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Effect of cold, heat and chemical stresses on the induction of androgenesis in lisianthus (*Eustoma grandiflorum*)

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Abstract

Several methods are available to produce haploid plants. One of the most efficient methods is especially microspore culture. Stress as a triggering factor is essential for embryogenesis induction in microspores. In the first experiment, the effect of different thermal stresses including cold treatments and heat stress and the control were evaluated. In the second experiment, the effect of 2,4-D and in the third experiment effect of PEG-4000 were studied. In addition, some other stresses including high medium pH, ethanol and high speed of centrifugation were also tested. Results showed that cold pretreatment (4˚C for 1 day) and heat stress (35˚C for 2 days) induced cell divisions. Among stresses tested, heat stress (35˚C for 1 day) was the most efficient one for induction of and rogenesis. The best concentration of 2,4-D for and rogenesis induction was 25 mg/l that induced the highest ratio of multicellular structures. The most effective cellular changes were observed when PEG in 10 percent density was applied. The pH (6.5 and 7) induced the initiation of microspore cellular divisions and creation of multi-cellular structures. The high speed centrifugation caused only swelling of microspores.

Keywords: 2,4-D, chemical stresses, microspore culture, PEG-4000, thermal stresses.

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Determination of suitable medium for non symbiotic germination of self pollinated seeds of *phalaenopsis* 'Kyoto'

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Abstract

In this study, *in vitro* non-symbiotic germination of self pollinated seeds, protocorms survival percentage and protocorms growth of *Phalaenopsis* 'Kyoto' were investigated. For this purpose, five different modified media include Vasin and Went (VW), Murashing and Skoog (MS), ½ MS, Knudson C (KC), FAST that supplemented with two g/l peptone, 15 percent sterile coconut water or two g/l peptone together with 15 percent coconut water were used. The highest seed germination of (65.9 percent) was observed by 30 days after culture on KC with two g/l peptone and 15 percent CW. The highest protocorm survival (94.7 percent) was observed by 50 days after culture on KC with two g/l peptone. The highest growth of protocorm (3/3 mm) was obtained by 50 days after culture on FAST containing two g/l peptone and 15 percent CW.

Keywords: coconut water, non symbiotic culture, protocorm survival and growth, peptone, seed germination.

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Evaluating reaction of rice (*Oryza sativa* L.) Mutant lines to salt stress at seedling stage

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Abstract

In order to evaluate chemical mutation on cultivar mahali Tarrom' in salt stress, seeds of rice cultivar 'mahali Tarrom' were treated with two chemical mutagens, ethyl methane sulfonate (14 mM) and sodium azide (two mM). In second generation, appropriate plants for economically important traits have been selected. seeding of selected plants were tested under salt stress in third generation using a factorial experiment with two factors based on completely randomized design with three replications at two salinity levels (zero and 12 dSm^{-1}) were in hydroponic media. Results showed that two mutant lines obtained by treatment of ethyl methane sulfonate were stayed at tolerance group that acted better in comparison with the control (non-treated) under salt stress. However, two sensitive lines to salinity conditions were observed under mutagen treatment, while most of mutant lines in sodium azide treatment under salinity conditions were performed similar to control. Also, a number of sensitive lines to salinity were identified under treatment with this mutagen.

Keywords: ethyl methane sulfonate, mutation, rice, salt stress, sodium azide.

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Genetic variation and traits interrelationship in some rapeseed genotypes using multivariate techniques under two moisture conditions

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Abstract

To study of genetic diversity of rapeseed genotypes using multivariate methods under normal and drought stress conditions, 16 genotypes were evaluated using a randomized complete blocks design with three replications in Razi university in 2007-08 cropping season. Factor analysis under normal condition showed that nine factors explained 89.05 percentage of total data variation, and under drought stress condition showed that eight factors explained 86.05 percentage of total data variation. Path analysis for oil yield based on selected traits and stepwise regression showed that two traits including proline in early flowering stage and plant height in middle flowering stage under normal condition and plant height in end of flowering stage and pod length under drought stress condition were selected. Cluster analysis based on all traits under normal condition using WARD method showed that genotypes were placed in three groups and there was highest genetic distance between Sunday and Shiralee. Under drought stress condition the genotypes were located in three groups using UPGMA method and the highest distant was observed between Sahara and Shiralee, thus predict that hybridization of Sahara and Sunday with Shiralee could provide best hybrids and supply a desirable genetic diversity in segregated generations for breeding programs..

Keywords: cluster analysis, drought stress, multivariate analysis, path analysis, rapeseed.

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Evaluation of yield stability of barley genotypes using GGE-biplot method

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Abstract

This study was performed for determine stability of the 18 promising barley lines and two check lines Nosrat and MB-86-5 in Six parts of the temperate zone including Karaj, Isfahan, Birjand, Varamin, Zarghan and Nishapur based on randomized complete block design(RCBD) with three replications and in two cropping seasons (2009-2011). Following combined analysis, grain yield stability assessment was performed using graphical multivariate GGE biplot analysis. Genotypes 1, 2, 16, 5 had very high yield stability. This method was reveald three mega- environments including 1. Karaj, Varamin and Zarghan, 2. Nishapur and Birjand and 3. Isfahan. Superior genotypes 2, 16 and 5 identified for these three mega-environments, Results of this study showed genotype 2 (Kavir Kavir / / Badia Badia / 3 / Torsh Torsh /cr.279-07/ / 9cr.279-07 / Bgs Bgs /4/ / 4 / Karoon Karoon / / Kavir Kavir) with an average yield of 6.626 tons per ha and genotype 16 (ZBL-2640) with an average yield of 6.438 tons per ha as stable genotypes after check genotype1with an average yield of 6.492 tons per ha.

Keywords: addaptation, genotype × environment interaction, mega-environment, stability, temperate zone.

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Evaluation of morphological, phonological and essential oil yield in populations of four chamomile species *Anthemis tinctoria, A. haussknechtii, A. pseudocotula* and *A. Altissima* under field condition

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Abstract

In other to evaluation of morphological and phenological traits of 24 populations, from four species chamomile of the genus of Anthemis, an experiment were carried out using Randomized Completely Blocks Design (RCBD) in three replications in Alborz Research Station in Karaj, Iran during 2011-12. 13 traits including: length and width of canopy diameter, plant height, number of flower, shoot fresh and dry weight, growth degree days (GDD), essential oil percentage and essential oil yield and plant height were evaluated. Mean comparison of the four *Anthemis tinctoria, A. haussknechtii, A. pseudocotula, A. Altissima*, showed that *Anthemis tinctoria* had higher length of canopy diameter, shoot fresh and dry weight and plant height than other species. Mean comparison of the population of four population showed that Galikesh population (*Anthemis haussknechtii*) had higher mean value of length and width of canopy diameter, plant height, number of flower, shoot fresh and dry weight than other populations but Baneh two population (*Anthemis tinctoria*) had higher mean value of essential oil yield compare with other populations. Regarding of positive correlation of vegetative and generative of the genus of Anthemis and maximum traits interpretation showed that essential oil yield was followed shoot fresh and dry weight, width of canopy diameter and plant height. Cluster analysis of the populations of *Anthemis tinctoria, A. haussknechtii, A. pseudocotula* and *A. Altissima* showed that the populations divided into four groups and therefore it was proved the reason of relationship between them.

Keywords: chamomile, cover canopy, growth degree days, shoot mass.

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Estimate of heterosis and combining ability in ranian melon using diallel crosses analysis

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Abstract

In order to estimate heritability, heterosis, general and specific combining ability and relationships between them in traits of fruit number per plant, days to the first fruit harvest, yield per plant, average fruit weight and rind thickness, seven local populations of Iranian melon (‘Tashkandi’, ‘Khatouni’, ‘Garmak’, ‘Aran1’, ‘Mirpanji’, ‘Suski-e-Sabz’ and ‘Golpaygan’) were crossed using a complete diallel crosses design, Griffing’s method 1, Model I. Parents and all possible hybrids were evaluated in a randomized complete block design with three replications. Analysis of variance revealed high significant differences among F_1 hybrids and their parentes for all studied traits. Therefore analysis of combining abilities showed that specific combining ability (SCA) for yield per plant was greater than general combining ability (GCA), indicating the importance of non-additive genes controlling this character. General combining ability effects were significant for most parents in all the studied traits. High estimation of narrow sense heritability (h^2ns) for the traits of fruit number per plant, fruit weight, days to the first fruit harvest and rind thickness (0.83, 0.82, 0.79 and 0.74, respectively) indicated low effects of environment on the expression of those traits and very important role of additive gene effects. High estimate of h^2ns (0.83) was found for fruit number per plant. High heterosis effect over the better parent was found for yield per plant (15.78 percent), therefore, it is suggested to apply both additive and non-additive genetic effects to develop superior hybrids in melons.

Keywords: additive gene action, general and specific combining ability, griffing, heritability, heterosis.

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Evaluation of drought tolerance of sugar beet monogerm hybrids under *in vitro* condition using polyethylene glycol (PEG 6000)

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Abstract

The present study was designed to evaluate the drought tolerance of new sugar beet monogerm hybrids using polyethylene glycol 6000, under *in vitro* condition. The experiment was carried out as a factorial experiment based on completely randomized design with four replications in Sugar Beet Seed Institute, Karaj in 2013. 23 new sugar beet monogerm hybrids with two tolerant and normal controls were sowed in normal (osmotic potential at zero) and drought stress (-0.7 Mpa) conditions. After six weeks, traits such as length of root and shoot, fresh and dry weight of root and shoot, seedling length, dry and fresh weight were measured. The analysis of variance showed that stress levels and interaction genotypes in stress were significant for all of the measured traits. The effect of genotype was also significant for all traits except root dry weight. According to the results of Cluster analysis with Ward method, hybrids were classified in three and four different groups, respectively, based on the measured traits under drought stress conditions that hybrids number two, 21, 22, three, 23 and 20 in normal conditions and hybrids number 13, four and three in stress conditions were identified as superior hybrids. Also was used of the stress tolerance index (STI) in order to compare the drought tolerance and the final screening tolerant hybrids and top and hybrids number 13, 22, 23, 21, seven, four, 20 and three were introduced as the most tolerant hybrids to drought stress at seedling stage that can be used in future breeding work by researchers.

Keywords: evaluation, hybrid, *in vitro* condition, monogerm, STI index, stress.

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Genetic study of two species of wild saffron using morphological traits and RAPD marker

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Abstract

In this study, the genetic diversity of 25 Iranian saffron genotypes from three species (*Crocus speciosus*, *Crocus cancellatus* and *Crocus sativus*) has been evaluated using 16 morphological traits and RAPD marker. *C. sativus* was different with *speciosus* in the leaf number per plant, tepal length, flower weight, inflorescence stem height and the stigma length, but had no significant difference with *cancellatus* species. Considering traits such as the number of outer cover and the corm dry weight, domestic saffron species was different with *cancellatus* and similar to *speciosus*. 19 primers have been investigated in PCR reactions. A total number of 276 bands have been amplified from all the samples, out of which there were 261 polymorphic bands and the cophenetic coefficient was about r = 0.96. Cluster analysis was done on the basis of polymorphic bands and using Jaccard's similarity coefficient and by UPGMA method and the samples were divided into four groups at similarity of 0.36. In this method, the same as morphological traits, *C. specious* were separated from the other two species. Domestic saffron was well separated from *cancellatus* and *speciosus* at similarity of 0.28.

Keywords: *Crocus*, genetic diversity, RAPD, UPGMA.

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