TÜRKTOB
TÜRKİYE TOHUMCULAR BİRLİĞİ
TURKISH SEED UNION

VIII. International Seed Congress 2024

Congress Book

seedcongress.org - tohumkongresi2024.com - turktob.org.tr

09-12 December 2024
Granada Luxury Belek
Antalya / TÜRKİYE

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INVITATION

Seeds are a fast-growing sector of agriculture, with a trade volume of $50 billion. In recent years, those involved in the seed sector have sought to have technical and commercial facilities capable of quality production, breeding new varieties and production in different regions of the world.

The "Seed Congresses", which have been organised in Türkiye on a national level seven times since 2002, will be held on an international level from 2024 onwards.

Today, seed is not just an agricultural input, but a high-value, technology-enabled product of strategic importance for sustainable food production. For this reason, it is intended to address the issues of marketing, sales, branding and foreign trade, as well as production technologies and methods, with the contributions of the stakeholders in the sector.

Given the fact that the presentation of academic studies alone will not suffice, it has been deemed appropriate for our congress to create a platform where the future of the sector can also be discussed, and a platform that will provide opportunities for the establishment of cooperation between all stakeholders. With this in mind, our congress will include invited speakers who are experts in their field, trade desks, exhibition stands, company and association promotions, panel discussions and conferences on current issues.

Your participation is valuable in achieving this common goal.
As a stakeholder in the seed sector, we would be delighted to have you join us.

Kind regards.

Topics:
Our congress covers all plant propagation materials such as seeds, saplings, seedlings, tuber crops, bulbs, production and storage technologies, etc. in the area of field crops, horticultural crops and ornamentals.
Oral and poster presentations will be accepted on the main topics listed below.

Seed Production and Technologies - Biotechnology in Seed Production - Plant Breeding - Seed Diseases and Pests - Seed Trade

Date:
9-12 December 2024

Place:
Granada Luxury Belek Antalya / Türkiye

Congress Language:
English

Website:
Visit tohumkongresi2024.com for all the latest information on the congress.

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Turkish Seed Union

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Ankara University Faculty of Agriculture

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HISTORY

BRIEF HISTORY OF TÜRKİYE SEED CONGRESSES

Looking at the history of seed congresses in Türkiye, the calendar goes back 22 years to 2002. Organised by the Seed Technology Application and Research Centre (TOTEM) of Ege University and the Faculty of Agriculture of the same university, the 1st Turkish Seed Congress was held on 11-13 September 2002 at the campus of the Faculty of Agriculture of Ege University in Izmir with the participation of about 200 people. Academics from the agricultural faculties of 4 universities outside the Aegean region, managers from public institutions, especially the Ministry of Agriculture and Rural Affairs, and representatives of the private sector attended the congress.

The Congress featured a total of 48 oral and poster presentations under the main headings of Seed Policies, Variety Registration and Certification System in Türkiye, Expected Developments in EU Harmonisation, Seed and Quarantine in the EU Harmonisation Process, The Role of the Private Sector in Seed Production in Türkiye, Restructuring of the Sector, Biodiversity, Biosafety, Biotechnology and Changes in Variety Development Strategies, University Education in Seed Production.

3 years later, the Faculty of Agriculture of Çukurova University will host the 2nd Turkish Seed Congress in Adana on 9-11 November 2005. The Ministry of Agriculture and Rural Affairs, the Scientific and Technological Research Council of Türkiye (TÜBİTAK) and Ege University Application and Research Centre of Seed Technology (TOTEM) were among the stakeholder institutions of the Congress. Academics and researchers from the Faculties of Agriculture of 8 universities other than Çukurova are taking part in the Congress, and research institutes affiliated to the Ministry of Agriculture and Rural Affairs also showed great interest. Around 150 people attended the congress, which was co-sponsored by 15 private sector organisations. A total of 82 papers and posters were presented at the congress, including various scientific studies in each agricultural product group, as well as basic topics such as What Should Our New Seed Strategies Be in the Face of Rapidly Changing Food Consumption, General Evaluation of Vegetable Seed Cultivation in Türkiye, Recruiting Unemployed

HISTORY

Agricultural Engineers to the Seed Cultivation Sector, Problems in Seed Marketing and Proposed Solutions.

On 25-28 June, as the calendars showed 2008, the 3rd Turkish Seed Congress gathered the stakeholders of the seed sector in Nevşehir.

Following the Aegean, Southeast Anatolia and Central Anatolia regions, it was now the turn of the Black Sea region. The 4th Turkish Seed Congress, held between 14-17 June 2011, was organised by Ondokuz Mayıs University, Faculty of Agriculture. Turkish Seed Union (TÜRKTOB), established on 15 November 2008, has been contributing to and participating in this first Seed Congress since its establishment.

Variety Breeding, Seed Production and Technology, Seed Physiology, Seed Quality, Seed Biology, Seed Control and Certification, Plant Protection Problems in Seeds, Organic Seed Production, Biotechnology in Seed Production, Simulation Models in Seed Production, Seed Processing, Storage and Marketing, Seed Legislation, Policies and Practices were the main topics of the Congress.

Organised for the 5th time in cooperation with Dicle University Faculty of Agriculture, Turkish Seed Union (TÜRKTOB), Ministry of Food, Agriculture and Livestock, Turkish Seed Industry Association (TÜRKTED), Scientific and Technological Research Council of Türkiye (TÜBİTAK), Turkish Patent Office, GAP Regional Development Administration, Karacadağ Development Agency, the congress has gained an international dimension.

The 5th Turkish Seed Congress and Sectoral Business Forum with international participation brought the sector together in Diyarbakır on 19-23 October 2014. 220 papers and presentations were presented at the congress with 300 participants, including 45 from Australia, the Netherlands and the Turkic Republics.

The 6th Turkish Seed Congress with International Participation is organised by the Turkish Seed Union (TÜRKTOB) and hosted by Niğde Ömer Halisdemir University Faculty of Agricultural Sciences and Technologies at Niğde Şehit Ömer Halisdemir

HISTORY

Congress and Culture Centre between 10-13 September 2018.
About 150 papers were presented at the congress, which was supported at every stage by the Ministry of Agriculture and Forestry and related organisations. The congress was attended by around 400 participants, with 22 senior academics from 15 universities in Türkiye and 6 senior academics from 5 universities in the USA, Japan, Germany, Denmark, Iran, Hungary and Pakistan serving on the scientific committee and academics from the same institutions presenting papers.

The 7th Turkish Seed Congress with International Participation, organised by TÜRKTOB and Iğdır University Faculty of Agriculture, was held online on 15-17 November 2021 due to the global pandemic.

Seed Technology, Seed Biotechnology, Seed Breeding, Seed Pathology, Seed Technology, Seed Biotechnology, Seed Biotechnology, Seed Breeding, Seed Pathology were the main topics of the congress where 55 topics were evaluated with 9 sessions and 70 speakers. 6 international speakers from USA, Germany and England participated in the congress.

All sessions of the congress are available
on TÜRKTOB's YouTube page (@turkiyetohumcularbirligi).

INVITED SPEAKERS

Recent Developments in Plant Breeding

Prof. Dr. Hakan ÖZKAN

Hakan Özkan completed his primary and secondary education in Siirt, Zonguldak, and Kahramanmaraş. He graduated from the Department Field Crops at Çukurova University Faculty of Agriculture and was appointed as, a research assistant in the same department in 1990. He completed his master's degree in 1993. As part of a joint doctoral program between the Weizmann Institute of Science (Israel) and Çukurova University, he completed his PhD in 2000. He conducted his postdoctoral research at the University of Arizona (Tucson, Arizona, USA) and the Max Planck Institute (Cologne, Germany). Hakan Özkan, awarded the EMBO short-term fellowship twice, also received the prestigious "Alexander von Humboldt Fellowship" from Germany.In 2004, he received the TUBITAK Young Scientist Award. At the University of Çukurova, Faculty of Agriculture, he was appointed as a Professor in 2009. He has published over 100 original articles in international peer-reviewed journals (Web of Science), which have received over 5000 citations on Web of Science. His research areas include the evolution of cultivated plants, cereal breeding, and using wild genetic resources in plant breeding.

Possible Effects of the Constitutional Court on Agriculture and Seed Production

Ahmet Volkan GÜNGÖREN

He was born in 1977 in Ankara. After graduating from Middle East Technical University (METU) Vocational High School Food Technology Department in 1999 as the second runner-up in the department, he graduated from METU Food Engineering Department Undergraduate Programme in 2004. In 2012,he completed his master's degree in Ankara University Institute of Science and Technology, Department of Agricultural Economics and started his doctoral studies in the same year. Mr. Gungoren started his professional career as a specialist at the Turkish Foreign Trade found ation in 1999 and started his career at the Ministry of Food, Agriculture and Livestock as a food inspector at Kirsehir Provincial Directorate of Agriculture in 2004. He worked as a food engineer at the General Directorate of P rotection and Control between 2007-2009 and at the Press and Public Relations Consultancy between 2009-2011. Between 2011 and 2015, Mr. GÜNGÖREN worked as working group responsible at the General Directorate of Food and Control and in 2015, he was appointed as the Head of International Organisations Department at the General Directarate of European Union and Foreign Relations. As of February 2018, Mr. GÜNGÖREN has been working as Deputy Director General at the same Directorate General. Mr.C Gtingören can speaks F English fluently he i is married and has two children.

Seed Coating Technologies

Dr. Alan TAYLOR

Background: Alan Taylor is a professor of Seed Science and Technology at Cornell AgriTech and started at the New York State Agricultural Experiment Station in 1981. Taylor's research program can best be described as "modern seed technology" with many well-organized projects for multiple stakeholders. His responsibilities include 80% research with emphasis on post-harvest topics including seed treatment and coatings, biostimulants and seed quality. Alan has 20% outreach for college wide extension programs. Awards and Honors . Invited guest editor of Special Issue on Modern Seed Technology (2020/21). . Leadership, dedication and service to the New York State Seed Testing Laboratory (2017) plaque from Dean College of Agriculture and Life Sciences (CALS) . Appreciation letter for dedicated leadership of the New York State Seed Testing "Lab from Richard Ball Commissioner of Agriculture, December 19, 2016. . Dedication plaque "For your dedicated research of seed treatments (2016) Atlantic Seed Association". Best Paper (2013) AAIC (Association for the Advancement of Industrial Crops) . Seed Science Award (2003) Crop Science Society of America Extension/Outreach: Co-hosted two annual extension events: Cornell Seed Growers Field day and Cornell Seed Conference. Attendance at the 2023 Seed Growers Field day was 61, while there were 91 registered at the Cornell Seed Conference

Developing Varieties Tolerant to Climate Change

Luigi CATTIVELLI

LC has been fellow at the Max Planck Institute of Cologne (Germany) fromn 1987 till1989, LC is in permanent position since 1991 at the Experimental Institute for Cereal Research in Fiorenzuola dArda Italy) (an institute incorporate in the Agricultural Research Coundil - CREA-ef italy in 2004). From 1997 to 2003 LC has been protessor of Plant Genetics at University ofVerona(italy), Faculty of Blotechnology. From 2005 to 2009 LC has beon director of the CREA Cereal Rosearch Centre in Foggla leacing a group of about 25 researchers/post-docs with a main interest in breeding genetics, metabolernics and processing technology of durum w heat. t From 2010 LC is director of the C REA Research Centre for Genomics and B Bioinforratics In Forenzuola dArda where coordinates a group of about 40 researchers/post-docs working in plant genomics, plant phryslology and blointormatilcs. LC research activity has been focused on genetics and molecular biology of cereals (barley, wheat and rice), from plant breeding to gene dioning QTL analysts and genome sequencing. Genetics, genomics, gene functlonal analysis and blcin formatics are used to Identify and invostigate koy genes involved in the expression af agronomic tralits.
LC Is the Itallan representative in the research committee of Wheat Initative, an international organization tor the coordination of wheat research andorsed by the G20 Agricultural Minlsters and In the frame of Wheat Initiative, LC Is co-chalr of the Expert 'Working Group on Durum Wheat Genomics and Breeding. LC has beer/Is member of the editorlal boards of "Plant Sdence" (2008-2021), of Journal of Cereal Science" (2015-2023), "Molecular Plant", Associate Editor of "Frontiers in Plant Science" "and of nternational Journal of Molecular S cience: Scopus registers more than 220 publications and > 1 6.000 citations for LC with a H-index of 58 (Google scholar: >22.000 citations, H-index 67).

Recent Developments in World Seed Trade

Csaba GASPAR

Csaba GASPAR is the the Head of Section, OECD Codes and Schemes.In this capacity he is leading the ECD's work on international standardisation and certification of agricultural products including agricultural and vegetable seeds, forest reproductive material, tractors and fruits and vegetables.
Mr Gaspar has an MSc in Horticulture with specialisation in Biotechology as well as an MSc in Geo-Information Systems (GIS). He has more than 20 years of experiences in standardisation and certification of agricultural products such as agricultural seeds, fruits & vegetables, and forest reproductive materials. Before joining the OECD in 2006 he worked for the National Food Chain Safety Office of Hungary as inspector and coordinator of international relations.
As Hungarian representative, he was the Chair of the Specialised Session on Standardisatlon of Dry and Dried Produce and Vice-Chair of the Working Party 7 on Agricultural Quality Standards of The United Nation Economic Commission for Europe (UNECE) in 2005 and 2006.

Recent Developments on Plant Breeders' Rights

Leontino TAVEIRA

Leontino TAVEIRA is Director of Global Development and Technical Affairs at UPOV. With background in agriculture, plant breeding and business administration, he works with policy makers and different actors developing plant variety protection and implementing the UPOV system. He is in charge of organizing the technical work of UPOV and guidance for variety examination. He has experience in the private sector with ornamental plant production and agricultural market research. Over the past 22 years he has been working with plant variety protection.

SCIENTIFIC PROGRAM

SCIENTIFIC PROGRAM

December 9, 2024, Monday: Hotel Check-in

December 10, 2024, Tuesday: **Main Hall**	
09:30	Registration
10:30	**Opening and Protocol Speeches** **Hacı Ömer GÜLER** - President, TÜRKTOB **Prof. Dr. Hayrettin KENDİR** - President, Congress **İbrahim YUMAKLI** - Minister of Agriculture and Forestry of the Republic of Türkiye
11:45	TÜRKTOB – TAGEM Protocol Ceremony
Panel 1	
14:00-16:00	**Future of Agriculture: Planning, Support and Innovation** **Uğur ERDEM** - General Director, BÜGEM **Dr. Mustafa Altuğ ATALAY** - General Director, TAGEM **Dr. Osman YILDIZ** - General Director, TRGM **Dr. Ersin DİLBER** - General Director, GKGM
December 11, 2024, Wednesday: **Main Hall**	
Panel 2	
10:30-12:30	Agricultural Policies, Pricing, Water, Strategies and Subsidies **Ahmet GÜLDAL** - General Director, TMO **Dr. Hasan GEZGİNÇ** - General Director, TİGEM **Mehmet Akif BALTA** - General Director, DSİ **Dr. Ahmet ANTALYALI** - President, TKDK
Panel 3	
14:00-16:00	Sustainability in Agricultural Ecosystems: Sustainable Finance, Seeds, Artificial Intelligence (AI) **Kemalettin BAYAT** - Group Head of Agricultural Banking, Ziraat Bank **Aykut ÖZBUĞDAY** - General Director, PROGEN SEED **Süleyman Yavuz İLGÜN** - General Director, ALP AGRICULTURE **Dr. Ömer YAZICI** - Marketing Director, AGROVECH

SCIENTIFIC PROGRAM

10 December, Tuesday		Hall A
13:30-15:00	**Keynote Speaker** **Chair:** *İbrahim Demir*	
13:30-14:00	Recent Developments in Plant Breeding	*Hakan Özkan*
14:00-14:30	Recent Developments in World Seed Trade	*Csaba Gaspar*
14:30-15:00	Seed Coating Technologies	*Alan George Taylor*
15:00-15:10	**Coffee Break**	
15:10-16:10	**Session: Seed Production & Technology** **Chair:** *Csaba Gaspar*	
15:10-15:20	Responses of Enzymes To Salinity Stress In Perennial Ryegrass, Tall Fescue And Festulolium In Salt Tolerance	*Amjad Ali*
15:20-15:30	Electrical conductivity estimates of normal germination percentages of seed lots in the same cultivar and different cultivars in cabbages	*İbrahim Demir*
15:30-15:40	Pistachio (Pistacia vera) Rootstock Production and Its Importance from Buttum (Pistacia khinjuk) Seeds in Southeastern Anatolia Region	*Kander Koç*
15:40-15:50	Effects of Biopriming With Pgpr Bacterias on The Viability of Eggplant Seeds At Different Physiological Maturity	*Burcu Kenanoğlu*
15:50-16:00	Enhancing Onion Seed Production and Disease Resistance through Seed Priming and Foliar Application of Salicylic Acid and Potassium Nitrate	*Arushi Padiyal*
16:00-16:10	Q&A	
16:10-16:20	**Coffee Break**	

SCIENTIFIC PROGRAM

10 December, Tuesday		Hall A
16:20-17:20	**Session: Seed Production & Technology** **Chair:** *Ayup Iskakov*	
16:20-16:30	Impact of Electromagnetic Fields on the Germination of Perennial Ryegrass Seeds	*Cansu Telci Kahramanoğulları*
16:30-16:40	Effects of Nanopriming Treatments on Germination Performance of Tomato and Snake Melon Seeds	*Kübra Özmen*
16:40-16:50	Efficacy of Seedlings Produced from Microbiota-Modified Seeds Against Some Biotic Stresses	*Kutay Coşkun Yıldırım*
16:50-17:00	Cold Plasma Treatments Alleviate Peg-Simulated Drought Stress on Germination of Lettuce Seeds	*Ertan Yıldırım*
17:00-17:10	Response of Cowpea to Natural and İnorganic Seed Priming Agents	*Shakeel Imran*
17:10-17:20	Q&A	
17:20-17:30	**Coffee Break**	
17:30-18:30	**Session: Seed Production & Technology** **Chair:** *Ahmad Alsaleh*	
17:30-17:40	Effects on the Germination of Festulolium Seeds By Treatments With A Magnetic Field	*Muhammad Sameeullah*
17:40-17:50	Relationship Between Different Maturity And After Ripening Levels And Seed Quality In Eggplant Varieties	*Kübra Özmen*
17:50-18:00	Effects of Temperature And Potassium Nitrate Treatments on Seedling Emergence Performance In Passion Fruit Species	*Fulya Uzunoğlu*
18:00-18:10	Effect of Seed Treatments on Breaking Dormancy In Different Minor Fruit Species	*Suzan Demir*
18:10-18:20	Unravelling mechanistic and metabolic interaction of melatonin in alleviating abiotic stress response in chickpea	*Shahied Ahmed Khan*
18:20-18:30	Q&A	

SCIENTIFIC PROGRAM

10 December, Tuesday		Hall B
15:10-16:10	**Session: Plant Biotechnology** **Chair:** *Leontino Taveira*	
15:10-15:20	Sanitation of Fruits Plants for the Production of Virus-Free Seedlings and Creation Nuclear Stock	*Balnur Kabylbekova*
15:20-15:30	Development of Determinate Tomato Cultivars Using Speed Breeding and Marker Assisted Selection	*Merve Yiğit*
15:30-15:40	Comparison on Releasing of Gene Edited Varieties in Turkey and Some Countries	*Hasan Çelen*
15:40-15:50	The Expression of the RBD Domain of Spike Protein from Omicron Variant of SARS CoV-2 in Tomato	*Bayram Cevik*
15:50-16:00	Development and Assessment of new transgenic myrosin deficient plant seeds for sustainable fodder and oil production	*jam Ahmad*
16:00-16:10	Q&A	
16:10-16:20	**Coffee Break**	
16:20-17:20	**Session: Plant Biotechnology & Plant Breeding** **Chair:** *Hakan Özkan*	
16:20-16:30	Survey of Protein, Amino Acids, and Lipid Profiles In Hempseed Using Ftir Spectroscopy	*Ahmad Alsaleh*
16:30-16:40	The Effect of CNT on Soybean Plant Development by Different Techniques	*Ayten Kubra Yagiz*
16:40-16:50	Deciphering Resistance To Tomato Brown Rugose Fruit Virus (Tobrfv) Using Genome-Wide Association Studies	*Yasin Topcu*
16:50-17:00	99 years of wheat breeding in Türkiye and the impact of regulations in variety development	*Mesut Keser*
17:00-17:10	Investigation and Characterization of Grain Size Variation in Barley (Hordeum vulgare L.) Landraces Using Conventional and Image Processing Techniques	*Guray Akdogan*
17:10-17:20	Q&A	
17:20-17:30	**Coffee Break**	

SCIENTIFIC PROGRAM

10 December, Tuesday		Hall B
17:30-18:20	**Session: Plant Breeding** **Chair:** *Bülent Uzun*	
17:30-17:40	Resistance of Winter Wheat Genotypes to Fungal Diseases in Kazakhstan	*Saltanat Dubekova*
17:40-17:50	Pepper Varieties in Türkiye and Molecular Markers Used in Virus Resistance	*Ayse Kahraman*
17:50-18:00	Ayaş Tomato Variety Improving Studies	*Seyfullah Binbir*
18:00-18:10	R&D Studies of Tagem (General Directorate of Agricultural Research and Policy, MoAF) in Vegetable Seed Growing	*Evran Doğan*
18:10-18:20	Q&A	

SCIENTIFIC PROGRAM

11 December, Wednesday		Hall A
09:00-10:00	**Session: Seed Production & Technology** **Chair:** *Kazım Mavi*	
09:00-09:10	Reactions of Magnetic Field Treatments On Seeds of Hungarian Vetch	*Ahmad Alsaleh*
09:10-09:20	{Alcea rosea} L. Treatments to Improve Emergence Performance in Seeds of the Species	*Emine Erğan*
09:20-09:30	Comparative Assessment of Wood Vinegar Types And Nacl-Induced Salinity Stress On Germination And Early Growth Performance In Popcorn (Zea Mays Var. Everta)	*Sıtkı Ermiş*
09:30-09:40	Improvement of Functional Properties of Hull-Less Barley With Microfluidization Process	*Arzu Özer*
09:40-09:50	Seed producibility potential of stress resilient maize hybrids for commercialization in Nigeria	*Silvestro Meseka*
09:50-10:00	Q&A	
10:00-10:10	**Coffee Break**	
10:10-11:00	**Session: Seed Production & Technology** **Chair:** *Cerima Zahirov Sinanovic*	
10:10-10:20	The Position And Importance of Konya Province's Seed Production In Türkiye	*Süleyman Soylu*
10:20-10:30	The Importance of Silicon as a Biostimulant in Sustainable Agriculture and Seed Production	*Şafak Köseoğlu*
10:30-10:40	Effects of Wood Vinegar and Salt Stress on Germination and Seedling Growth in Field Crop Varieties	*Yusuf Sarıtaş*
10:40-10:50	Seed Yield and Quality Performance in Crosses of Pot Miniature x Garden / Cut Roses	*Emine KIRBAY*
10:40-10:50	Changing the food systems in Africa	*Michael Oke*
10:50-11:00	Q&A	
11:00-11:10	**Coffee Break**	

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11 December, Wednesday		Hall A
11:10-12:10	**Session: Seed Production & Technology** **Chair:** *Ertan Yıldırım*	
11:10-11:20	Effect of Titanium Dioxide Nanoparticle Application on Seed and Different Growth Stages on Sunflower Yield and Yield Components	*Nilüfer Koçak Şahin*
11:20-11:30	The Status of Turkish Seed Sector Towards 2050 And Future Strategies	*S. Ahmet Bağcı*
11:30-11:40	Fruıt And Seed Characterıstıcs of Turkısh Asparagus	*Mehmet Şimşek*
11:40-11:50	Deciphering the Impact of Temperature and Dormancy Breaking Treatments in Ashwagandha (Withania somnifera) and Improving its Seed Quality	*Sultan Sıngh*
11:50-12:00	Q&A	
12:00-13:30	**LUNCH**	
13:30-15:00	**Keynote Speaker** **Chair:** *Hakan Özkan*	
13:30-14:00	Possible Effects of the European Green Deal on Agriculture and Seed Production	*Volkan Güngören*
14:00-14:30	Advanced Genomic Tools for Leveraging Durum Wheat Diversity	*Luigi Cativelli*
14:30-15:00	Recent Developments on Plant Breeders' Rights	*Leontino Taveira*
15:00-15:10	**Coffee Break**	
15:10-16:00	**Session: Seed Production & Technology / Trading** **Chair:** *Ahmad Alsaleh*	
15:10-15:20	Problems Encountered By Seed Companies In Turkey In Producing Seeds In Accordance With The Standards And Their Solutions	*Meltem Özbay Konca*
15:20-15:30	Why Farmers Choose Their Maize Hybrids: An Example of Southern Kazakhstan	*Gulmira Samenova*
15:30-15:40	Seed Priming with Plant Growth-Promoting Rhizobacteria: A Promising Method For Enhancing Tolerance to Abiotic Stress	*Muhammet Çağrı Oğuz*
15:40-15:50	Enhancing Seed Sprouting of Calopogonium Caeruleum	*Siti Maesaroh*
15:50-16:00	Q&A	
16:00-16:10	**Coffee Break**	

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11 December, Wednesday		Hall A
16:10-17:00	**Session: Plant Protection** **Chair:** *Arzu Çelik Oğuz*	
16:10-16:20	The Effect of some Yield Trial Experimental Materials on the Effect of Bunt Reactions and Yield	*Serik Bakırov*
16:20-16:30	Cotton Seed Storage Diseases and Pests	*Ece Yücel*
16:30-16:40	Determination of The Response of Some Wheat Genotypes To {Tilletia Caries} (D.c.) Tul And Its Effects On Quality	*Aigul Madenova*
16:40-16:50	Q&A	
16:50-17:20	**Coffee Break**	
17:20-18:10	**Session: Plant Protection** **Chair:** *Luigi Cattivelli*	
17:20-17:30	Reactions to Wheat Leaf Rust {Puccinia triticina} and Its Effect on Grain Quality	*Kanat Galymbek*
17:30-17:40	Analyzing Genetic Diversity and Mating Type Distribution in the Turkish Pyrenophora graminea Population	*Arzu Çelik Oğuz*
17:40-17:50	Developing A Dsrna-Based Biopreparate, “Nano Rugose”, Against Tomato Brown Rugose Fruit Virus	*Bayram Cevik*
17:50-18:00	Identification, Characterization of Aflatoxin-Producing Aspergillus Strains From Corn Seed And Its Mitigation of By Using Nanoparticles	*Muqadas Faisal Batool*
18:00-18:10	Q&A	

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11 December, Wednesday		Hall B
09:00-10:00	**Session: Plant Breeding** **Chair:** *Mesut Keser*	
09:00-09:10	Marker-assisted selection of soybean for photoperiodic sensitivity genes	*Raushan Yerzhebayeva*
09:10-09:20	Barley Breeding Program in TRNC	*Mehmet Karsili*
09:20-09:30	Genotype-Environment Interaction Analysis of Advanced-Stage Barley Breeding Lines (Hordeum vulgare L.) under Diverse Rain-fed Conditions	*Melih Bilir*
09:30-09:40	Using Genomics Tools For Improvement of Silage Hybrid Corn Varieties By Cooperation of Public And Private Sector	*Gönül Cömertpay*
09:40-09:50	Broadening Genetic Diversity of the Breeding Advanced Germplasm for Accelerated Lentil Varietal Development Through Speed Breeding Based on the Combination of Extended Photoperiod and Off-Season Sowing	*Omar Idrissi*
09:50-10:00	Q&A	
10:00-10:10	**Coffee Break**	
10:10-11:00	**Session: Plant Breeding** **Chair:** *Ahmet Latif Tek*	
10:10-10:20	Salt Tolerance Assessment of Durum Wheat (Triticum Durum Desf.) Germplasm: A Comparative Study	*Nasrine salhi*
10:20-10:30	Assessment of Quantitative Agronomic Traits Using a Bi-parental Doubled Haploid Barley (Hordeum vulgare L.) Population	*Emre Karahan*
10:30-10:40	The Effect of Trichome Morphology on Resistance to Yellow Mite (Polyphagotarsonemus Latus Banks) in Pepper (C. Annuum L)	*Ramazan Özalp*
10:40-10:50	Effects of Long-Term Flooding on Pollen Viability and Germination Ability in Tomato (Solanum lycopersicum L.)	*Mine Bulut*
10:40-10:50	Impacts of Climate-Resilient Wheat Varieties on Production Risk Management in Different Agroecological Zones of Turkey	*Yigezu Atnafe Yigezu*
10:50-11:00	Q&A	
11:00-11:10	**Coffee Break**	

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11 December, Wednesday		Hall B
11:10-12:10	**Session: Plant Breeding** **Chair:** *Sıtkı Ermiş*	
11:10-11:20	Comparison of Local Peanuts Grown in the Turkish Republic of Northern Cyprus and Some Varieties of Peanuts that have been Adapted	*Kazım Baş*
11:20-11:30	Twelve Years of Bread Wheat Regional Yield Trials in Central Anatolia: Insights from Multi-Environment Analysis	*Mehmet Dogan*
11:30-11:40	A Perspective on Genome and Polyploid Dynamics in Agriculture: An Example of Legume Forage Crop Sainfoin ({Onobrychis viciifolia})	*Ahmet L. Tek*
11:40-11:50	Effects of Two Different Gamma Ray Sources on In Vitro Shoot Explantation of Fraser Photinia and Determination of Effective Mutation Dose	*Onur Sinan Türkmen*
11:50-12:00	Seed Dispersal Strategies In The Sahara Desert: Adaptive Mechanisms For Plant Survival	*Trabelsi Hafida*
12:00-12:10	Q&A	
12:10-13:30	**LUNCH**	
15:10-16:00	**Session: Plant Breeding** **Chair:** *Gönül Cömertpay*	
15:10-15:20	Characterization of Native Olive Genotype İn TRNC	*Hüseyin Karanfiloğlu*
15:20-15:30	Exploring The Coat Protein-Mediated Resistance To Tomato Brown Rugose Fruit Virus	*Bayram Cevik*
15:30-15:40	Line Tester Analysis of Some Inbred Lines Developed By East Mediterranean Agricultural Research Institute	*Nergiz Coban*
15:40-15:50	Breeding For Improvement Of Grain Quality of Spring And Winter Wheat Under Conditions of Western Siberia	*Сергей Шепелев*
15:50-16:00	Q&A	
16:00-16:10	**Coffee Break**	

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11 December, Wednesday		Hall B
16:10-17:30	**Session: Plant Breeding** **Chair:** *Ahmet Bağcı*	
16:10-16:20	Evalutaton of Silage Hybrid Corn Varieties For Yield and Quality Parameters	*İbrahim Cerit*
16:20-16:30	Whole Genome Sequence Analysis Reveals Possible Resistant Genes In Tomato Mutant Lines	*Özer Çalış*
16:30-16:40	Scientific Support For Seed Production In Kazakhstan	*Ayup Iskakov*
16:40-16:50	Determining the Effects of Different Gamma Radiation Doses Applied on Sunflower	*Hacı Tek*
16:50-17:00	The National Seed System With Its Strengths and Challenges: Organization of the Seed Chain and Roles of the Main Players	*Souapibe Pabame Sougnabe*
17:00-17:10	Evaluation of Sunflower Seed Production and Regulations in Turkey	*Süleyman Safa Arslan*
17:10-17:20	Development of Genotypes Resistant to IMI Group Herbicides in Chickpea (Cicer arietinum L.) Using Chemical Mutation Breeding Method	*Abdulkadir Aydoğan*
17:20-17:30	Q&A	

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DISCUSSIONAL POSTER SESSIONS		
11 DECEMBER 2024	**17:45-19:00**	**E-POSTER AREA**
GROUPS	CHAIR	E POSTER NUMBER
Group 1	Sibel Day	PP-1 PP-2 PP-3 PP-4 PP-5 PP-6
Group 2	Arzu Çelik Oğuz	PP-7 PP-8 PP-9 PP-10 PP-11 PP-12
Group 3	Sıtkı Ermiş	PP-13 PP-14 PP-15 PP-16 PP-17 PP-18
Group 4	Ahmad Alsaleh	PP-19 PP-20 PP-21 PP-22 PP-23 PP-24
Group 5	Ahmet Latif Tek	PP-25 PP-26 PP-27 PP-28 PP-29 PP-30

Controversial Poster authors must be present to make their presentations in the E-poster area at the time specified above.

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POSTER PRESENTATIONS

PP-1	Nfluence of Temperature, Light and Length of Storage on the Quality and Speed of Germination of Petunia X Hybrida Seeds	*Jasna Avdić*
PP-2	Crambe (Crambe abyssinica L.) as an Alternative Oil Plant That Can Be Grown in Central Anatolian Conditions Evaluation of	*Mehmet Gencer*
PP-3	Effect of Aerosol Smoke on Seedling Emergence and Seedling Quality Parameters in Spinach Seeds at Different Temperatures	*İbrahim Demir*
PP-4	Pre-Sowing Biological Measures of Maize Seed Stimulation	*Marijenka Tabaković*
PP-5	The Potential of Using Local Seed From Autothon Variety ''Čapljinska Paprika'' in Comparison to the Commercial ''Istarska F1'' Hybrid	*Lutvija Karić*
PP-6	Determination of the Site and Mechanism of Seed Transmission of Tobrfv	*Damla Ulusoy*
PP-7	Biocrust Determines the Seed Germination and Seedling Survival of Annual Plants in a Temperate Desert	*Xinrong Li*
PP-8	Use of Pgprs as Bio-Priming in Seed Germination	*Onur Okumuş*
PP-9	Unlocking the Potential of Autothon Varieties of Collard Greens (Brassica Oleracea Var. Acephala) for Microgreens Production	*Ćerima Zahirović Sinanović*
PP-10	Biotechnological Approaches in Vegetable Seed Production	*Serkan Aydın*
PP-11	Gene Banks and the Importance of Seed Storage	*Uğur Yegül*
PP-12	Estimation of the Effect of Climate Change on Potential Distribution Areas of Hordeum Vulgare in Summer Growing Regions by Using Species Distribution Model	*Gülben Meryem Arslan*
PP-13	Biological Soil Crusts Affect Seed Germination and Growth of Exotic Vascular Plant in an Arid Ecosystem	*Rong Hui*
PP-14	Pre-Extention Demonstration of Improved Chikcpea Varieites in Different Agro-Ecological Area of Morocco	*Houasli Chafika*
PP-15	Biocrusts Affect the Multistability of Arid Regions through Their Impact on Plant Germination	*Jingyao Sun*

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POSTER PRESENTATIONS

PP-16	Influence of Seed Stratification and Different Types Containers of the Quality of Walnut Seedlings	*Fikreta Behmen*
PP-17	Fungal Contaminants in Wheat	*Samia Mezaache-Aichour*
PP-18	Breaking Seed Dormancy of Three Wild Pastoral Fabaceae Species: Effect of Passage Through the Digestive System of Camel	*Hafida Trabelsi*
PP-19	Research of Yield and Nutritional Values of Local Elephant Grass (Pennisetum purpureum) and Imported Elephant Grass Varieties in TRNC Güzelyurt Conditions	*Erkut Uluçam*
PP-20	Allelic Polymorphism of VRN Genes in Barley Collection and Breeding Samples	*Askar Baimuratov*
PP-21	Identification of Breeding Lines of Winter Wheat by Common Bunt Resistance Genes (BT)	*Bekzhan Maikotov*
PP-22	Genome-Wide Association Study Spoting Single-Nucleotide Polymorphisms for Iron (Fe) and Zinc (Zn) Biofortification in Einkorn Wheat (Triticum monococcum L.)	*Fatma Gul Maras-Vanlioglu*
PP-23	Determination of Biochemical and Physiological Responses of Pgpr Seed Priming: Enhancing Tolerance to Drought Stress in Sunflower {Helianthus annuus}	*Ezgi Oğuz*
PP-24	Pre-Extension Demonstration and Evaluation of Bread and Durum Wheat Varieties in Different Agro-Ecological Areas of Morocco	*Mona Taghouti*
PP-25	Production of Original and Elite Seeds of Varieties and Hybrids of Field Crops Selected by KazRIAPG LLP	*Sholpan Bastaubayeva*
PP-26	Seed Dormancy Was Associated Seedbank Longevity in a Set of Isogenic Lines of Rice	*Ugur Korkmaz*
PP-27	Reliability Assessment of Different Biological Markers for Pre-Control Maize Varietal Purity and Uniformity Testing in Seed Production	*Vojka Babić*
PP-28	Importance and Applications of Drying Technique and Technology	*Uğur Yegül*
PP-29	Selection of Seedlings M. Sievers for the “Aport” Apple And Physiological and Phyto-Pathological Assessment of Scion-Rootstock Combinations	*Sagi Soltanbekov*
PP-30	Optimization of Clonal Micropropagation Technology and Rooting of Pear for in Vitro Micrografting	*Zarina Yussupova*

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(OP-01)
Seed Yield and Quality Performance in Crosses of Pot Miniature x Garden / Cut Roses

Emine KIRBAY[1]

[1]Afyonkarahisar Health Sciences University, Ataturk Health Services Vocational School, Afyon, Türkiye

Abstract: Roses are popular ornamental plants, with pot miniature roses, cut roses and old garden roses being widely cultivated to meet high demand. Given their popularity, it is important to examine the potential effects of combining these three types on seed yield and quality to optimize the development of new commercial rose varieties. This study was conducted to investigate the effects of hybrid combinations between pot miniature and garden roses/cut rose on seed yield and quality. Rosa White Star, a miniature rose, was used as the seed parent, at the same time, three garden roses (Spelwark, Gräfin Diana, and Genotype 1) and two different cut rose cultivars (Magnum, Tineke) as the pollen parents. Parameters observed included fruit set, the number of seeds per fruit, seed weight, seed germination rate. The seeds were stratified in cold storage at 4°C for 12 weeks to determine the seed germination rate. The highest number of seeds (111.0) was obtained from the Rosa White Star x Spelwark hybrid combination, while the lowest (10.0) was determined in the Rosa White Star x Genotype 1 combination. In terms of the average number of seeds per fruit, the highest value was recorded for the Rosa White Star x Tineke combination (14.0 seeds), and the lowest for the Rosa White Star x Genotype 1 combination. The highest germination rate was 15.31% (Rosa White Star x Tineke), although seeds of White Star x Genotype 1 didn't germinate. The results indicate that seed production efficiency of miniature roses is low when "pot miniature rose x garden rose" cross combinations are used. However, Tineke was found to be more compatible with Rosa White Star as the pollen parent.

Keywords: hybridization, seed, quality, pot rose

(OP-02)
Developing Imidazolinone-Tolerant Lentil Lines Through Mutation Breeding

Selin Gündüz[1], Abdulkadir Aydoğan[1], Elif Atasayar[1], Havva Vildan Kılınç[1], Ersin Kavlak[1], İstem Budak[2]

[1]Field Crops Central Research Institute
[2]Plant Protection Central Research Institute

Abstract: Weeds threaten lentil cultivation, causing yield reductions of up to 73%. Therefore, developing lentil varieties resistant to imidazolinone herbicides, which effectively control both narrow and broad-leaved weeds at lower doses, is critical for sustainable yield improvement. Mutation breeding has emerged as a valuable tool for creating genetic diversity and enhancing agronomic traits in lentils. This research evaluates the Imozomax herbicide effect on 31 lentil lines, alongside three checks as three replicates, over two consecutive years (2023-2024). These lines were developed using Ethyl Methane Sulfonate (EMS) mutagenesis to enhance imidazolinone tolerance with preliminary studies. Besides assessing herbicide tolerance, winter damage on the lines has also been considered. The results demonstrated that the herbicide

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application yielded resistance in the lentil lines, consistent with preliminary findings. Additionally, these lines showed strong winter resistance. The average plant height was 29.4 cm, with the first pod height averaging 13.3 cm. These 31 lines will serve as a foundation for future breeding programs aimed at developing herbicide-resistant lentil lines.

Keywords: Lentil (Lens culinaris Medik.), Mutation Breeding, Imidazolinone tolerance, Weed control

(OP-03)
Assessment of Quantitative Agronomic Traits Using a Bi-parental Doubled Haploid Barley (Hordeum vulgare L.) Mapping Population

Emre KARAHAN[1], Melih BİLİR[1], Ülkü Selcen HAYDAROĞLU[1], İsmail SAYIM[1], Namuk ERGÜN[1], Gülden ÇETİN ÖZKAN[1]

[1]Central Research Institute for Field Crops

Abstract: This study visually assessed 312 barley genotypes, comprising a bi-parental doubled haploid mapping population and their parental lines, Avcı-2002 (drought-sensitive) and Bülbül-89 (drought-tolerant), for some quantitative agronomic traits. The parental lines were replicated across 13 blocks, each comprising 24 experimental units, to estimate the genotypic performance of the doubled haploid accessions using the error variance of the checks. The agronomic traits observed included spike length (cm), grain weight per spike (g), number of seeds per spike, 1000-grain weight (g), plant height (cm), peduncle length (cm), grain yield (kg/da), and lodging (rated 0-9). The results revealed statistically significant genotypic variability within the mapping population for plant height ($p < 0.05$) and lodging ($p < 0.01$), suggesting a considerable level of genetic diversity for the mapping population. These findings indicate that observed genetic diversity is substantial for some traits, making these accessions valuable for further molecular studies. However, non-significant genotypic differences ($p < 0.05$) for grain yield and peduncle length pointed to the potential influence of the lack of genotype-by-environment interactions and replicates. Replicated field trials are necessary to elucidate these complex traits' heritability and ensure genotypic variation across various environments. This recombinant population will be promising in identifying stable QTLs and providing insights into the genetic control of complex traits under diverse rain-fed conditions, ultimately facilitating the development of advanced barley varieties and promoting sustainable seed production.

Keywords: Hordeum vulgare L., quantitative agronomic traits, doubled haploid population.

(OP-04)
Breeding For Improvement Of Grain Quality Of Spring And Winter Wheat Under Conditions Of Western Siberia

Vladimir Shamanin[1], Sergei Shepelev[1], Inna Pototskaya[1], Alexander Chursin[1], Violetta Pozherukova[1], Oleg Kuzmin[1], Amanzhol Aydarov[1], Svetlana Esse[1], Michail Koshkin[1], Ilya Bezukladov[1], Artem Verner[1], Alexander Kovalchuk[1], Alexei Morgounov[1], Hamit Koksel[1]

[1]Omsk State Agrarian University

Abstract: In the last decade breeding for improvement of quality-related traits is

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considered as most important in the Russian Federation. A genome-wide association study (GWAS) and using KASP markers, associated with these traits, allow to increase the genetic diversity of new wheat varieties and improve of they grain quality. The purpose of the research is to identify new genetic sources of spring and winter bread wheat with a complex of favorable alleles of genes that control traits of grain quality. A panel comprising 94 landraces sourced from the VIR collection (Russia) and 142 wheat varieties from breeding programs of Russia and Kazakhstan (KASIB program) was subjected to GWAS using the Affymetrix 25K platform (Germany, www.traitgenetics.de). 96 accessions of winter wheat generated from different breeding programs (Russia, Germany, Bulgaria, Türkiye, USA, and program Türkiye -CIMMYT-ICARDA) were genotyped using KASP markers, associated with grain quality traits. Phenotypic data for grain quality traits were collected over two growing seasons (2022 and 2023) in Western Siberia. Based on GWAS analysis among 294 MTAs seven unique loci were identified with a –log10(p) value >6 in the landrace collection that had significant associations with grain protein content, grain gluten and strong gluten content, gluten index, and vitreousness (AX-158572632, wsnp_Ex_c10084_16572374, BobWhite_c31129_60, AX-158586137, AX-94949506, BobWhite_c46257_130, wsnp_JG_c5646_2148382). These markers were distributed on chromosomes A, 2B, 5B, 6B, and 6D with ranged of phenotypic variation 9–26%. 22 candidate genes in landraces and KASIB varieties, also seven new MTAs were identified. The promising varieties of winter bread wheat were identified and characterized by favorable alleles associated with quality-related traits. The results of the research can be successfully used for improvement of the wheat grain quality in breeding programs.

Keywords: spring and winter wheat, grain quality, GWAS, KASP markers

(OP-05)
Improvement Of Functional Properties Of Hull-Less Barley With Microfluidization Process

Arzu Özer[1], Berrin Özkaya[2]

[1]Central Research Institute for Field Crops
[2]Ankara University

Abstract: Hull-less barley contains high amounts of β-glucan and is also very good in terms of bioactive components. The microfluidization process applied to cereal products had positive effects on the functional compounds of the product. In this study, the effects of microfluidization process on the functional properties of hull-less barley were investigated. The microfluidization process applied on whole hull-less barley flour increased the β-glucan, dietary fiber, phenolic contents and antioxidant activity of flour and reduced the amount of phytic acid. Özen and Yalın hull-less barley varieties registered by the Central Research Institute for Field Crops were used as material in the research. Hectolitre weight and thousand kernel weight analyzes were performed as physical analysis on barley grains. As chemical analysis, the amounts of moisture, crude ash and crude protein were determined. β-glucan, total dietary fiber, total phenolic substance amounts, total antioxidant activity, phytic acid, phytate phosphorus and total phosphorus amounts values were determined in whole hull-less barley flour and microfluidized whole hull-less barley flour samples. With the microfludization process applied, there was

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an 82.2% decrease in the amount of phytic acid in the Özen variety and a 78.6% decrease in the Yalın variety. Microfludization process increased β-glucan content by 2.35% in Özen variety and 8.41% in Yalın variety, total dietary fiber content by 6.1% in Özen variety and 6.9% in Yalın variety, total phenolic matter content by 23% in Özen variety and 19.6% in Yalın variety, and total antioxidant activity value by 2.7% in Özen variety and 1.8% in Yalın variety.

Keywords: Hull-less barley, microfluidization, phytic acid, β-glucan, dietary fiber, phenolic compounds

(OP-06)

The Quick Assessment for Mechanical Damage in Soybean Seed

Papassorn Wattanakulpakin[1], Kantima Thongsri[1], Paveena Ruk-Ak[1]

[1]Phitsanulok Seed Research and Development Center,Seed Research and Development Division, Department of Agriculture, Thailand

Abstract: Mechanical damage plays an important role in seed quality. According to high protein and oil components, soybean seed is easily fragile during seed harvesting and processing resulted in seed yield and quality reduction. The investigation of seed mechanical damage has been monitoring along with the seed production to ensure the sufficient seed quality before distribution. Indoxyl acetate (IDA) test is recommended method for mechanical soybean seed damage detection, but this test is complicated, high costs and difficult to apply in field. Therefore, the quick assay to detect mechanical damage of soybean seed was carried out in this study. Fast green (FG), ferric chloride (FC) and sodium hypochlorite (SDH) methods were conducted in different soybean seed quality for 15 seed lots compared with the IDA. The germination, vigour indicated by accelerated ageing tests and mechanical damage determined by IDA were ranged between 71 – 90%, 46 – 86% and 1.5 – 16.0%, respectively. The average mechanical damage of 15 seed lots tested by IDA showed 7.9% that was significantly different with the FG (11.3%), FC (11.2%) and SDH (11.6%) methods determined by paired t-test. The correlation coefficient (r) and linear regression (R2) among mechanical damage methods were analysed. The significantly highest r and R2 between IDA and SDH was observed that showed 0.9515*** and 0.9054***, respectively. The mechanical damage detected by SDH was significantly higher than IDA, however, this method had the greatest relationship with IDA, easiest, lowest costs and feasible applying in field compared to other methods. Future study would develop SDH method to be more precise and practical for mechanical damage detection in soybean seeds either laboratory or field application.

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Figure 1

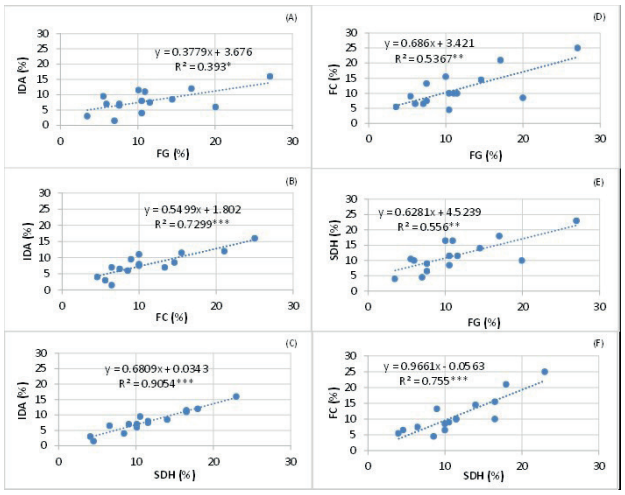

Figure 1 Linear regression (R2) among mechanical damage methods; (A) indoxyl acetate (IDA) &, fast green (FG), (B) IDA & ferric chloride (FC), (C) IDA and sodium hypochlorite (SDH), (D) FC & FG, (D) SDH & FG and (F) FC & SDH for 15 seed lots of soybean seeds cv. Chiangmai 60.

Table 1

See lots	Germination (%)	AA (%)	IDA (%)	FG (%)	FC (%)	SDH (%)
1	90	86	9.5	5.5	9.0	10.5
2	90	80	1.5	7.0	6.5	4.5
3	87	57	7.0	7.5	13.3	9.0
4	86	80	8.0	10.5	10.0	11.5
5	84	76	3.0	3.5	5.5	4.0
6	83	50	6.5	7.5	7.5	6.5
7	82	75	11.0	11.0	10.0	16.5
8	81	70	7.5	11.5	10.0	11.5
9	81	62	6.0	20.0	8.5	10.0
10	80	61	4.0	10.5	4.5	8.5
11	80	55	11.5	10.0	15.5	16.5
12	80	75	7.0	6.0	6.5	10.0
13	80	59	12.0	17.0	21.0	18.0
14	78	63	8.5	14.5	14.5	14.0
15	71	46	16.0	27.0	25.0	23.0
Mean	**82**	**66**	**7.9**	**11.3**	**11.2**	**11.6**

Table 1 Germination, accelerated ageing (AA) test and mechanical damage amout of soybean seeds determined by indoxyl acetate (IDA), fast green (FG), ferric chloride (FC) and sodium hypochlorite test (SDH) for 15 seed lots of soybean seeds cv. Chiangmai 60

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Table 2

Parameters	Correlation coefficient (r) 1/					
	Germination (%)	AA (%)	IDA (%)	FG (%)	FC (%)	SDH (%)
G (%)	1.000	0.6695**	-0.5874*	-0.7454*	-0.5874*	-0.6943**
AA (%)	.	1.000	-0.4159	-0.5747*	-0.5709*	-0.4283
IDA (%)	.	.	1.000	0.6269*	0.8543***	0.9515***
FG (%)	.	.	.	1.000	0.7326**	0.7457**
FC (%)	.	.	.	.	1.000	0.8689***
SDH (%)	.	.	.	.	.	1.000

Table 2 Correlation coefficient (r) analysis among germination (%), vigour (%) by AA-test and mechanical damage methods (%) determined by indoxyl acetate (IDA), fast green (FG), ferric chloride (FC) and sodium hypochlorite test (SDH) for 15 seed lots of soybean seeds cv. Chiangmai 60

Table 3

Comparisons	Cracking mean (%)	Stdv.	t value	df	p value	Sig.
Ind & FG	7.9 & 11.3	4.83	2.67	14	0.0182	*
Ind & Fer	7.9 & 11.2	3.26	3.83	14	0.0018	**
Ind & Sod	7.9 & 11.6	2.02	7.02	14	0.0000	***
FG & Fer	11.3 & 11.2	4.40	0.1026	14	0.9197	ns
FG & Sod	11.3 & 11.6	4.17	0.3093	14	0.7616	ns
Fer & Sod	11.2 & 11.6	2.88	0.6054	14	0.5546	ns

Table 3 The mean comparison among mechanical damage methods including indoxyl acetate (IDA), fast green (FG), ferric chloride (FC) and sodium hypochlorite test (SDH) by paired t-test for 15 seed lots of soybean seeds cv. Chiangmai 60

Keywords: soybean seed, mechanical damage, mechanical damage methods

(OP-07)
Effects of Wood Vinegar and Salt Stress on Germination and Seedling Growth in Field Crop Varieties

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[1]Variety Registration and Seed Certification Centre

Abstract: This study aimed to evaluate the effects of wood vinegar applications and different NaCl concentrations on the shoot length of various plant species. The experiment was conducted under controlled field conditions, where different dosages of wood vinegar (0.02% and 0.002%) and NaCl (200 mM and 300 mM) were applied to Özkaynak (pea), Aydanhanım (barley), and Başaran (sunflower) cultivars. The findings showed that shoot length differed significantly among the treatment groups, suggesting that wood vinegar could help reduce the negative impact of salt stress on seedling growth. In particular, the seeds treated with wood vinegar displayed better shoot growth compared to those exposed only to salt, indicating that wood vinegar may support salt tolerance in crops. This study not only shows the benefits of using natural substances like wood vinegar to manage salt stress but also provides valuable insights for sustainable farming practices that could help increase crop yields in areas affected by high salinity.

Keywords: Helianthus annuus L., Hordeum vulgare L., Pisum sativum spp. arvense L., wood vinegar, salt stress, seed germination

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(OP-08)
Sea-water Vulnerability Damages the Photosynthetic Apparatus of Maize (Zea mays) Seedlings

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Abstract: AbstractWorldwide soil salinity adversely affects crop production. The affected soil's salinity level and electrical conductivity are almost close to seawater. Maize is a major cereal crop whose productivity is overwhelmed by abiotic stress, particularly salinity. This study aimed to understand the structural and functional integrity of the photosynthetic apparatus in maize seedlings exposed to seawater. Chlorophyll a fluorescence (OJIP) transients study reveals that both the photosystems (PSI and PSII) were major damage centers during high salinity that led to massive loss of quantum yield (δRo and ϕPo). In addition, the energy pipeline model (membrane-based) showed that increased inactive reaction centers led to disruption of electron transport rate in seawater-exposed seedlings as compared to control. Manganese supplement repaired the photosynthetic apparatus of maize seedlings. The optimal photosynthetic efficiency and electron flow under a range of cellular Mn concentration (3.15–3.51 µg Mn g−1 DM), that led to the best plant performance. OJIP transients could be used as a non-destructive method to monitor photosynthetic damage during salinity. The findings of this study would be useful in developing strategies to mitigate salinity stress with cellular Mn supplements for optimal growth and development of crops.

A spider plot of 22 O-J-I-P parameters for chlorophyll a fluorescence

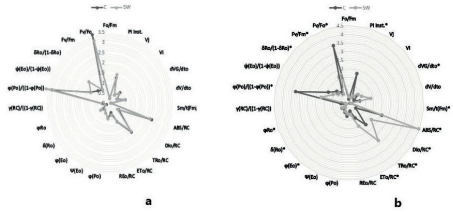

Fig. 2

A spider plot of 22 O-J-I-P parameters for chlorophyll a fluorescence in maize seedlings exposed with seawater (SW) after day one (a) and days seven (b) as compared to control (C). An asterisk shows a significant difference at $p < 0.05$ by multiple comparisons (Tukey's test).

Pipeline model of specific fluxes (membrane model) per reaction center (RC) in maize seedlings exposed with seawater

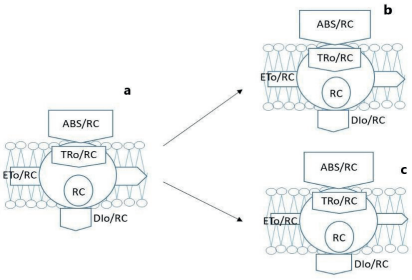

Fig. 3

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Pipeline model of specific fluxes (membrane model) per reaction center (RC) in maize seedlings exposed with seawater after day one (b) and days seven (c) as compared to control (a) . ABS/RC: absorption flux per RC, TRo/RC: trapped energy flux per RC (t=0), ETo/RC: electron transport flux per RC (t=0) and DIo/RC dissipated energy flux per RC (t=0). Each relative values represented by the size of proper parameters in arrow

Keywords: chlorophyll fluorescence, maize, photosynthetic apparatus, Electron transport, salinity, seedlings

(OP-09)
Marker-assisted Selection of Soybean for Photoperiodic Sensitivity Genes

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Abstract: Soybean (Glycine max (L.) Merr.) is the world's leading oilseed crop. Soybeans are a rich source of vegetable oil and protein. World soybean production has been increasing annually, totaling 129 million hectares in 2021 (http://www.fao.org/faostat). Soybean is a short-day crop with high photoperiod sensitivity. However, it has become widespread due to breeding advances based on genetics of flowering, ripeness and sensitivity to photoperiod. In Kazakhstan, soybean is cultivated mainly on irrigated fields in southeastern Kazakhstan. Varieties of three maturity groups MG 0, MG00, MG000 are cultivated there. The Kazakh Research Institute of Agriculture and Plant Industry is the only breeding center for soybean breeding and seed production in Kazakhstan. Currently, the urgent task for the republic is the promotion of soybean to the vast northern, western and eastern regions. The purpose of this research is to create early maturing and photoperiodically neutral soybean lines and varieties. In this regard, the center is conducting research on genotyping soybean collections for photoperiod insensitivity genes (e1, e3, e4, e7) and crossing carriers of valuable genes with local soybean varieties. Using SSR and CAPS-markers, identification of 6 hybrid populations of soybean generation F2-F3 (1200 individual plants) by genes e1-as/e1-fs/e1-nl, e3-fs/e3-ns, e4, e7 was carried out. The selected lines (F4-F6) with recessive genes were tested in conditions of Kostanay region at 53ON of northern latitude and in conditions of Voronezh region of the Russian Federation at 51ON of northern latitude. The results of the test allowed to select the Early Maturing, photoperiodically neutral breeding lines that matured in 90-110 days. The research was conducted under the 267 budget program of the Ministry of Agriculture of the Republic of Kazakhstan, IRNBR22885857.

Keywords: Photoperiodic neutrality, CAPS - markers, Marker-assisted selection, Early Maturing, Genes

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(OP-10)
Pepper Varieties in Türkiye and Molecular Markers Used in Virus Resistance

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Abstract: Pepper (Capsicum annum L.), a vegetable of the Solanaceae family, ranks 7th in the world in terms of vegetable production and 3rd in Türkiye. Although the origin of pepper is South America, Türkiye is one of the centers of diversity in terms of consumed pepper varieties and types. Among the peppers produced; capia, Charleston, stuffed, pointed, block, jalapeno, Chile California Wonder, ornamental and local peppers stand out. In recent years, breeding studies especially related to pepper have increased. According to Variety Registration and Seed Certification Center data, there are 712 registered pepper varieties in our country in 2024. Although the first varieties developed were open-pollinated varieties, hybrid varieties have been offered to the market since the 1990s. Today, the most important features released in pepper varieties are yield and quality, as well as resistance to diseases and pests, which are biotic stress factors. Resistance genes showing monogenic inheritance for diseases and pests have been reported. Resistant varieties are developed with the use of these genes in breeding. Marker-based selection (MAS) method is used intensively in breeding studies. With the MAS method, the status of genes providing resistance in the plant can be determined independently of environmental conditions. Virus resistance is an important parameter in pepper breeding. Important genes used in breeding are TSWV (Tomato spotted wilt virus) resistance gene Tsw and L4 gene is one of the Tobamovirus resistance genes controlled by 5 alleles. L4 gene is required for resistance against pathotypes of TMV, ToMV, BePMV, TMGMV and PMMV viruses. In studies conducted at AARI, breeding lines containing Tsw and L4 genes were developed in different fruit types.

Keywords: MAS, alleles, gene, fruit, type

(OP-11)
Genotype-Environment Interaction Analysis of Advanced-Stage Barley Breeding Lines (Hordeum vulgare L.) under Diverse Rain-fed Conditions

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Abstract: This study evaluated the performance of 18 advanced-stage barley lines and six commercial varieties across five diverse environments using a randomized complete block design with four replicates. The primary aim was to assess the stability and adaptability of these lines for grain yield. The barley lines, consisting of advanced-stage barley lines and checks, were conducted in different environmental conditions, ranging from optimal to stress-prone environments,

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to identify high-yielding and stable genotypes. Genotypic performance was analyzed using general linear models, considering the genotype-by-environment (G×E) interaction and the main effects of genotypes and environments. The overall average yield of the barley genotypes across all environments was around 454 kg/da. Sayım-40, Burakbey, Larende, Line-3, and Line-18 had high grain yield potential in varying conditions. In the combined analysis results, the grain yield exhibited a coefficient of variation (CV) of 16%. The genotype-by-environment (G×E) interactions were highly significant ($p < 0.001$), indicating the existence of a notable interaction between genotypes and environmental factors. These findings highlight the potential of the advanced-stage barley lines in breeding programs aimed at enhancing barley's resilience to environmental variability. This research contributes to the ongoing efforts to improve barley seed productivity and sustainability, particularly in the face of climate change and fluctuating growing conditions.

Keywords: Hordeum vulgare L., genotype-by-environment, high-yielding, multi-environment

(OP-12)
99 Years of Wheat Breeding in Türkiye and the Impact of Regulations in Variety Development

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Abstract: The main objectives of this study were to evaluate 99 years of wheat breeding in Türkiye, compile historical list of released wheat varieties, assess the impact of regulations on wheat research and variety development, and make comparisons with other countries in terms of variety development. Wheat breeding began in 1925, shortly after the founding of the Republic of Türkiye, with the first variety released in 1928. Since then, including 2024, 771 wheat varieties have been developed. However, only 583 of these are currently listed in the annually published National Variety List. Out of the 771 varieties, 605 are bread wheat, 113 are durum wheat, 3 are Tr. monococcum, 3 are Tr. dicoccum, 1 is Tr. turgidum, and 1 is Tr. spelta variety. Given Türkiye 's diverse growing conditions, spring, winter, and facultative wheat varieties are developed for respective areas. A total of 390 winter, 255 spring, and 196 facultative wheat varieties have been released up to date. The first regulation for wheat variety development in Türkiye was introduced in 1963. New regulations led to an increase in the release of wheat varieties and greater involvement of the private sector in breeding. Following the publication of the Plant Breeders' Rights in 2004 and the Seed Law in 2006, the private sector began releasing varieties at a much faster rate, surpassing the public sector in annual releases since 2011, except for 2015. In total, 403 varieties were released by the public sector, 345 by the private sector, and 23 by universities. The number of varieties released per one million hectares per year is significantly higher than in Iran, comparable to Hungary, but lower than in the UK.

Keywords: breeding, wheat, Türkiye, regulation, variety

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(OP-13)
Development Of Determinate Tomato Cultivars Using Speed Breeding And Marker Assisted Selection

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Abstract: Conventional breeding techniques are inherently time-consuming, requiring a significant investment of resources to develop parental lines, new varieties. To accelerate the process of plant breeding, speed breeding (SB) has been proposed as a potential solution. Its efficacy has been demonstrated in the context of certain plant species. The objective of this study was to test the feasibility of applying speed breeding coupled with marker-assisted backcrossing and embryo rescue to determinate tomato varieties. The photoperiod was extended to 22 hours of light and 2 hours of darkness, with an average temperature reduction of 8 degrees Celsius. Disease-resistant donor parents were crossed with susceptible recurrent parents (RP) to generate F1s, which were subsequently backcrossed to the RPs. The fruits, which immatured, were harvested and the embryos were rescued in a tissue culture laboratory. The seedlings derived from the embryos were subjected to molecular marker analysis to ascertain the presence of the trait of interest. The resistant plants were subsequently returned to the speed breeding greenhouse, where they were cultivated, backcrossed, selfed, and immature fruits were harvested for embryo rescue. This combined system demonstrated that 80-90 days was sufficient to advance the plants from seed to seed for determinate tomatoes. In this study, TSWV and F3 resistance were transferred to the parents of two determinate tomato varieties with commercially important potential in terms of yield and quality. These varieties also exhibit resistance to V, FF, N, P, Sm. This was achieved through the use of SB and MAS. The results indicated that the speed breeding technique, when coupled with marker-assisted backcross selection and embryo rescue, could facilitate the advancement of four generations of tomato in a single year.

Keywords: Speed breeding, marker-assisted backcrossing, gene pyramiding

(OP-14)
Effects On The Germination Of Festulolium Seeds By Treatments With A Magnetic Field

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Abstract: The fundamental infrastructure of contemporary technology (high-voltage power lines, mobile phones, base stations, etc.) generates magnetic fields of varying intensities. These magnetic fields represent a significant environmental factor influencing plant growth. The objective of this study was to ascertain the responses of Festulolium seeds to varying magnetic field intensities and durations. Magnetic field applications were conducted at the Physics Laboratory of Kırıkkale University, while germination studies were carried out at the Department of Field Crops, Faculty of Agriculture, Ankara University. Festulolium cv.Hostyn was used in the study. The research was conducted in 2024 in accordance with the completely randomized plots experimental design with four replications. The seeds were exposed to different magnetic field intensities (20, 40 and 80 mT) for three and five minutes. The mean germination time, germination rate, shoot length and root length of seeds of the Hostyn variety were analysed. It was determined that magnetic field applications had a statistically significant impact on the average germination time ($p<0.01$). It was found that seeds exposed to a magnetic field intensity of 40 mT for five minutes had a shorter germination time, with an average of 5.96 days. It was observed that magnetic fields did not cause significant differences in the other traits analysed. Although the difference between the treatments was not statistically significant, it was observed that magnetic field treatments caused an increase in seedling length. The lowest seedling height was obtained from the control group, while the highest seedling height was obtained from seeds treated with 80 mT for 5 min. These findings suggest that magnetic field application may reduce the germination time of Festulolium.

Keywords: Festulolium, Magnetic Field Effect, Seed Germination

(OP-15)
R&D Studies Of TAGEM (General Directorate Of Agricultural Research And Policy, MOAF) In Vegetable Seed Growing

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Abstract: Plant breeding programs are carried out by research institutes of General Directorate of Agricultural Research and Policy (TAGEM) for vegetable seed growing, in which new varieties and genetic materials resilient to biotic and abiotic stress conditions arising due to climate change are developed. R&D studies of TAGEM on vegetable breeding are aimed to improve both know-how of

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domestic seed companies on vegetable breeding and to support them in terms of plant genetic material. Marker technology and biotechnological methods such as mutation, dihaploidization, MAS, CRISPR-Cas9 etc. in seed breeding are applied in the studies carried out in R&D centers and institutes of TAGEM; thus making the rapid and accurate detection of plants in a short time, preventing diseases and pests, that cause yield reductions, increasing yield and quality in products, and reducing costs. 264 vegetable varieties have been developed and registered on behalf of TAGEM as a result of the breeding studies. The Project of Developing of Breeding Lines and Cultivars for Winter Vegetable Cultivation aims to improve domestic cultivars and to increase domestic seed usage rate of 1 % in winter vegetable seed cultivation in Türkiye to 30% in medium term and above 50% in long term with the cooperation of the private seed sector. For this purpose, the breeding period was shortened with molecular and biotechnological methods in carrot, onion, broccoli, red cabbage and lettuce species and thus 57 new cultivars and 1824 breeding/dihaploid lines (DH) have been developed between 2018-2023. Qualified lines and cultivars developed with breeding studies of vegetables at TAGEM are presented to the seed sector in order to meet genetic material needs of domestic vegetable seed growing of Türkiye.

Keywords: research & development, Vegetable breeding, vegetable seed growing

(OP-16)
Barley Breeding Program in TRNC

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Abstract: Barley (Hordeum vulgare L. subsp. Vulgare) is the most important crop grown under rainfed conditions in Cyprus Its contribution to the agricultural economy and to other economic sectors of the island is considerable.The type used is winter-sown spring barley and its main use is for livestock feed either as hay or grain (Hadjichristodoulou,1979;Kari,1995). Barley cultivated areas are affected by drought in different periods, and this has negative effects on barley production from year to year. In fact, in some years they cannot meet their seed needs. In 2013 Cyprus initiated efforts to develop new barley varieties. This task, under the aus- pices of the Agricultural Research Institute (TAE) of Repuplic of North Cyprus, was enhanced by initiatinga dynamic breeding programme in 2013. Under the weather conditions prevailing inMediterranean rainfed areas, both the amount and distribution of rainfall is unpredictable and selection of new lines is considerably affected by the significant genotype X environment interaction . The programme with long term studies carried out under the dryland conditions of Cyprus, developed the appro- priate methology and selection criteria forselecting stable genotypes with high perform- ance in agronomic characters under multiple environments. Initially, the barley

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breeding programme at the TAE placed more emphasis on developing high yielding cultivars, through the crossing programme and introduced materials, . through this the cultivars Beşparmak, Reşatbey were recorded. The program continues to find new productive and persistently resistant barley varieties.

Keywords: Barley, crossing, field crops, variety

(OP-17)
Electrical Conductivity Estimates of Normal Germination Percentages of Seed Lots in the Same Cultivar and Different Cultivars in Cabbages

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Abstract: This work was carried out to test whether electrical conductivity (EC) of solute leakage related to normal seedling germination percentages in cabbage seed lots. This was tested in eleven seed lots belonging to the same cultivar (Brassica oleracea var. Yalova-1) and nine seed lots from five different cultivars in cabbage. EC (µScm-1g-1) test was conducted with two replicates of 50 seeds in 40 ml deionised water at 20°C over 24 hours, and laboratory germination with 50 seeds x 3 replicates was conducted at 20°C over 10 days. EC values varied between 207 and 506 µScm-1g-1 within the cultivars, and between 180 and 735 µScm-1g-1 between the cultivars. Normal germination ranged between 45 and 86% in the same cultivar and 11 and 95% between the cultivars. EC and normal germination percentages were highly related (R2=0757, p<0.001) in seed lots of the same cultivar and seed lots belonging to different cultivars (R2=0.848, P<0.001). The results indicated that EC can be used for estimating normal seed germination percentages in cabbages, not only in seed lots in the same cultivar but also among the different cultivars.

Keywords: Cabbage, electrical conductivity, seed germination

(OP-18)
Investigation and Characterization of Grain Size Variation in Barley (Hordeum vulgare L.) Landraces Using Conventional and Image Processing Techniques

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Abstract: Barley (Hordeum vulgare L.) is the fourth most cultivated cereal globally, with 60-70% used for animal feed and 20-30% for the malt and brewing industries. Grain size is a critical factor for yield and market value, influenced by both genetic

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and environmental factors. This study aimed to identify grain characteristic differences among barley landraces stored in the Osman Tosun Gene Bank using conventional analysis methods and image processing techniques. The study included 51 two-row and six-row barley landraces (102 genotypes), alongside three two-row and three six-row control varieties. Grain analyses were conducted on samples obtained from two continuous field trials between 2021 and 2023. Grains were evaluated using sieve analysis, thousand-grain weight, and an image processing software, GrainScan, to determine grain area, perimeter, length, diameter, and color values. In the two-row control varieties, the percentage of plump grains (>2.5 mm) was 95%, with 11 genotypes showing similar sizes. In the six-row controls, the percentage of plump grains ranged from 63% to 81%, while 31 genotypes exceeded these values. Thousand-grain weight ranged from 46.15 to 64.60 g in two-row barley and 35.80 to 58.61 g in six-row barley. A strong correlation was found between plump grains (>2.8 mm) and high thousand-grain weight with grain diameter and area in two-row barley, and with grain area, perimeter, and length in six-row barley. In conclusion, there is significant variation in grain size among barley genotypes, and image processing techniques effectively detect these differences.

Keywords: Plump grains, Image analysis, Yield component, Thousand-grain weight, GrainScan

(OP-19)

Provincial and District Wise Mapping of Produced Wheats Quality in Farmer Fields of Iran

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Abstract: To evaluate the bread making quality status of Iranian produced wheats and also to construct quality maps for different areas wheats, 5278 samples, collected from different provinces of the country at the district scale during 3 crop seasons: 2009-2010, 2010-2011 and 2011-2012. Different quality traits: thousand kernel weight (TKW), Hectoliter weight (HW), Kernel protein content (PC), Zeleny sedimentation volume (ZSV), bread volume (BV), kernel moisture content (MC), grain hardiness (GH), flour water absorption rate (WA), wet gluten content (WG), gluten index (GI) and SDS sedimentation height (SDS) were measured. GIS software was used to construct quality maps with provincial and district wise demonstration. Obtained results for some of the traits are as follows. Country mean of HW was 78.26 kg which is considered as very heavy. Kokilloyeh and Boir Ahmad province showed the maximum of 80.52 kg as very heavy for this trait and the least amount was shown by Southern

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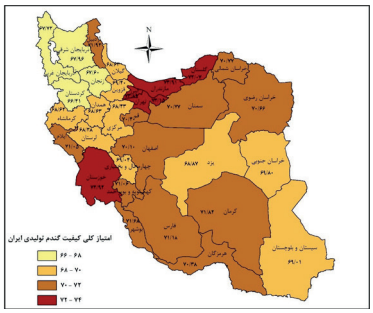
Khorasan (77.18 kg as medium). Country mean for PC was 11.58 (Medium class). The maximum rate for this trait was shown by Boushehr province (12.27) and the minimum amount belonged to Kordestan with 11.15 percent. For GH, country mean was 49.00. Boushehr province showed the maximum rate (53.82) and the lowest amount belonged to Kourdestan (44.15). Considering several traits, a regression model was applied on the data to obtain a quality score for each province and district. These quality maps are key dashboards for awareness of production administrators as well as breeders to enhance the quality of produced wheats as much as they can.

Total quality score of produced wheats



This image shows the quality score of different provinces of the country

Keywords: Wheat Quality, Farmer Fields Samples, Iranian Produced wheats, Quality Map

(OP-20)
Characterization of Native Olive Genotype in TRNC

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Abstract: The local olive type constitutes the vast majority of olive groves in the TRNC region. However, no study has been conducted on the olive type in question to date. Therefore, the first goal of the project was to identify the local olive type and it was studied according to the upov variety definition criteria. The findings obtained since the beginning of the project should be summarized by periods. The Characterization of the Local Olive Type (Phase I) has been completed and the local olive genotype identification information, morphological and physiological characteristics have been studied as 36 characters according to the UPOV rules. The material selection and seedling production of this study, which was completed in 2014, were made and an application was made to the Ankara Seed Registration and Certification Center in 2021 for the registration of the local olive genotype as a variety under the TRNC conditions, and studies were carried out for two years and four periods and the reports presented in the board held in April 2024 (No: 1662, 26.04. 2024) were accepted

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and it took its place in the Turkish National Variety List with the name ADA YERLİSİ.

Keywords: olive characterization cyprus

(OP-21)
Whole Genome Sequence Analysis Reveals Possible Resistant Genes In Tomato Mutant Lines

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Abstract: The bacterial wilt and canker disease caused by Clavibacter michiganensis subsp. michiganensis (Cmm) is seed transmitted especially spreading throughout all tomato (Solanum lycopersicum) grown places, the bacteria are resulting serious losses to both greenhouse and field tomato crops either killing whole plant or reducing tomato yields. A prominent control is Cmm-resistant cultivars for tomato production is a suitable way for sustainable and eco-friendly method. The mutant lines were generated by using 0.5% Ethylmethanesulfonate (EMS) chemical mutagen from susceptible NCEBR3 plant; M3-9 and M3-15 plants were determined as resistant against Cmm isolate 2 at M3 population previously. Individual mapping populations were constructed with M3-9 and M3-15 mutant line and a resistance locus was mapped at chromosome 5 of tomato. The resistance locus was linked with SL20210_883i SSR marker flanked by single nucleotide polymorphism markers. For understanding and cloning genetic polymorphisms, entire 5th chromosomes were sequenced to reveal Cmm-resistance locus using Illumina HiSeq. There were 20 mutations were investigated between M3-9 and M3-15 mutant plants, and 53 mutations among susceptible NCEBR3, M3-9 and M3-15 mutant plants. Preliminary results showed that there were 8 uncharacterized proteins and 11 serine/threonine-protein phosphatase and 2 acylsugar acyltransferase 3-like proteins found between 2 mutant lines. Further, next generation sequencing analyses will precisely exhibit which proteins are governing resistance to Cmm2 bacteria.

Keywords: Bacterial canker and wilting, Next Generation Sequencing, Resistance, Tomato

(OP-22)
The Position And Importance Of Konya Province's Seed Production In Türkiye

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[3]Alp Tarım Ltd.

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Abstract: Konya Region is one of the most important agricultural production region in our country with approximately 2 million hectares of agricultural land. Among with the largest producers of many products Konya, in the country's agriculture such as sugar beet, wheat, barley, corn, potatoes, sunflower, alfalfa, vetch, chickpeas, dry beans and safflower. The region is the most important centre in Türkiye for seed production, which is the main element of plant production as well as plant production. In Konya province, a total of 13,300 seed production declarations were given in 2023 and seed production was carried out in a total area of 1,100,000 decares.There are more than 200 seed producer companies and around 700 seed distributor dealers located in Konya. Almost a quarter of the seed production companies registered with TSÜAB in our country are located in Konya. It cannot be said that Konya, which has a great agricultural potential especially in terms of field crop seeds, has yet to fully utilize its suitable climate, soil and other production factors. Almost all of the seed production in the region is carried out by our farmers in farmer fields under control of the companies, through contracts made between the company and the farmer/grower. The education level of the farmers, their level of cultivation knowledge and their perspective on the subject closely affect the seed production and quality in the region. At Konya province, seed production of 470 different varieties belonging to 20 different species was carried out in 2023. Although the seed production amount of the region varies from year to year, it corresponds to 30-40% of the country's seed production.

Keywords: Konya, Türkiye, seed, seed production, potential

(OP-23)
Valorization Of Cattle Manure in Forage Legumes Seeds Production And Contribution For Theirs Disseminations in South Benin

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Abstract: Scarcity of forage legumes seed in quantity and their poor germination in Benin has led to it low adoption by farmers. Firstly, the purpose of this study was to evaluate the influence of cattle manure application rate and plant row spacing on the growth, phenology and seed production of Centosema pubescens (Benth) and Aeschynomene histrix Poir. Secondly, seed germination was evaluated using eight different pre-planting treatments including seeds defecated by cattle. The experiment was a split plot design where plant row spacing (40×40, 80×80 and 120 cm ×120 cm for C. pubescens and 20, 40, 60 and 80 cm for A. histrix) represented the main-plot, while fertilizer (40 kg P2O5 .ha-1, dry cattle manure rates of 0, 4, 8, 12 and 16 t.ha-1) was the sub-plot with three replicates and repeated in three cropping seasons. Plant height, day of 50% flowering were assessed from selected plants on weekly basis starting from 4 week after sowing, seed yield at maturity. For C. pubescens, plant spacing of 80 cm × 80 cm and 12 t.ha-1 cattle manure produced in average the highest seed yield (245.2 kg.ha-1) while 40 cm × 40 cm and control without fertilizer produced the lowest (66.5 kg.ha-1). For A. histrix the highest seed yield (467.3 kg.ha-1) was observed from a combination of 40 cm row spacing

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with application of 12 t.ha-1 dry cattle manure. A suitable combination of plant spacing and cattle manure can significantly increase forage legumes seed production. Hot water scarification 80°c at 2 minutes may be more beneficial than cattle digestion and can be recommended to farmers to break the dormancy of C. pubescens and A. histrix seeds.

Treatments					
Treatments	Germinable seeds(%)	Hard seeds (%)	Rotten seeds (%)	Mean germination time (day)	Germination speed (seed/day)
Control	26.00e	54.00a	20.00d	5.12a	1.19d
Sandpaper	96.00a	0.00c	4.00e	3.24b	6.26ab
2 min	86.00b	8.60b	5.40e	3.03b	8.32a
4 min	74.00c	9.80b	16.20de	3.80ab	4.90bc
6 min	48.00d	10.00b	42.00c	4.14ab	3.07cd
8 min	32.00e	12.00b	56.00b	3.99ab	2.03d
10 min	24.00e	8.00b	68.00a	3.97ab	1.54d
Overall mean	55.14	14.62	30.22	3.90	3.90

Characteristics of seeds germination for the various other pre-planting seed treatments

Effect of plant density, cow manure and phosphor fertilizer on seed yield (Kg/ha) of Centrosema pubescens on ferralitic soils of Benin

Fertilizer	Row spacing			Mean
	40×40 cm	80×80 cm	120×120 cm	
2014				
Control	95.0αcC*	150.0βdA	121.0αbB	122.0
4 tons/ha	98.4βcC	151.1βcdA	128.5βbB	125.3
8 tons/ha	145.0γbC	187.7βbcA	164.8βaB	165.8
12 tons/ha	147.9βabC	201.7γabA	166.0βaB	172.6
16 tons/ha	128.0βbC	170.0βcA	157.3βaB	151.8
40 kg/ha P2O5	168.8αaC	216.3αaA	172.3βaB	185.9
Mean	130.5	179.4	151.6	153.8
2015				
Control	64.6βcC	167.5αβdA	145.0αdB	125.5
4 tons/ha	160.0αbC	196.3αcA	173.8αcB	176.7
8 tons/ha	172.6αbC	223.8αbA	200.0αbB	198.8
12 tons/ha	197.6αaC	254.0βaA	233.5αaB	228.3
16 tons/ha	173.3αbC	221.6αbA	200.7αbB	198.5
40 kg/ha P2O5	176.0αbC	213.8αbcA	197.9αbB	195.9
Mean	157.3	212.8	191.8	187.3
2016				
Control	39.8γdC	170.0αdA	150.1αdB	119.7
4 tons/ha	156.0αcC	195.0αcA	179.6αcB	176.9
8 tons/ha	175.6ααbC	228.0αbA	198.9αbB	200.8
12 tons/ha	200.0αaC	280.0αaA	229.9αaB	236.9
16 tons/ha	169.0bC	227.7αbA	210.7αabB	202.5
40 kg/ha P2O5	172.0αbC	225.9αbA	192.9αbB	196.9
Mean	151.9	221.2	193.7	189.0
3-year mean	146.6	204.5	179.0	176.7

Effect of plant density, cow manure and phosphor fertilizer on seed yield (Kg/ha) of Centrosema pubescens on ferralitic soils of Benin

Effect of plant density, cattle manure and phosphore fertilizer application, on seed yield (kg.ha-1) of Aeschynomene histrix on ferralitic soils of Benin.

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Fertilizer	Row spacing				Mean
	20 cm	40 cm	60 cm	80 cm	
2016					
FTSP	357bBβ	414.4 cbAβ	299.8cCβ	203.9bcDβ	318.8
F0	233.4eBα	206.7 eAβ	211eAα	144.5eCβ	198.9
F4	300.7dBβ	361.1 dAβ	274.9dCα	170.3dDβ	276.7
F8	343.8 cBβ	404.4 cAβ	298.1cCβ	195.7cDβ	310.5
F12	365.8 aBβ	426.6 bAγ	314.8bCγ	213.2bDβ	330.1
F16	375.5aBα	455.9 aAα	353.8aCα	231.9aDα	354.3
Mean	329.3	378.2	292.1	193.2	298.20
2017					
FTSP	372cBα	429.4cAα	314.8cCα	218.9cDα	333.8
F0	229.0eAα	235.3fAα	204.0eBα	180.6dCα	212.2
F4	310.7dBαβ	373.6eAαβ	284.9dCα	185.3dBα	288.6
F8	362.5cBα	419.4dAα	313.1cCα	210.7cDα	326.4
F12	404.3aBα	480.9aAβ	383.8aCα	256.9aDα	381.5
F16	382bBα	446.6bAα	334.8bCβ	233.2bDα	349.1
Mean	343.4	397.5	305.9	214.3	315.27
2018					
FTSP	365.5cBα	422.9bAαβ	308.3cCαβ	212.4cDβα	327.3
F0	222.5eAα	228.8eAα	197.5eBα	174.1dCα	205.7
F4	304.2dBβ	367.1dAβ	278.4dCα	178.8dDαβ	282.1
F8	356.0cBα	412.9cAβα	306.6cCαβ	204.2cDαβ	319.9
F12	397.8aBα	494.4aAα	377.3aCα	250.4aDα	380.0
F16	375.5bBα	425.1bAβ	328.3bCβ	226.7bDβ	338.9
Mean	336.9	391.8	299.4	207.8	308.98
3-year mean	336.6	389.2	299.1	205.1	307.48

Anova revealed statistically significant differences (P<0.05) in seed production between years, row spacing and fertilizer on ferralitic soil in Southern Benin. The average seed yield over three years was 307.48 kg.ha-1

Keywords: Row spacing, fertilizer, seeds, forage legumes, germination

(OP-24)

Problems Encountered By Seed Companies in Türkiye in Producing Seeds in Accordance With The Standards And Their Solutions.

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Abstract: Certified seed is one of the main inputs required for sufficient plant production.If the seed subject to field control passes the control, then, a sample is taken from it by the procedure, and the sample is sent to the authorized certification institution for laboratory control. As a result of laboratory analyses, a report stating that the seed cannot be used is issued for seeds represented by samples that do not meet seed standards. Republic of Türkiye Ministry of Agriculture and Forestry Variety Registration and Seed Certificaion Center (TTSM), which is the reference laboratory, is authorized for objections regarding laboratory analyses. The certificate or report issued because of the laboratory analyses conducted by TTSM is final. Seed sample lots for which a report has been prepared stating that they cannot be used as seeds are not accepted for seed purposes and cannot be marketed. Between 2018 and 2023, companies objected to TTSM (which has a reference laboratory) to re-analyze 1740 seed samples with a report stating that they could not be used for seed purposes, but they received the final report stating that they could not be used as seed. The reasons in the final reports why the

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rejected seeds did not meet the standards were that they did not meet the purity standards with % 43 and germination standards with % 57. According to the data obtained, the reasons why the seeds produced do not meet the standards are; Field cleaning and field control should be done carefully,Seed preparation stage (cleaning process) should be done properly,Seeds should be stored under suitable conditions,Samples should be taken properly.

Keywords: certification, seed, germination, analysis, report, purity

(OP-25)
Line Tester Analysis of Some Inbred Lines Developed By East Mediterranean Agricultural Research Institute

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Abstract: Corn (Zea mays L.) is among the most demanded and fastest growing cereals in the world in terms of annual volume. Foreign companies are highly dominant in our country's seed industry. Therefore, there is a need to develop new corn varieties with high yield and superior characteristics. This study was conducted using 46 female lines and 2 male lines developed by the Eastern Mediterranean Agricultural Research Institute, according to the Line x Tester mating method, it was conducted to determine the variance and effects of the general and special combination abilities of the lines, heterosis values and to define promising hybrid combinations. Parent lines and 92 hybrid combinations obtained from them were established according to 12x12 Alpha Lattice design with 3 replications for 3 years. Days to tasseling, plant height, ear height, , ear length, ear diameter, row numbers per ear and yield characteristics were examined. The yield averages covering 3 years were between 285.21 kg/da and 942.34 kg/da for lines and testers; and between 1103.90 kg/da and 1899.13 kg/da for hybrids. When heterosis values were examined; it varied between %-67.96-281.65, %-78.63-367.60, %-50.95-227.30 for 3 years, respectively. According to the results obtained, it was determined that all the examined traits were under the influence of dominant genes. In conclusion, in terms of yield traits, L27, L30 female lines and T2 male lines and L27xT1, L30xT2, L42xT1 and L44xT2 hybrid combinations was determined.

Evaluation of hybrids

views from hybridization

Keywords: Corn, Line x Tester, inbred lines, combination ability, heterosis.

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(OP-26)
Regulation On The Certification And Marketing Of Oil, Fiber, Medicinal And Aromatic Plant Seeds And Evaluation Of The Problems in The Case Of Sunflower

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Abstract: AbstractSunflower seed production in Türkiye is based on certain criteria and is registered within the scope of technical instructions. During production, the personnel from the Ministry of AgricultureandForestrytogetherwiththecompanies carry out the inspections and are subjected to certification procedures at the Certification Centers under the Ministry. National and international criteria are defined and companies follow these criteria in their production and marketing. Diseases, pests and the other criteria encountered during the production phase are discussed in a general perspective and analyzed as sufficient or improvable.

Keywords: Sunflower, Seed, Marketing, Certification

(OP-27)
Effect Of Seed Treatments On Breaking Dormancy in Different Minor Fruit Species

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Abstract: The study was carried out in HMKU Laboratory and greenhouse.In the study, seeds of M.communis, H.undatus and A.unedo species were used.In the seeds where non-germination was detected after the initial germination,differentseedtreatmentswereappliedbefore sowing to break the dormancy.After the Stratification, Stratification+GA3 and Stratification+Scrafication treatments, all seeds were placed in peat:perlite(3:1) growth medium and their emergence was observed. In addition, after the emergence test, seedling length, stem diameter and upper part length of seedling were taken for species.After the emergence test, the highest emergence rate in M.communis was obtained from stratification 40%, in H.undatus from stratification 40% and in A.unedo from stratification+scrafication 50%. When the mean emergence time were examined, it was observed that the earliest groups were obtained from stratification+GA3 treatments with 12.8 days in M.communis, 14.4 days in H.undatus and 15.4 days in A.unedo.After seedling measurements, the highest seedling length was 39.5mm, the highest stem diameter with 0.91mm, the maximum number of leaves was 10 and the highest upper part length of seedling was 29mm from stratification treatments. For H.undatus, it was observed that the highest results were obtained from the folding application with a seedling length of 27cm, from the Stratification+GA3 treatment with a stem diameter of 3.64mm and from the stratification treatment with a value of 19.9mm.For A.unedo, the best values were obtained from the stratification+GA3 treatment with a seedling length of 27.3mm, stem diameter of 0.83mm and the number of leaves 7, while the highest upper part development was determined as 12.5mm as a result of the stratification treatment.Due to, it was determined that it was possible to break the dormancy on these species with the stratification and stratification+GA3 treatments.

Keywords: Myrtle, Dragon Fruit, Koca Yemiş, emergence, quality.

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(OP-28)
Effects Of Nanopriming Treatments On Germination Performance Of Tomato And Snake Melon Seeds

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Abstract: Alternative treatments for these treatments in agricultural production are the subject of numerous studies today, as the importance of sustainable and good agricultural practices grows daily. When it comes to nanotechnology treatments, one of these studies stands out.Priming treatments in improving seed quality, increase germination and emergence rates, provide earliness in germination and emergence times and improve seedling quality, determining the effectiveness of nanopriming treatments is especially important for our country's agriculture, sustainable and good agricultural practices. In this context, this study aimed to determine the effects of tomato, which is the most cultivated species in our country and snake melon, which is also an important species for the vegetable sector, on germination rate, germination time, germination speed index and coefficient of velocity of germination as a result of nanopriming treatments. In the production of nanomaterials, 6 different nanomaterials were produced by adding zinc and 10% by volume Tagates erecta,Ferula elaeochytris,Potassium,Magnesium and Calcium and these materials were applied to the seeds at doses of 0.005, 0.01 mg/L-1. After the treatments, the highest germination rate in tomato was from Fer+ZnO 0.005 treatments (90%), and the earliest group with a germination time of 2.57 days was pure ZnO 0.005 treatments. In the snake melon species, pure ZnO 0.005 and Fer+ZnO 0.005 treatments were the groups that gave the best results in terms of germination rate, while Fer+ZnO 0.01 treatments attract the attention, as the earliest group with 1.53 days. When all the results were examined, it was observed that nanopriming treatments were especially earlier compared to the control group and that the content used in the production of the applied nanomaterial had different effects on the germination.

Keywords: solanum lycopersicum, Cucumis melo var. flexuousus, nanopriming, zinc

(OP-29)
{Alcea rosea} L. Treatments to Improve Emergence Performance in Seeds of the Species

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Abstract: This research shows that different seed treatments can be used as medicinal and ornamental plants. Alcea rosea L. was carried out to improve the emergence performance of seeds belonging to three different genotypes of species. The effects of control (U0), single-piercing with front and back (U1), single-piercing with back and front+GA_3 (U2), single-piercing with back and front+Ferula (U3), single-piercing with back and front+water (U4), and single-piercing with back and front+KNO_3 (U5) treatments on the emergence test were investigated in this

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study. First of all, the initial germination rates of the seed lots used were determined. Then, in the emergence study, emergence rate (%), emergence time (days), emergence speed index, coefficient of velocity of emergence and emergence index characteristics were determined. After the initial germination test, Genotype 1 13% germination rate and Genotype 2 had a 13% germination rate. It was found to have a 10% germination rate and Genotype 3 had a 49% germination rate. When the output parameters are examined, the highest emergence rate value from the Genotype 1 U3 treatment (77%), the shortest emergence time from the Genotype 3 U4 treatment (4.47 days), the highest emergence rate from the Genotype 3 U4 treatment (3.26), the best emergence rate from the Genotype 3 U4 treatment. Coefficient of velocity of emergence (22.6), the highest emergence index value (3177.49) was obtained from Genotype 1 U8 treatment. When the results for all genotypes were examined separately, it was observed that U1, U4 and U2 treatments significantly improved the emergence parameters. As a result of seed treatments, Alcea rosea L. it has been determined that seeds have physicomorphological dormancy.

Keywords: Piercing, GA_3, Hollyhock, KNO_3, Ferula, Dormancy

(OP-30)
Effects of Long-Term Flooding on Pollen Viability and Germination Ability in Tomato (Solanum lycopersicum L.)

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Abstract: Tomato is the most produced vegetable species all over the world and in Türkiye. Biotic and abiotic stress factors are most common factors that limiting production in tomato cultivation. The long therm flood is one of the abiotic stress factor and it's frequency is incteasing in recent years due to global warming and climate changes. Agriculture is one of the sectors most affected by this stress condition. Long-term floods, which cause yield losses and damages in many fruit and vegetable species due to excessive rainfall or poor drainage, also cause quality and yield losses in tomatoes. Our study was conducted to determine the performance of 299 pure tomato lines resistant/tolerant to some diseases and pests against long-term floods. In this context, the pots of tomato plants that reached the flowering and fruiting period were placed in larger plastic pots. They were exposed to flooding for different periods (0, 4, 8 and 12 days) by irrigating with excessive amounts of tap water. Pollen viability and pollen germination ability were examined as generative development parameters. According to the study results, it was observed that the average pollen viability decreased with the increase in the flooding duration. However, these decreases differed depending on the genotypes. It was observed that the response of pollen germination ability to long-term flooding applications varied depending on the genotype.

Keywords: tomato, Long-term floods, Pollen viability, Pollen germination

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(OP-31)
Fruit And Seed Characteristics of Turkish Asparagus

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Abstract: Fruit And Seed Characterıstıcs of Turkısh AsparagusŞİMŞEK M., DUMAN İ., Agricultural Engineer, Atatürk Horticulture Central Research Institute Yalova/TÜRKİYE - PhD Student, Department of Horticulture, Graduate School of Natural and Applied Sciences, Ege University,İzmir/TÜRKİYE ORCİD:0000000180376101 2 Prof. Dr. Department of Horticulture, Faculty of Agriculture, Ege University,İzmir/TÜRKİYE ORCİD:0000000300817208Correspondence: mehmet-simsek@tarimorman.gov.trAbstractAsparagus is a versatile plant used for vegetable, ornamental and medicinal purposes. 10 species have been identified in Türkiye, 3 of which are endemic. These; Asparagus officinalis L. (Garden Asparagus), Asparagus acutifolius L., Asparagus aphyllus L., Asparagus verticillatus L., Asparagus lycicus P.H.Davis (Endemic), Asparagus coodei P.H.Davis (Endemic), Asparagus lycaonicus P.H.Davis (Endemic), Asparagus persicus Baker, Asparagus palaestinus Baker, Asparagus tenuifolius Lam. types. Asparagus studies have not been carried out sufficiently in Türkiye. In this study, fruit and seed characteristics of these species are given. Germination and emergence characteristics of some species were studied. The species were collected by Yalova Atatürk Horticulture Central Research Institute within the scope of the project and studies on them are continuing.Keywords: Asparagus, seed, fruit, coodei, lycaonicus, germination

Keywords: Asparagus, seed, fruit, coodei, lycaonicus, germination

(OP-32)
Cold Plasma Treatments Alleviate Peg-Simulated Drought Stress On Germination Of Lettuce Seeds

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Abstract: The inhibitory effect of drought stress on seed germination is one of the important problems encountered in production. Therefore, in recent years, new non-chemical techniques have been emphasized in order to provide resistance to abiotic and biotic stress factors in seed germination in seed germination. One of these is the application of cold plasma. In this study, the effect of cold plasma technique on germination of lettuce seeds under drought stress was investigated. In drought conditions with PEG 6000, cold plasma (0, 15, 300 and 600sec)

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application was examined on parameters such as germination rate (GR), mean germination time (MGT), mean daily germination (MDG), peak value (PV), germination value (GV) and germination rate index (GRI). Drought stress had a negative effect on lettuce seed germination, but this negative effect was alleviated by cold plasma application. The effect on the parameters examined varied depending on the plasma application time. With plasma application, there was an increase in the germination of lettuce seeds under stress conditions compared to the control. In this study, which was conducted as a preliminary study, it is thought that the cold plasma technique may be effective in increasing tolerance under stress conditions.

Keywords: plasma, germination, lettuce, water stress

(OP-33)
Usıng Genomıcs Tools For Improvement Of Silage Hybrid Corn Varieties By Cooperation Of Public And Private Sector

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Abstract: The success of maize breeding programs depends on the diversity of germplasm included in the breeding program and the identification of this diversity. Genomic analysis on parental lines has become a very effective method in reducing the number of hybrid combinations to reasonable numbers in hybrid breeding programs. In silage hybrid breeding, grain yield heterosis is very important as well as biomass. Therefore, knowing the degree of relatedness of the lines owned by the Eastern Mediterranean Agricultural Research Institute (EMARI) and commercial companies (Polen, TAREKS, Biotek and Zeagen) can make the breeding program more effective. In this study, parental lines with defined agronomic properties and relatedness degrees according to genomic analysis were used to obtain hybrid maize genotypes. In the field trials were conducted in 2023 with 220 genotypes and 6 commercial varieties as controls. The silage yields yield per decare showed a high variation and varied between 4651 kg/da and 10435 kg/da. The general average value of 225 genotypes was found as 7852.8 kg/da. Quality parameters for silage were varied signicantly between the genotypes. After evaluation of yield and quality parameters, 64 genotypes were selected according their yield and quality performance for second year trials. In second year (2024), the trial were conduted with 62 genotypes and 7 comercial varieties as a four set.

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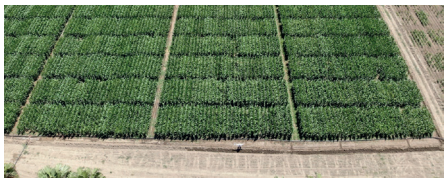
The results of the trials in different location showed that 9 genotypes were selectable as promising hybrids. The outcome of this study showed that using genomic tools in corn breeding is effective for management of the germplasm to produce new maize hybrids.

hybrid silage trials



alpha latice trials

silage maturity time

harvesting

Keywords: maize, genomics, inbredlines, silage hybrid, digestion

(OP-34)
Effects Of Biopriming With Pgpr Bacterias On The Viability Of Eggplant Seeds At Different Physiologıcal Maturity

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Abstract: Biopriming, which is one of the seed priming treatment, is an easily applicable, economical and effective method, as well as having the potential to contribute to the reduction of chemical inputs, shows that it is an important alternative to achieve sustainable goals in agriculture. The aim of this study was to test a biological approach to improve the quality of seed lots of Kemer 27 eggplant cultivar at 3 different physiological maturities against chemical applications used in the seed sector. For this purpose, biopriming was performed with three different Bacillus sp. isolates. Abnormal and total germination rate (%), mean germination and emergence times (days), root length (cm), hypocotyl length (cm), seedling wet and dry weight (g), root length (cm), hypocotyl length (cm), seedling wet and dry weight (g) were determined to compare the effects of biopriming on seed germination (4x25 replicates/seed, 25 OC, 14 days) and emergence (4x25 replicates/seed, 25 OC, 21 days) performances. It was observed

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that the rate of germination and emergence as a result of biopriming treatments provided better emergence and germination compared to the control group, and at the same time reduced the percentage of abnormal germination in general. When compared with the control group for 3 harvest maturities, it was determined that B. velezensis was the bacteria that decreased the rate of abnormal germination the most, while the bacteria that increased the percentage of total germination the most depending on the harvest maturity in the total germination parameter showed differences from each other. In terms of the mean germination time parameter, bacterial strain B. amyloliquefaciens had a positive effect on seed lots regardless of harvest maturity.

Keywords: Bacillus spp., Biopriming, Eggplant, PGPR, Seed vigor

(OP-35)
Effects Of Temperature And Potassium Nitrate Treatments On Seedling Emergence Performance in Passıon Fruit Species

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Abstract: Determining the effects of potassium nitrate treatment and various temperature treatments(25–32°C) on the seedling emergence performance of the studied passion fruit species was the goal.KNO3 treated and untreated seeds of the 3 species taken into test were sown in peat perlite mixture(3:1) media at 25 and 32°C.KNO3 treatment was done by keeping the seeds in 3% KNO3 solution at 25°C for 48h.Seed measurements were taken to determine the morphological differences of the seeds belonging to the species and genotypes used, and SEM microscope images were used to determine the differences in their topographic structures. After the emergence test, emergence rate (%), emergence time (days) values were taken, and after the seedlings were placed in the pots, the surviving seedling rate (%), seedling height (cm), stem diameter (mm), real leaf number (number), chlorophyll and photosynthesis contents were determined.After the seedling emergence test conducted at 25°C, the highest emergence rate was determined as 68-76% (KNO3-Control) in seeds of the species P.edulis, while the highest emergence rate at 32°C was determined as 83% (KNO3) in P.edulis. In P.ligularis, which stands out as a less studied species in the experiment, the emergence rate was determined as 0-2% (KNO3 and control) at 25°C and 36-76% (KNO3 and control) at 32°C. Seedling emergence test conducted at 25°C, the lowest mean emergence time was obtained from the KNO3 treatment group in P.caerulea with 9.98 days, while the lowest mean emergence time at 32°C was obtained from the KNO3 treatment group with 20.27 days.As a result of the treatments, it was observed that the KNO3 treatment and emergence tests conducted at high temperature(32°C) increased the seedling emergence rate and seedling emergence quality in the species.

Keywords: Passiflora species, Seed treatments, Priming, KNO3.

ORAL PRESENTATIONS

(OP-36)
Developing A Dsrna-Based Biopreparate, "Nano Rugose", Against Tomato Brown Rugose Fruit Virus

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Abstract: Tomato brown rugose fruit virus (ToBRFV) is the most recently emerged seed-trasmitted tobamovirus becoming the most serious problems of tomato production. In this study a spray induced RNA interference-based biopreparate was developed as an alternative control strategy against ToBRFV. The ToBRFV genome sequences were compared to identify two conserved regions in different parts of ToBRFV genome. The selected regions were cloned and dsRNAs targeting these regions were synthesized by in vitro transcription. MgAl-layer double hydroxide (LDH) nanosheets with average size of 50 nm were chemically synthesized as the carrier of dsRNAs. The dsRNAs and the LDH nanosheets were mixed at to show dsRNA binding to LDH nanosheets and the capacity dsRNA loaded into LDH nanosheets. A mixture of ToBRFV dsRNA1 and/or dsRNA2 with the LDH nanosheets, was prepared and tested for stability, dsRNA uptake and effect on ToBRFV replication in a commercial tomato cultivar. To determine the effect of biopreparates to ToBRFV 5-10 seedlings of the tomato cultivar were first sprayed with LDH nanosheets with or without dsRNA, or water, then 2 hr, 1 d, 2 d, 4 d and 7 d after spraying seedlings were inoculated with ToBRFV. Finally, symptoms were observed on plants and leaf samples were collected 30 days post inoculation to determine virus load by RT-qPCR and ELISA. The RT-qPCR test revealed that virus RNA load was 100-fold lower in LDH-dsRNA treated plants than only LDH-treated control plants. Similarly, virus load was 50% lower in plants treated with LDH-dsRNA than only LDH-treated control plants in ELISA test. The results showed that biopreparate called "NaNO Rugose" significantly reduced virus symptoms and replication but unable to prevent ToBRFV the infection in tomato.

Keywords: Tomato, RNAi, ToBRFV, LDH, Nanoparticles, Biopreparate

(OP-37)
Comparative Assessment Of Wood Vinegar Types And Nacl-Induced Salinity Stress On Germination And Early Growth Performance in Popcorn (Zea Mays Var. Everta)

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Abstract: The objective of this study was to evaluate the effects of wood vinegar application on the germination and early seedling development of R606 popcorn (Zea mays var. everta) seeds under various salt stress conditions. Three NaCl concentrations (0, 200, and 300 mM) were used to simulate varying levels of salinity stress, and wood vinegar was applied at two concentrations (0.02% and 0.002%). A control treatment with no wood vinegar or NaCl was included for baseline comparison. Germination rate (%), germination duration (days), root length (cm), and shoot length (cm) were measured to assess the physiological response of seeds to each treatment. The findings showed that rising salinity has a negative impact on germination and seedling growth. In particular, higher NaCl concentrations (300 mM) significantly reduced germination rates and impaired seedling development. However, the application of wood vinegar, especially at a concentration of 0.02%, mitigated the adverse effects of salinity stress, resulting in higher germination percentages, longer root and shoot lengths, and improved overall seedling vigor. Among the treatments, the 0.02% wood vinegar concentration under non-saline conditions showed the highest germination rate, reaching up to 100%, although the same concentration under 200 mM NaCl stress maintained a high germination rate when compared to the control. These findings emphasize wood vinegar's potential as a natural biostimulant capable of reducing the deleterious effects of salt stress on seed germination and early growth. Wood vinegar, with its capacity to improve seed performance under difficult conditions, offers a promising, environmentally friendly solution for boosting crop resilience in salt-affected areas.

Keywords: Wood vinegar, salinity stress, Zea mays var. everta, seed germination, seedling vigor, abiotic stress

(OP-38)
Effect of Titanium Dioxide Nanoparticle Application on Seed and Different Growth Stages on Sunflower Yield and Yield Components

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Abstract: Nanoparticles have unique physio-chemical properties and in agriculture nanoparticles are active components in nano-fertilisers. Seed priming could be used to increase the efficiency of seed germination and seedling fidelity under optimal and unfavourable conditions. Several nanoparticles (NPs) such as Al2O3 NPs (Aluminium oxide), Ag NPs (Silver), TiO2 NPs (Titanium dioxide), CeO2 NPs (Cerium oxide), FeO NPs (Iron oxide), ZnO NPs (Zinc oxide), silicon NPs, and carbon nanotubes are used in seed germination and growth of several plant species and varieties. This experiment was conducted to investigate the impact of TiO2 nanoparticles on plant morphology when applied from leaves in different growth stages of sunflower and used

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as seed priming material. Before the start of the field experiment the seeds were soaked in 20 mg L^{-1} for 8 hours. The experiment was laid out in a randomised complete block design using five TiO2 treatments with three times replicated doses of 0 (control), 20 mg L^{-1} TiO2 treatments to seeds, and at different growth stages. Plant height reached its highest level with TiO2 treatments to seeds in both years. The maximum yield value observed in TiO2 treatments to seeds in the first year of the experiment. Results revealed that TiO2 application to seeds and at V-4 stage is the most effective stages on sunflower growth. Key words: Nanoparticles, Sunflower, Seed priming, Yield

Keywords: Nanoparticles, Sunflower, Seed priming, Yield

(OP-39)
Survey Of Protein, Amino Acids, And Lipid Profiles in Hempseed Using Ftir Spectroscopy

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Abstract: Studying the structures, amino acids, and lipid profiles of hempseed protein is crucial for understanding the nutritional value, functionality, and genetic diversity of Cannabis sativa L. They also inform targeted breeding programs aimed at enhancing desirable traits. Additionally, lipid profiles are essential for industrial uses such as biofuels and cosmetics. In contrast, certain amino acids and lipids offer significant health benefits, providing reassurance about the potential impact on human health. This study examines the biochemical and structural characteristics of 24 hempseed genotypes collected in the 2023 season. Using Fourier Transform Infrared spectroscopy (FTIR), we analyzed protein structures (Amide I, II, III), amino acids, and lipid profiles, classifying the genotypes into dioecious and monoecious groups. The results revealed significant structural variations: monoecious seeds showed higher average absorbance for most studied traits, particularly α-helix-rich proteins (0.486 AU) compared to dioecious seeds (0.476 AU), while β-sheet structures were similar (dioecious: 0.428 AU; monoecious: 0.432 AU). Amino acid profiles were notable, with monoecious genotypes having higher tryptophan levels (0.490 AU) than dioecious (0.478 AU). Ester linkages related to triglycerides averaged 0.735 AU for dioecious and 0.719 AU for monoecious groups, highlighting their nutritional significance.
Lipid analyses showed intense compositions, averaging 0.642 AU for dioecious and 0.638 AU for monoecious genotypes. Maltepe-4 genotype showed the highest values, indicating strong protein stability. This analysis underscores the genetic diversity among these genotypes and its significant implications for targeted breeding programs that optimize hemp for various applications. Ultimately, these insights will contribute to the sustainable cultivation of hemp and its diverse uses in the food industry. This research emphasizes the versatility and importance of hempseeds in nutrition and industry.

Keywords: Hempseed, Protein structures, Amino acids, Lipid profiles, FTIR spectroscopy

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(OP-40)
Effects of Two Different Gamma Ray Sources on In Vitro Shoot Explantation of Fraser Photinia and Determination of Effective Mutation Dose

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Abstract: Photinia fraseri cv. Red Robin, which is also included in outdoor ornamental plants that are widely preferred in garden designs due to its resistance to environmental conditions as well as its decorative feature. Considering the increasing adaptation capacity of the existing varieties of the species to changing climatic conditions, efforts to develop new varieties with high attractiveness to the market have started to increase. The in vitro mutation breeding method has serious potential for expanding the existing variability for this species, which is prone to in vitro propagation. For this reason, it is important to determine the applicability of gamma ray sources, which are ionizing radiation sources for in vitro mutation studies, for fraser photinia. In this study, two different gamma-ionizing radiation sources (cesium 137 and cobalt 60) were used to determine the radiation sensitivity of in vitro shoot explants, and effective mutation dose (EMD50) values were determined for the sources. For this purpose, in vitro shoot explants were irradiated at eleven different doses (0, 10, 20, 30, 40, 40, 50, 60, 60, 70, 90, 110, and 130 Gy). Thirty days after irradiation, shoot length and number of leaves were measured in in vitro plantlets, and EMD50 values were calculated by linear regression analysis. The EMD50 dose based on the number of leaves as a result of irradiation with cesium 137 source was determined as 60.34 Gy, while this value was determined as 80.88 Gy for cobalt 60 source. According to these results, it was seen that the source power, irradiation time, and the effect created by the linear energy transfer value of the beam during tissue penetration were effective on the EMD50 dose difference.

application

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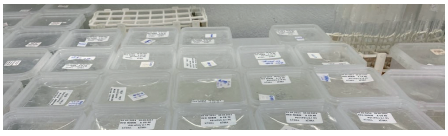

Keywords: EMD50, in vitro mutation, Photinia fraseri, Red Robin, Tissue culture

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(OP-41)
Enhancing Seed Sprouting Of Calopogonium Caeruleum

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Abstract: Calopogonium caeruleum is a legume plant that can be utilized as both forage and ground cover in plantations in Indonesia. Additionally, this plant is also considered a potential ground cover plant in marginal land. However, a thick coat of their seeds pose a challenge in their cultivation. There is a limited information on improving germination on these plant seed. The various scarification methods were treated to seeds to enhance germination. It is used pre-treatment are (i) using 95-98 % of sulfuric acid for 5, 10, 15 and 20 minutes, (ii) using 0.3 % of KNO3 in ambient temperature for 12, 24, 36 and 48 hours, (iii) using glycerine at 70 oC for 30, 60, 90 and 120 minutes, (iv) using hot water at 70oC for for 30, 60, 90 and 120 minutes and (v) using sandpaper with 2 and 4 times of scratch. The treatment using glycerine at 60°C for 120 minutes showed the best result of germination percentage and seed vigor on C. caeruleum seeds.

Keywords: Forage, legume, scarification, seed, sprouting

(OP-42)
Pistachio (Pistacia vera) Rootstock Production and Its Importance from Buttum (Pistacia khinjuk) Seeds in Southeastern Anatolia Region

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Abstract: Pistachio (Pistacia vera) is a very valuable product that can be grown in certain microclimate areas in the world and in our country. Our country has a very important place in the world pistachio production. In our country, the Southeastern Anatolia Region stands out as both the gene center and the production area where the most pistachio is produced. It is known that there are biotic and abiotic stress factors that negatively affect yield and quality in pistachio production areas. Cultural measures in combating these stress factors come to the forefront due to ease of application and low cost. Selection and use of resistant rootstocks, which are among the cultural measures, are one of the most economical methods of combating stress factors. The most commonly used rootstocks in pistachio cultivation areas in Türkiye are Melengiç (Pistacia terebinthus L.), Antep pistachio (Pistacia vera L.), Buttum (Pistacia khinjuk Stocks.) and Atlantic gum (Pistacia atlantica Desf.). In recent years, UCB-1 rootstocks have also begun to be preferred in our country due to their advantages such as being able to be grown in irrigated areas,

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growing rapidly and being suitable for grafting. Among these rootstocks, Buttum (Pistacia khinjuk) rootstocks stand out because they have adapted to the soil structure of the region and have been found to be resistant to biotic and abiotic stress factors in studies. In the pistachio cultivation areas of the Southeastern Anatolia Region, seedlings should be produced from Buttum seeds and distributed to producers and support should be provided in this regard.

Keywords: Pistachio (Pistacia vera), Buttum (Pistacia khinjuk), Rootstock, Cultural precaution

(OP-43)
The Status Of Turkish Seed Sector Towards 2050 And Future Strategıes

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Abstract: Seeds and propagation materials are among the most important agricultural inputs in terms of human nutrition and ensuring food safety. In parallel with the transformation of agriculture into an economic activity, the seed industry has also shown a similar development. In the last century, genetic science, plant breeding and especially plant biotechnology, which gained momentum in the 1990s, have contributed to the seed industry gradually becoming a sector based on science and technology. In addition, developments in the field of industrial and intellectual property rights have made significant contributions to the strengthening of the seed sector. In parallel with the development of seed production in the world, the studies that started with the Republic in our country continued in the form of a public-oriented seed system in the 1960s. In the following years, studies on initiating adaptation to the world, establishing a private-oriented national seed industry/ sector compatible with developing science, technology and free market economy rules, EU norms and the developed world seed sector have been largely completed. As a result, significant developments have been made in seed production and the increase in the number of companies, use of certified seeds, exports and R&D studies. With the developments in the Turkish seed sector continuing, it is necessary to have a significant share in the global seed market, to develop exports and to increase competitiveness. For this, it is necessary to review the current legal regulations, to provide easy access to financial resources, to develop new support models, to make structural changes within the country and regionally (ECO and Balkan Countries), to create a highly competitive seed sector with technology production and transfer.

Keywords: Seed, seed sector, current situation, future strategies, Türkiye

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(OP-44)
Ayaş Tomato Variety Improving Studies

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Abstract: There are tomatoes produced and consumed with pleasure in many parts of Türkiye. With the registration of them, both yield and quality will increase. Not much work has been done on this subject, but there are more tomato populations in our country that need to be studied. In this study, it was planned to obtain a new high quality variety desired by consumers from the Ayaş tomato populations. In the study, firstly, tomato accessions collected from Ankara-Ayaş region were requested from Türkiye Seed Gene Bank and then their characterization was done. Later, Ayaş Tomato populations were collected from Ayaş. All the obtained material was planted and observed in two different locations in the institute and Ayaş. As a result of the observations, the study continues with the lines selected as Ayaş tomato.

Keywords: Ayaş tomato, breeding, new improving variety

(OP-45)
Salt Tolerance Assessment Of Durum Wheat (Triticum Durum Desf.) Germplasm: A Comparative Study

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Abstract: Soil salinization is a significant threat to global food security, particularly in arid and semi-arid Mediterranean regions. This study evaluated the germination response of six durum wheat genotypes (Virton, Oued el Bared, Boutaleb, Bousselem Targui, and Chen's) to increasing NaCl concentrations (0, 100, 150, and 200 mM/L) under controlled conditions.Salt stress generally inhibited seed germination rate, shoot, and root growth in seedlings. However, a transient increase in germination speed and root/shoot growth was observed at a lower salinity level (150 mM/L NaCl). Among the varieties, Boutaleb was the most sensitive, exhibiting very low germination rate and root growth rate. In contrast, Targui and Bousselem genotype demonstrated the highest tolerance to salt stress, as evidenced by their germination rate, root growth rate, and germination stress index. This makes them promising candidates for cultivation in areas with high salt content.The study revealed that salt stress elicits different response mechanisms in the genotypes, with varying degrees of tolerance. These findings highlight the potential of Targui and Bousselem as valuable genetic resources for breeding durum wheat cultivars adapted to saline environments.

Keywords: Triticum durum Desf, germination, germplasm, growth, salt stress, NaCl.

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(OP-46)
Broadening Genetic Diversity of the Breeding Advanced Germplasm for Accelerated Lentil Varietal Development Through Speed Breeding Based on the Combination of Extended Photoperiod and Off-Season Sowing

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Abstract: In the context of climate changes and increasing demand for food, enhancing agricultural production of crops providing staple food with high nutritional value such as lentil is important. In this regard, rapid and effective genetic improvement that allow the development of new high yielding varieties could help to meet these challenges. Although conventional breeding techniques are widely used, it takes many years to develop high-performance varieties. Speed breeding approach, combined with off-season sowing, is a promising solution. We focused on the use of speed breeding based on the combination of the application of an extended photoperiod 18h light/6 h darkness to produce rapidly fixed homozygous F6 lines from F2 populations driven from targeted crosses, followed by the use of off-season sowing at the INRA Morocco Annoceur field highland research station, to multiply the obtained fixed lines. This combination allowed enhanced genetic gain and broadened diversity by increasing the number of genetic recombination and the number of obtained lines effectively introduced to the observation nurseries and yield trials steps thus increasing the likelihood of identifying promising lines carrying the targeted traits. In fact, one to two rounds of offseason growing allowed one more recombination and significant seed increase of the F6-7 lines that enabled their testing in multi-location trials for further screening the following season. Using this combined approach of speed breeding and off-season sowing, we have successfully produced more than 1500 homozygous fixed lines with sufficient amount of seeds. In fact, these lines have been integrated successfully into multiplication trials, opening the way for their subsequent transfer to observation nurseries and yield trials the next seasons in the perspective of developing new varieties adapted.

Keywords: Speed breeding, genetic gain, variety development

(OP-47)
Responses Of Enzymes To Salinity Stress In Perennial Ryegrass, Tall Fescue And Festulolium In Salt Tolerance

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Abstract: It is crucial to gain an understanding of how plants respond to stress factors at various stages of their vital cycles. Salinity is one of the environmental stress factors that affect plants at different developmental stages, from seed germination onwards, and thus limit their habitat. The objective of this study was to ascertain the morphological and physiological responses of perennial grass (Lolium perenne L., LP), tall fescue (Festuca arundinacea Schreb, FA) and Festulolium (FL) to varying degrees of salt stress. The research was planned at Ankara University's Faculty of Agriculture, Department of Field Crops in 2024, in accordance with the completely randomized plots experimental design. In the study, five distinct doses of NaCl salt stress (0, 5, 10, 15 and 20 dS.m-1) were applied to the Bartennivum (LP), Honeymoon (FA) and Lofa (FL) cultivars at the germination and early seedling development stages. Upon examination of the results, the following values were identified: average germination period (5.55-11.09 days), germination rate (50-81%), shoot length (3.64-9.68 cm), root length (1.96-6.41 cm), shoot fresh weight (3.98-14.24 mg.plant-1), and root fresh weight (0.58-3.57 mg.plant-1). These values exhibited a range between the specified limits. Proline (0.28-3.45 µmol.g-1 in 7 days, 0.35-4.97 µmol.g-1 in 14 days), MDA (2.42-16.65 µmol g-1 TA in 7 days, 1.84-20.32 in 14 days), APX (18.68-255.90 µmol min-1 mg-1 TA in 7 days, 22. 32-356.27) and CAT (746.49-1445.60 µmol min-1 mg-1 TA in 7 days, 687.39-1843.99 in 14 days) were measured in seedlings under salt stress and in control groups. It was demonstrated that the responses of the cultivars to salt stress exhibited variability according to the characteristics examined, contingent on the level of salt stress.

Keywords: Forage Crops, Salinity Stress, Reactions of Plants to Stress

(OP-48)
Development Of Genotypes Resistant To IMI Group Herbicides In Chickpea (Cicer Arietinum L.) Using Chemical Mutation Breeding Method

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Abstract: AbstractChickpeas have an important place in both human and animal nutrition with their high protein content. In addition, it is a plant that offers important opportunities for

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sustainable agriculture and the environment due to its low water and carbon footprint. Türkiye is the gene center of chickpeas and the 4th largest producer in the world. Weeds are among the important biotic factors that limit the yield and quality of chickpeas. Weeds can sometimes limit the yield of chickpeas by more than 60%. There is no effective method for controlling weeds in chickpeas. The methods used for control are inadequate, especially for broad-leaved weeds in broad-leaved chickpeas. However, in recent years, the use of varieties resistant to IMI group herbicides has increased the effectiveness of weed control. The aim of this study is to develop resistant chickpea genotypes to IMI group herbicides by chemical mutation in chickpea. The study was conducted between 2020-2024. Azkan, Arda, Aksu, Aydoğan, Göktürk varieties were used as material in the study. Ethyl Methane Sulfonate (EMS) was used as mutagen at doses of 0.10-0.20-0.40-0.60%. In field conditions, 40 g/l imazamox was used as IMI group herbicide after emergence. In the trial, herbicide resistance observation was taken according to the 1-5 scale. The pedigree method was used as a breeding method. As a result of the study, 113 herbicide tolerant material was developed at the M5 level.Key words: Chickpea, EMS, Mutation, IMI tolerant, weed

Keywords: -

(OP-49)
A Perspective on Genome and Polyploid Dynamics in Agriculture: An Example of Legume Forage Crop Sainfoin ({Onobrychis viciifolia})

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Abstract: Sainfoin, Onobrychis viciifolia Scop., is a member of the Fabaceae family and is a tetraploid (2n = 4× = 28) perennial forage legume plant with a genome size of 1,225 Mbp. Sainfoin, which has highly nutritious properties in animal nutrition, can be grown under different environmental conditions, protects the soil structure and prevents erosion. The majority of sainfoin cultivars are developed as either population or synthetic cultivars. Therefore, they contain a wide variety of heterozygous genotypes. There are only a few studies on the sainfoin genome and chromosome structure. However, the sainfoin karyotype and heterochromatin patterns have not yet been defined and there is no clear information about ploidy dynamics. Here, we present a detailed sainfoin ideogram and karyogram, for the first time, based on the distribution of repetitive DNA elements on sainfoin chromosomes. Therefore, we propose that sainfoin originated from structurally heterozygous ancestral genomes. This research is supported by the Scientific and Technological Research Council of Türkiye (TÜBİTAK) Project ID 118Z589.

Keywords: Onobrychis viciifolia, sainfoin, polyploidy, repetitive DNA elements

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(OP-50)
Analyzing Genetic Diversity and Mating Type Distribution in the Turkish Pyrenophora graminea Population

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Abstract: Barley stripe disease, caused by the fungal pathogen Pyrenophora graminea, is an economically important disease of barley globally. In 2021, 2022, and 2023, 116 P. graminea isolates were collected from various provinces of Türkiye. Among the 116 isolates, 89 were identified as MAT-1, while 27 were MAT-2 ($\chi 2$ (1:1)= 33.138 (P ≤0.001)). The ratio of mating types suggests that the Turkish P. graminea population may mainly reproduce asexually. However, in Siirt province, evidence of sexual recombination was found to support sexual reproduction ($\chi 2$ (1:1)= 0.222 (P ≤ 0.6375)). Most Siirt isolates were obtained from wild barley (Hordeum spontaneum). Polymorphic ISSR markers UBC 856, ISSR 1, ISSR 3, UBC 895, UBC 868, UBC 847, and UBC 822 and iPBS markers 2076, 2080, 2078, 2081, and 2399 were identified. Among these, UBC 856, UBC 868, 2080, 2081, and 2078 showed the highest number of polymorphic bands. Genetic variation was analyzed using ISRR markers, iPBS markers, and a combination of both markers, resulting in three dendrograms. No clear distinction was observed in the isolates based on mating type, virulence value, or geographical origin. The majority of Ankara isolates in all three dendrograms showed high similarity, suggesting a common gene pool possibly due to infected seed trade and spore dispersion. However, the diverse clustering of isolates from wild barley and the indication of a population structure supporting sexual reproduction in mating types could lead to increased future variation.

Keywords: Pyrenophora graminea, Hordeum vulgare, Barley, Mating type, Genetic variation

(OP-51)
Comparison on Releasing of Gene Edited Varieties in Türkiye and Some Countries

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Abstract: Gene editing techniques have emerged as formidable instruments for plant breeding. The reactions against GMOs in the world public opinion were directed against these techniques with the idea that gene editing is also GMO. For this reason, the processes of releasing varieties which developed with gene editing and allowing their production are the subject of technical and legal discussions. In this study; discussions and evaluations from different perspectives experienced in the process of

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allowing the release of varieties obtained with gene editing techniques in different countries are discussed. The definition of GMO in the Biotechnology Law, which is the main GMO regulation in Turkish law, was detailed and a table was created regarding whether different gene editing techniques comply with this definition. In addition, the approaches of some countries and Türkiye are tabulated under different headings and similar and different aspects are revealed. In general, it is stated that varieties developed with gene editing techniques cannot be considered as GMOs according to the provisions of Turkish Biosafety Law as long as there is no gene transfer in the technique. In addition, it has been evaluated that there is no provision in the Seed Law No. 5553 and the related registration legislation that these varieties will be subject to a different process than conventional varieties registration process. In addition to the attempts for distinguish, uniformity and stability in the registration process of gen edited varieties, it has been recommended that some arrangements be made in the registration legislation in order to establish the risk assessment mechanism applied in some countries.

Keywords: CRISPR, Gen editing, Gen-edited variety, GMO, Variety release

(OP-52)
Enhancing Indonesian Local Seed Quality and Certification Using Cytogenetic and Molecular Data

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Abstract: Indonesia boasts an extraordinary range of biodiversity, including a rich variety of agronomic germplasm cultivated by local communities. Among these are numerous native chili plants, each unique to different regions and passed down through generations. However, extensive cultivation in open environments leads to genetic segregation, expanding the genetic pool of these varieties. This disruption in genetic stability results in phenotypic and quality changes. To address this, it is crucial to enhance genetic quality in partnership with industry stakeholders, ensuring the distribution of high-quality seeds to the community. Our approach involves collaborating with business actors using cytogenetic studies and DNA barcoding to assess the genetic segregation of native chili cultivars in Indonesia. This article marks a critical starting point for our research implementation. While we have yet to present definitive results, preliminary findings demonstrate promising outcomes. Specifically, our research on the native Katokkon chili from Tana Toraja, using colchicine-mediated polyploidization, has shown a significant increase in fruit yield. Furthermore, ongoing exploration of local cultivars is essential to preserving biodiversity through effective seed storage practices, ensuring food sovereignty, and preventing biodiversity loss in Indonesia.

Keywords: genetic stability, local cultivars, cytogenetic, seed storage, seed management, multiple-multilocus DNA barcode

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(OP-53)
Impact Of Electromagnetic Fields On The Germination Of Perennial Ryegrass Seeds

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Abstract: It is known that plants respond differently to electromagnetic field applications of different frequencies and intensities. The aim of this study was to investigate the effects of magnetic field intensities and durations on the germination of perennial ryegrass (Lolium perenne L.) seeds. Seeds of the perennial ryegrass population were obtained from Ankara University. The research was designed according to a completely randomised experimental design with four replications and was carried out in 2024. The seeds were treated with magnetic field strengths of 20, 40 and 80 mT for three and five minutes. The average germination time, germination rate, length of shoots and roots, and the fresh weights of shoots and roots were determined. The results demonstrated that the application of magnetic fields did not have a statistically significant impact on the average germination time or germination rate. Significant statistical differences were observed in shoot length, root length, root fresh weight ($p<0.01$) and shoot fresh weight ($p<0.05$). The lowest and highest values for shoot length were 5.71 cm (control group) and 7.17 cm (5 min-80 mT), respectively. With regard to root length, the lowest recorded value was 2.69 cm (5 min-20 mT), while the highest value was 4.25 cm (control group). The variation in shoot fresh weight was observed to range from 4.55 mg.plant-1 (control group) to 6.25 mg.plant-1 (3 min-20 mT), while root fresh weight exhibited a variation between 0.30 mg.plant-1 (control group and 3 min-80 mT) and 0.73 mg.plant-1 (3 min-40 mT). From the evaluation of the data obtained, it can be concluded that electromagnetic field applications had a beneficial effect on perennial ryegrass.

Keywords: Lolium perenne L., Magnetic Field Intensity, Morpholojical Characters

(OP-54)
Twelve Years of Bread Wheat Regional Yield Trials in Central Anatolia: Insights from Multi-Environment Analysis

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Abstract: Understanding genotype-environment interactions (GEI) is crucial in breeding programs to identify high-yielding and stable wheat varieties. This study presents an analysis of variance components, heritability estimates, genotype (G), environment (E), and GE interactions from a 12-year multi-environment regional yield trial (2012–2013 to 2023–2024 seasons) across 4 to 7 distinct environments. Trials were conducted using a modified randomized complete block design with four replications, including commercial checks, to evaluate the adaptability and performance of lines annually.A mixed model approach revealed that the environment (E) accounted for 35–85% of the total variability in yield, genotype (G) contributed up to 25%, and GE interaction accounted for 5–25%. Heritability estimates ranged from 0.55 to 0.70, with higher values in favorable environments, indicating potential for yield stability. The results highlighted the significant role of environmental factors and GE interactions in breeding for yield stability. Additionally, a strong positive correlation ($R = 0.88$, $p = 0.0019$) was observed between the environmental mean yield (t/ha) and the climatic variable (GDD*DL)/GWETROOT, suggesting that yield increased with higher values of this variable. A heatmap analysis identified the 215–217 day window as a critical period with the highest correlation to yield outcomes, emphasizing the impact of environmental conditions during this growth phase.These findings provide valuable insights for selecting and breeding high-yielding, stable wheat varieties, contributing to wheat breeding programs to enhance productivity and resilience against changing environmental conditions.

Keywords: bread wheat, wheat breeding, regional yield trials, multi-environment analysis, genotype-environment interaction, yield stability

(OP-55)
Exploring The Coat Protein-Mediated Resistance To Tomato Brown Rugose Fruit Virus

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Abstract: omato brown rugose fruit virus (ToBRFV) is a seed transmitted and recently emerged tobamovirus infecting tomato and pepper. There is no durable genetic resistance to the virus in commertial tomato cultivars. Therefore, development of resistance strategies against ToBRFV is needed. In this study, the coat protein mediated (CPM) resistance to ToBRFV was explored as an alternetive strategy. The CP gene of ToBRFV

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was cloned into pCAMBIA0380 under control of CaMV35S promoter and transferred to Agrobacterium. About 3000 hypocotyl and cotyledon explants were transformed and 350 shoots were regenerated. Surviving 140 shoots were transferred to rooting medium and 41 rooting shoots were obtained. After transferring 22 surviving potentially transgenic plantlets to soil 9 plants adapted to the soil. PCR analysis revealed that six of 22 and four of 9 surviving plantlets were positive for ToBRFV CP gene. The expression analyses of ToBRFV CP gene in three transgenic lines showed that CP gene was expressed in all three transgenic lines. ELISA test performed with antibodies specific to ToBRFV CP showed that ToBRFV CP was produced in all three transgenic plants. Two transgenic plants TG6 and TG8 were propagated and at least four plants from each line were challenged by mechanical inoculation with ToBRFV. The resistance of two transgenic tomato lines to ToBRFV was determined by measuring ToBRFV titter by a RT-qPCR assay. The RT-qPCR analysis demonstrated that the virus able to replicate in all plants of two transgenic lines tested, but the titter of the virus was lower in transgenic lines than in non-transgenic control plants. The results showed overexpression of ToBRFV CP gene in tomato plants limited ToBRFV replication but did not provide complete resistance.

Keywords: Coat protein mediated resistance, Genetic transformation, ToBRFV, Tomato

(OP-56)
Deciphering Resistance To Tomato Brown Rugose Fruit Virus (Tobrfv) Using Genome-Wide Association Studies

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Abstract: Tomato Brown Rugose Fruit Virus (ToBRFV) is an emerging, highly virulent virus that presents a serious threat to tomato and pepper production globally. Upon first identification in Israel and subsequent isolation in Jordan, the virus has spread to more than 40 countries in Asia, Africa, Europe, and America. Over the past years, the virus has become a significant concern due to its ability to spread through various ways, including contaminated seeds, mechanical contact, pollinators such as bumble bees (Bombus terrestris) and pests such as invasive tomato leafminer (Tuta absoluta). Furthermore, the lack of resistant commercial varieties and the hurdle of disinfecting contaminated areas underscore the critical importance of addressing the threat posed by ToBRFV. Therefore, the objective of this study was to explore genetic loci associated with ToBRFV resistance and identify accessions that will serve as a resistance source. To achieve this, we evaluated 161 tomato accessions from Varitome collection and conducted Genome-

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Wide Association Studies (GWAS) utilizing 11,700,114 SNPs, 2,735,297 INDELs, and 27,477 SVs. GWAS led to identification of six INDELs associated with ToBRFV Disease Severity Index, and we identified six QTLs, designated as ToBRFV 1.1, ToBRFV 1.2, ToBRFV 2.1, ToBRFV 2.2, ToBRFV 6.1 and ToBRFV 10.1, using FarmCPU and GLM models. Furthermore, we identified specific tomato accessions that exhibit high resistance to ToBRFV, namely BGV006370, BGV007366, BGV012615, LA0716, and LA1777. The identified ToBRFV resistant accessions and genomic loci will aid in further finemapping QTLs controlling ToBRFV tolerance, which could be utilized to develop commercial cultivars with desired phenotypic performance.

Keywords: GWAS, Tomato brown rugose fruit virus (ToBRFV), QTL mapping

(OP-57)
The Importance of Silicon as a Biostimulant in Sustainable Agriculture and Seed Production

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Abstract: The agriculture and food sector carries the risk of being insufficient to feed the world's population, which is estimated to reach 9 billion in 2050. In scientific reports, it is stated that water scarcity and drought will increase in the world with the effect of climate change, agricultural productivity will decrease, and food prices may increase by up to 85 percent worldwide. The earth's crust, which is the main source of elements used in seed production, plant nutrition and integrated pest management is equipped with many essential minerals that can have positive effects on plants exposed to various abiotic and biotic stresses due to the effects of increasing global warming. Silicon, is the second most abundant element in the earth's crust after oxygen. The beneficial effects of silicon (Si) on plants are often due to their important role in the biogeochemical cycles of carbon and nutrients. Silicon increases productivity because it increases the healthy growth and development of different plants and makes an important contribution against biotic and abiotic stresses. However, rapid and synchronized seed germination is desirable to increase crop yields. Exogenous Si has many effects on embryo viability, reserve mobilization, hormone/enzyme activity, membrane integrity, antioxidant metabolism, and regulation of gene expression in seed germination. Drought, extreme cold, salinity, flooding, and abiotic stresses from heavy metals have a negative impact on seed germination. The application of silicon has a promising approach to improve seed germination. With this review, we discuss the role and beneficial effects of silicon in plants to regulate biotic and abiotic stresses, while also reviewing recent findings on how the seeds respond to Si application under abiotic stress.

Keywords: Climate change, Agriculture, Biotic and Abiotic stress, Silicon, Seed germination, Plant diseases and pests

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(OP-58)
Harvesting Heat Resilience: Unveiling Wheat's Transgenerational Memory For Stress Tolerance Through Seed Priming Strategies

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Abstract: In this study, the role of terminal heat memory (stress priming), and seed priming in improving heat tolerance in wheat (Triticum aestivum L.) was evaluated. During the first growing season, wheat plants were exposed to heat stress conditions (37/28 ± 2°C) during the reproductive stage until maturity. A second set of plants continued to grow under optimal conditions (25/18± 2°C). Seeds harvested from both sets of plants soaked in water (hydropriming) or γ-amino butyric acid solution (seed priming). These treated and control seeds, from both stress conditions, were then sown in soil-filled pots. After uniformity of emergence, half of the plants were maintained under optimal conditions, while the remaining half were subjected to heat stress. Heat stress disrupted plant water relations and reduced carbon assimilation rate, plant growth, and grain yield. There was an increase in malondialdehyde content, indicative of oxidative stress, osmolyte accumulation (γ-amino butyric acid, proline, and glycine betaine), and activities of antioxidant enzymes under heat conditions. The progeny from seeds collected from terminal heat-stressed plants had lower lipid peroxidation, enhanced osmolyte accumulation and carbon assimilation rate, and better growth and grain yield than the progeny of plants raised under optimal conditions. Seed priming with γ-amino butyric acid improved crop performance under heat stress compared to the control. In conclusion, heat-induced modifications in seed composition enhanced transgenerational heat tolerance, and seed priming further improved heat tolerance. These improvements were attributed to improvements in tissue water status, antioxidant enzymes, and osmolyte accumulation, coupled with a decrease in lipid peroxidation. These results suggest using seed priming to improve wheat productivity in the face of rising temperatures, contributing to sustainable agriculture in a changing climate.

Keywords: Seed priming, stress priming, seed development, heat stress, climate change

(OP-59)
Evaluation Of Silage Hybrid Corn Varieties For Yield And Quality Parameters

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Abstract: The main input of animal production is the feeding of animals. Feed, which constitutes 70% of the inputs in animal production, is the most effective and determining element of animal husbandry.

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In order to meet the roughage needs of our country's animal husbandry, silage varieties need to be developed. This study aimed to determine the yield performances of 23 hybrid variety candidates obtained using elite lines developed by the Eastern Mediterranean Agricultural Research Institute. In 2022, a trial was established with 23 hybrid variety candidates and 4 commercial varieties as controls, and the prominent varieties were taken to the trial in 2023 in Adana (Dogankent), Konya (Meram) and Sakarya (Arifiye) locations according to the randomized complete block design with 4 replications. In the study, properties such as green herbage yield, plant height, first ear height, ear/plant ratio, dry matter yield, pH, crude protein ratio and ADF ratio were examined. In 2022, the green herbage yields of hybrid variety candidates varied between 4293 kg/da and 8342 kg/da, with the general average of 6798 kg/da. As a result of variance analysis, statistically significant differences were found in terms of the examined properties in all 3 locations in 2023. Silage corn quality parameters affect the nutritional value of silage and are also a very important factor in terms of economy and productivity. Dry matter yield, pH, ADF and protein ratio were obtained between 2077.42-3985.37, 3.66-4.02, 16.20-26.95, 9.45-13.92, respectively. It is planned to submit the 2 hybrid variety candidate that shows the best performance in all 3 locations for registration.

harvesting

harvesting time

Keywords: maize, hybrid, silage, yield, digestion quality, ADF ve NDF

(OP-60)
The National Seed System With Its Strengths And Challenges: Organization Of The Seed Chain And Roles Of The Main Players

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Abstract: Seed is the primary factor of production, supporting agricultural activities

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which are the main source of employment and income for around 78% of the population of Chad. The Chadian seed sector is an important lever in agricultural production. Chad has a number of challenges and major assets, including a young population with enormous potential, agro-ecological zones suitable for seed production in all seasons, national and sub-regional markets and seeds of improved varieties and healthy quality, with yields in excess of 40% (FAO).The government's determination to combat food insecurity and make agriculture the main driver of economic growth.The development of the national seed policy in 2016 reflects the vision of the State and all stakeholders in the sector, and has ensured the smooth operation and coordination of the seed sector, enabling the production of quality seeds in quantities capable of meeting the needs of Chadian producers. It has also made it possible to put in place an appropriate institutional, regulatory and legal framework, and a political will to develop the seed sub-sector to ensure harmonious development of the sector, with a view to fostering the emergence of a genuine national seed industry.

Keywords: Seeds organization seed chain Tchad

(OP-61)
Cotton Seed Storage Diseases and Pests

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Abstract: Cotton seed is the seed of the cotton plant (Gossypium spp.) and is a high value-added product due to its various uses in both agricultural production and industry. Cotton production in Türkiye is intensively carried out especially in the Aegean, Southeastern Anatolia and Mediterranean regions and provides positive contributions to the economies of the regions and countries where it is grown with its different areas of use in the industry, the added value it creates and various employment opportunities. There are many biotic and abiotic stress factors that negatively affect yield and quality in cotton production. These stress factors can affect yield and quality at every stage of production. Any stress factor that may occur especially during the storage or seed preservation stage can cause serious economic losses. In order to obtain and preserve a quality seed, the storage conditions must meet the current physiological, biological and chemical requirements of the cotton seed, and the prevention and control of diseases and pests that may be encountered from the harvest process to the storage period until the seed reconnects with the soil and in the relevant case, are extremely important for seed quality and yield. The cotton plant may encounter various diseases and pests during storage. Important fungal diseases that can be seen in cotton seeds are; "Aspergillus spp., Penicillium spp. and Alternaria spp.", bacterial diseases are "Xanthomonas spp. and Pseudomonas spp." Important pests that can be seen in cotton seeds are; Mice, rats, Helicoverpa spp., Tribolium spp. and Sitophilus spp. These diseases and pests mentioned in cotton seeds can negatively affect the quality and economic value of cotton products.

Keywords: Cotton (Gossypium spp.), storage diseases, storage pests, cotton seed

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(OP-62)
Genotype-Environment Interaction Analysis of Advanced-Stage Barley Breeding Lines (Hordeum vulgare L.) under Diverse Rain-fed Conditions

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Abstract: This study evaluated the performance of 18 advanced-stage barley lines and six commercial varieties across five diverse environments using a randomized complete block design with four replicates. The primary aim was to assess the stability and adaptability of these lines for grain yield. The barley lines, consisting of advanced-stage barley lines and checks, were conducted in different environmental conditions, ranging from optimal to stress-prone environments, to identify high-yielding and stable genotypes. Genotypic performance was analyzed using general linear models, considering the genotype-by-environment (G×E) interaction and the main effects of genotypes and environments. The overall average yield of the barley genotypes across all environments was around 454 kg/da. In the combined analysis results, the grain yield exhibited a coefficient of variation (CV) of 16%. The genotype-by-environment (G×E) interactions were highly significant ($p < 0.001$), indicating the existence of a notable interaction between genotypes and environmental factors. Sayım-40 and Burakbey varieties were more stable or adaptable than advanced lines under varying conditions. These findings highlight the potential of the advanced-stage barley lines in breeding programs aimed at enhancing barley's resilience to environmental variability. The study underscores the importance of multi-environment trials in identifying advanced lines with stable performance, providing valuable insights for breeders and researchers targeting the development of high-yielding, adaptable barley varieties. This research contributes to the ongoing efforts to improve barley seed productivity and sustainability, particularly in the face of climate change and fluctuating growing conditions.

Keywords: Hordeum vulgare L., genotype-by-environment, high-yielding, multi-environment.

(OP-63)
Why Farmers Choose Their Maize Hybrids: An Example of Southern Kazakhstan

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Abstract: Agriculture plays a crucial role in Kazakhstan's economy, and despite this, there has been limited academic research on maize production in the country. However, many farmers in southern Kazakhstan heavily depend on maize as their primary source of income. In 2021, around 301 thousand hectares were dedicated to maize cultivation in Kazakhstan, with 63% allocated for grain maize production and the remaining 37% for silage maize. Notably, more than 25 seed suppliers sold their maize seeds to Kazakhstani farmers, with 60% of the maize seed being imported.A survey conducted in 2021 across three regions

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of southern Kazakhstan involving 121 maize growers revealed that farmers in Kazakhstan predominantly favoured hybrid seeds, with none of the respondents using conventional open-pollinated varieties. Interestingly, 51% of farmers opted for expensive hybrids of mainly western origin, while 49% preferred more affordable seeds produced domestically or in developing countries.The primary factors influencing the choice of maize seed among agricultural growers in Kazakhstan were potential yield, the opinion of other farmers, price and payment terms, seed quality, and ear drying speed. Furthermore, the survey found that 46.3% of respondents considered themselves loyal to a specific seed brand, and this brand loyalty significantly influenced their intention to purchase maize seed.However, the study did not establish any correlation between seed type and factors such as education, age, farm size, maize importance, and technological advancement.

Keywords: Kazakhstani maize, seed sales, seed attributes, maize seed choice, maize seed brand loyalty

(OP-64)
Relationship Between Different Maturity And After Ripening Levels And Seed Quality in Eggplant Varieties

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Abstract: The study was carried out Uşak University, Faculty of Agriculture. Seedlings of Manisa Kır Çizgili(MKÇ) and Aydın Siyahı(AS) varieties of eggplant (Solanum melongena L.) were used in the field for 2 years.Seed extractions were carried out by applying 4 different post-harvest ripening treatments to eggplant fruits obtained from 4 different harvest periods. Germination and seedling emergence tests were continued for 14-21 days at 30 and 20ºC using 4×50(replication×seed) for each seed lot. The total phenolic substance amount in the seeds of eggplant varieties was analyzed.As a result of the 20ºC germination test, the highest germination rate for MKÇ was obtained from the 75th day harvests of the 35/20 ripening period with 100%. 20ºC seedling emergence test, it was determined that the highest emergence rate was obtained with 90% as a result of the 60th day harvest of the 35th ripening period. 20ºC germination test, the highest germination rate for AS was obtained with 100% as a result of the 75th day harvest of the 35/20 ripening period. After the 20ºC seedling emergence test, it was determined that this group had the highest emergence rate with 100% as a result of the 75th day harvest of the 35th ripening period. The highest total phenol content for MKÇ was determined as 139 mg GA/kg seed from the 75th day harvest of the 20/35 ripening period. For AS, this rate was determined as 157.97 mg GA/kg seed from the 75th day harvest of the 35/20 ripening period. As a result, it is seen that in this cultivation carried out in Uşak conditions, the 75th day harvests stand out and the seeds can be improved with variable temperature treatments.

Keywords: After Ripening, Seed maturity, Phenol, Aydın Siyahı, Kemer27, Manisa Kır Çizgili.

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(OP-65)
Resistance of Winter Wheat Genotypes to Fungal Diseases in Kazakhstan

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Abstract: Due to global climate change, the geographic distribution and harmfulness of epidemics from dangerous pathogens will increase. In the conditions of south-east Kazakhstan, where winter wheat is mainly grown, harmful diseases are rust (Puccinia), septoria (Septoria), smut (Tilletia) etc. In years favorable for their development, an increase in harmfulness is observed, that is, a decrease in seed quality and yield loss. The emergence of new, aggressive pathotypes increases the threat of virulent evolution of infection in grain-growing regions. In this regard, a systematic and continuous study of the pathogen population and the selection of resistant genotypes remains relevant. In order to determine the immunological value of genotypes and search for sources of winter wheat resistance, we conducted immunological studies (2020-2024) at the experimental base of the Kazakh Research Institute of Agriculture and Plant Growing (N43.238193° E76.696753°). Screening and selection of resistant genotypes was carried out on a specialized site, under artificial infectious background conditions. According to the reaction to the pathogen population, the genotypes were ranked into resistance types, according to the established scales and methodology (CIMMYT). As a result, the state of resistance of winter wheat varieties to dominant pathogens was analyzed. Sources of resistance - valuable genotypes from the collection block of the study were identified. Immunological studies taking into account intrapopulation changes in pathogens and the search for effective sources of resistance are a necessary preliminary stage of successful selection for immunity.

Keywords: genotypes, rust, resistance, immunity, selection, winter wheat

(OP-66)
Sanitation of Fruits Plants for the Production of Virus-Free Seedlings and Creation Nuclear Stock

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Abstract: The mountains of South-Eastern Kazakhstan are unique in the richness of wild fruit plants. On the territory of Kazakhstan, favorable climatic conditions have been created for cultivating wild fruits and their cultivars. Nevertheless, in Kazakhstan, production orchards of all fruits about 50,000 ha, are affected by frequent return frosts, a lack of virus-free planting material and the spread of viral diseases. This research aimed to develop and improve methods of virus-infected plant sanitation, and creation of

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the virus-free in vitro collection and nuclear stock. Plant samples of 32 varieties were collected in the South-Eastern and Southern Kazakhstan. Apple rootstocks samples were tested for ACLSV, ASPV, ApMV, ASGV. Stone fruit rootstocks and varieties were tested for ACLSV, ApMV, ASPV, ASGV, PPV, PDV, PNRSV, CGRMV, and MLRSV viruses. Real-time RT-PCR technique was used to determine the presence of ASPV in apple rootstocks 'B16-20' and 'Zhetysu-5', PPV in 'Stanley' and 'Ansar' cultivars and Prunus armeniaca genotype and PPV, ACLSV viruses in the cv. 'Ayana'. For the eradication of PPV and ACLSV viruses, combination of in-vitro chemotherapy, thermotherapy, and cryotherapy treatments techniques were used. As a research result, it was determined that chemotherapy + thermotherapy + cryotherapy + SAM treatment was more effective in controlling PPV and ACLSV viruses. However, the 'Ansar' cultivar and P. armeniaca died during treatment. Plant death during recovery occurs at 60-100% for thermotherapy and 62-100% for cryotherapy. It will be develop a specific treatments for ASPV virus. An in vitro collection of virus-free plants of 10 rootstocks, 6 plum cultivars, and 3 apricots was created. Also, in the field collection, virus-free trees were noted as a 'pre-basic plant'.

Keywords: Virus-free seedlings, Plum, Apricot, Apple rootstocks, Plant viruses, Sanitation in vitro

(OP-67)
Seed Priming with Plant Growth-Promoting Rhizobacteria: A Promising Method For Enhancing Tolerance to Abiotic Stress

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Abstract: The increasing global climate crisis shows that natural resources should be used more carefully. Agricultural production and sustainability are in danger due to climate change. Environmental effects such as drought, irregular precipitation regimes, and temperature values outside the seasonal norms due to the climate crisis negatively affect agricultural production. Chemical inputs used to prevent losses in agricultural production cause the destruction of natural resources and damage to the ecology. Environmentally friendly, biologically based and innovative systems that will be integrated into agricultural production are of great importance for a sustainable environment. Recently, incorporating biological approaches such as PGPR (plant growth-promoting rhizobacteria) into sustainable farming systems and research studies has attracted great attention. As a part of our work carried out; the effects of PGPR bio-fertilizers on yield and quality criteria in wheat under abiotic stress were investigated. According to the results, PGPR applications significantly positively affected the amount of chlorophyll content, relative water content and yield criteria against salt stress. Bio-fertilizers show promising results in preventing yield losses in agricultural production under the influence of abiotic stress.

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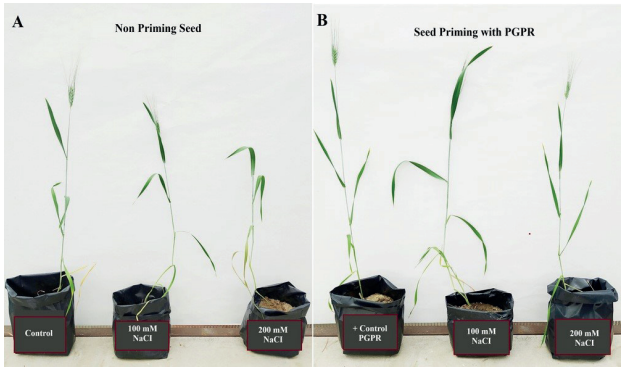
Seed Priming with PGPR



NaCl stress and PGPR treatment

Treatment	Plant height (cm)	Flag Leaf Width (cm)	chlorophyll (SPAD)	Spike height (cm)	Number of Seeds per Spike	Seed Yield per Plant (g/plant)	Seed Yield (kg/da)
Control (-)	59.7	1.02	58.844	6.18	9.6	0.424	212
100mM	58.6	1.12	54.952	4.51	8.6	0.348	174
200mM	53.3	0,93	51.346	4.13	7.4	0.248	124
Control (+) PGPR	62.4	1.23	60.891	7.16	12.6	0.562	281
100mM NaCl + PGPR	59.6	1.09	57.694	6.21	9.1	0.431	215
200mM NaCl + PGPR	57.8	0.96	54.231	5.76	8.1	0.334	167

Keywords: Seed priming, wheat, abiotic stress, PGPR, bio-fertilizier, drought

(OP-68)
Efficacy of Seedlings Produced from Microbiota-Modified Seeds Against Some Biotic Stresses

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Abstract: The seed microbiome plays an essential role in the seed germination and viability of seedlings, facilitating vertical transmission and modulating the growth of adult plants. Modifying the seed microbiome with beneficial endophytic bacteria is a promising approach for boosting seed quality and seedling vigour against various biotic stressors. However, The current body of literature on the manipulation of seed microbiome is limited, particularly with regard to the tolerance of seedlings grown from seeds with altered microbiomes to biotic stresses. Thus, porpose of this study was to demontrate efficiency of seeds with altered microbiome against Fusarium oxysporum and Clavibacter michiganensis in tomato and eggplant species. After the transmission of Pseudomonas fluorescens-L5b, Pseudomonas gessardii-L13 strains into tomato and eggplant seeds by floral inoculation, the tolerance of the offspring seedlings against Fusarium oxysporum (Fo) and Clavibacter michiganensis (Cmm) were analysed. Furthermore, seed lots coated with same endophytic bacteria were also included in the experiment (conventional method). The results revealed that L13 and L5b strains suppressed Cmm and Fo infections in both species to a certain level compared to control group. Accordingly, a significant (90%) tolerance against Cmm was achieved in both species with strain L5B. Moreover, with the coating treatment, tolerance against Cmm was observed in both species with both strains. As for the Fo, L13 and L5B strains suppressed Fo by 24% and 17% in the floral inoculation method, respectively. This rate

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was found to be 35%-18% in the coating treatment. In conclusion, it was revealed that offspring seedlings whose microbiota was mofidified with beneficial endophytic bacteria by floral inoculation increased tolerance to some important diseases.

Keywords: Endophytic bacteria, seed, Fusarium oxysporum, Clavibacter michiganensis, tomato, eggplant

(OP-69)
The Expression of the RBD Domain of Spike Protein from Omicron Variant of SARS CoV-2 in Tomato

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Abstract: The coronavirus disease-19 (COVID-19) caused by SARS Coronavirus 2 (SARS-CoV-2) originated from China and spread worldwide resulting the worst a pandemic in the history. While mRNA vaccine played a major role for ending the pandemic, cost of production, and difficulties of scaling, distribution, storage of mRNA vaccines emphasised the importance of alternative vaccine production strategies including plant-based edible vaccines. Therefore, to develop plant-based edible vaccines the receptor binding domain (RBD) of surface glycoprotein spike (S) from the original SARS CoV-2 Wuhan was previously expressed in tomato. In this study, RBD of S from, the latest major variants, SARS CoV-2 Omicron, with substantial number of mutations in RBD was expressed in tomato to produce updated edible vaccine. The RBD of Omicron variant was amplified from S gene by RT-PCR and cloned into modified pCAMBIA binary vectors under constitutive CaMV35S promoter. pCAMBIA vectors containing RBD of SARS CoV-2 Omicron were transferred into Agrobacterium tumefaciens. Then, cotyledon and epicotyl explants of in vitro germinated seedlings from a F1 parental tomato line, 7855, were transformed with RBD from Omicron using Agrobacterium. During the transformation process 269 seeds were germinated in vitro and 1201 explants consisting of 526 kotiledon and 675 epicotyl segments were transformed. A total of 178 shoots were regenerated from transformed cotyledon and epicotyl explants. After rooting of shoots, 31 rooted whole tomato plantlets potentially expressing RBD of SARS CoV-2 Omicron were obtained. The presence of RBD transgene in genomes of three potential transgenic plants and expression of transgene mRNA was confirmed, respectively, by PCR and RT-qPCR methods. The transgenic plants expressing RBD will be analyzed and its potential for a plant-based edible vaccine will be evaluated.

Keywords: COVID-19, SARS CoV-2, genetic transformation, plant-based vaccine, edible vaccine, tomato

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(OP-70)
Utilization Of Incompatibility and Male Sterility System In F1 Hybrid Seed Production In Cabbage Family

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Abstract: Commercial hybrid varieties are widespread in the cultivation of cabbage group vegetables currently. Hybrid varieties are imported from abroad in Türkiye. There are no cabbage hybrid variety breeding programs of private sector in Türkiye. The most important reason is the difficulties experienced in hybrid seed production of cabbage. The only breeding program is carried out on hybrid variety breeding in cabbage by Samsun Black Sea Agricultural Research Institute. Hybrid seed production is quite costly in cabbage due to the low seed amount per fruit and high foreign fertilization. Researchers have developed different pollination control methods in order to reduce the seed production cost. Pollination control methods provide hybrid seed production without manual hybridization. The most important of these methods are incompatibility and male sterility systems, which have also found routine use in commercial production. Self-incompatibility system has been used commercially in many cabbage species. However, the prevention of the incompatibility mechanism under low and high temperature conditions and the incompatible parents becoming compatible cause problems in hybrid seed production. This situation reduces the purity level of the hybrid variety produced and prevents the production of a uniform product. Therefore, researchers have started to work on the male sterility mechanism. Male sterility is the situation where viable pollen is not formed as a result of the male organs not being functional. Nowadays, the cytoplasmic male sterility (CMS) method is widely utilized in seed production of hybrid varieties in cabbage group vegetables in the world. The male sterility system used in cabbage was developed with the protoplast fusion technique.

Keywords: cabbage, hybrid, Self-incompatibility, sterility, seed

(OP-71)
Comparison of Local Peanuts Grown in the Turkish Republic of Northern Cyprus and Some Varieties of Peanuts that Have Been Adapted

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Abstract: Peanuts were produced in our country from 1975 to the end of the 1990s. Our peanut cultivation area, which increased to 576 acres in 1982, decreased to 15 acres in 2000, and currently, peanut production is carried out on 2 acres of land in Northern Cyprus. The production in our country cannot meet the need and since the years when production decreased, an average of 580 tons of peanuts are imported to our country every year.The main purpose of this project; Determination of peanut varieties suitable for Northern Cyprus conditions. It is to bring the determined varieties to our country's agriculture and to increase the production,

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which is almost non-existent.Varieties grown in Türkiye were selected as material. YerelÇeşit, NC-7, Halisbey, Masal, Ayşehanım. Among these 5 cultivars to be tested, the most productive cultivars with high market share will be investigated in TRNC climatic conditions

Keywords: TRNC, Peanut, Variety, Adaption

(OP-72)
Reactions Of Magnetic Field Treatments On Seeds Of Hungarian Vetch

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Abstract: Utilizing magnetic fields is one of the physical methodologies that can benefit plants' growth and development at all life cycle stages. This study aimed to assess the effects of this physical intervention at varying magnetic field intensities and durations on Hungarian vetch (Vicia pannonica Crantz.). The application of magnetic fields was conducted at Kırıkkale University, while germination processes were investigated at Ankara University's Faculty of Agriculture. The study used a Hungarian vetch population from the seed gene bank of Ankara University. The wholly randomized plots experimental design with four replications was conducted in 2024. Seeds were subjected to varying magnetic field intensities (20, 40, and 80 mT) for three or five minutes. Several parameters related to seed germination were conducted, including average germination time, germination rate, shoot-root lengths, and shoot-root fresh weights. The findings revealed that applying magnetic fields had no statistically significant influence on the average germination time, germination rate, shoot length, and root fresh weight. A statistically significant difference was observed in root length and shoot fresh weight ($p<0.01$). The mean, minimum, and maximum values of root length were 4.81, 3.13 (5 min-40 mT), and 6.07 (5 min-20 mT) cm, respectively. The mean shoot fresh weight was determined to be 59.28 mg per plant. The lowest value of shoot fresh weight was observed in the control group (34.70 mg.plant-1), while the highest was recorded in the 20 mT magnetic field application for 5 minutes (80.08 mg.plant-1). The results show that magnetic field application increased root length and shoot fresh weight in Hungarian vetch.

Keywords: Vicia pannonica Crantz., Magnetic fields, Germination rate, Germination time

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(PP-01)
Determining the Effects of Different Gamma Radiation Doses Applied on Sunflower

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Abstract: Sunflower (Helianthus annuus L.) is an essential crop for producing vegetable oil in both Türkiye and globally, thanks to its high-quality oil and significant seed oil content. Beyond its role in the cooking oil industry, sunflower serves as a crucial raw material for a wide range of industries, including biodiesel, cosmetics, paints, varnishes, soaps, and plastics. Mutation breeding has been used to develop numerous parental lines in sunflowers. This study utilized Cobalt-60 (^{60}Co), a radioactive isotope of Cobalt, as the source of gamma radiation. The SUN2239CL parent line was selected as the maintainer parent material. Sunflower seeds were exposed to 14 different gamma radiation doses, ranging from 100 Gy to 1400 Gy, and then grown in pots in a controlled growth chamber, with three replicates for each dose. Observations were made at the cotyledon stage to determine the LD50 dose for seedlings. The goal of this research is to robust genetic variation and develop parental lines using mutation breeding techniques, ultimately identifying suitable doses for breeding new sunflower varieties that align with market quality standards.

Keywords: mutation breeding, Heliantus annuus L., gamma radiation

(PP-02)
Influence Of Temperature, Light And Length Of Storage On The Quality And Speed Of Germination Of Petunia X Hybrida Seeds

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Abstract: Petunia x hybrida Hort. it is considered one of the most common types of annual flowers inBosnia and Herzegovina. It varies a lot in terms of height, shape of the tree, appearance, size andcolor of the flower. Propagation of petunias is done mainly by seeds. The seeds are quite small,so there are 8000-10000 seeds in 1g. Germination remains for 3-4 years. The seeds of certainplant species do not germinate with the same intensity and quality. Every biological process,including germination, is under the direct influence of various abiotic factors (temperature, lightand moisture). The seeds of three different cultivars of Petunia x hybrida ´Nana compatta rossa´,´Nana compatta bianca´, ´Nana compatta multicolor´, were used for laboratory research. The aimof this work is to explain how and to what extent temperature and light affect the quality of seedgermination of three cultivars of petunia (Petunia x hybrida), and the dynamics of itsgermination at different

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values of temperature (16, 22, 26°C) and light (light, darkness). Thetests were carried out in the laboratory of the Faculty of Forestry in Sarajevo.

Keywords: Petunia x hybrida, seed, temperature, light

(PP-03)
Crambe (Crambe abyssinica L.) as an Alternative Oil Plant That Can Be Grown in Central Anatolian Conditions Evaluation of

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Abstract: It is an annual oil plant from the Brassicaceae family with high oil content and high erucid acid content, which is used in the production of many industrial products. In this study, the yield and yield elements of eighty-two crambe genotypes obtained from the American gene bank were evaluated. The experiment was designed according to the Augmented trial design in 2024 at the Central Research Institute of Field Crops in Yenimahalle district of Ankara province. In the experiment, the emergence time was 7-12 (days), leafing was 21-25 (days), bud formation was 55-67 (days), flowering onset was 53-74 (days), physiological maturity was 57-72 (days), plant height was 30.0-81.6 (cm), number of branches in plant was 10.8-25.8 (pieces) and yield per plant was 0.04-0.79 (g/piece). According to the results of the research, It was determined that genotypes 15, 17 and 21 stood out in terms of yield from the genotypes grown. In order to make a clearer decision about the cultivation of the crambe, the decision should be made by conducting the perennial, multiple locations and economic analysis of the experiment.

Keywords: Crambe, erucic acid, grain yield. industrial oil seed, agronomic characteristics

(PP-04)
Effect Of Aerosol Smoke On Seedling Emergence And Seedling Quality Parameters İn Spinach Seeds At Different Temperatures

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Abstract: This work was carried out to test the effect of aerosol smoke treatment (AS) on germination and seedling emergence and fresh and dry weight of spinach (Spinacia oleracea cv. Matador) seeds at three different temperatures. Seeds were treated with aerosol smoke for 20 and 60 minutes in smoke cabinet and emerged at 18, 24 and 30°C in peat moss over in climatic room (light, 72 µMol m-1s-1) for 20 days. Untreated (C) and hydroprimed (HP, 16 hours at 20 °C on wet papers) were used as controls. AS treated seedling emergence was not greatly change

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ranged in between 89 and 98 % compared to C and HP but seedling fresh and dry weight were significantly higher than those of controls. AS of 20 minutes had the highest values of 263 mg, 172 mg and 167 mg /plant of seedling fresh weight at 18, 24 and 30°C. Seedling dry weight in this treatment was recorded as the highest of 14.4, 10.3 and 9.2 mg of seedling at three temperatures, respectively. Results indicated that aerosol smoke can be a promotive effect not on seedling emergence percentages but seedling size reflected on fresh and dry weight in spinach seeds.

Keywords: Spinach, seed treatment, seedling emergence, seedling weight

(PP-05)
Pre-Sowing Biological Measures Of Maize Seed Stimulation

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Abstract: In a non-irrigated cropping system, the lack of water in the early stages of plant development reduces the number of plants per unit area, which has a direct impact on yield. Pre-sowing seed stimulation through biological measures is one of the ways to combat unfavorable weather conditions and drought stress.A two-factor trial was set up with three maize lines L-1, L-2, L-3 and six hydropriming treatments. The treatments are a combination of treatments with different water temperatures of 20°C (T1) and 25°C (T2) and treatments with different immersion times of the seeds in water, 6 (D1), 12 (D2) and 18 (D3) hours. After hydropriming, the seeds are air-dried at 40°C for 24 hours. Germination, stem length, root length, stem mass and root mass were determined after seven days of seed germination in an incubator using a standard method. All six treatments applied had a positive effect on stem and root length and mass. By applying treatment T2 in combination with all time treatments (D1, D2, D3), the root length is significantly greater compared to the control. The longest root, 137 mm, was recorded at L2 in the treatment combination T2D1. The longest seedling stem was 98.11 mm in T1D2. The treatments also affected the increase in stem mass: The L3T1D2 combination had the greatest stem mass at 0.93 g, and the L4T2D3 combination had the greatest root mass at 0.68 g. The use of hydropriming improves seedling performance, which is a good basis for overcoming the problem of water deficiency in the earliest stages of development.

Keywords: kernel, seedling properties, treatments, sustainable

(PP-06)
The Objective Of Osmopriming And Biopriming Treatments On Vegetable Seed Vigour Under Salt Stress Conditions

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Abstract: Salinity stress has emerged as an important factor that negatively affects agricultural production and yield. The high salt content of the soil is a result of natural and artificial practices that lead to the accumulation of sodium salts in the soil. The application of beneficial microorganisms to increase salt tolerance in plants is a viable alternative approach to recovering salinity-prone soils in production areas. In the study; osmopriming, biopriming + salt stress, salt stress and no salt stress (control) groups. For osmopriming, 1 and 2% concentrations of 50, 100 and 200 mM NaCl stock solutions were used. RioGrande and Kemer 27 varieties were used as plant material. For biopriming; three different Bacillus spp. isolates and combinations and seed groups were subjected to salt stress with the same doses and germination tests were performed. Normal and abnormal germination (4x25 replicates/ seed, 25 0C, 14 days) and mean germination time (days) of seeds of all treatment groups were determined. When the results were evaluated, while the germination rate of the control group was 40%, germination decreased to 36% under 50 mM NaCl salt stress. Under the same stress conditions, the germination rate of seeds bioprimed with B. velezensis bacterial isolate increased to approximately 53%, while the rate of Bacillus spp. isolate increased to 47%. In addition, germination rate of these three isolates was determined as 43% as a result of mix treatment. In terms of abnormality, the lowest rate was achieved with B. velezensis isolate. The earliest group in terms of MGT was calculated in B. amyloliquefaciens treated seeds. In conclusion, it is thought that seed performance under salt stress conditions can be supported by biopriming treatment.

Keywords: Bacillus velezensis, Biyopriming, Osmopriming, Salinity, Bacillus amyloliquefaciens

(PP-07)
The Potential Of Using Local Seed From Autothon Variety "Čapljinska Paprika" in Comparison To The Commercial "Istarska F1" Hybrid

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Abstract: This study explores the potential of using local seeds of the "Čapljinska Paprika" (Capsicum annuum L.) and compares their quality with the commercial hybrid Istra F1, the most common pepper variety in Bosnia and Herzegovina's protected areas. Plants were exposed to high-temperature stress (47°C for 16 h and 37°C for 8 h) without watering. Key factors such as chlorophyll content, leaf humidity, and cell viability were measured. There were no significant differences in the average chlorophyll

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content between the treated plants of the two varieties, with the domestic variety showing 41.117 mg/cm^2 and the hbyrd Istra F1 41.112 mg/cm^2. Similarly, the average moisture content was 91.16% in the domestic peppers and 84.97% in the Istrian peppers. The electrolyte leakage values were also comparable, with 15.99% for the domestic variety and 15.69% for the Istrian variety.Results showed no significant differences between the varieties in these parameters, suggesting the local "Čapljinska Paprika" is equally suitable for cultivation, supporting its preservation and broader use.

Keywords: Capsicum annum L., seedlings, production.

(PP-08)
{Plasmopara halstedii} Threat in Sunflower Farming

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Abstract: Sunflower (Helianthus annuus L.) is an industrial plant that belongs to the Asteraceae family and has a chromosome number of 2n=34 (Anonim, 2014; Kaya, 2015). Its primary gene center is located in North America. Sunflowers are not only harvested for vegetable oil production but their seeds are also enjoyed as a snack. In Türkiye, sunflower oil is the most popular way to utilize sunflowers. Currently, Türkiye ranks eighth in the world for sunflower production. However, sunflower plants are vulnerable to various diseases and pests. One of the most significant threats to them is the fungal disease caused by Plasmopara halstedii, which can result in a complete yield loss of up to 100%. The symptoms of this disease can vary depending on the stage of infection in the plant. Zoospores can initiate primary infections by moving towards the roots, and later lead to secondary infections on the leaves. Though secondary infections are less impactful in terms of disease spread and overall crop loss, they still contribute to the overall vulnerability of the plants. (Anonim, 2008; Kaya ve ark., 2012; Škorić, 2012; Spring, 2019).

Keywords: Infection, Sunflower, Plasmopara halstedii, Downy Mildew, Helianthus annuus

(PP-09)
Determination Of The Site And Mechanism Of Seed Transmission Of Tobrfv

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Abstract: Tomato brown rugose fruit virus (ToBRFV) is one of the epidemiological plant viruses belonging to the genus Tobamovirus.The most important source of the epidemiological effect of ToBRFV, which causes disease outbreaks worldwide, is seed-borne transmission. The aim of this study was to determine the location and mechanism

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of seed transmission of ToBRFV.In order to determine the percentage of seed transmission of ToBRFV, each of 1000 seeds taken from ToBRFV infected tomato fruits was considered as a separate sample and analyzed by RT-PCR method.In this study, 100% of the seeds tested without disinfection were found to be infected with the agent. In the second stage of the study, surface sterilization was applied to the other 1000 seeds taken from infected tomato fruits in order to eliminate the risk of transmission, since the ToBRFV agent can easily spread by contact. It was determined that the disinfection process eliminated the viruses in the seed coat of ToBRFV. In order to determine the transmission rates in the embryo and endosperm, 1000 embryos and 1000 endosperms separated from each other by embryo rescue on the 28th day were tested separately by RT-PCR method. Although there are hypotheses that the virus is transferred to the embryo following the pollination process, it was determined by RT-PCR method within the scope of this study that the agent was not seen in the embryo, but localized in the seed coat and endosperm. According to these results, it was determined that ToBRFV was found in the seed coat at a rate of 100% and the virus could be removed from the shell by using disinfectant, but 0.8% of the virus was found in the endosperm.

Keywords: ToBRFV, Tomato, Seed, Virus localization

(PP-10)

Biocrust Determines The Seed Germination And Seedling Survival Of Annual Plants İn A Temperate Desert

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Abstract: Annuals are important components of desert vegetation and play a vital role in ecosystem restoration, with populations frequently fluctuating with precipitation and various surface disturbances. However, the presence of biocrusts on the surface of desert soil can affect the germination and survival of annuals, but the reasons are not well investigated. Our field surveys and experiments in the Tengger Desert revealed biocrusts have dual impacts on desert annuals. intact biocrusts, especially moss- or lichen-dominated crusts, which prevent the seeds from going directly into the soil, as the large number of seeds is blown away by the wind. Proper destruction of biocrust covering surface can significantly increase the soil seed banks. In comparison with bare soil, the survival and growth of the tested annual plants were enhanced in three types of biocrusts (cyanobacteria- lichen- and moss-dominated crusts). These can be explained by improved soil habitat through carbon and nitrogen fixation by biocrusts, and increased topsoil moisture through enhanced soil water-holding capacity. The differences in the influence on the tested plants are likely because they differ from their biological traits of seeds

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(size, shape and age), and their seed position in biocrust covered soils. These influences are more pronounced in late developed crusts (lichen- and moss-) than in the early stage crusts (cyanobacteria). In addition, the presence of biocrusts in temperate desert ecosystems can provide more nutrients and a suitable environment for native annuals, as well as acting as an inhibitory effect on exotic plants. These findings have implications for future desert restoration and ecosystem management.

Keywords: Seed germination, Soil seed bank, Annual desert plants, Biocrusts, Ecosystem restoration

(PP-11)
Increasing The Germination Rate Of in Vivo Maternal Haploids With Priming

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Abstract: In maize breeding, germination is the first step of chromosome doubling stages in haploid seeds obtained by in vivo maternal haploid technique. At this stage, germination does not occur in all putative haploid seeds. This study aims to increase the germination success rate by applying different priming protocols to haploids that do not germinate. Haploids obtained within the scope of TUBITAK 1501 program, project number 3220213 were kept in 1% and 2% PEG6000 solution at different temperatures (15^{0}C, 25^{0}C, and 35^{0}C) for 24 hours. After 9 hours of drying, the seeds were placed between papers moistened with 0.2% Ca(NO3)2 solution and 0.2% Ca(NO3)2 solution was used as germination water. In germination studies where different temperatures and concentrations were applied, 3rd-day counts were made and in 2 seeds with 1% PEG application at 25^{0}C, plumule and radicle emergence were observed. However, plumule and radicle elongation did not continue. In 7th day counts, there was no germination in 1% PEG applications; in 2% PEG application at 15^{0}C and 25^{0}C ambient temperatures, plumule and radicle emergence were observed in 4 and 2 seeds, respectively. Haploids that emerged were subjected to the doubling process and selfing was performed and 2 number of DH maize lines were obtained. As a result, the success rate in osmopriming applications at low and optimum temperatures was determined as 3.3%.

Keywords: Maternal Haploid, priming, PEG, germination

(PP-12)
Optimization of Clonal Micropropagation of Pear

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Abstract: In the Almaty region, climatic and soil

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conditions allow for high yielding pear fruits. The most radical method of reducing the productivity of fruit plantings is to improve the assortment by introducing new competitive varieties that are high-yielding with traditional shelf-stable fruits, resistant to conditions and the most harmful diseases, and suitable for intensive cultivation technologies (1). Three varieties of pear were grown on artificial nutrient media in vitro: Karyndas, Vystavochnaya, Noyabrskaya; 5 pear rootstocks Su-li, Bai-li, Wild forest, OHxF230, OHxF69; 2 hybrids selected by KazNIIPO-1-1-4; 1-5-7. The highest reproduction coefficient for the Karyndas variety was 2.2%, the lowest for the Vystavochnaya and Noyabrskaya varieties was 1.7-1.8%. Among the rootstocks, the highest reproduction rate was for the Dikaya Lesnaya rootstock - 3.4%, and the lowest for the Bai-li rootstock - 1.7%, OHXF230. 2.9%, for hybrids it was -1.2%. Sterilizing drugs and their concentrations for disinfecting explants from saprophytic microflora were determined, the composition of nutrient media for introduction into in vitro culture and clonal micropropagation of pear was optimized. Explants can be effectively sterilized with one of the antiseptics: a) HgCl2 0.1% at an exposure time of 3.5-4.0 minutes. To introduce pear explants into in vitro culture, the following medium was used: MS-BAP-0.5 mg/l and GK-0.5 mg, 30 g/l sucrose was added, and for microclonal propagation, MS-50% nitrogen medium with a BAP content of 1.0 mg/l; HA - 0.2 mg/l, IBA - 0.1 mg/l, mesoinositol -100 mg/l, sucrose - 30 mg/l, vitamins B 1 - 0.5 mg/l, PP - 0.5 mg/l , B6 -0.5 mg/l.

Keywords: nutrient media, clonal micropropagation, tissue culture

(PP-13)
Scientific Support For Seed Productıin in Kazakhstan

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Abstract: SCIENTIFIC SUPPORT FOR SEED PRODUCTION IN KAZAKHSTANIskakov A.R., Kazakh RI of Agriculture and Plant Growing. Seed production is the most important component of agriculture. In Kazakhstan, the annual demand for seeds is 2.0 million tons for grain and leguminous crops, 87 thousand tons for oilseeds, 23 thousand tons for forage crops, and 289 thousand tons for potatoes. Country has a high import dependence on crop seeds. Therefore, the development of breeding and seed production is one of the priority areas of agriculture. The government of the country approved the Comprehensive Plan for the Development of Breeding and Seed Production of Crops of the Republic of Kazakhstan for 2024-2028.There are 284 certified producers of elite seeds in Kazakhstan. Research work on breeding and seed production of crops is carried out by research institutes of the NASEC. The leading centers for breeding and primary seed production are the Kazakh Research Institute of Agriculture and Plant Growing in South region, the A. Barayev Center for Grain Farming, the Karabalyk Experimental Station in North region. Institutes are developing varieties and hybrids of agricultural crops. As originators of varieties of agricultural

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crops, they also conduct research on seed production. The Kazakh Research Institute of Agriculture and Plant Growing has created the country's largest gene bank with 21 thousand samples of 29 species. The Institute is actively developing international cooperation, including with the Central Institute of Field Crops of Türkiye. Kazakh scientists intend to expand cooperation with scientific institutions of the Türkiye on plant breeding and genetic resources, as well as on seed production of field crops, study the experience of seed production development and implement it in Kazakhstan.

Keywords: Plant breeding, Seed growing, Plant breeding, seed growing, agriculture

(PP-14)
Unlocking The Potential Of Autothon Varietıes Of Collard Greens (Brassica Oleracea Var. Acephala) For Microgreens Production

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Abstract: Bosnia and Herzegovina, consumer interest in microgreens of vegetables, aromatic herbs, and cereals has been on the rise in recent years. Since there is no domestic research data on the amount of minerals, phenols, and other antioxidant substances in microgreens, the question of their examination arises. There is a short period of time for growing microgreens, and interest in their production in European urban areas is growing. In addition to the fact that the urban population in Bosnia and Herzegovina and around the world is constantly increasing, there is a need to reduce the burden on rural areas regarding food production. Super-fresh, functional food rich in nutrients can be made available both in basements and on the twentieth floor of skyscrapers by producing microgreens. In addition to enabling a balanced diet, microgreens production can turn into a very profitable business. Therefore, there is a need to modernize the production of microgreens by introducing modern growing equipment and choosing appropriate varieties with high quality, which has a great impact on both the yield and the content of antioxidant and nutritional compounds in microgreens. Accordingly, the right choose of the seed of production of microgreens is of great interest both for producers in urban areas and for end-users. For microgreens production, only untreated, organic seeds with high quality are used. Due to the limited availability of organic seeds with these characteristics on the Bosnian and Herzegovinian market, there is a growing need to utilize indigenous autohton varieties. To address this, an experiment was conducted using three autohton collard greens (Brassica oleracea var. acephala) varieties: Mostar, Blagaj, and Kočine—compared to the Bonanza F1 hybrid.

Keywords: quality, organic seeds, microgreens

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(PP-15)
Accelerated Aging Test to Predict Seed Storage Potential in Swisschard Seeds

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Abstract: This study was carried out using 12 commercial seed lots of swiss chard (Beta vulgaris var. Cicla) species in order to predict the germination potential after storage by accelerated aging test. For this purpose, the seed lots were subjected to accelerated aging (AA) test at 41°C for 72, 96 and 120 hours at 100% relative humidity, then the total and normal germination percentage (25 C, 14 days, BP method) were calculated. For storage experiment, seed lots were equilibrated at 75% relative humidity (using saturated NaCl solution) and stored in hermetic packages at 15°C for 12 months. After storage, as in the ageing test, total and normal germination percentage were calculated. At the end of the study, correlation coefficients in between after AA test and after storage were calculated. Significant correlation was found between the results of the AA96 hours and the germination percentages after storage. The significance level was at $p<0.01$ in both, total; $r=0.725^{**}$ and normal; $r=0.725^{**}$ of post-storage germination percentages with AA96. In this study, 96 hours of accelerated ageing at 41°C 100% relative humidity was found to be suitable for determining the germination potential of red beetroot seeds after storage.

Keywords: -

(PP-16)
Determination of Oxidant and Antioxidant Parameters of Different Seeds of Oilseeds and Impact of Cooking Temperature on These Parameters

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Abstract: The study aimed at to determine the antioxidant and oxidant capacity amounts in oilseeds that are consumed in Türkiye and globally. Soya, rapeseed, sunflower, safflower, linseed, hemp, sesame, poppy, black cumin, coriander and pumpkin seeds were analysed for superoxide dismutase (SOD) and malondialdehyde (MDA) content as raw seeds (control) and after heating (160 °C) for 5 and 20 minutes. Within the range of seed antioxidant values, soybean (158.4 g ml^{-1}) and coriander (150.9 g ml^{-1}) had the highest antioxidant values and rapeseed (30.9 g ml^{-1}) the lowest in the control group. Coriander (152.7 g ml^{-1}, 154.4 g ml^{-1}), black cumin (143.4, 151.5 g ml^{-1}) and sunflower (143.6, 151.5) had the highest antioxidant values and pumpkin (41.3 g ml^{-1}, 28.1 g ml^{-1}) the lowest in 160 °C for 5 and 20 minute heatings. The highest and the lowest oxidant value in control was obtained from coriander (204.8 g ml^{-1}) and poppy (60.4 g ml^{-1}) seeds. While hemp seed (had the highest level of oxidants, sunflower seed had the lowest level of oxidants at heating (160 °C) for 5 minute. The maximum and minimum oxidant value for heating at 160 °C was observed in sunflower (533,6 g ml^{-1}) and hemp (78.8 g ml^{-1}) seeds respectively.

Keywords: Oilseed, MDA, SOD

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(PP-17)
Biotechnologıial Approaches in Vegetable Seed Production

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Abstract: Vegetable seed production plays a critical role in ensuring agricultural productivity and global food security. While traditional breeding methods have long been employed in this field, recent advancements in biotechnology have transformed vegetable production, making it more efficient, resilient, and sustainable. This abstract reviews key biotechnological approaches currently used in vegetable seed production. Techniques such as genetic modification (GM) and CRISPR-Cas9 have been instrumental in enhancing the resistance of vegetable crops to pests and environmental stresses, while simultaneously improving their nutritional profiles. In addition, molecular marker-assisted selection (MAS) and tissue culture techniques have accelerated the breeding process, allowing for the quicker development of high-yield and disease-resistant varieties. Synthetic biology further offers opportunities to redesign the genetic makeup of seeds, enabling the introduction of specific, desirable traits into vegetable crops. Despite the potential benefits, concerns remain regarding the long-term effects of genetic modification and synthetic biology on human health. This uncertainty has sparked global debates and led many countries to adopt cautious approaches, introducing regulatory frameworks to control or limit the use of these technologies. Nevertheless, biotechnological innovations hold significant promise for increasing the efficiency, sustainability, and overall resilience of vegetable production, offering critical solutions to the challenges of future food security.

Keywords: seeds, biotechnology, abiotic and biotic stress, sustainable agriculture

(PP-18)
Whole Genome Sequence Analysis Reveals Possible Resistant Genes in Tomato Mutant Lines

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Abstract: The bacterial wilt and canker disease caused by Clavibacter michiganensis subsp. michiganensis (Cmm) is seed transmitted especially spreading throughout all tomato (Solanum lycopersicum) grown places, the bacteria are resulting serious losses to both greenhouse and field tomato crops either killing whole plant or reducing tomato yields. A prominent control is Cmm-resistant cultivars for tomato production is a suitable

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way for sustainable and eco-friendly method. The mutant lines were generated by using 0.5% Ethylmethanesulfonate (EMS) chemical mutagen from susceptible NCEBR3 plant; M3-9 and M3-15 plants were determined as resistant against Cmm isolate 2 at M3 population previously. Individual mapping populations were constructed with M3-9 and M3-15 mutant line and a resistance locus was mapped at chromosome 5 of tomato. The resistance locus was linked with SL20210_883i SSR marker flanked by single nucleotide polymorphism markers. For understanding and cloning genetic polymorphisms, entire 5th chromosomes were sequenced to reveal Cmm-resistance locus using Illumina HiSeq. There were 20 mutations were investigated between M3-9 and M3-15 mutant plants, and 53 mutations among susceptible NCEBR3, M3-9 and M3-15 mutant plants. Preliminary results showed that there were 8 uncharacterized proteins and 11 serine/threonine-protein phosphatase and 2 acylsugar acyltransferase 3-like proteins found between 2 mutant lines. Further, next generation sequencing analyses will precisely exhibit which proteins are governing resistance to Cmm2 bacteria.

Keywords: Tomato, Bacterial canker and wilting, Resistance, Next Generation Sequencing

(PP-19)
Scientific Support For Seed Production İn Kazakhstan

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Abstract: Seed production is the most important component of agriculture. In Kazakhstan, the annual demand for seeds is 2.0 million tons for grain and leguminous crops, 87 thousand tons for oilseeds, 23 thousand tons for forage crops, and 289 thousand tons for potatoes. Country has a high import dependence on crop seeds. Therefore, the development of breeding and seed production is one of the priority areas of agriculture. The government of the country approved the Comprehensive Plan for the Development of Breeding and Seed Production of Crops of the Republic of Kazakhstan for 2024-2028. There are 284 certified producers of elite seeds in Kazakhstan. Research work on breeding and seed production of crops is carried out by research institutes of the NASEC. The leading centers for breeding and primary seed production are the Kazakh Research Institute of Agriculture and Plant Growing in South region, the A. Barayev Center for Grain Farming, the Karabalyk Experimental Station in North region. Institutes are developing varieties and hybrids of agricultural crops. As originators of varieties of agricultural crops, they also conduct research on seed production. The Kazakh Research Institute of Agriculture and Plant Growing has created the country's largest gene bank with 21 thousand samples of 29 species. The Institute is actively developing international cooperation, including with the Central Institute of Field Crops of Türkiye. Kazakh scientists intend to expand cooperation with scientific institutions of the Türkiye on plant breeding and genetic resources, as well

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as on seed production of field crops, study the experience of seed production development and implement it in Kazakhstan.

Keywords: Agriculture, Seed production, breeding

(PP-20)
The Expression Of The Receptor Binding Domain Of Spike Protein From Sars Cov-2 Omicron Variant in Tomato

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Abstract: The coronavirus disease-19 (COVID-19) caused by SARS Coronavirus 2 (SARS-CoV-2) originated from China and spread worldwide resulting the worst a pandemic in the history. While mRNA vaccine played a major role for ending the pandemic, cost of production, and difficulties of scaling, distribution, storage of mRNA vaccines emphasised the importance of alternative vaccine production strategies including plant-based edible vaccines. Therefore, to develop plant-based edible vaccines the receptor binding domain (RBD) of surface glycoprotein spike (S) from the original SARS CoV-2 Wuhan was previously expressed in tomato. In this study, RBD of S from, the latest major variants, SARS CoV-2 Omicron, with substantial number of mutations in RBD was expressed in tomato to produce updated edible vaccine. The RBD of Omicron variant was amplified from S gene by RT-PCR and cloned into modified pCAMBIA binary vectors under constitutive CaMV35S promoter. pCAMBIA vectors containing RBD of SARS CoV-2 Omicron were transferred into Agrobacterium tumefaciens. Then, cotyledon and epicotyl explants of in vitro germinated seedlings from a F1 parental tomato line, 7855, were transformed with RBD from Omicron using Agrobacterium. During the transformation process 269 seeds were germinated in vitro and 1201 explants consisting of 526 kotiledon and 675 epicotyl segments were transformed. A total of 178 shoots were regenerated from transformed cotyledon and epicotyl explants. After rooting of shoots, 31 rooted whole tomato plantlets potentially expressing RBD of SARS CoV-2 Omicron were obtained. The presence of RBD transgene in genomes of three potential transgenic plants and expression of transgene mRNA was confirmed, respectively, by PCR and RT-qPCR methods. The transgenic plants expressing RBD will be analyzed and its potential for a plant-based edible vaccine will be evaluated.

Keywords: COVID-19, SARS CoV-2, genetic transformation, plant-based vaccine, edible vaccine, tomato

(PP-21)
Gene Banks And The Importance Of Seed Storage

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Abstract: Plants are widely used to meet a significant part of human needs such as nutrition, heating and shelter. The rapid increase in the world population, unconscious use of plant resources to meet the needs of people, land clearing, replacement of indigenous (traditional) varieties with improved varieties, use of weed pesticides, consumption by uprooting from nature instead of production, natural disasters, urbanization and industrialization cause the decrease and rapid loss of plant gene resources. Both the development of new varieties to increase agricultural production and the transfer of natural (wild) plant species, which are raw materials, to future generations without erosion will be possible by preserving and protecting the existing plant diversity. Since the first years of agriculture, human beings have cultivated the plant resources available in nature according to their consumption purposes and developed varieties of the species we use today. The regions where genetic diversity in plant species is intense are defined as Plant Gene Centers, and small areas showing variety richness within gene centers are defined as Micro Gene Centers. Some researchers have stated in their studies that there are 12 different gene centers in the world. It was realized by scientists in the early 19th century that plant species in these centers had been lost due to the above-mentioned reasons, and in order to identify and preserve genetic resources, the "Seed and Plant Introductions Unit" under the Ministry of Agriculture was established for the first time in the USA in 1898 and hundreds of thousands of plant samples were collected from different parts of the country. In this study, the importance of gene banks and seed storage is explained.

Keywords: gene bank, seed preservation, biodiversity, genetic resources, agricultural sustainability, food security

(PP-22)
Intercorrelation of Ethylene Biosynthesis and Signaling Genes with Agronomic Traits in Determining Climacteric Behavior in Melon Genotypes

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Abstract: Melons exhibit significant intraspecific variation, making them an ideal model for studying fruit ripening traits, particularly the distinction between climacteric and non-climacteric fruit. This differentiation is crucial for post-harvest management, market quality, and optimal harvest timing. Our research analyzed four genotypes—'Melona', 'Tacapa Gold', 'Kinaya', and 'Gama Melon Parfum'—focusing on their agronomic traits and the expression of ethylene regulatory and signaling genes. The results indicate that while the fruit's skin structure does not directly define the climacteric type, it affects resistance to impact and damage during distribution. Ethylene biosynthesis genes (CmACS and CmACO) serve as markers for climacteric traits, with gene expression patterns correlating with reduced fruit firmness and thinner skin. Ethylene signaling genes (CmATH and CmEREBP) show a spike at the end of the harvest period in non-climacteric melons, contrasting with the gradual increase in climacteric types. Notably, the hybrid 'Tacapa Silver' exhibited an

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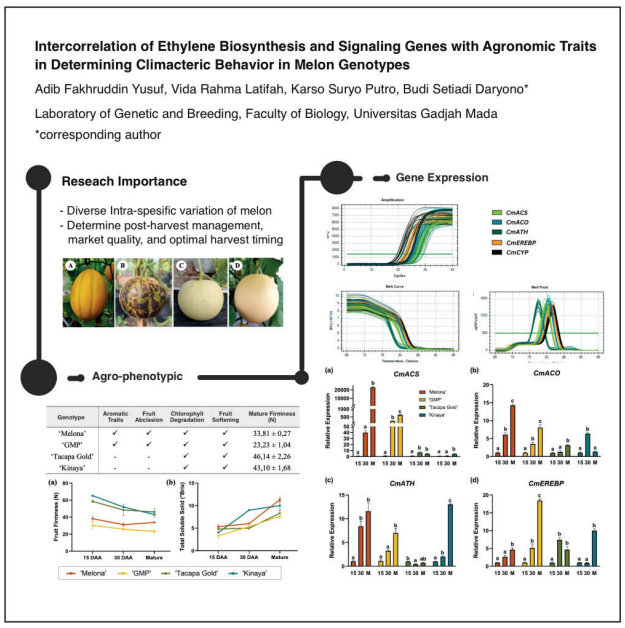
intermediate-climacteric type with a distinct expression pattern. Although total soluble solid content is genetically determined, it is influenced by plant nutrition and serves as a significant marker in sweet-tasting melons such as 'Melona', 'Tacapa Gold', and 'Kinaya'. This study enhances the understanding of post-harvest melon biology, offering valuable insights for breeders and farmers to tailor cultivation practices according to specific genotype characteristics.

Graphical abstract



Keywords: climacteric, gene expression, post-harvest strategies, agro-phenotypic, melon genotype

(PP-23)

Estimation of the Effect of Climate Change on Potential Distribution Areas of Hordeum Vulgare in Summer Growing Regions by Using Species Distribution Model

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Abstract: In order to determine how Hordeum vulgare, which has an important place in cool season cereals in our country and in the world and is widely cultivated, will be affected by climate change, it is important to model its current and future distribution areas. Current and future distribution areas of Hordeum vulgare in areas where it is cultivated in summer growth can be determined with the maximum entropy algorithm (Maxent). Using the presence data and environmental variables of the species representing its distribution in Türkiye, the distribution areas of Hordeum vulgare in the areas where it is cultivated as summer crops within the scope of SSP2 4.5 and SSP5 8.5 scenarios in the time intervals of 2041-2060 and 2081-2100 according to the CNRM-CM6-1 global climate change scenario were modeled using MaxEnt 3. 4.1. In the Jacknife test, Bio1 (annual average temperature) had the most effect on the distribution, while Bio7 (range of annual temperature change) was the least effective bioclimatic variable. According to SSP2 4.5 and SSP5 8.5 scenarios, it was determined that the distribution area will increase and spread inland. As a result, the effects of potential and future distribution areas on sustainable cultivation and agriculture were discussed.

Keywords: Climate changes, Hordeum vulgare, CNRM-CM6-1, MaxEnt, SSP2 4.5, SSP5 8.5

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(PP-24)
Determination Of Genotypes That Can Be Used in The Development Of Edible Dry Peas And Fodder Pea Varieties Suitable For Konya Conditions

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Abstract: This research was conducted to develop edible and forage dry peas (Pisum L.) varieties suitable for Konya conditions. The research was conducted in two locations in Selçuk University Sarayönü Vocational High School and Konya Kadınhanı Kolukısa District in the 2022-2023 production season, using 14 foreign varieties, 3 domestic registered varieties and 3 domestic lines, according to the randomized block trial design, with four replications. In the research, agricultural characteristics such as winter hardiness, flowering time, plant height, grain yield and quality analysis values of dry pea genotypes were examined. Winter hardiness of dry pea genotypes is between 11% and 87%, flowering time is 180.3-202 days, plant height is 59.8-140.5 cm, biological yield is 117-1080 kg/da, grain yield is 34-457 kg/da, 1000 grain weight is 110.1-316.6. g, harvest index varies between 16.52-42.38%. According to the quality analysis results, crude protein was determined as 19.9-27.3%, starch as 39.7-46.6%, crude fat as 0.7-1.2%, crude fiber as 5.7-7.4%, and crude ash as 2.7-3.0%. As a result, the Retrija variety stands out in terms of resistance to cold stress and grain size. In terms of food quality characteristics, Ps13-2, Deren, Hubal and Vitra came to the fore with crude protein content, Astronaute, Ps317, Psx5 and Irmak with low cellulose content, Green Wood, Irmak, Salamanca and Guiduro with high starch content. In the research, it was seen that there was a wide diversity in terms of the characteristics of the genotypes and it is thought that this will provide a high combination opportunity for the development of new varieties suitable for our region.

Keywords: Dry peas, grain yield, plant breeding, protein

(PP-25)
Biological Soil Crusts Affect Seed Germination And Growth Of Exotic Vascular Plant in An Arid Ecosystem

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Abstract: Biological soil crusts (BSCs) are widespread communities that display patchy distributions surrounding vascular plants in arid and semiarid regions, formed by fungi, bacteria, cyanobacteria, green algae, lichens, and mosses closely integrated with soil particles, which can improve the stability and health of vascular plant communities in arid ecosystem. In arid ecosystems, BSCs provide available nutrients and appropriate

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habitats for vascular plants by improving the microenvironment, including the soil fertility, moisture, and temperature. However, it is unknown whether BSCs have inhibitory effect on the germination of exotic vascular plants on stabilized reclaimed sand dunes. we conducted a greenhouse experiment to test the effects of cyanobacteria-dominated BSCs on seed germination and biomass of exotic grass (Stipa glareosa P. Smirn.). In this study, we investigated the effects of cyanobacteria-dominated crusts under three conditions (intact crust, disturbed crust, and bare soil) on seed germination and biomass of S. glareosa. The results showed that cyanobacteria-dominated crusts can significantly reduce the cumulative percent germination of exotic vascular plants ($p<0.001$). Maximum cumulative percent germinations were found in bare soil, and minimum in intact crusts. The presence of BSCs may decrease the threat of propagation of exotic species. In the meantime, reducing exotic vascular plant seeds germination would maintain more diverse plant communities and contribute to the formation of clumped vegetation patterns. Thus, our research results provide insights into BSCs act as a natural regulator for maintaining the health and stability of arid ecosystem.

Keywords: Biological soil crusts, biomass, exotic grass, maintain stability, seed germination

(PP-26)

Selection Of Seedlings M. Sievers For The "Aport" Apple And Physiological And Phyto-Pathological Assessment Of Scion-Rootstock Combinations

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Abstract: In 2011, 30 forms of Malus Sieversii were selected in the Zhongar-Alatau, Ile-Alatau and Tarbagatai National Parks. Five forms of 'Aport' variety were selected from the Pomological Garden and farmers. Using molecular analysis, 11 forms of M. Sieversii and 1 clone of the 'Aport' with similar DNA profiles were selected to create variety-rootstock combinations. The relationship was assessed using the DNA profile of the rootstock and scion, assessing the number and length of amplicons obtained from at least 5 ISSR markers. 'Aport' plants recovered by tissue culture. The studies showed that forms №5, №6, №2, №3, №4 and №7 are characterized by high productivity of photosynthesis during the ripening period, and forms №18, №8, №9 and №10 – during the period of laying generative buds, this indicates that the M.Sieversii form as a rootstock influenced the formation of photosynthesis productivity. As a result of the analysis, form 5 was isolated, which included

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rootstock genotypes positive for the AE-375 marker at the QTL FBF7 locus. In addition, scion form 5 carries alleles of resistance to bacterial blight for two markers. In the work, 2 scions and 4 rootstock genotypes carrying the resistance allele for the AE-375 marker, 5 scions and 6 rootstock genotypes for the GE-8019 marker were identified. In general, according to the photosynthetic productivity indicator for the entire vegetation period, forms №5, №18, №1, №2, №3, №9 and №10 were identified as highly productive. According to all the studied biometric, physiological-genetic and biochemical indicators, forms №18 and №2 were identified as productive, drought-resistant and quickly entering fruiting. 9-years old Aport orchard and M. Sieversii seedlings using for plant material production.

Keywords: variety-rootstock combination, State National Natural Park, Aport, Malus Sieversii, markers, diseases

(PP-27)
Pre-Extention Demonstration Of Improved Chikcpea Varieties in Different Agro-Ecological Area Of Morocco

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Abstract: This activity was conducted during 2023-2024 cropping season at 12 sites, including INRA experimental stations and farmers' fields, with the objectives to demonstrate, disseminate and recommend the best performing chickpeas varieties. Twenty-four platforms were used, featuring three novel varieties with a local commercial check. The demonstration was undertaken on single plot design of 10m x 10m area for each variety with the spacing of 50 cm between rows. agronomic management followed best practice recommendations at each site. Field day was organized at each site on which different stakeholders were participated, participatory evaluation of the varieties was made and experiences were shared among participants. Yield data per plot was recorded and analyzed using descriptive statistics. Participant farmers were enhanced to set their own selection criteria and the most important were pods per plant, seed per plant, seed size, drought tolerance The combined results of average grain yield and farmers' preferences confirm the performance of the improved varieties due to their ability to produce more pods per plant, larger seed size, disease resistance and high grain yield. The latest new variety was selected as the first choice of farmers for its higher grain yield and larger seed size compared to the control varieties. Furthermore, farmers call on government and non-government organizations to promote the new chickpea varieties on a large scale with complete packages in the study area.

Keywords: Chickpea, improved varieties, scaling -up, farmers

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(PP-28)
Biocrusts Affect the Multistability of Arid Regions through Their Impact on Plant Germination

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Abstract: Biocrusts significantly affect seed germination, a critical ecological process stemming from their bistable interaction with vegetation. They often hinder germination through physical barriers (e.g., covering the soil surface) and by altering soil resources (e.g., nutrient and water availability). This can prevent plant cover increase under certain conditions, leading to a biocrust-dominated state. Conversely, in more favorable conditions, such as increased rainfall, vegetation can gradually outcompete biocrusts, facilitating a shift towards a vegetation-dominated state. This bistable dynamic between biocrusts and vegetation means each state offers distinct ecological benefits. For instance, biocrust-dominated ecosystems may provide superior soil protection and water retention under arid conditions, while vegetation-dominated states may enhance biodiversity and biomass production in slightly moister environments. The transition between these states is driven by environmental factors and the interplay between biocrusts and vegetation.Our study seeks to deeply understand how biocrusts influence the multistability of arid regions by impacting plant germination and soil processes. We will develop a feedback model of biocrust-vegetation interactions and conduct field studies to verify the nonlinear effects of biocrusts on germination. This research aims to inform ecological conservation and sustainable management strategies for arid areas.

Keywords: Biocrusts, Seed germination, Drylands, Multistability

(PP-29)
Radicle Emergence (RE) Test Identifies Differences in Normal Germination Percentages (NG) Of Artificially Aged Pepper And Cucumber Seed Lots

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Abstract: This study was conducted to determine the potential of the radicle emergence test to predict normal germination percentages of artificially aged cucumber (Cucumis sativus L. cv. Beith Alpha) and capsicum (Capsicum annuum L. cv. Sera Demre) seed lots. In order to correlate RE and normal germination percentages, 14 seed lots were obtained from each species by applying the aging test at 45°C and 100% relative humidity at different hours. Cucumbers were aged for 2, 4, 6, 8, 16, 20, 24, 32, 48, 72, 96, 108, 116 and 124 hours; capsicums were aged for 2, 24, 36, 48, 56, 64, 72, 76, 80, 84, 88, 92, 96 and 116 hours. A seed germination test was conducted for

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each ageing time with three replicates of 50 seeds at 25°C for eight days in cucumbers and 14 days in capsicums. The radicle emergence (2 mm radicle) percentage values were found by frequent counts, and normal germination percentages were determined after the final count. RE percentages were correlated with final normal germination percentages. The RE values of 44 hours in cucumbers and 132 hours in capsicums were found to be highly related to normal germination percentages at the final count (cucumber R2=0.8396, capsicum R2=0.8737, p<0.001). As a result, RE test can be considered as a fast and easy test that can be used for estimating germination percentages.

Keywords: Pepper, cucumber, normal germination, Radicle emergence test

(PP-30)
The Influence Of Diseases Affecting The Seeds Of The Sievers Apple Tree On The State Of Wild Fruit Forests

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Abstract: The Sievers apple tree represents a unique original botanical-geographical and breeding-genetic material. It depends on the choice of the direction of scientific research, and the preservation of the gene pool is currently relevant.The main common types of diseases in the fruit forests of the Alpine zone are scab, powdery mildew of apple trees. In 2015-2017, we conducted research on the problem of natural regeneration of wild apple trees in natural habitats (in situ), maintenance and restoration of viable populations in the conditions of the Dzungarian and Trans-Ili Alatau and found out that this does not actually happen. That the seeds of wild apple trees are affected by a fungal infection (alternariasis and fusariasis).Using classical microbiological methods, the identification of isolated strains of microorganisms showed their belonging to the family of representatives of fungal flora: Alternaria tenuis, Fusarium sp., Penicillium sp., Aspergilus candidas, Mucor sp.Alternaria tenuis and Fusarium sp were a serious threat. These phytopathogenic microscopic fungi prevent the germination of the seeds of the Sievers apple tree. In wild forests, there is no natural reproduction of apple trees due to seed disease, and the germination of seedlings from apple seeds in all industrial nurseries is only 50-60%.The most common microorganisms are alternariasis (38.9% in the fruit shell, 34.0% of internal infection) and fusarium (16.5% in the fruit shell, 6.7% of internal infection). The fungus Penicillium claucum was present in almost all seeds (11.7% on the fruit shell, 4.8% inside).These phytopathogenic microscopic fungi interfere with the natural germination of apple seeds. This can lead to the destruction of the Sievers apple tree, which is one of the world's gene pools.

Keywords: Sievers apple tree, biotic factor, vertical zone, seeds, pathogen, microbiological method

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(PP-31)
Influence Of Seed Stratification And Different Types Containers Of The Quality Of Walnut Seedlings

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Abstract: Since the beginning of mankind, humans were bringing and growing different cultures in theirenvironment, primarily for their utilitarian, edible but medicinal properties as well. Its place insuch environments found the walnut (Junglans regia), whose breeding beginnings date back tothe time BC. This work presents the production of walnut seedlings under the influence of seedsstratification and different types of containers. Sowing seeds is carried out in two types ofmultiple containers and flower beds. Seeds that are not stratified, were planted in the autumn,while the stratified seeds were planted in the spring in the same way. This work containsstatistical data, analysis and interpretation of the results and conclusions of the research results.

Keywords: Junglans regia, seed, nut, stratification, containersThemes: Fruit Crops, Seeds

(PP-32)
Fungal Contaminants İn Wheat

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Abstract: Wheat and its by-products are the main staple food of the southern Mediterranean population, giving it a strategic role in national policies. Throughout the Maghreb, durum wheat remains the mainstay of the cereal diet, a traditional product (along with semolina) that is increasingly competing with soft wheat (bread). The presence of fungal flora in cereals intended for human consumption can have serious consequences for human health. Analyzing stored wheat varieties from the east of Algeria and the evaluation of level of contamination by cultivating seeds on Potato dextrose Agar for one week; revealed that some samples exhibiting high rates of contamination for some varieties, while others exhibit none. The most frequently found fungi were Alternaria sp., Ulocladium sp., Hendersonia sp., Dichomera sp., Dothiorella sp., and Helminthosporium sp. The Bousslem variety was the most contaminated, followed by the Vitron, Oued el bared, and Simeto varieties. Controlling the quality of wheat grain during storage helps to limit product losses caused by mold. It is also a means of preventing and managing the risk of contamination by fungi, some of which can be highly toxinogenic; or their early detection for effective control of subsequent diseases.

Keywords: Durum Wheat, seeds, fungal contaminants

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(PP-33)
Breaking Seed Dormancy Of Three Wild Pastoral Fabaceae Species: Effect Of Passage Through The Digestive System Of Camel

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Abstract: Argyrolobium uniflorum, Astragalus cruciatus and Astragalus ghysensis, a wild Saharan pastoral species which belongs to the Fabaceae family. These seeds have physical dormancy imposed by a water-impermeable seed coat. Building on this knowledge, we set out to explore the possibility that camels facilitate seed dispersal and dormancy break in some native Saharan fabaceae seeds. We collected fresh feces from various camel grazing areas across the desert. To test the hypothesis that camel may effectively disperse Fabaceae seeds and break dormancy, we collected fresh faeces from different grazing sites frequented by camels. We then quantified and collected viable seeds in camel faeces and control seeds from the parental plants, those not consumed by camel. The germination behaviour of Fabaceae recorded has been studied under controlled conditions. Germination values recorded were final germination percentages for Fabaceae seeds ingested and defecated by camel, and compared with seeds removed directly from fruit. We quantified the presence of 2248 seeds belonging to three shrub and annuals spontaneous pastoral Fabaceae species (Argyrolobium uniflorum, Astragalus cruciatus and Astragalus ghysensis) and two unidentified species. A high proportion of the Fabaceae seeds recovered in camel's faeces especially Astragalus ghysensis. These seeds are intact after passing through the camel's digestive tract passage. For the three species, differences in proportion of germinated seeds were significantly higher for gut passed seeds than for controls. Germination percentage increased, especially for Argyrolobium uniflorum. Camel act therefore as effective dispersers of these species by promoting germination. Consequently, future studies should consider Fabaceae seed ingestion by camel acts as a dispersal mechanism, particularly for those plants that possess dormancy, in order to assess the global significance of this plant–animal interaction.

Keywords: camel, seed, Sahara, Fabaceae, dormancy, germination.

(PP-34)
Allelic Polymorphism Of VRN Genes in Barley Collection And Breeding Samples

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Abstract: According to the research data on drought problems assessment and drought monitoring models, the regions of Central Asia and Kazakhstan are at risk and are particularly vulnerable to climate

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change (EDCAP, 2020). Barley (Hordeum vulgare L.) as an early maturing, drought-resistant and salt-tolerant crop is cultivated in almost all regions of Kazakhstan. Due to the increasing aridity of the climate in the south of the country, the creation of early maturing varieties of winter barley, as well as varieties with an alternative type of development (double-armed), is relevant. In barley, the length of the vegetation period (the period of "germination-heading") and responsiveness to vernalization are controlled by the genetic systems Ppd and Vrn. The diversity of combinations of alleles of the Ppd and Vrn genes found in barley determines the adaptation of plants to various environmental conditions. In this regard, the aim of our research was to identify the allelic variation of the vernalization genes of winter barley collection samples (100 samples) and breeding nurseries of competitive variety testing (20 samples). The work was carried out at the Kazakh Research Institute of Agriculture and Plant Growing. Published and proven effective SSR and CAPS markers were used for the work. It was established that the allelic polymorphism of the vernalization genes of 120 samples of the winter barley collection and breeding lines was represented by the following combinations: VrnH1vrnH2vrnH3, vrnH1VRNH2vrnH3, VRNH1vrnH2VRNH3, VrnH1VRNH2vrnH3 and vrnH1vrnh2vrnH3. Winter, spring and facultative forms were determined. Classification of genotypes, determination of allelic variation is important for predicting the length of the vegetation period of the genotype and for differentiating for different regions of Kazakhstan. Funding was by Grant AP19678544.

Keywords: Barley, selection, genetics, allelic variation, genes

(PP-35)
Identification Of Breeding Lines Of Winter Wheat By Common Bunt Resistance Genes (Bt)

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Abstract: Wheat is the main grain crop in the world. Wheat is grown throughout the entire territory of Kazakhstan. The pathogen agent of common bunt is the fungus Tilletia caries (DC.). Infection of wheat with common bunt spores leads to significant (up to 40%) crop losses (Cota L.C., 2009). One of the effective methods of combating this disease is the creation and introduction of new wheat varieties genetically resistant to common bunt. Annually, breeders use donors and sources of common bunt resistancegenes Bt8, Bt9, and Bt10 in crossbreeding programs that are effective for Kazakhstan. Currently, the use of highly effective DNA markers is relevant for solving the issues of selecting genotypes resistant to common bunt. The aim of this study was to screen winter wheat breeding lines and identify carriers of valuable alleles of the genes for resistance to common bunt (Bt8, Bt9, Bt10). DNA identification of the genes for resistance to common bunt was carried out at the Plant Biotechnology Laboratory of the Kazakh Research Institute of Agriculture and Plant Growing using the PCR method. Based on the results of DNA marking of 120 winter wheat breeding samples, two introgressive lines of winter wheat (1127-7, 2041-7), that

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contain a complex of four genes Bt9, Bt8, Bt10 and Bt11, were isolated.70 samples with three genes resistant to common bunt Bt8, Bt10, Bt11 were isolated. The isolated breeding lines of winter wheat are candidates for varieties resistant to common bunt. The lines can be used in the ecological strategy for combating infectious diseases of wheat. The research was conducted under the 267 budget program of the Ministry of Agriculture of the Republic of Kazakhstan, IRN BR24892821.

Keywords: winter wheat, breeding line, DNA identification, gene, resistance to bunt, marker selection.

(PP-36)
Genome-Wide Association Study Spoting Single-Nucleotide Polymorphisms for Iron (Fe) and Zinc (Zn) Biofortification in Einkorn Wheat (Triticum monococcum L.)

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Abstract: The growing global population faces a significant challenge: nutritional deficiency, which affects over one-fourth of the world population and results in a condition known as hidden hunger. This issue has serious health repercussions, including the onset of chronic diseases. Developing crop varieties using genes or loci responsible for nutrient storage in grains is crucial. The most sustainable approach is using nutrient-rich crops in the breeding program. Einkorn (Triticum monococcum L.), one of the earliest cultivated crops known for its high nutrient content, is an excellent candidate for this endeavor. To address this, we performed a field experiment in three locations, and subsequently, analyzed the Fe and Zn contents of 252 genotypes of T. monococcum. GWAS was performed in R using the rMVP package for the mixed linear model (MLM) and the fixed and random model circulating probability unification (FarmCPU) model. 9 and 5 marker-trait associations (MTAs) were identified above the Bonferroni threshold by the FarmCPU and MLM model, respectively. All the MTAs for the MLM model were shared with FarmCPU, indicating their consistency. This study relied on the high

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genetic diversity of mineral content in T. monococcum germplasm. It also explored the use of GWAS to identify novel loci that could enhance variation in the A genome, ultimately improving the nutritional quality of wheat.

Keywords: Triticum monococcum, biofortification, GBS, SNP, GWAS

(PP-37)
Seed Coating Techniques

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Abstract: Reproduction in plants is classified into two groups: sexual and asexual reproduction. Sexual reproduction is based on the process of seed formation as a result of the male organ pollinating and fertilizing the female organ. Asexual reproduction includes vegetative propagation of plants and apomixes. Seed is defined as plant parts that have the potential to form a new plant. The sector formed by public or private institutions and organizations that produce, grow, process, sell, import or export seeds, in short, the sector that operates related to seeds is called the seed sector. Seed production is an important sector not only in agriculture but also in food, health and trade. Therefore, seed production is a vibrant and important sector for the economy of a country. It is also important for sustainable agriculture, such as preserving agricultural areas and natural resources, keeping the economy alive and increasing productivity in agriculture. Efforts to develop, register and market high yielding and high quality varieties resistant to abiotic and biotic stress factors are increasing day by day. In addition to resistance to biotic and abiotic stress conditions and high yield, seed coating is one of the most important methods in terms of seed storage conditions, improving the seed bed, increasing their ability during germination and germination, plant nutrition and similar issues. Seed coating technique is a widely used method to change the shape, size and weight of seeds, to add protective substances against diseases and pests and to ensure germination under optimum conditions. The aim of this review is to summarize the importance, effects and development of seed coating processes carried out in recent years.

Keywords: seed, seed coat, seed coating, pelletizing, film coating

(PP-38)
Effect Of Aerosol Smoke On Seedling Emergence And Seedling Quality Parameters in Spinach Seeds At Different Temperatures

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Abstract: This work was carried out to test the effect of aerosol smoke treatment (AS) on seedling emergence and fresh and dry weight of spinach (Spinacia oleracea cv. Matador) seeds at three different temperatures. Seeds were treated with aerosol smoke for 20 and 60 minutes in a smoke cabinet, and emerged at 18, 24 and 30°C in peat moss in a climatic room (light, 72 µMol m-1s-1) over 20 days. Untreated (C) and hydroprimed (HP, seeds dipped at a proportion of 1:5 seed : water for 6 hours at 20°C in dark conditions) were used as controls. AS treated seedling emergence was not greatly changed, and ranged between 84 and 98% compared to C and HP, but seedling fresh and dry weight were significantly higher than those of the controls. AS of 20 minutes had the highest values, with 263 mg, 172 mg and 167 mg/plant of seedling fresh weight at 18, 24 and 30°C respectively. Seedling dry weight in this treatment was recorded as the highest, with 14.4, 10.3 and 9.2 mg of seedling fresh and dry weight at the three temperatures. The results indicated that aerosol smoke can have a promoting effect in spinach seeds not on seedling emergence percentages but on seedling size reflected in fresh and dry weight.

Keywords: Spinach, Seed Treatment, Seedling Emergence, Seedling weight

(PP-39)
Molecular Mechanisms Underlying Seed Transmission of Plant Viruses

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Abstract: Plant virus transmission occurs through two primary pathways: vertical and horizontal transmission. Vertical transmission includes seed transmission, which can happen directly through the embryo or indirectly via the ovules or pollen. Seed transmission offers several advantages to plant viruses, such as the ability to overwinter in seeds, facilitate long-distance dispersal, and serve as a source of primary inoculum. The success of this transmission process depends on various factors, including the host's age, cultivar, and seed production, as well as characteristics of the virus, such as genus, isolate, and virulence. Research into the molecular mechanisms behind seed transmission of plant viruses has identified key factors that contribute to this process, including single recessive genes, specific chromosomal regions, RNA 1-2 proteins, RNA-induced silencing complexes (RISC), and viral small interfering RNAs (vsiRNA). Despite these findings, our understanding of the molecular mechanisms involved, especially the role of the host in seed transmission, remains limited. Gaining a deeper understanding of these molecular interactions could lead to the development of novel management strategies aimed at reducing the spread of viral diseases. In this review, we focus on the molecular mechanisms underlying the seed transmission of plant viruses, highlighting areas that remain unclear and emphasizing the importance of future research in this field.

Keywords: vertical transmission, seed transmission, molecular mechanisms, host plant, plant viruses

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(PP-40)
Evaluation of Storage Conditions of Plant Propagation Materials

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Abstract: Changing climate conditions with global warming and the problem of feeding the rapidly growing world population increase the importance and value of genetic resources. Türkiye is in a very special position in terms of plant genetic diversity and has a very rich plant potential. This wealth that our country has; It is threatened by many negative factors such as pollution, drought, over-collection and human factors. Transferring and protecting this existing genetic diversity to future generations is possible by preserving resources and is mandatory for the sustainability of plant production. In our country, plant genetic resources are mainly preserved in national gene banks and land gene banks with ex situ and in situ strategies. Preservation methods have various methods and these vary according to the purpose of preservation and use; It is done as the most valid method that suits the preservation location, plant type, structure and genetic composition of the material. In this study, the production amount and storage conditions of all plant propagation materials such as seeds, saplings, saplings, tubers and bulbs, which are included in the definition of seed, were examined. It has been determined that the production amounts of certified seeds, fruit saplings, vine saplings, strawberry seedlings, vegetable seedlings and ornamental plants, among the plant propagation materials, have increased in parallel with the increase in the number of varieties. Therefore, it has been found that the preservation conditions of these materials are different and longer and higher quality preservation is provided under suitable conditions.

Keywords: Seed, Seedling, Tuber, Bulb, Production, Storage

(PP-41)
Determination of Biochemical and Physiological Responses of Pgpr Seed Priming: Enhancing Tolerance to Drought Stress in Sunflower {Helianthus annuus}

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Abstract: Drought is an important abiotic stress factor limiting crop productivity worldwide. Regardless of the plant growth period, drought has a yield-reducing effect on the plant at every stage of development. Sunflower an important in human nutrition with its quality oil content. It is of great importance to increase the yield losses in sunflower oil production due to environmental stresses with correct fertilization methods.

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Increasing the stress tolerance of the plant in the early stages has a significant positive effect throughout the growth and development period. This affects the final product yield. Integrating biologically based fertilizers and regulators into agricultural production with different methods is important for sustainable agriculture. In sunflower agriculture, applications that will improve the biochemical responses and physiological development of plants and provide better development of roots and aboveground organs are of great importance. In this context, the use of plant, animal and microorganism-based products as plant growth regulators and fertilizers in accordance with environmentally friendly and sustainable approaches plays an important role in improving yield losses. The use of plant growth regulator bacteria called PGPR is becoming more widespread in the world and in Türkiye. The effects of PGPR on parameters such as germination rate, shoot length, root length, chlorophyll (SPAD), and proline content in sunflowers under drought stress were determined. According to the obtained results, it was determined that the applications made caused significant differences between the examined parameters. It is suggested that PGPR applications are successful in alleviating the damages of drought stress in sunflower cultivating and that the application area can be expanded for sustainable agriculture.

Sunflower seedlings from treatments

PGPR seed priming and drought stres effect on Sunflowers

Treatment	Germination rate (%)	Shoot length (cm)	Root length (cm)	Chlorophyll (SPAD)	Proline (ppm)
Control	91	15.4	5.2	38.31	1.91
Drought	81	11.2	4.1	31.42	4.21
Pgpr	90	17.6	5.9	37.91	2.34
Pgpr+drought	89	16.7	5.3	36.13	2.97

Keywords: Seed priming, sunflower, drought, PGPR

(PP-42)
Effects Of Biopriming Treatments On The Vigor Of Aged Tomato Seeds

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Abstract: Biopriming is a new seed preparation technique that biologically and physiologically improves seed quality to promote plant growth and disease control. Bacillus species are stress-resistant, endospore-producing, gram-positive bacteria that are ubiquitous in nature and can be easily isolated and cultured from all ecological conditions in the environment. The controlled deterioration test is a stress test by Matthews (1980) to reveal the differences in strength between small seeded vegetable seed lots, and raising to a certain moisture level is one of the features that distinguishes this test from the accelerated aging test. Our goal was to determine how the viability of bioprimed seed lots was affected after the controlled deterioration vigor test. Four different commercial tomato varieties were used in the study. For this purpose, Bacillus velezensis (B4 and B5) and B. amyloliquafaciens (B12) isolates were used for biopriming. Germination (4x25 replicates/seed, 24 OC, 14 days), emergence (4x25 replicates/seed, 25 OC, 21 days) and controlled deteriotion (CD) test (%18 moisture content, 45 OC, 24h) were determined to compare the effects of biopriming treatments on seed quality. According to the results, the viability of 60, 70 and 80th day harvested seeds in the aging test decreased by 10-30% with biopriming treatment compared to the control group. Especially the treatment with B4 isolate had a decreasing effect on the abnormal seedling rate. The combination treatments of the isolates provided the earliest emergence compared to the other treatments and control groups. In regards to seedling parameters, after CD test, seedling measurements of day 80 harvested seeds gave more favorable results with biopriming, and biopriming with bacteria combination (B4xB5xB12) was the most effective in all harvest groups.

Keywords: Bacillus spp., Biopriming, controlled deteriotion test, day after anthesis, tomato

(PP-43)
Pre-extension Demonstration and Evaluation of Bread and Durum Wheat Varieties in Different Agro-Ecological Areas of Morocco

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Abstract: This study aims to promote Moroccan bread and durum wheat varieties in the major wheat-growing regions of Morocco. The objectives were to evaluate and demonstrate improved bread wheat varieties along with their production packages to stakeholders, particularly farmers. The activity was conducted during the 2023-2024 cropping season at 12 sites, including INRA experimental stations and farmers' fields.Twenty-four platforms were used, featuring eight varieties of durum wheat and nine varieties of bread wheat,

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including a local commercial check. The genotypes were planted in 48 m^2 plots. Agronomic management followed best practice recommendations at each site, and agronomic data were collected and analyzed. The 2023-2024 season was characterized by severe drought, particularly during the early stages of the growing cycle, necessitating supplemental irrigation at some sites.Results showed that the performance of the improved wheat varieties varied among sites, ranging from an average of 2 qx/ha in arid zones to 100 qx/ha in irrigated areas. Additionally, field days were organized at six sites to demonstrate the potential of INRA's novel durum and bread wheat cultivars to a total of 744 invited stakeholders, including farmers. The improved new wheat varieties should be promoted for pre-scaling up, accompanied by effective and efficient delivery of technical advice and support to farmers, to enhance national wheat production and productivity.

Keywords: Demonstration Platforms, Wheat varieties, Stakeholders, Scalling up, promoting new release

(PP-44)
Production of original and elite seeds of varieties and hybrids of field crops selected by KazRIAPG LLP

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Abstract: Seeds is the key resource in crop production: the contribution of selection increased the yield reaching 70% over the few decades. The seeds' share costs in the plant production reaches 30-40% (IvanovA.I., 2020), while agricultural producers are critically depended on suppliers of high-quality seeds. The domestic markets of the EAEU countries for a number of agricultural crops are demonstrating high dependance on seed material importation. Creation of a globally competitive field of selection and seed production under strong government coordination is state policy's priority. The institute annually produces 2,000 tons of high-quality certified grain spike seeds, 400 tons of feed grain, 150 tons of leguminous crops, 50 tons of corn, 30 tons of safflower, 20 tons of forage crops to provide elite seed farms and seed farms and further propagation. In Kazakhstan, more than 85% of winter wheat crops, 70% of soybean crops, 40% of barley crops are occupied by varieties of KazRIAPG, including the Arna barley variety, occupying 23% of the total barley crops in Kazakhstan. Innovation Center for the production of high-quality forage crop seeds on the basis of KazRIAPG, where a 5-stage seed cleaning is carried out. A modern seed manufactory for original and elite seeds of sugar beet hybrids was built on the KazRIAPG territory, ensuring low cost and a productivity of 7-8 thousand sowing units of sugar beets per year which will increase the volumes of production and reduce imports. Mentioned original and elite seeds bred by KazRIAPG will be implemented in local farms. The seeds of varieties and hybrids of agricultural crops undergo laboratory control to enter the market with the issuance about the level of their hybrid purity.

Keywords: variety, hybrid, seeds, selection

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(PP-45)
Seed Dormancy Was Associated Seedbank Longevity in A Set of Isogenic Lines of Rice

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Abstract: Seed dormancy (SD) and seedbank longevity (SL) are adaptive traits of both ecological and agricultural importance. To address phenotypic and genotypic relationships between SD and SL, a set of 16 isogenic lines (ILs) was developed by introducing single alleles at the qSD1-2, 7-1, 7-2 & 12 loci from weedy rice into a cultivated rice background. A subset of seed samples from individual plants of the ILs was evaluated for SD by germination percentages at 7, 21 and 35 days of warm dry storage. The other set of the samples was buried in 20-cm-deep soil of a rice field for 7 months (Oct. to the next Apr.), and evaluated for SL by decayed/intact seed rates at the excavation and survivability (germination percentages after 14 days of air-drying). A range of phenotypic variation was observed for both traits. The variation for SD was partitioned into main and epistatic (2-4 order) effects of the four loci. Whereas, the variation for SL was partitioned into main effects of the SD7-1, 7-2 and 12 loci, and 2 to 3 orders of epistasis of the four loci. Phenotypic correlations between the two traits were significant, with the genotypes having a higher germination percentage at maturation tended to be higher in the decayed seed rate (r = 0.45 to 0.53) and lower in seed survivability in soil (-0.29 to -0.35). This research provided unambiguous evidence that natural genes for SD are also involved in the genetic control of SL, and seeds dormant at maturation likely survive longer in local soil seedbanks.

Keywords: rice, dormancy, longevity, seedbank, gene

(PP-46)
Reliability assessment of different biological markers for pre-control maize varietal purity and uniformity testing in seed production

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Abstract: The average seed production of agricultural plants in Serbia is conducted on ~ 50,000 ha annually, while maize seed production is conducted on ~ 5–10,000 ha. Production is officially monitored by the Ministry of Agriculture, Forestry, and Water Management of the Republic of Serbia, but many seed companies additionally perform super-control in order to minimize the occurrence of mistakes that could deteriorate the identity, uniformity, or genetic purity of the produced seed, thus causing high financial problems for all parties involved in the seed production chain. A pre-control test for varietal verification, a very important component of a seed multiplication and certification process, should be applied to avoid potential mismatches during maize hybrid development and parental inbred lines'

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maintenance. Hence, the aims of this study were to: i) evaluate the varietal purity of one experimental maize hybrid and its parental lines using three types of biological markers (UPOV morphological, biochemical, and SSR); and ii) compare marker types' efficiency regarding genetic purity assessment. An exceeding level of variation in the F1 hybrid and maternal line was determined by UPOV morphological markers, using the STDEV and Off-types approaches. According to the comparison of prolamin and albumin banding patterns of parental and F1 seeds, genetic impurities could not be detected. Detected genetic impurities in maternal line and F1 hybrid by SSRs, environmentally independent genetic markers, indicated the importance of their use in pre-control seed quality testing. The most important result of this study is the identification of the microsatellite marker umc1545 polymorphism and its ability to detect off-types even with 40 individuals in size, which recommends it for quick and reliable maize genetic purity testing.

Keywords: phenotypic uniformity, seed storage proteins, SSRs, ultrathin-layer isoelectric focusing

(PP-47)
Importance and Applications of Drying Technique and Technology

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Abstract: The removal of moisture from the product by evaporation up to a certain limit value is called drying. Thanks to drying, microorganism, ferment or enzyme activities are stopped in the product. Thus, the product can be stored for a long time without spoiling. Products preserved by drying occupy less space. On the other hand, since the consumption period of dried products is increased, price stability can be achieved. In the storage of dried products, it is essential to protect them from the harmful effects of moisture and light. Drying, especially heat convection drying, utilizes high-temperature dry air. In addition, additional drying can be carried out with low-temperature dry air, as well as cooling the dried product. In addition to the temperature of the drying air, the moisture content is also important. In fact, high moisture content adversely affects the drying speed and therefore the drying quality. The amount of moisture content of a certain volume of air is limited depending on its temperature. Air containing maximum moisture is called saturated air. Accordingly, the air can absorb moisture from the environment up to the maximum moisture content it can carry according to its temperature. After saturation, the moisture to be given to the air starts to condense as fog. Air and its properties must be well known to ensure success in drying applications. In this study, the importance and applications of drying technique and technology are explained.

Keywords: humidity control, food drying, industrial drying, energy efficiency, drying methods, thermal processing

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(PP-48)
Accelerated Aging Test to Predict Seed Storage Potential in Red Beetroot Seeds

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Abstract: Accelerated aging test to predict seed storage potential in red beetroot seedsGULOKSUZ T1., EKER H, A.1., MEMIS, N.2 and DEMİR İ.1*1Ankara University, Agricultural Faculty, Horticulture Department Ankara, Türkiye, 2Ministry of Agriculture and Forestry, Akyaka, Kars, Türkiye*Corresponding author: demir@agri.ankara.edu.trAbstractThis study was carried out using 12 commercial seed lots of red beetroot (Beta vulgaris) species in order to predict the germination potential after storage by accelerated aging test. For this purpose, the seed lots were subjected to accelerated aging (AA) test at 41°C for 72, 96 and 120 hours at 100% relative humidity, then the total and normal germination percentage (25°C, 14 days, BP method) were calculated. For storage experiment, seed lots were equilibrated at 75% relative humidity (using saturated NaCl solution) and stored in hermetic packages at 15°C for 12 months. After storage, as in the ageing test, total and normal germination percentage were calculated. At the end of the study, correlation coefficients in between after AA test and after storage were calculated. Significant correlation was found between the results of the AA96 hours and the germination percentages after storage. The significance level was at $p<0.01$ in both, total; $r=0.725^{**}$ and normal; $r=0.725^{**}$ of post-storage germination percentages with AA96. In this study, 96 hours of accelerated ageing at 41°C 100% relative humidity was found to be suitable for determining the germination potential of red beetroot seeds after storage.

Keywords: Red beetroot, accelerated aging test, storage germination, seed vigour

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