

Kurdistan 3rd Conference on Biological Sciences

VI. PLANT SCIENCES

**Effect Of Nitrogen Levels And Water Stress On The Yield
And Quality Of Two Cultivars Of Wheat
(*Triticum Aestivum* L.)**

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Abstract

Pot experiment was conducted at the greenhouse of College of Science- University of Salahaddin– Erbil- Iraq, during 28-11-2007 to 13-4-2008, to test the combined effects of different levels of nitrogen application (0, 50, 100, 150, 200 mg N/pot) and irrigation at (50, 75, 100% field capacity) of two selected wheat cultivars (C₁= Semeto, C₂= Khashna Sardar) on yield, vegetative growth characters, total N- uptake and nitrogen use efficiency. As expected the results indicated that, under normal irrigation grain yield of both cultivars increased with increasing nitrogen level but under limited soil moisture condition, water stress was a more yield limiting factor than N fertilization for wheat production. Nitrogen use efficiency was found to decrease with increasing N levels, while under water stress, it was reduced to half of its values under normal irrigation. Both N application and increasing of irrigation increased total N- uptake, N- translocated and grain yield of wheat.

Developing An *In Vitro* Propagation Protocol For Spider Plant (*Chlorophytum Comosum*)

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Abstract

Chlorophytum comosum, commonly known as Spider plant, is one of the most common and well-known houseplant and as an important plant in reducing indoor pollution. In the present study, an *in vitro* micropropagation protocol was developed for this plant at the plant tissue culture laboratory, Scientific Research Center at the University of Duhok. An efficient and reliable micropropagation of *C. comosum* was achieved by the culture of the explants in MS medium solidified with agar. Kinetin and BA were comprised to declare their effects on the multiplication stage. The results revealed that BA at 1 mg/l was more effective than kinetin by producing significantly higher average number of branches per explant (16.63) as compared to the highest average number of branches (11.13) achieved by adding 1.5 mg/l kinetin. Whereas, the longest plantlets and the highest number of leaves per explant were achieved when kinetin was added at 0.1 mg/l. An interesting rooting was found at the multiplication stage and the highest number of roots was recorded at 0.5 mg/l kinetin. Explants grown on cytokinins-free medium (control) gave the highest mean length of roots (8.39 cm). At rooting stage, the optimum rooting parameters were recorded on MS medium supplemented with different concentrations of NAA as compared to the addition of IAA or IBA. The gradually acclimatized plants were successfully transferred to the out-air conditions and a high survival rate (98%) was recorded.

Genetic Analysis In Some Durum Wheat Varieties And Their Hybrids Using Line X Tester Design

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Abstract

Using the line × tester mating design, the combining ability, gene effect and heterosis of some quantitative characters were studied, using 3 line Bakrajo 1, Jerardo 574 and Cham 3 and 4 testers Ovanto, Acsad 65, Apeo and Grezo to produce 12 F1 hybrids of durum wheat. The study was conducted at Qulyasan research station-College of Agriculture University of Sulaimani during 2007-2009. The line parents of Bakrajo 1 and Jerardo 574 were good general combiner for most the agronomic traits including grain yield/plant. The tester plant Acsad 65 was found good general combiner for 1000-grain weight and grain yield/plant. The cross Bakrajo 3 × apeo performed better for spike length and number of grains/spike, but the cross Cham 3 × Acsad 65 was good specific combiner for plant height and number of spikes/plant, Jerardo 574 × Crezo and Cham 3 × Apeo were best specific combiner for grain yield/plant. GCA to SCA variances ratio revealed predominantly additive gene action for the traits plant height, 1000-grain weight and grain yield plant. The average degree of dominance values were found more than one for the traits number of days to 50% anthesis, number of spikes/plant, spike length and number of grains/spike, confirming the presence of over dominance for these traits. Heritability in broad sense was low for no.of days to 50% anthesis, no. of spikes / plant, spike length, and no. of grains/spike, but it was moderate for 1000 grain weight and grain yield/plant, where as it was high for only plant height.

Inheritance Of Grain Protein In Durum Wheat

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Abstract

The F1 progenies of a five-parents (Bakrajo I; Iraq 7; Um Rabea; Smito and Pansefil), diallel cross (including reciprocals) of tetraploid wheat (*Triticum turgidum* var. *durum*) were analyzed, to determine the nature of gene action, which controlled the inheritance pattern of grain protein content. Kernels of 25 genotypes (20 F1's hybrids + 5 parents) were prepared to determine their protein content at ICARDA laboratories by the authors. Combining ability analysis carried out were using the method as described by Griffing Method1. Model II. The estimates of components of genetic variation showed the presence of highly significant mean squares due to genotypes, gca and sca. Among the parents Smito recorded the highest protein content 16.2%, while the diallel cross (Bakrajo 1 × Iraq 7) exhibited maximum protein content 18.2% and maximum heterosis value 23.81%. Directional dominance was observed in case of protein content, which indicated the possibility of further improvement in this particular trait. It was established that the inheritance of grain protein content in F1 generation controlled by non additive gene action.

Genetic Diversity Of Apricot (*Prunus Armenica L.*) Varieties In Duhok-Region Using AFLP-Markers

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Abstract:

Apricot (*Prunus armeniaca* L.) is one of the most important prunus species grown in the world; more than 80% of the world's apricot production is restricted to the Mediterranean regions. Molecular markers and their use for genotyping have revolutionized the identification of cultivars. In any advanced breeding program, it is important to be able to establish unique DNA profiles for selections, to identify varieties unambiguously and to determine their genetic relationship. In this study, the genetic diversity of apricot varieties cultivated in Duhok rejoin was sought using AFLP markers. Two AFLP selective primer combinations were used. A total number of 96 legible bands (markers) were revealed, of which 74 (77%) were polymorphic markers representing 77% of the total number of bands. The calculated genetic diversity among 6 varieties of apricot ranged between 0.11 the lowest was found between Abyath Mobaker and Turkey Motaexer where as the highest genetic distance 0.56 between Abyath Mobaker and Turkey Mobaker. The results of cluster analysis by un weighted pair group method of arithmetic means (UPGMA based dendrogram) revealed one distinct cluster and within this cluster there were 2 sub-groups. The results obtained in this study may pave the way to assist apricot cultivation and in further apricot breeding programs in this region.

The Role Of Cultivar Growth Substrate On Microtuber Production In Potato

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Abstract

Plantlet shoot (1.5) of four potato cultivars (Diamond, Desiree, Kardinal and Famosa) were planted in three growing substrates (Petmose, Petmose+loamy soil and loamy soil). All the potted shoots were covered by polyethylene bags and incubated at $25\pm 2C^{\circ}$ with 16 hr/ day light (1000 lux) for 90 days. Data of survivals, microtuber per plant and their diameters and fresh weight were investigated. Results indicated that there was a significant interaction effect of both cultivars and growth substrate on all yield components investigated. Based on this interaction, Desiree plantlets growing in petmose showed the highest mean of microtubers per plant (3.5) and highest mean of fresh weight of the microtuber (1.653 g). However, based on survival percentage, petmose proved to be the best substrate for potato shoot growth in all cultivars used. Survival percentage of the four cultivars planted in petmose were ranged from 53.33 in Kardinal to 76.67% in Diamond, Meantime, although survivals of all cultivar were significantly reduced in Loamy soil, Diamond cultivar completely failed to grow in the same substrate.

Somaclonal And Radiation Induced Variation In *Lycopersicon Esculentum Mill.*

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Abstract

The aim of this study is to optimize the appropriate conditions to initiate the callus and determine the phenotypic variation of the somaclones of *Lycopersicon esculentum Mill* derived from callus. Tissue culture and ionizing radiation of tomato seeds were used to induce or to allow the expression of phenotypic variation in two processing tomato cultivars. Cotyledon cultures of Miljana and UC82A were exposed to 5000, 7500 and 10000 rads from cobalt generator and laser energy from helioneon sources with rate frequency of 10,15 and 20. Plants regenerated from these cultures were grown in a greenhouse planting to observe variation. The optimal medium to initiate the *Lycopersicon esculentum Mill* callus cultures is MS enriched with NAA and benzylaminopurine (BAP) and modified by 0.05,0.075 M NaCl. Explants placed on the medium gave the highest mass of the callus on average.

A strong suppression of growth *in vitro* was observed at the 5000 rad level and 10 frequency, while growth in treatments exposed to more than 5000 rads was directly correlated to radiation dose. The addition of BAP cytokinin to initiating medium stimulated the process of organogenesis, whereas, the process of rhizogenesis was observed in the media with the addition of auxins. Intermediate levels of radiation dosage led to the greatest number of observable variants. Seedling control populations exhibited the least variation. Progency evaluation showed segregation, indicating some variation was due to genetic changes.

The Extraction and Purification of Apigenin from the Sage *Salvia Officinalis L.*

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Abstract

Garden sage (*Salvia officinalis L.*) is a valuable medicinal plant, which is used widely in traditional medicine. This plant species is very rich in biologically active compounds and many studies have indicated their increasing practical importance. The study was to extract and purify flavonoid compound (Apigenin) from leaves of sage *Salvia officinalis* cultivated in Iraq. Our aim is to investigate the chemical composition of the sage and in this paper the original procedure is described for the extraction of apigenin. The preparative chromatography on paper was used for the isolation of these compounds from ethanol extract (1:10) of the plant (leaves) in the n-butanol-water-acetic acid system 12:2:1 v/v/v. Considering the R_f values of IR, UV spectra and HPLC and compared with the stander data it was determined that the isolated compound apigenin .

Effect of Different Doses of Gamma-Rays as Elicitor on Essential Oils Production from Rosemary (*Rosmarinus Officinalis* L.) Leaf and Callus Analyzed by GC-MS

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Abstract

The yield of rosemary (*Rosmarinus officinalis* L.) from essential oils was investigated. Yield of callus tissue was compared with the intact plant production. Callus was induced on leaf explants and maintained on Murashige and Skoog medium (MS) supplemented with Dichlorophenoxy acetic acid (2,4-D) and Benzyl adenine (BA). The highest percentage of callus induction (100%) was recorded on leaf explants when a combination of 2 mg/l 2,4-D and 0.5 mg/l BA was added to the culture medium. Maximum callus fresh weight was obtained in the combination of 2 mg/l 2,4-D and 0.5 mg/l BA in cultures grown under 16/8 hrs photoperiod, which reached 1780 mg. Callus cultures were treated with different doses of gamma-rays. The chemical analysis of callus ethanol extracts revealed that the major components that identified were, cineole, camphor, borneol, verbenone, bornyl acetate, linderol, isocarnosol and other non-identified compounds. Results showed a significant increase in essential oil constituents with the increased doses of irradiation up to 7 Gy.

Wheat Nutritional Diagnosis With Dris Affected By Supplemental Irrigation And Fertilization

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Abstract

A field experiments were conducted in Girdarasha fields, College of Agriculture, Salahaddin University during the growing season 2006 to study the effect of different levels of nitrogen (0,92,184 Kg N.ha⁻¹), phosphorus (0,92,184Kg P₂O₅.ha¹), potassium (0,120Kg K₂O.ha¹), magnesium (0,40 Kg MgO.ha⁻¹) and their combinations on nutrient balance in wheat under rainfed and supplemental irrigation using the factorial randomized complete block design with three replications. The lowest nutrient balance index (6.08) at flowering growth stage, was recorded from treatment combination (N₁P₂K₁Mg₀), whereas the highest NBI (47.83) was produced from combination treatment (N₀P₀K₀Mg₀) at flowering growth stage under supplemental irrigation. DRIS index values with supplemental irrigation ranged from -16 to+16 considered adequate. Under rainfed irrigation lowest NBI (9.99) was produced from combination treatment (N₂P₂K₀Mg₀) at flowering stage , whereas highest value of NBI (70.79) was recorded from combination treatment (N₁P₁K₀Mg₀) at the same growth stage. The DRIS index ranged between -5 to +5 considered adequate under rainfed irrigation.

**Effect of Storage Temperature and Bulbs Weight on the
Flower Bud Development of Wild Narcissus *Narcissus
Tazetta L.***

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Abstract

This study was carried out in the cold storage unit of Horticulture Department / College of Agriculture / Baghdad University on the wild Narcissus , *Narcissus tazetta L.* to study the influence of storage temperature and bulbs weight on the flower bud development . Stored bulbs with 22 and 27 gm weights at room temperature (27-34C°) in average 31C° and 25C° at 120 days . The bulbs which stored at last temperature enhanced flower bud development for both weights , but there were some differences between them during the storage period , bulbs weight 22gm gave in florescence after 30 days as compared with the 27gm. However both weight stored at room temperature gave delay the florescence to 90 and 75 days.

A Study of the Effects of Planting Date on Yield and Yield Components of Grain Corn 540, 647, and 704 in the Environmental Conditions of Darrehshahr

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Abstract

In order to study the effects of planting date on yield and yield components of grain corn 540, 647, and 704, a study was done in environmental conditions of Darrehshahr in 1384. The study was done in split plot design and based on a completely random design in four recurrent experiments. In this experiment, four planting dates, including 84/4/10, 84/4/20, 84/4/31, and 84/5/10 were considered as the main splits, and cultivar was considered as the secondary factor, including three cultivars (540,647, 704). The results of analyzing variance tables of yield and yield components demonstrated that the Grain number per ear was meaningful in 5% statistical level, while the thousand kernel weight and Grain yield was meaningful only in 1% statistical level. Moreover, in most of the cases, the effect of cultivar on planting date was proven to be insignificant. In the end, it become evident that the 20th of Tir is the most appropriate planting date, and the grain corn 540, having the average yield of 11250 kg. per hectare, was recognized to have the highest yield.

Characterization of a tissue-specific PR10 promoter from alfalfa (*Medicago sativa*)

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Abstract

Plants respond to stresses by means of diverse patterns of gene expression that are usually inducible. Among stress-inducible genes in plants, pathogenesis-related (PR) genes represent a well known category that responds to both biotic and abiotic stresses. The expression of a pathogenesis-related (PR) gene (*MsHI7*), previously isolated from cDNA induced following harvesting of stems and leaves of *Medicago sativa* cv Gala was studied using RT-PCR. The expression was induced by harvesting, wounding, heat, ABA, ethylene and infection by *Xanthomonas campestris* pv. *alfalfae*. Expression of GUS gene encoding β -glucuronidase in the transgenic *Nicotiana benthamiana* plants under the control of *MsHI7* was studied. Stably transformed *N. benthamiana* plants were created with a 657 bp portion of the promoter of *MsHI7* fused to the GUS gene. Histochemical observations showed that this sequence was sufficient to drive GUS expression in stems and leaves, particularly in the vascular tissue. In addition, GUS expression driven by the *MsHI7* promoter was wound-inducible in leaves, which was consistent with the accumulation of *MsHI7* mRNA in alfalfa leaves in response to mechanical wounding and harvesting. The *MsHI7* promoter represents a valuable tool for research and biotechnology applications related to vascular tissues and disease resistance.

Effect of locality, elevation and aspect on some wood and growth characteristics of *Pinus brutia* Ten. in Duhok/ Iraq

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Abstract

Pinus brutia grows naturally in Kurdistan and widely used in plantation programs, therefore this study was planned to help enlarging variation knowledge of traits commonly used in future selection, breeding and gene conservation. Three categories of variation in natural stands of the species have been investigated: 1. Horizontal variation within the isolated populations of Atrush and Zawita localities. 2. Southern and northern aspects variation within the Atrush and Zawita localities. 3. Elevational variation within each aspect of Atrush and Zawita localities.

Twenty trees were selected from each of elevational strip per aspect per locality. Tree height, dbh, branch-free stem, crown diameter, specific gravity, width of growth ring, early wood and latewood were evaluated for variation throughout the range of species distribution. Characters indicative of physiological activities: leaf length and leaf width, stomata rows on the dorsal face, stomata rows on the ventral face, number of stomata per cm of leaf length were assessed. Tracheid parameters determining the quality of wood pulp and paper making were measured. Cone scale dimensions with the seed germination vigor (germination percentage and germination rate) were also calculated to define the characters of trees and best position of collecting high vigor seeds.

The results indicate that trees of a mid-elevation are superior in stem height, diameter at breast height, free-branched bole, compared to high and low elevations, probably due to superior gene pool at this elevation strip. Tracheid length is at peak in dense patches at the low elevations, while cell walls are thicker in the mid-elevation. Annual ring width, latewood and early wood rings are at peak in the mid-elevation of Zawita locality. Crown diameter provides a reliable method for estimating tree diameter at dbh. Seed from the southern aspects of Zawita and Atrush are always vigor and germinate faster than anywhere else. Multivariate analysis proves clear discrimination between elevational strips indicating differentiation in population occupying these altitudes and that some kind of adaptation has taken place.