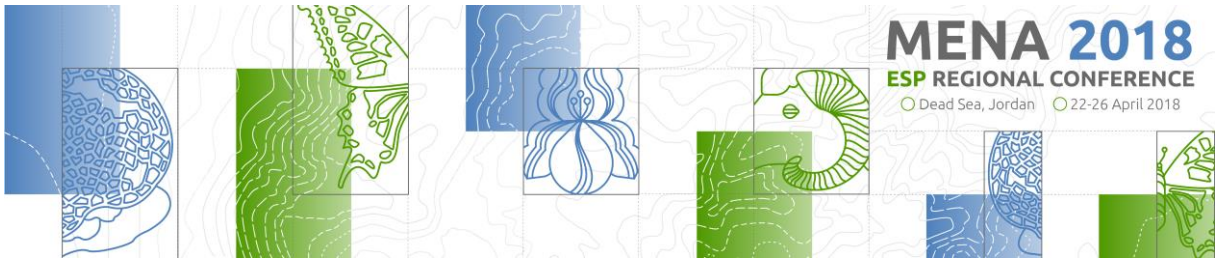


BOOK OF ABSTRACT

I. SESSION DESCRIPTION

ID: S8b

Title of session:

Native seed preservation and breeding: Best practise for maintaining ecosystem services

Hosts:

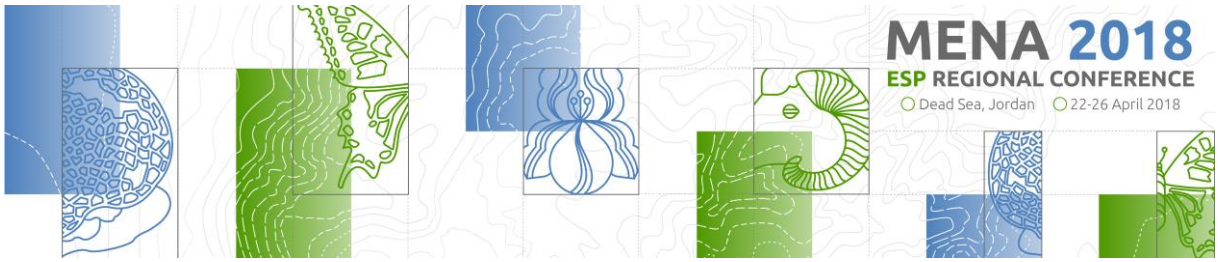
	Title	Name	Organisation	E-mail
Host:	Dr.	Manar Talhouni	NCARE	manar@ncare.gov.jo
host:	Eng.	Abeer Aburumman	NCARE	Abeeraburumman1@gmail.com

Abstract:

The warmer climate threatens the production of many horticultural crops. Forecasts show that warming over the next several decades will take place irrespective of what actions we take today. Therefore, adapting crops to the changing environments may be vital step to mitigate the adverse effects of climate change.

An understanding of genetic basis of abiotic tolerance is a pre-requisite for plant breeders to evolve superior genotype through breeding methodologies. Progress requires the introduction of traits that reduce the gap between yield potential and actual yield in abiotic stress-prone environments by introducing new genomic technologies that promise to enhance tolerance for abiotic stresses (e.g molecular breeding, genetic engineering, tissue culture, grafting, use of crop wild relatives and/or alternative cash crops).

The session presents studies assisted in understanding crops tolerance mechanisms to abiotic stresses, and how different breeding technologies enhanced tolerance level to alleviate negative effects of the climate change.



Goals and objectives of the session:

To enhance knowledge how to mitigate the effects of climate changes on crops through understanding of updated breeding technologies.

To better understand plants tolerance mechanisms against environmental stress factors.

Planned output / Deliverables:

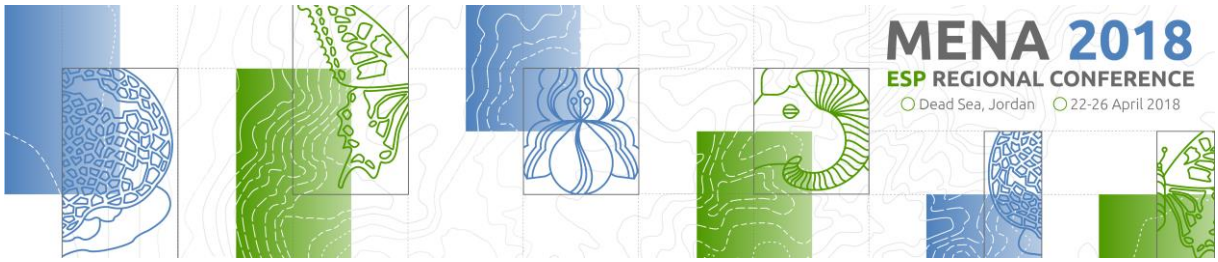
Knowledge on past and/or recent research activities is to be shared, including information on available case studies, presentations and conference papers.

Voluntary contributions accepted:

Yes, I allow voluntary contributions to be submitted to my session for review

Related to ESP WG or NN:

SWG 8 – ES in Conservation



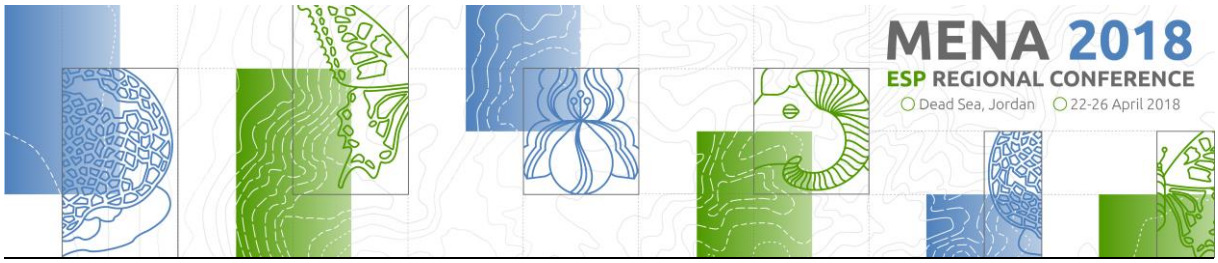
II. SESSION PROGRAM

Date of session: 25-April-2018

Time of session: 10:30-12:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
10:30-10:35	Manar	Talhouni	NCARE	Welcoming speach
10:35-10:45	Abeer	Aburumman	NCARE	Introduction of session
10:45-11:00	Manar	Talhouni	NCARE	Effects of Grafting on Chlorophyll, Leaf Water Potential and Some Fruit Characteristics of Aubergine Plants Grown Under Salt Stress
11:00-11:15	Afaf	Adamat	NCARE	EFFECTS OF SALINITY AND LEAD ON GROWTH AND CHEMICAL COMPOSITION OF THREE FOREST TREE SPECIES
11:15-11:30	Nuha	Mutwali	Forestry and Gum Arabic Research Center, Sudan	Causes of Degradation of the Vegetation Cover in the White Nile State (Elgetaina Area)
11:30-11:45	Reham	Tahtamouni	The University of Jordan, Jordan	Evaluation of phytoremediation potential of callus cultures of Lantana camara LINN. In vitro grown in heavy metals contaminated media



Time	First name	Surname	Organization	Title of presentation
11:45–12:00	Majda	Suleiman	KISR, Kuwait	Collection Processing and Storage of Native Seeds for Ecological Restoration
12:00–12:15	Abrar	Alenzi	University of Jordan, JORDAN	IN VITRO PROPAGATION AND EVALUATION OF SOME PHENOLIC COMPOUNDS IN WILD PARONYCHIA ARGENTEA L.
12:15 – 12:30	General Discussion			

III. ABSTRACTS

1.Type of submission: ***Voluntary contribution***

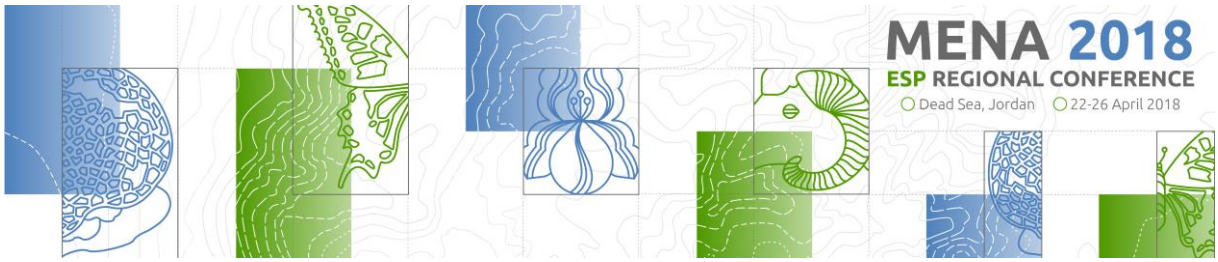
S. Sectoral Working Group sessions: S8b Plant breeding and native seed preservation: Best practices for maintaining ecosystem services

Collection Processing and Storage of Native Seeds for Ecological Restoration

Authors:Majda Suleiman, Bhat Narayana
Other author(s): M. K. Suleiman, N. R. Bhat and T. M. Thomas
Affiliation: Kuwait Institute for Scientific Research, Kuwait
Contact: mkhalil@kisr.edu.kw

Faced with harsh and highly unpredictable climate, limited water availability and relatively short growing period, Kuwait's native vegetation are under tremendous pressure from large environmental fluctuations over time. Prior to the Gulf War, rangeland deterioration in Kuwait resulted from overgrazing, off-road vehicular movements, uprooting of plants, sand encroachment, and drought. Post-Gulf War, the rangeland resources came under additional pressures such as physical disruption of soil by placement of mines, construction of bunkers, foxholes, and movement of heavy machinery, and petroleum oil pollution caused by large numbers of devastated oil wells. Such highly degraded rangelands are very slow to recover requiring several decades to re-establish naturally. Therefore, specific short-to-medium and long-term restoration measures are needed to accelerate vegetation regeneration. This will require large numbers of keystone native species to be planted or seeded.

Kuwait Institute for Scientific Research (KISR) has been making concerted efforts to collect, process, test the quality and store seeds of keystone native species for use in ex-situ conservation and restoration of degraded ecosystems. In this regard, a year-round program has been developed to collect seeds from the wild based on seed maturity and quality. Additionally, several studies were conducted to develop efficient quality testing and storage protocol for these native seeds. KISR also established 15 ha of field plots of native plants for mass production of seeds and plants. These efforts have proved highly successful and efficient. The seeds produced in the field products are harvested, processed and maintained in short-, medium- and long-term storages for their future use in restoration of degraded ecosystems. The presentation will discuss KISR experience in this area and highlight future strategies for meeting growing demands for planting materials both for conservation and ecological restoration projects.



Keywords:Ecological restoration, seed propagation, restoration seed bank, seed farming, ex-situ conservation.

2.Type of submission: ***Voluntary contribution***

S. Sectoral Working Group sessions: S8b Plant breeding and native seed preservation: Best practices for maintaining ecosystem services

Effects of Grafting on Chlorophyll, Leaf Water Potential and Some Fruit Characteristics of Aubergine Plants Grown Under Salt Stress

Authors:Manar Talhouni

Other author(s): Kenan Sönmez, Şebnem Kuşvuran, Sevinç Kıran, Ş. Şebnem Ellialtıoğlu

Affiliation: NCARE, Jordan

Contact: manar@ncare.gov.jo

Salinity is one of the most severe environmental stresses affects crops growth and production worldwide. Eggplant (Solanum melongena L.); the third most important vegetable crop after potato and tomato; is relatively salt sensitive. Grafting over tolerant rootstocks is an effective tool to alleviate negative effects of salinity upon vegetable crops.

In this study, different rootstock/scion eggplant combinations were obtained as follow; Five commercial rootstocks (AGR 703 (Solanum aethiopicum), Vista, Köksal F1, Yula F1 (S. incanum x S. melongena hybrids) and Hawk (S. torvum)), in addition to two Turkish genotypes Burdur and Mardin (S. melongena L.) were used as the rootstocks. For scion two cultivars were used (Artvin and Naomi F1). Self-grafted and non-grafted seedlings were used as control. Grfated plants where grown under two salinity treatments 1.8-2 dS/m (control) and 6-7 dS/m (stress) in pots under greenhouse conditions.

Salinity treatment started when plants were at the flowering stage by adding NaCl to the nutriontion solution applied through drip irrigation system.

Total yield, average fruit weight, leaf chlorophyll content,fruit total soluble solids (TSS) and titratable acidity (TA) parameters were tested .

Salinity had negative effects on the parametrers measured. Grafating was found to alleviate these effects significantly when compared to the non-grafted plants.

Naomi Fi genotype was found superior compared to Artvin genotype as a scion, while between rootstocks Köksal F1 and Vista F1 genotypes were found significantly superior among the other comercial genotypes used. Burdur breeding line used as rootstock has been found to be a promising genotype which can be used for rootstock breeding.

Keywords:rootstock/scion combination, Aubergine, salinity

3.Type of submission: ***Voluntary contribution***

S. Sectoral Working Group sessions: S8b Plant breeding and native seed preservation: Best practices for maintaining ecosystem services

CULTIVATION OF ENERGY CROPS FOR LAND RECLAMATION- THE CASE OF JATROPHA CURCAS (J. CURCAS) PLANT

Authors:Nirza Fabiola Castro Gonzáles
Affiliation: American University of Beirut, Lebanon
Contact: nc30@aub.edu.lb

J. curcas is a hearty and resistant tree. For this reason, it can also grow on unfertile, eroded or drained sandy soils, on a tropical dry land and under semi-arid conditions. J. curcas needs sunlight for growing. Its propagation is easy (seeds or cutting) and it has a short gestation period. It has a high oil and protein content. Its water demand is low. The plant can survive under hostile environmental conditions and even for two drought years. It is toxic and its cultivation has no direct competition with the cultivation of edible plants. The plant can even produce three times in a year under optimal maintenance conditions, water supply and soil nutrients. J. curcas plant can have blooms and green mature fruits at the same time and therefore, the harvest has to be done manually and consequently it creates employment opportunities. In addition, it has numerous uses (soap, candle and honey making, fish food, fertilization, medical use, bio-pesticide and insecticide, fire wood, among others) as well as that it is an energy source with big potential (biogas, biomass, vegetable coal, briquettes as byproducts from J. curcas fruit and in particular for biodiesel production). J. curcas oil can be used without trans-esterification in engines and run with a satisfactory efficiency without any change in the engine by blending up to 10% J. curcas oil directly with diesel. Oil from J. curcas has low GHG-emissions. The use of biodiesel from J. curcas also sparks interest in the aviation industry.

Currently, the cultivation of J. curcas is gaining more interest in several countries due to its qualities. There are experiences of J. curcas cultivation in Central America, South America, North America, Africa and Asia. J. curcas can be cultivated in many MENA regions to recover land and produce biodiesel and create employment.

Keywords:Jatropha curcas, Biodiesel, land reclamation, energy crops, developing countries

4. Type of submission: ***Voluntary contribution***

S. Sectoral Working Group sessions: S8b Plant breeding and native seed preservation: Best practices for maintaining ecosystem services

EFFECTS OF SALINITY AND LEAD ON GROWTH AND CHEMICAL COMPOSITION OF THREE FOREST TREE SPECIES

Authors:Afaf Al-Adamat, Jamal Ayyad
Affiliation: NCARE, Jordan
Contact: afaf.adamat@yahoo.com

Impact of irrigation water salinity was investigated on three selected forest tree genotypes (Eucalyptus camaldulensis Dehnh., Acacia cyanophylla Lind. and Populus alba L.) in pot experiment under greenhouse conditions/the University of Jordan campus. Evaluation of the three selected genotypes responses to five different salinity (NaCl-CaCl2) levels (0, 3, 6, 9 and 12 dS/m) and three different lead (Pb) levels (0, 50 and 100 µmol/L) were carried out for their growth, physiological and chemical ion accumulation responses. Treatment combinations were arranged in a factorial experiment within a completely randomized blocked design with four replications.

Results indicated that increasing salinity levels inhibited growth of three forest trees genotypes and caused reduction in (root, stem and leaves) dry weight, shoot/ root ratio (R/S), plant height and stem diameter. On the other hand, increased lead levels had no significant effect on growth parameters measured. Chlorophyll fluorescence of E. camaldulensis, A. cyanophylla were increased as salinity level increased but in P. alba, it was decreased. Relative water content was also decreased when salinity increased in all genotypes. Leaf greenness was affected only in A. cyanophylla at 3 dS/m. Stomatal resistance was increased with 5 to 7 folds in E. camaldulensis and A. cyanophylla, respectively with increasing salinity levels.

Moreover, salinity significantly increased Na, Ca and Cl content in all tested genotypes and decreased K in Eucalyptus camaldulensis Dehnh. Lead decreased in all tested genotypes

when salinity levels increased. Ions ratios with both Na and Cl (Ca/Cl, Ca/Na, K/Cl and K/Na) were all decreased when salinity increased. Meanwhile, effects of increased Pb levels were different among tested genotypes. E. camaldulensis was tolerant and absorbs more Pb than others

In conclusion, significant variability of salt tolerance existed among the tested genotypes. Acasis cyanophylla was more tolerant to salt than other tested genotypes, while P. alba showed the least salt tolerance responses. Meanwhile E. camaldulensis was more tolerant and absorbs more Pb compared with P. alba that was the more sensitive species. Further testing of these genotypes is still needed under various soil and irrigation water salinities with different types and concentrations of heavy metals under field conditions.

Keywords: Salinity, heavy metals, phytoremidation, forest

6.Type of submission: ***Voluntary contribution***

S. Sectoral Working Group sessions: S8b Plant breeding and native seed preservation: Best practices for maintaining ecosystem services

causes of degradation of the vegetation cover in the white Nile

Authors:nuha mutwali
Affiliation: forestry and gum arabic research center, Sudan
Contact: nuhamutwali@yahoo.com

This study was conducted in the White Nile state which is classified as a semi-arid zone of Sudan. The state is located in central Sudan (32° 15′ N and 14° 45′ E). The average rainfall is less than 200 mm. The soil of the study area is classified as White Nile clays. The objectives of this study were to investigate the limitations for natural regeneration of vegetation in Gitaina area in Central Sudan. Variation in rainfall, soil properties and soil seed bank were studied. Soil samples were taken from four experimental sites and soil seed bank, and soil chemical properties were determined. In addition, the vegetation density was estimated for trees, shrubs and grasses. Satellite imageries were used to monitor the changes in the vegetation cover that may have occurred through the years. The results showed that the main cause of degradation of the vegetation cover is the deterioration in soil properties. Rainfall amount and distribution for the period 1987-2005, and soil seed bank has little effect on degradation of vegetation cover in the study area. The high sodicity/salinity reduced seeds germination and soil infiltration rate thus increasing runoff and reducing the amount of water stored in the soil

profile. Most of the study area is presently devoid of vegetation. For rehabilitation of the vegetation cover, the study recommended use of water harvesting methods, soil reclamation using organic and inorganic materials and enrichment of the soil seed bank with tree seeds.

Keywords:sodicity,salinity,vegetation cover

7. Type of submission: ***Voluntary contribution***

T. Thematic Working Group sessions: T18 Ecosystem services assessments and valuations for policy impacts: lessons and tools from the global project ValuES

Evaluation of phytoremediation potential of callus cultures of Lantana camara LINN. In vitro grown in heavy metals contaminated media

Author(s): Reham Tahtamouni, Rida Shibli
Presenting author: TamaraAl-Qudah
Other author(s): Reham Tahtamouni, Rida Shibli, Laila Younes , Saida Abu-Mallouh
Affiliation: The University of Jordan, Jordan
Contact: tam_squdah@yahoo.com

Lantana camara Linn. is a flowering plant that has recently attracted the attention of researchers due to its novel phytoremediation powers against some heavy metals. In this study, phytoremediation potential of Lantana camara callus was assessed in vitro by measuring the actual accumulation of different levels (0.0, 0.12, 0.2,0.3 mg/L) of either Chromium (Cr), Led (Pb), or Cadmium (Cd) in callus. Also, the effect of these heavy metals on growth and survival of the callus cultures was investigated. Callusing was induced successfully from leaf discs grown on MS media plus (2.0 mg/L) of 2,4-dichlorophenoxy acetic acid (2,4-D), while callus multiplication was maximized in MS media supplemented with (2.0 mg/L) 2,4-D plus (1.0 mg/L) Kinetin. In heavy metal experiments, callus growth and quality were found to decrease in response to adding heavy metals to the media at all levels. Meanwhile, all callus cultures recorded full survival rates (100%) by the end of the experiments and resumed growth after being transferred to normal growth conditions. Also, the maximum amounts (0.096, 0.109, 0.0193 ppm) of Cr, Pb, and Cd, respectively were found in callus cultures pregrown on MS media supplemented with (0.3 mg/L) of each heavy metal type. Meanwhile, maximum Biological Absorption Coefficient (BAC) values (0.41, 0.6, 0.30) were recorded in callus cultures pregrown on media with (0.12 mg/L) of either Cr, Pb, or Cd, respectively. More work is still needed to improve BAC values obtained in Lantana camara callus cultures to be used as a platform for massive production of hyper accumulator plants against these contaminants.

Keywords: Callus, Heavy metals, in vitro, Lantana camara Linn., Phytoremediation.

8. Type of submission: ***Voluntary contribution***

T. Thematic Working Group sessions: T18 Ecosystem services assessments and valuations for policy impacts: lessons and tools from the global project ValuES

IN VITRO PROPAGATION AND EVALUATION OF SOME PHENOLIC COMPOUNDS IN WILD PARONYCHIA ARGENTEA L.

Author(s): Abrar Alenzi

Other author(s): Reham W. Tahtamouni, Tamara S. Al-Qudah

Affiliation: University of Jordan, Amman, Jordan, Jordan

Contact: r.shibli@ju.edu.jo

Paronychia argentea is a wild medicinal herb with a high medicinal value. It is widely used in folk medicine for its therapeutic characteristics. Till now it is a wild neglected herb that grows wildly without any research for its cultivation and propagation and there are a few research on its medicinal value. Thus, this research was conducted to produce a multiplication prortocol fo this plant via tissue culture techniques and to maximize in vitro secondary metabolites production for some important phenolic compounds. In this research work, we studied effect of different cytokinins (6-Benzylaminopurine (BAP) , 6-furfuryladenine (Kin), 6-(γ,γ, dimethylallylamino)2ip and Thidiazuron (TDZ) at different levels (0.0, 0.1, 0.5, 1.0, 1.5 or 2.0 mg/L) on shoot multiplication. Beside that, different Auxins types (Indol-3-butric acid (IBA), Indol-3-acetic acid (IAA), and 1-naphthalenacetic acid (NAA), at different concentrations (0.0, 0.1, 0.5, 1.0, 1.5, or 2.0 mg /L) were experimented to induce rooting in the in vitro grown microshoots. Acclimatization was experimented for rooted in vitro plantlets under controlled circumstances to produce full hardened plants that can survive normal environmental conditions. Furthermore, the accumulation of two phenolic compounds (Quercetins, and isorhamnetin) was determined in samples extracted from in vitro grown P.argentea microshoots pretreated with different cytokinines types and levels and compared with those extracted from wild using HPLC (High-performance liquid chromatography) method. A maximum of 3.5 shoots/explant were obtained on Murashige and Skoog (MS) medium supplemented with 1.5 mg/L TDZ. Furthermore; maximum roots number (5.90 roots/ explant) was obtained on MS medium supplemented with 0.5 mg/L IBA. Moreover, TDZ (0.5 mg/L) enhanced the production of quercetins to (6.967 mg/ g DW). Meanwhile; maximum isorhamnetin (6.360 mg/ g DW) were obtained at 0.1 mg/L 2iP. This study; was the first for in vitro multiplication and in vitro secondary metabolites production of Paronychia argentea ,

hoping that it will be a reference to do more research for production of other medicinal compounds and reintroduce it as a valuble medicinal herb.

Keywords: In vitro propagation, Isorhamnetin, Quercetins, HPLC