, the materials foreseen as a result of the research that can contribute to the progress of the application were used.

2. Materials and Methods

The carbon market system is a single market but includes different systems such as compulsory and voluntary. Mandatory systems are more active and carbon prices are higher. The voluntary market system offers more flexibility in tradable carbon credits, but carbon prices are generally lower. The voluntary market system is also less organized and takes longer to find buyers and sellers (Linacre et al., 2011). Since the reduction of global greenhouse gas emissions is based on combating climate change, which is a global problem, emission reduction activities carried out anywhere in the world support the realization of this target. Carbon offset certificates are obtained as a result of projects carried out to prevent or reduce emissions that will occur in another source with financially effective methods. In order to determine the feasibility of the agricultural sector and the current situation, it is necessary to collect the CO2 emission data of the product types according to the production areas and then to carry out R&D project studies (Peters, 2010). Considering the studies based on what can be done to reduce this, the data obtained should be put into practice.

Figure 1: Global Agricultural Emissions, 1990-2017



Source: FAOSTAT, 2020.

3. Results and discussion

In this study, the subjects were evaluated in terms of global climate change. The applicability of the agricultural sector, on the other hand, should start with the collection of carbon emission data based on the production regions of the product types in order to determine the current situation, and then projects and R&D studies should be put into practice in order to reduce it in the light of the data obtained. Although large agricultural enterprises can carry out these operations within their own bodies or through consultancy firms, organization is very important for individual and relatively small producers in order to obtain more efficient results. As a result of the activities that can be done under the name of cooperatives, the money funds that will contribute to the development of the agricultural sector will reach the small producers and the way for more sustainable and technological investments will be paved. There are some standards set for carbon and it is quite effective on the price. For example, if the carbon is in the "Gold Standard", its price can be doubled. The carbon market, which also has retailers and wholesalers, operates like other exchanges. For example, there are various carbon indices and prices in the London and Chicago Stock Exchanges, and prices are constantly changing according to supply and demand (Linacre et al., 2011).

4. Conclusion

Our world has been faced with many environmental problems in recent years. Environmental problems are of a type that can directly affect all living things and sectors. At this point, states have made various agreements for a solution and have introduced some new rules to reduce the derivatives of carbon, which is defined as a harmful emission. These rules have created new sectors and fields. It has a great impact on agricultural products, as it is a sink area for the resulting carbon trade. Selling our remaining carbon burning rights as a result of the techniques, plans and modernization stages we have already used to produce agricultural products and imposing on the products with R&D studies and inspections, and the development of the agricultural sector with an income that can come from there can also be used to subsidize a more liveable world and as a result, agriculture sector can be moved to a more sustainable and environmentally friendly phase.

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Investigation of Colony Performance Characteristics of Queen Bees Obtained via Larva Transfer in Sustainable Beekeeping in the Mediterranean Region

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1. Introduction

Colonies of honeybees *(Apis mellifera* L.,*)* are beneficial insects that contribute to a country's agricultural productivity as well as provide people with useful bee products. The contributions that nations make to their economy are significant in this regard (Carreck, 2017). The growth rate of the colony depends on the genetics of the queen, the queen's age, the genetics of the bee that mate with the queen, the queen's quality (Laidlow and Eckert, 1962; Tarpy et al., 2000). For this reason, the selection of breeding colonies gains importance in queen bee breeding (Delaney et al., 2011). 50-60 kg honey yield per colony can be obtained in enterprises using breeding queens with superior genetic characteristics (Ruttner, 1976). Honey yield is directly related to colony population strength (Farrar, 1937; Gilley et al., 2003).

2. Materials and Methods

The present study was conducted at Cukurova University, Faculty of Agriculture, Department of Animal Science, in the Beekeeping Unite, between 2018 October and 2019 February-July. The material of this research was the colonies formed by queen bees reared by the transfer of four larvae in April 2018 from *A. mellifera* colonies (Kumova et al., 2022). Colonies were fed supplementary diets during October 2018 and February 2019. These feeding diets were applied in 3 groups (Group A: Bee Food + Powdered Sugar/1:3, Group B: Soy Meal+Milk Powder+Bee Food/2:2:3, Group C: Control) for 3 weeks. 120 colonies (3 groups x 4 larval transfer x10 colonies) were selected randomly in March 2019 from breeding colonies. Before the start of the study, 120 colonies were equalized in terms of population strength (Winston, 1987). In the period of March-July 2019, brood surface areas and adult surface area of the research group colonies were recorded with a camera every 21 days, and the estimated number of frames of brood and adult bees (Jeffree, 1951). The colonies were taken to Tufanbeyli region for honey production on 10 June 2019. In these colonies, honey was harvested between 22-30 July 2019 (Lensky and Golan, 1966; Delaplane, 2013). The number of frames of adult bees, the number of frames of brood, the adult surface area, the brood surface area and honey yield were tested in the randomized complete block design with 10 replications (Montgomery, 2001). Significant differences between means were tested using Duncan's test. Statistical analyses were calculated by using SPSS 22.0 V. package program.

3. Results and discussion

The average value of the number of frames of brood and the brood surface area, the adult surface area, the number of frames of adult bees and honey yield in the research breeding colonies are given in Table 1.

Table 1. Colony Performance Characteristics

Group	n	The brood surface area (number/colony) ($\bar{X} \pm S_{\bar{X}}$)	The number of frames of brood (number/colony) ($\bar{X} \pm S_{\bar{X}}$)	The adult surface area (number/colony) ($\bar{X} \pm S_{\bar{X}}$)	The number of frames of adult bees (number/colony) ($\bar{X} \pm S_{\bar{X}}$)	Honey yields (Kg/colony) ($\bar{X} \pm S_{\bar{X}}$)
A	40	10660.30±708.21	5.14±0.28	20182.99±1411.24	7.87±0.48	19.89±1.77
B	40	11675.57±754.25	5.44±0.32	21738.95±1486.15	8.18±0.49	21.85±1.86
C	40	7253.23±563.16	3.28±0.26	13379.86±1073.26	5.30±0.31	9.31±1.27
General Average		9863.03±675.21	4.62±0.28	18433.93±1323.54	7.11±0.43	17.01±1.63

The average the brood surface area in research production colonies was determined as 9863.03±675.21 number/colony. When the difference between the groups has been examined, it is seen that the best group is Group B (Soya Flour+Milk Powder+Bee Feed). The effect of larval transfers applied in the study on the brood surface area was not found to be statistically significant (P>0.05). Transfer x group interactions have not found to be statistically significant (P>0.05). This result was lower than that reported by (Kumova et al., 2019) which claimed that there were 15236.66±1873.60 number/colony. The average the number of frames of brood in research production colonies (number/colony) was determined as 4.62±0.28. When the difference between the groups has been examined, it is seen that the best groups are Group A (Bee Feed + Powdered Sugar) and Group B (Soya Flour+Milk Powder+Bee Feed) (p<0.05). When the difference between the transfers has been examined, it is seen that the best transfer is number 1 (P<0.05). Transfer x group interactions have not found to be statistically significant (P>0.05). This result was higher than that reported by (Abd El-Wahab et al., 2016) (4.52

number/colony), (Uygur and Yücel, 2016) (4.32±2.53 number/colony), (Kumova et al., 2020) (3.77±0.2 number/colony), (Uygur et al., 2015) (3.93±1.92 number/colony). The average the adult surface area in research production colonies was determined as 18433.93±1323.54 number/colony. When the difference between the groups has been examined, it is seen that the best group is Group B (Soya Flour+Milk Powder+Bee Feed) (P<0.05). The effect of larval transfers applied in the study on the adult surface area was not found to be statistically significant (P>0.05). Transfer x group interactions have not found to be statistically significant (P>0.05). This result was higher than that reported by (Kumova et al., 2019) (15406.66±942.38 number/colony). The average the number of frames of adult bees in research production colonies was determined as 7.11±0.43 (number/colony). When the difference between the groups has been examined, it is seen that the best groups are Group A (Bee Feed + Powdered Sugar) and Group B (Soya Flour+Milk Powder+Bee Feed) (P<0.05). When the difference between the transfers has been examined, it is seen that the best transfer is number 1 (P<0.05). Transfer x group interactions have not found to be statistically significant (P>0.05). This result was found to be compatible with the values reported by (Uygur et al., 2015) (7.40±3.59 number/colony). This result was lower than that reported by (Kumova, 2000) (9.18±0.30 number/colony), [20] (8.75±0.73 number/colony), (Uygur and Yücel, 2016) (8.95 ± 0.19 number/colony). This result was higher than that reported by (Kumova et al., 2007) (5.76±0.36 number/colony), (Eshbah et al., 2018) (6.38 number/colony), (Kösoğlu et al., 2019) (3.43±0.13 number/colony), (Kumova et al., 2020) (5.48±0.19 and 5.80±0.26 number/colony). The average honey yields of research production colonies was determined as 17.01±1.63 (kg/colony). When the difference between the groups has been examined, it is seen that the best groups are Group A (Bee Feed + Powdered Sugar) and Group B (Soya Flour+Milk Powder+Bee Feed) (P<0.05). When the difference between the transfers has been examined, it is seen that the best transfer is number 1 (P<0.05). Transfer x group interactions have not found to be statistically significant (P>0.05). This result was found to be compatible with the values reported (Karacaoğlu et al., 2003) (19.36±1.46 kg/colony), (Gençer and Karacaoğlu, 2003) (21.66±1.64 kg/colony). This result was higher than that reported by (Allsopp and Cherry, 2004) (8.5 kg), (Kumova et al., 2019) (9.022±5.03 kg/colony), (Abd El-Wahab et al., 2016) (2.25 kg), (Uygur and Yücel, 2016) (7.73± 0.63 kg/colony), (Yusuf, 2018) (13 kg/colony). In addition, the correlation between honey yield and the brood surface area was r=0.848, and this correlation was found to be statistically significant (P<0.01). The correlation between honey yield and the number of frames of brood was r=0.859, and this correlation was found to be statistically significant (P<0.01). The correlation between honey yield and adult surface area was r=0.874, and this correlation was found to be statistically significant (P<0.01). The correlation between honey yield and the number of frames of adult bees was r=0.876, and this correlation was found to be statistically significant (P<0.01). This result was found to be compatible with the values reported by (Cale et al., 1956; Moeller, 1961; Woyke, 1984).

4. Conclusion

Under the Cukurova conditions, beekeepers' work with degenerated, unproductive bee genotypes results in a decline in honey yield, the loss of colonies, and financial loss. Technically, producing queen bees from breeder bee genotypes adapted to the area and providing them to local beekeepers will boost the region's agricultural and beekeeping industries.

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