

EFFECT OF ZINC SULPHATE FERTILIZER RATE ON THE BREAKAGE SUSCEPTIBILITY OF THREE WHEAT VARIETIES

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ABSTRACT. Mechanical damage of seeds due to harvest, handling and other process is an important factor that affects the quality and quantity of seeds. Seed damage results in lower grain value, storability problem, and reduces seed germination and seedling vigor and subsequent yield of crops. The objectives were to determine the effect of different levels of zinc sulphate fertilization on the breakage susceptibility of three irrigated wheat varieties (*Bahar*, *Shiraz* and *Pyshtaz*). An experiment was conducted at the Experimental research station of Lorestan University, Iran. A factorial experiment was conducted with three replicates in a completely randomized block design (CRBD). Factors included three levels of zinc sulphate. Zinc sulphate treatments were combinations of three fertilization rates (0 - control, 25 and 50 kg/ha) at three replicates. The harvested seeds were subjected to impact energies of 0.05 and 0.1 J at constant moisture contents of 9.8, 15 and 20% using an impact test apparatus. The analysis of variance showed that wheat variety, fertilization level of zinc sulphate and moisture content significantly influenced breakage susceptibility of wheat seeds at the 1% probability level. Resistance to the breakage of wheat seeds for all varieties increased, as polynomial functions, with increase in the zinc sulphate rate. The average values of percentage breakage of seeds decreased from 37.07 to 27.80% as the fertilization level of zinc sulphate increased from 0 to 50 kg/ha. *Bahar* variety exhibited the highest resistance to breakage than other varieties. As the moisture content increased from 9.8 to 20% the percentage breakage of seeds decreased from 36.58 to 30.03%. Increasing the impact energy from 0.05 to 0.1 J caused an increase in the percentage breakage of seeds from 16.19 to 50.47%.

Key words: Wheat; Mechanical damage; Harvesting; Handling; Fertilization; Zinc sulphate.

THE STUDY EFFECT OF NITROGEN, *AZOTOBACTER* SPP. AND *AZOSPIRILLUM* SPP. ON PHENOLOGICAL AND MORPHOLOGICAL TRAITS OF DURUM WHEAT CULTIVARS IN DEHLORAN REGION, IRAN

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ABSTRACT. This experiment was carried out in the form of factorial split in the model random complete block design in three replicates. In this design three kinds of durum wheat including Yavarous, Karkheh, Seimareh were planted in the main plots and three levels of 40, 80 and 120 kg net nitrogen in hectare which it had been provided from source of urea and three levels of bio fertilizer including *Azotobacter* spp. and *Azospirillum* spp. and without using bio fertilizer (control) as factorial were cultivated in secondary plots. Before cultivation, amount of seeds which it must be mixed with together *Azospirillum* spp. and *Azotobacter* spp. bacteria's, it was mixed together water and sugar with 2% density of wet and in proportion of 2 kg in 100 kg seeds were mixed with seeds. The irrigation of blocks was separately done for preventing from mixture of bacteria. This research will have a new aspect for/in order to effect of biological fertilizers in replacement with/to fertilizers and it hasn't demonstrate its comparison on durum wheat in the region by now. Finally, with interpretation of results obtained from this research defined that positive effect of biological fertilizers on growth that before they have

verified about plants, also, they are true about grains such as wheat. So, considering the obtained results from this research, it is seemed that application of suitable biological fertilizers can be effective in increase of function, improvement of growing traits of wheat and decrease nitrogen fertilizer.

Key words: Nitrogen fertilizers; Biological fertilizers; Phenological; Morphological; Durum wheat.

THE EFFECTS OF SALINITY STRESS ON SEED RESERVE UTILIZATION AND GERMINATION PERCENTAGE OF TREATED SEEDS OF BARLEY (*HORDEUM VULGARE* L.)

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ABSTRACT. In order to investigate salinity stress on seed reserve utilization and seedling growth of treated seeds of barley (*Hordeum vulgare* L.), an experiment was carried out. Factorial experiment was carried out in completely randomized design with three replicates. To create salinity stress, NaCl in osmotic levels at 0 (as control), -4, -8, -12 and -16 bar were used. For seed priming, gibberellin (GA) 50 ppm was used. Our results showed that treatment \times drought interaction on these traits: germination percentage, weight of utilized (mobilized) seed, seed reserve utilization efficiency, seedling dry weight and seed reserve depletion percentage were significant. The highest germination percentage, weight of utilized (mobilized) seed, seed reserve utilization efficiency, seedling dry weight and seed reserve depletion percentage were attained from priming by gibberellin at control conditions. Thus, priming increased characteristics as compared to the unprimed. Priming improved seed reserve utilization such as: weight of utilized (mobilized) seed reserve, seed reserve depletion percentage, seed reserve utilization efficiency and seedling growth in barley under salinity stress.

Key words: Salinity stress; Seed reserve utilization; Gibberellin; *Hordeum vulgare* L.

RESPONSE OF LEAF AREA INDEX, VEGETATIVE AND REPRODUCTIVE PHASES OF TWO COTTON (*GOSSYPIUM HIRSUTUM* L.) CULTIVARS AT DIFFERENT REGIMES OF IRRIGATION SCHEDULING

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ABSTRACT. The experiment was conducted to investigate the effects of different regimes of irrigation schedule on various vegetative and reproductive stages of cotton crop. The results showed that irrigation effect was non significant for number of plants m^{-2} , while I_4 treatment produced maximum number of monopodial branches 2.18, but statistically it was at par with I_3 , I_5 . I_4 treatment showed maximum number of sympodial branches (20.43), followed by I_3 (18.63). F.H-900 showed statistically higher sympodial branches (18.34) than the F.H-901 (17.08). Maximum number of flowers per plant was formed in the I_4 treatment (101.00), followed by I_3 (96.31) and I_5 (92.23). Significantly higher number of flowers and boll drops

was recorded in treatment I₁, followed by I₂. Flowers and boll drop per plant decrease with increase in irrigations applied to crop. Minimum number of flowers (60.45) and bolls (16.98) dropped per plant were in I₄ and I₃ (65.0 and 22.72, respectively).

Key words: Growth; Bolls; Monopodial; Sympodial; Yield.

EFFECTS OF POTASSIUM AND IRON ON YIELD OF CORN (*ZEA MAYS L.*) IN DROUGHT STRESS

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ABSTRACT. In hot and arid regions, drought stress is considered as one of the main reasons for yield reduction. To study the effect of drought stress, Iron and potassium spray on the yield and yield components of corn, an experiment was carried out during the crop seasons of 2010 and 2011 on Abosaeid research field of Mahvellat as a split factorial within randomized complete block design with three replicates. The main plots with irrigation factor and three levels were considered: irrigation per 6, 9 and 12 days. Subplots were considered with and without Iron and potassium spray. The irrigation reduced the grain yield in irrigation per 12 more than other stages. Irrigation effects significantly on chlorophyll value, leaf relative water content, stem, ear and leaves dry weight, number grain in ear and row, number row in ear, unfilled seed percentage and thousand grains weight. Iron increased the seed yield and yield component, except unfilled seed percentage and SPAD. Using K, as compared with control treatment, causes the increase of grain yield, 1000 grains weight and number grain in ear 16.5, 9 and 5.5% respectively. Potassium could somewhat reduce the impact drought stress on corn.

Key words: Drought stress; Potassium; Iron; Spray; Corn.

THE CONTRIBUTION OF AGRICULTURAL RESEARCH AND DEVELOPMENT STATION SECUIENI, NEAMŢ COUNTY, ROMANIA, TO THE SUPPLY OF SOYBEAN SEED

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ABSTRACT. In the 2008-2012 period, in the Seed production laboratory from Agricultural Research and Development Station (A.R.D.S.) Secuieni, Neamţ county, Romania, were cultivated three varieties of soybean, Granat, Eugen and Onix, created at A.R.D.S. Turda, Cluj county. These varieties were well adapted to the climatic conditions of A.R.D.S. Secuieni, obtaining yields of up to 3000 kg/ha. During 2008-2012, the following amounts of seeds were produced: PB1(pre-basic seed 1): 11000 kg in 2008, 8700 kg in 2009, 6500 kg in 2010, 5600 kg in 2011 and 3800 kg in 2012; PB2 (pre-basic seed 2): 45900 kg in 2008, 39000 kg in 2009, 67000 kg in 2010, 32000 kg in 2011 and 27000 kg in 2012. The amount of seed from the biological category PB2 ensure, annual, the required for sowing 300-700 ha of basic biological category, which is delivered to farmers for the sowing of about 5000-12000 ha. Both in the field of seed production as well as in the ecological testing field (comparative cultures of

contest) Onix variety presented the greatest adaptability to the pedoclimatic conditions from the Central Moldavian Plateau, achieving the highest yields.

Key words: Soybean; Seed production; Cultivar.

REZUMAT. Contribuția Stațiunii de Cercetare-Dezvoltare Secuieni, județul Neamț, la asigurarea necesarului de sămânță la soia. În perioada 2008-2012, în cadrul Laboratorului de producere de sămânță de la Stațiunea de Cercetare-Dezvoltare Agricolă Secuieni, județul Neamț, s-au cultivat trei soiuri de soia, Granat, Eugen și Onix, create la S.C.D.A. Turda, județul Cluj. Aceste soiuri s-au adaptat foarte bine la condițiile pedoclimatice de la S.C.D.A. Secuieni, obținând producții de până la 3000 kg/ha. În anii 2008-2012 s-au produs următoarele cantități de sămânță: PB1 (sămânță prebază 1): 11000 kg în anul 2008, 8700 kg în 2009, 6500 kg în 2010, 5600 kg în 2011 și 3800 în 2012; PB2 (sămânță prebază 2): 45900 kg în anul 2008, 39000 kg în 2009, 67000 kg în 2010, 32000 în 2011 și 27000 în 2012. Cantitatea de sămânță din categoria biologică PB2 asigură, anual, necesarul pentru însămânțarea a 300-700 ha din categoria biologică bază, aceasta fiind livrată fermierilor pentru însămânțarea a circa 5000-12000 ha. Atât în câmpul de producere de sămânță, cât și în câmpul de testare ecologică (culturi comparative de concurs), soiul Onix a prezentat cea mai mare adaptabilitate la condițiile pedoclimatice din Podișul Central Moldovenesc, realizând cea mai mare producție.

Cuvinte cheie: soia; producere de sămânță; cultivar.

CYCOCEL PRIMING AND FOLIAR APPLICATION AFFECT YIELD COMPONENTS OF RAPESEED (*BRASSICA NAPUS L.*)

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ABSTRACT. A factorial based on RCBD experiment was conducted to evaluate the effects of priming and foliar spray of cycocel on rapeseed yield components. Treatments were included; seed priming (0, 600, 900, 1200, 1500 μ M) and foliar spray (0, 600, 1200 μ M) with cycocel at development stage of flower buds. The results revealed that seed priming with cycocel significantly increased emerged plant number per plot, silique dry weight in the main stems and branches, plant dry weight, branches number, silique number in the main stems and branches, seed number in branches, 1000 seeds weight, and seed yield in non-stress conditions. Foliar application with cycocel also increased plant dry weight, 1000 seeds weight in branches, harvest index and seed yield. Moreover, interaction effect of priming and foliar application of cycocel increased plant dry weight and 1000 seeds weight with branches. CCC foliar application during the early stages of reproductive stage went to elevated plant dry weight and 1000 seeds weight in auxiliary branches and, also increased harvest index and grain yield. Mean comparison and interaction effects of traits also revealed that, appropriate levels of CCC had the meaningful effects on any agronomic and physiological trait. However, the most meaningful impact in most traits was traced in case with primed seed with 900 and 1500 μ M CCC. Overall, owing to the present data, CCC priming under both normal and harsh conditions may raise the germination related traits, seedling establishment, plant growth and ultimately may goes to increased yield.

Key words: Rapeseed; Cycocel; Priming; Foliar application; Yield.

GENETIC VARIABILITY, CORRELATION AND PATH ANALYSIS IN ADVANCED LINES OF RAPESEED (*BRASSICA NAPUS* L.) FOR YIELD COMPONENTS

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ABSTRACT. The present research was carried out to determine the best selection criteria for yield improvement in rapeseed (*Brassica napus* L.). Nine genotypes of *Brassica napus* were sown at Oilseeds Research Institute, Faisalabad, during the years 2011- 2012, to evaluate the means and components of variability (genotypic and phenotypic), heritability ($h^2_{B.S.}$), correlation (genotypic and phenotypic) and path analysis for yield and various yield components. At phenotypic and genotypic level, seed yield/plant had significant positive correlation with plant height, seeds/plant and siliqua/plant. A positive and highly significant genetic relationship was found between plant height and seeds/plant, siliqua length and seeds/siliqua, days to maturity and 1000 seed weight, days to flowering and seeds/plant, days to maturity and seeds/plant. Path coefficient revealed that the seeds/siliqua, 1000 seed weight, days to flowering, days to maturity and seeds/plant had direct positive contribution towards seed yield per plant. For rapeseed breeding seed per plant was the variable with maximum potential of selection for seed yield improvement because this trait possessed high $h^2_{B.S.}$, highly significant positive correlation and maximum positive direct effects with yield.

Key words: Genotypes; Siliqua; Heritability; Variance; Hybridization.

EFFECT OF NITROGEN LEVELS ON GROWTH, YIELD AND OIL QUALITY OF INDIAN MUSTARD GROWN UNDER DIFFERENT PLANT DENSITIES

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ABSTRACT. The study investigated agronomical and qualitative features of Indian mustard in a semi-arid region from Iran. Field trials were designed in split plot arrangement based on a Randomized Complete Block Design with three replicates at the Agricultural Faculty of Takestan, Iran. In the study, plant height (cm), the number of seeds in the siliqua (seed/siliqua), the number of siliquae in the plant (siliqua/plant), seed yield (kg/ha), biological yield (kg/ha), thousand-seed weight (g), harvest index (%), oil content (%) and oil yield (kg/ha) were determined. The all growth and yield parameters of mustard plant were significantly affected by nitrogen fertilization. All the parameters, except for harvest index (HI), were drastically affected by used densities. The highest seed yield and oil yield (2961 and 1159 kg/ha, respectively) were obtained for the crop utilized with 200 kg N/ha in plots with 80 plants/m². The maximum oil content (43.97%) was recorded in the lowest plant density (80 plants/m²) and nitrogen application level of 50 kg/ha. Results suggest that in semi-arid region of Takestan, researchers must direct their selection treatments to increase oil quality of Indian mustard.

Key words: *Brassica juncea*; Nitrogen; Plant population; Yield; Yield components; Oil quality.

EFFECT OF TRANSPLANTING DATES AND PLANT POPULATION ON GROWTH PARAMETERS OF POTATO (*SOLANUM TUBEROSUM* L.) RAISED FROM TRUE POTATO SEED (TPS)

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ABSTRACT. A field experiment was conducted during the rabi season of 2007-2008 and 2008-2009 at Paschim Medinipore, West Bengal to study the effect of transplanting dates and plant population on growth parameters of potato raised from TPS. Dry matter accumulation per plant was more in early transplanted (December 3) and sparsely populated (60 cm x 15 cm) crop. The highest leaf area index was observed in early transplanted crop with closer spacing (40 cm x 10 cm) at 60 days after transplanting. The highest crop growth rate, tuber bulking rate and tuber growth rate values were also recorded in early and closely transplanted TPS crop between 45-60 days after transplanting during both the years under investigation.

Key words: Growth attributes; Dry matter accumulation; Leaf area index; Crop growth rate; Tuber growth rate.

EFFECTS OF WATER STRESS AND POTASSIUM ON QUANTITY TRAITS OF TWO VARIETIES OF MUNG BEAN (*VIGNA RADIATA* L.)

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ABSTRACT. Water stress is known as the major threat to reduced growth and yield of plants in arid and semi-arid regions. Potassium is one of the indicators of plant responses to water stress. To evaluate the impact of water stress and levels of potassium on yield and yield components of two varieties of mung bean (*Vigna radiata*) (promising lines VC6172 and Indian), an experiment in the form of split factorial, based on randomized complete block design with three replicates was conducted in 2011, at the research farm of Safi-Abad Dezfool, Iran (latitude 32°16' N, longitude 48°26' E and altitude 82.9 m above sea level). Water stress in three levels: irrigation at 120 (no stress), 180 (moderate stress) and 240 (severe stress) mm evaporation from pan, were allocated to the main plots and potassium fertilizer at three levels (0, 90, 180 kg /ha) and two varieties of mung bean (promising line VC6172 and Indian) were allotted to the sub-plots. Results showed that water stress and potassium fertilizer significantly affect all traits. The highest grain yield (2093 kg /ha) was obtained from no stress treatment in the case of 180 kg /ha potassium. Total dry matter, number of pods and grain yield, were significantly different between the two varieties. The interaction between fertilizer and variety, on dry matter and grain yield and the interaction between irrigation and variety, on dry matter were significant. We conclude that use of potassium fertilizer can reduce the adverse effects of water stress.

Key words: Potassium fertilizer; Genotypes of mung bean; Yield components.