

SOIL AND WATER SALINIZATION IN GHALEH GHAZI REGION, IRAN

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ABSTRACT. Approximately 34% of soils in Asia are influenced by salts. With about 25 million ha of saline and alkaline lands, about 15% of the country, Iran has the most saline lands in Asia after China, India, and Pakistan due to its geographical position, climate and human activities. This research was done due to determine the effective factors on soil and water salinization. At the first the boundaries of this region were characterized using GIS, then landuses were determined for field survey and also soil sampling in nine landuses were done according to both factors of planting pattern and water resources in each unit. The soil profile was prepared and soil samples were obtained from surface depths of (0 - 50 cm) and some factors such as soil texture EC, SAR, pH, CaCO₃, Cl and potassium were measured. For study of water resources some samples were obtained from 30 wells and also from upland runoff, then soil and water sample were analyzed and some parameters such as EC, SAR, Cl⁻ and pH were measured. Finally, according to data base, geological map, topography map, landuse map, soil and water measured data and also field studies, soil and water salinization schedule and region status were investigated. The results showed that important factors influencing water salinization in Ghaleh Ghazi region (Iran) are geological formations located in aquifer recharge and climate condition. Important factors of soil salinization in region are irrigation with saline water, improper irrigation method, unsuitable planting method, climate condition and landform.

Key words: Salinization; Electrical conductivity; Sodium absorption ratio; Ghaleh Ghazi; Bandar Abbas.

GROUPING BREAD WHEAT GENOTYPES AND LINES BASED ON SOME MORPHOLOGICAL TRAITS USING MULTIVARIATE ANALYSIS

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ABSTRACT. The knowledge about the extent of variability among bread wheat (*Triticum aestivum* L.) genotypes is a high value for the genetic improvement programs and the efficient genetic diversity utilization of plant materials. The objective of this research was to assess the morphological characteristics of 56 common wheat genotypes which were planted under field condition and their morphological traits were recorded. The principal components (PC) analysis, factor analysis and clustering procedure were applied to group genotypes according to similarity on the basis of the measured traits. Results showed that the first two PCs explain 41% of the total variation. The PC and factor analyses grouped genotypes into four groups while the cluster analysis grouped them into five distinct clusters. The cluster I had good resistance to yellow rust and salinity while the cluster II, had good resistance to drought, cold and salinity. The cluster III had high tolerance to cold stress and low temperatures but the cluster IV had good tolerance to drought, brown rust and yellow rust. Also, cluster V had various properties including tolerance abiotic stresses, resistance to biotic stresses, resistant to

lodging and semi-dwarf property. The results of this research will support efforts of conservation and utilization of genotypes in bread wheat breeding programs.

Key words: Genetic diversity; Morphological characters; Multivariate analyses; *Triticum aestivum* L.

FOLIAR NITROGEN MANAGEMENT FOR IMPROVING GROWTH AND YIELD OF DRYLAND WHEAT

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ABSTRACT. Foliar nitrogen (N) application is considered an important factor affecting phenology, growth, yield, and yield components of dryland wheat (*Triticum aestivum* L.). A field experiment was conducted to study effects of foliar N on dryland wheat (cv. Prisabk-2004) at the Agronomy Research Farm, The University of Agriculture Peshawar, Pakistan, during winter 2010-2011. The experiment was laid out in randomized complete block design using four replications. A plot size of 3 m by 4 m, having 8 rows, 4 m long and 30 cm apart was used. A total of 80 kg N ha⁻¹ in the form of urea was applied. Out of 80 kg N ha⁻¹, 70 kg N ha⁻¹ was applied to the soil at sowing time, and the remaining 10 kg N ha⁻¹ was applied in the form of foliar spray (2% N). The required foliar N was applied in various combinations (splits) at different growth stages viz. 30, 60, 90 and 120 days after emergence (DAE). Phenological development (days to anthesis and physiological maturity) was delayed, yield components and yield increased significantly ($p \leq 0.05$) with foliar N over control (water spray without N). Wheat grain yield increased to the highest level (4427 kg ha⁻¹) when 100 % foliar N was applied (no split) at 90 DAE, followed by 4050 kg ha⁻¹ at 120 DAE, while the control (no foliar N) resulted in the lowest grain yield (2573 kg ha⁻¹). We concluded from this study that 2 % foliar N application in a single split either at 90 or 120 DAE could improve wheat productivity under dryland condition.

Key words: Wheat; Yield; Yield components; Foliar N; Moisture stress.

IMPROVEMENT OF GERMINATION CHARACTERISTICS AND ENHANCEMENT OF ANTIOXIDANT ENZYMES ACTIVITY OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.) AGED SEEDS BY USED OF GIBBERELLIN

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ABSTRACT. Seed priming is one of the methods that can be taken to counteract the adverse effects of abiotic stress, also Seed priming treatments have been used to reduce the damage of aging and invigorate their performance in many crops. Objective of this study was to evaluation the effect of gibberellin on germination characteristics and antioxidant enzymes of safflower seeds after aging. Experimental design was a factorial one with complete randomized design with three replications. The first factor was priming by gibberellin (0 and 50 ppm) and non-primed seeds (control) and the secondary factor was combinations of four levels of aging

(0, 1, 3 and 5 days of aging, at 43°C). The results showed that the priming and aging effects on germination percentage, germination index, normal seedling percentage, seedling length, vigor index, catalase and ascorbate peroxidase were significant, but on mean time to germination not significant. Results showed that, the highest germination characteristics such as; germination percentage, germination index, normal seedling percentage, seedling length, vigor index, catalase and ascorbate peroxidase were attained from priming by gibberellins, under non aged conditions. Also, our results indicated that seed aging is related to decrease of enzymes activity and may contribute to low seed germination efficiency, also priming increases enzyme activity and increases enzyme activity with priming treatment may contribute to improve germination characteristics. The general decreases in enzyme activity in the seed lowers the respiratory capacity, which in turn lowers both the energy (ATP) and assimilates supply of the germinating seed.

Key words: Germination; Priming; Aging; Enzyme activity.

EFFECT OF DIFFERENT PRIMING METHODS ON GERMINATION AND SEEDLING ESTABLISHMENT OF TWO MEDICINAL PLANTS UNDER SALT STRESS CONDITIONS

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ABSTRACT. Priming is one of the seed enhancement methods that might be resulted in increasing seed performance (germination and emergence) under stress conditions, such as salinity. Salinity is a major environmental stress which adversely affects germination and seedling establishment in a wide variety of crops. The experiment was arranged as a factorial in completely randomized design (CRD) at Seed Research Laboratory of College of Agriculture, University of Tehran, Iran. The objective of this research was to evaluate the effect of different priming methods on seed germination of two medicinal plants including lemon balm (*Melissa officinalis* L.) and cumin (*Cuminum cyminum* L.) under salinity stress. Treatments were combinations of two levels of salinity stress (0 and 10 dsm⁻¹) and five levels of priming (control = non-priming), GA₃, manitol, NaCl and distilled water) with three replications. Seeds of lemon balm and cumin were primed for 24 h at 25°C. Results revealed that different growth traits (including germination percentage, germination rate, seedling dry weight, plumule and radical length) significantly ($p=0.05$) decreased with applying salinity. However, priming of seeds with different materials particularly GA₃ was useful for alleviating salt stress effects and improving germination and seedling establishment under salt stress. Under salinity condition, primed seeds possessed more germination and emergence than control. The result of this experiment is consistent with the hypothesis that under salinity stress, priming can prepare a suitable metabolic reaction in seeds and can improve seed germination performance and seedling establishment.

Key words: Cumin; Germination; Lemon balm; Priming; Salinity.

IMPACT OF NANOSIZED TITANIUM DIOXIDE ON AGRONOMICAL AND PHYSIOLOGICAL CHARACTERISTICS OF ANNUAL MEDIC (*MEDICAGO SCUTELLATA* L.)

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ABSTRACT. In order to investigate the effect of exogenous application of nano-TiO₂ on annual medic, a field study was conducted in a factorial design based on randomized complete blocks with four replications. The experimental treatments included six concentrations of nano-TiO₂ (Control, 0.01%, 0.02%, 0.03%, 0.04%, 0.06% g/l) and spraying at two growing stages (pod stage and 10% flowering stage). Results showed that the effects of nano-TiO₂ and spraying times on dry forage yield were significant ($p<0.01$). Nano-TiO₂ spray appear to influence the malone dialdehyde (MDA) content ($p<0.01$). With increasing concentrations of nano-TiO₂ the values of aforementioned measured variable significantly decreased. The activities of antioxidant enzymes, including catalase (CAT), ascorbate peroxidase (APX) and guaiacol peroxidase (GPX) were affected by nanoparticle ($p<0.01$) and spraying times ($p<0.01$), as well as their interactive effect of two mentioned factors were significant in terms of guaiacol peroxidase (GPX) ($p<0.01$) activity and dry forage yield. Among different concentrations of nano-TiO₂, 0.04% and 0.06% have the best effect on all traits. Totally, treatment with nano-TiO₂ were more effective in the pod stage, compared to 10% flowering stage.

Key words: Medic; Nano-TiO₂; Antioxidant enzymes; Dry forage yield.

EFFECT OF SOWING DATE AND NITROGEN FERTILIZER ON SORGHUM (*SORGHUM BICOLOR* L. VAR. SPEED FEED) FORAGE PRODUCTION IN A SUMMER INTERCROPPING SYSTEM

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ABSTRACT. To evaluate the interaction effects of planting date and different levels of nitrogen fertilizer on sorghum (*Sorghum bicolor* var. Speed feed) forage production, an experiment was conducted in split plots based on a complete randomized block design in Agricultural Research Station of Khorramabad, Lorestan province, Iran. The experimental treatments comprised of three nitrogen fertilizer levels of control (N0), 100 (N1), and 150 kg per hectare (N2), assigned to main plots and three sowing dates of T1 (June, 10th), T2 (June 26th) and T3 (July 11th) assigned to subplots. Results showed that in sum of two harvests, the yield of hay, forage, leaf and shoot hay weigh in second planting date and N2 and N3 level of fertility was higher than all treatments. In the case of quality treatments the percent of crude protein in first harvest had the most amounts in first and second planting date and N1, N2 and N3 fertility levels. Crude fiber percentage in first harvest of second planting date was highest in N1, N2 and N3 levels of fertility. Treatment interactions had not any significant effect for crude fiber. The most ash percent was observed in first harvest and N1, N2 and N3 fertility level. In second harvest time N2 and N3 fertility levels were superior to the rest. Also, fat percentage in first and second planting date and N1, N2 and N3 increased than the control fertility treatment.

Key words: Crop management; Forage sorghum; Summer intercropping.

POLLEN SOURCES FOR HONEY BEE COLONIES AT LAND WITH DESERT NATURE DURING DEARTH PERIOD

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ABSTRACT. Autumn is a critical period for honey bee colonies and the weak colonies during autumn are likely to be lost during winter. The colonies need good pollen sources during this period to be able to foster enough brood, to boost colonies survival ability during winter. The situation is worse in desert areas where few pollen sources are expected to be existed. Identifying the availability of pollen sources for honey bees at desert areas is very essential to present appropriate recommendations regarding colonies feeding and suitable plants to be cultivated in such areas. Thus, the study objective is to identify pollen sources for honey bee colonies during the autumn at El-Bostan region (a region with desert nature). Samples of bee bread were collected at different times during autumn. The samples were microscopically analyzed and pollen sources were then identified. Nine plants belong to six plant families (Pedaliaceae, Malvaceae, Poaceae, Asteraceae, Myrtaceae, Resedaceae, and Casuarinaceae) were classified as major pollen sources. The most abundant plants were casuarina and eucalyptus during autumn. Beekeepers are advised to supply their colonies regularly (each two weeks) with pollen substitutes or supplements during autumn at El-Bostan region. Honey bee workers tend to mix different pollen types together in bee bread when different pollen sources are available. The number of pollen sources in the bee bread can be used to assess the richness degree of any region with suitable pollen sources to honey bees. The identified pollen sources in this study are recommended to be cultivated in lands with similar desert nature, to provide honey bee colonies with protein feeding during this critical period of the year.

Key words: *Apis mellifera*; Feeding; Honey bees; Pollen, vegetation..

RESULTS OBTAINED IN BREEDING OF BITTER CHERRY ASSORTMENT AT FRUIT GROWING RESEARCH STATION IAȘI - ROMANIA

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ABSTRACT. The paper proposes the improvement of the current bitter cherry assortment with new creations made at Iași, adapted to the specific conditions from the NE area of Romania. For the improvement of the bitter cherry assortment with new, productive, disease resistant cultivars with fruits of good quality, resistant to cracking with different maturation stages, in 1981 at Fruit Growing Research Station (F.G.R.S.) Iași - Romania has begun an action of selection and promoting of some valuable genotypes of bitter cherry (existent in the spontaneous flora or in plantations from the Iași county), which were being planted with cultivars and other genotypes from all around the country. Following the positive and gradual selection there were selected three biotypes of bitter cherry from which two of them have been approved as new cultivars in 1994, with the names „Amar Maxut”, respectively, „Amar Galata” and the biotype „Amar R5.P10” has been registered in 2013 at the State Institute for Variety Testing and Registration Bucharest to be approved as a new cultivar. All three bitter cherry genotypes correspond to the objectives of the main assortment breeding. They have a high productivity because the natural fertility index registered values between 36.5-63.7%, the

trees have a reduced vigour, they present a good resistance to frost (1-9% affected buds) and to diseases (values of 1% anthracnose, 1.1-2.8%). The fruits are high quality and the maturation stages are at the extremities of the cherries maturation season.

Key words: Genotypes; Productivity; Maturation; Fruit; Quality.

REZUMAT. Rezultate obținute în ameliorarea sortimentului de cireș amar la S.C.D.P. Iași. Lucrarea propune îmbunătățirea actualului sortiment de cireș amar cu creații noi, realizate la Iași, adaptate condițiilor specifice din nord-estul României. Pentru îmbunătățirea sortimentului de cireș amar cu soiuri noi, productive, rezistente la boli, cu fructe de calitate bună, rezistente la crăpare, cu diferite epoci de maturare a fructelor, la S.C.D.P. Iași a început din anul 1981 o acțiune de selecție și promovare a unor genotipuri valoroase de cireș amar (existente în flora spontană sau în plantații din județul Iași), care au fost plantate alături de soiuri și alte genotipuri din țară. În urma selecției pozitive și succesive au fost alese trei biotipuri de cireș amar, din care două biotipuri au fost omologate ca soiuri noi în anul 1994, cu denumirea de „Amar Maxut” și, respectiv, „Amar Galata”, iar biotipul Amar R5.P10 a fost înscris în anul 2013 la I.S.T.I.S. București în vederea omologării acestuia ca soi nou cu denumirea de „Amaris”. Cele trei genotipuri de cireș amar corespund principalelor obiective de ameliorare sortimentală. Acestea au productivitate ridicată, deoarece indicele de fertilitate naturală a înregistrat valori cuprinse între 36,5-63,7%, vigoarea pomilor este redusă, prezintă o rezistență bună la ger (1- 9% afecțiuni la muguri) și boli (valori 1% antracnoză, 1,1-2,8%). Fructele sunt de calitate superioară, iar epocile de coacere se află la extremitățile sezonului de maturare a cireșelor.

EFFECT OF XANTHAN GUM SOLUTION ON THE PRESERVATION OF ACEROLA (*MALPIGHIA GLABRA* L.)

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ABSTRACT. Nowadays, storing fresh fruit and vegetable by edible film was the best method. There are a lot of chemical which can coat the surface of fruit to increase the preservation time. Among the chemicals was xanthan gum which was known as an additive and applied widely in food technology but it can use currently in the post harvest technology as an edible film. Coating of acerola fruit with xanthan gum has been found to delay the ripening process. Xanthan gum in aqueous solutions of 0.4, 0.6, 0.8, 1.0, 1.2 and 1.4% (w/v) was applied as an edible coating of unripe acerola which were stored at 30°C and 70-80% RH for 6 days. Fruits were coated with 1.4% xanthan gum delayed the ripening process by slowing down the rate of respiration, in terms of percentage weight loss, soluble solids concentration (^oBx), total acidity and color of acerola fruit during storage as compared to the uncoated control and fruit treated with other xanthan gum concentration. The result suggest that using 1.4% xanthan gum as edible coating may form a protective barrier on the surface of acerola, the ripening process of acerola can be delayed and prevented oxygen penetration. It can be prolong the preservation during 6 days at 30°C without any negative effects on quality of fruit. The appearance of acerola does not have blemishes and which is fresh, shiny and bright colored.

Key words: Acerola; Edible film; Glucose; Storage; Respiration.

PECULIARITIES OF HUMAN RESOURCES MANAGEMENT IN SUSTAINABLE AND ECOLOGICAL FARMS

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ABSTRACT. Human resources management in agricultural farms is of particular importance in the context of the particularities of labor in agriculture, which is different from other economic sectors. Since labor is the most important production factor of any economic activity, labor productivity is the most used in the evaluation of economic efficiency. Accelerating the productivity growth is related to understanding content and its meaning, major factors of influence and way of exploitation. To emphasize human resource management and to illustrate the way of calculation of labor productivity, the study was conducted in an ecological farm with a vegetable profile of Iași County, Romania. The labor productivity has been used in the evaluation of economic efficiency, for three major crops: wheat, maize and potatoes. We used three indicators: average efficiency factor of production land use, W_{pm} ; the average productivity of labor in physical units, W_{Lm} ; labor productivity, W_H ; labor productivity in monetary value, W_V . To increase the labor productivity and efficiency of human resources there were organized training courses and programs both of managers and directly involved productive staff, but also there were introduced new production technologies that lead to ease and make efficient the staff work.

Key words: Human resources management; Labor productivity; Agricultural farms.

REZUMAT. Managementul resurselor umane în fermele agricole are o importanță deosebită în contextul caracteristicilor muncii în agricultură, care se deosebește de celelalte sectoare economice. Având în vedere că munca este factorul de producție cel mai important al oricărei activități economice, productivitatea muncii este cel mai mult utilizată în procesul de evaluare a eficienței economice. Accelerarea ritmului de creștere a productivității muncii este legată de înțelegerea conținutului și semnificației sale, a factorilor prioritari de influență și a modului de valorificare. Pentru a evidenția managementul resurselor umane și pentru a ilustra modul de calcul al productivității muncii, studiul a fost efectuat într-o exploatație agricolă cu profil vegetal din județul Iași. Având în vedere că munca este factorul de producție cel mai important al societății agricole, productivitatea muncii a fost utilizată în procesul de evaluare a eficienței economice la trei culturi mai importante și anume: grâu, porumb și cartof. S-a urmărit creșterea productivității muncii și a eficienței utilizării resurselor umane prin organizarea unor cursuri și programe de instruire, atât a managerilor, cât și a personalului direct productiv, dar și prin introducerea unor noi tehnologii de producție, care duc la ușurarea și eficientizarea muncii personalului.

Cuvinte cheie: managementul resurselor umane; productivitatea muncii; ferme agricole.