THE EFFECT OF PRIMING ON GERMINATION CHARACTERISTICS OF BARLEY SEEDS UNDER DROUGHT STRESS CONDITIONS

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ABSTRACT. Seed priming methods have been used to increase germination and seedling establishment under different abiotic stress conditions. Seed priming was used in barley to increase seed germination and tolerance on stress exposure. Barley seeds were treated with various priming agents for different time and temperatures. The effect of priming was assessed on germination characteristics on subsequent exposure to drought (PEG-12 bar) stress for 7 days. Seed priming treatments significantly ($p\leq 0.01$) affected germination percentage (GP), normality seedling percentage (NSP), germination Index (GI), germination uniformity (GU), means time to germination (MTG), coefficient of velocity of germination (CVG), seedling vigor index (SVI) and coefficient of allometry (AC). Seed priming with gibberelic acid (GA), salicylic acid (SA), ascorbic acid (ASc), hydropriming (HP), osmopriming (OP) and combined treatments (CT) significantly ($p\leq 0.01$) increased germination characteristics, compared to the unprimed. Seed priming with concentrations 25, 50 ppm of GA for 15 h at 10°C, 25 ppm of SA for 12 h at 10°C, 50 ppm of ASc for 12 h at 15°C, treatment 16 h hydropriming at 10°C and -15 bar PEG for 24 h for osmopriming maybe considered as optimal treatment for priming of barley seeds in drought stress conditions. In some cases, combined treatments are better than the separate treatments. Seed priming with PEG (potential -l5 bar PEG for 24 h at 10°C) was more effective in drought stress than the other treatments.

EFFECT OF NITROGEN FERTILIZER ON GROWTH, FLOWERING, FRUITING AND NODULATION OF THREE VARIETIES OF COMMON BEAN IN THE ARID REGION OF AÏN NAGA (BISKRA, ALGERIA)

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ABSTRACT. Field experiments were conducted to investigate the response of common bean (*Phaseolus vulgaris* L.) to nitrogen fertilizer. The main factor included the fertilizer (Granular Urea 46% N), was made up of two levels: no fertilization (0 kg/plot: control) and fertilization (0.4 kg/plot), while the secondary factor was the variety (three varieties of common bean: *Djedida*, *Nelson* and *Jalila*). The experimental design was a randomized complete block design with split plot arrangement and replicated four times. The effect of fertilization was evaluated during two development stages (flowering and fruiting) for each variety and this on the total dry biomass, the length of the aerial and root parts, as well as on the number of secondary roots. On the other hand, the combined effect of fertilization and variety was studied on some yield parameters per plant, such as the number of flowers, pods, seeds and the harvest index. In addition, the number of nodules at the end of seed maturation was evaluated. The results indicated that the nitrogen

fertilizer application significantly reduced the root length, the number of nodules and secondary roots in most of the common bean varieties. However, fertilizer application significantly increased dry matter in both flowering and fruiting stages, for the three studied varieties. Pod number per plant and seed yield was increased by the application of N fertilizer, depending on varieties and the parameters being measured. *Djedida* and *Jalila* varieties gave the best yield and can therefore be recommended to farmers. According to our results, the percentage of improvement by N fertilization on one parameter or another does not exceed an average of 20%, compared to the control. Indeed, the effect of fertilization is positive and seems to increase the harvest index by 18% in *Djedida* and by 20% in *Jalila*, compared to non-fertilized plants. Unfertilized plants of the variety *Nelson* showed the highest ability to nodulate.

Keywords: agriculture; dry matter; crops; Fabaceae; *Phaseolus vulgaris*; yield.

COMPARISON OF IPM PACKAGES ON FLOWER THRIPS AND POD BORERS MANAGEMENT OF MUNGBEAN WITH RECOMMENDED PRACTICE

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ABSTRACT. Effectiveness of integrated management approaches using blue sticky trap, pheromone trap, bio and synthetic insecticides were evaluated against major insects, like flower thrips and pod borers of mungbean at Regional Agricultural Research Station, Rahmatpur, Barishal and Pulses Research Centre, Ishurdi, Pabna, Bangladesh, respectively, during two consecutive years of 2018 and 2019. All of the management packages significantly reduced flower infestation, thrips population and pod borer infestation in mungbean. The highest percentage of reduction of flower infestation, thrips population and pod borer infestation was found in IPM package-3: installing blue sticky trap + two spraying of chlorfenapyr (Intrepid 10 EC) @ 1 ml/l + third spraying with (chlorantraniliprole + thiamethoxam), *i.e.* Virtako 40 WG) @ 0.15 g/l, followed by IPM package-1, IPM package-2 and recommended practice (spraying imidacloprid, *i.e.* Imitaf 20 SL @ 0.5 ml/l). The highest yield was also recorded from IPM package-3, which was statistically similar to IPM package-1, followed by IPM package-2 and recommended practice. Although the IPM package-3 provided the highest yield and return, followed by IPM package-1, but recommended practice (farmer's practice) gave the highest benefit because of higher cost of IPM components brought down the profit margin of IPM packages. The components of IPM package-1, *i.e.* biopesticides, are ecologically safer than that of IPM package-3 (synthetic chemical insecticides). So, considering environment friendliness, the IPM package-1: installation of blue sticky trap and pheromone trap + two spraying of azadiractin (Biomeem plus 1EC) @ 1 ml/l + third spraying with spinosad (Success 2.5 EC) @ 1.2 ml/l would be the best package for controlling flower thrips and pod borers of mungbean with higher yield in the insects prone areas, without harming the ecosystem.

Keywords: integrated management; environment; yield; return; cost, benefit.

THE YIELD AND QUALITY PROPERTIES OF CHICKPEA SEEDS (*CICER ARIETINUM* L.) AFFECTED BY HARVEST TIMES

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ABSTRACT. Harvesting of chickpea (*Cicer arietinum* L.) seeds at right time of maturity is one of the important issues because pod dropping and shattering is a major problem during harvest. Also, the physical properties of chickpea seeds can be affected by harvest time. For this purpose, a field experiment was carried out to examine the effects of harvest times after physiological maturity on the seed yield per plant and the seed quality properties in chickpea production. The treatments used in the experiment consisted of five harvest times, which chickpea pods were harvested at physiological maturity (H1) and 5, 10, 15, and 20 days after physiological maturity (H2, H3, H4 and H5, respectively). The physiological maturity time (R7) was considered as the stage that leaves start to yellow and 50% of pods are yellow. Moisture content, dimension properties, hundred seed weight, true density, bulk density and porosity and seed yield per plant was determined in the study. The results showed that all measured variables were affected by harvest time. The true density and porosity increased with delayed harvest time. But, the other measured variables decreased when harvest was delayed.

Keywords: harvest stage; seed quality; physiological maturity; density.

ADAPTIBILITY PERFORMANCES OF CHICKPEA (*CICER ARIETINUM* L.) GENOTYPES UNDER DIFFERENT ENVIRONMENTS FOR STABILITY OF QUANTITATIVE TRAITS

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ABSTRACT. The evaluation and computation of yield stability of a genotype over environments is a critical component of a certain breeding program. The present study was intended to screen 11 advance chickpea (*Cicer arietinum* L.) genotypes and one check for genotype × environment interaction (G × E) at six locations with varying micro and macro climatic conditions for yield correlated phenotypic characters. A number of 11 advanced genotypes of chickpea and one check variety were assessed for their adaptability at six different locations of Bangladesh. The randomized complete block design (RCBD) with three replications was chosen to experiment. The means were used to compute Additive Main Effects and Multiplicative Interaction (AMMI) analysis of variance, followed by regression analysis to measure × E. The regression analysis showed significant genotype × environment interaction for all the phenotypic characters. The mean values of days to flowering, days to maturity, plant height, number of pods per plant and seed yield were highly significant for linear, as well as non-linear components of G × E. Chickpea yield was significantly ($p< 0.01$) affected by genotypes, the environments and G × E interaction, indicating that the varieties and the test environments were diverse. G × E was further partitioned by principal component axes. The first two principal components cumulatively explained 86.59% of the total variation, of which 53.34% and 33.25% were

contributed by IPCA1 and IPCA2, respectively. The AMMI stability value discriminated genotypes G2 (BCX 09010-9), G3 (BCX 09010-2) and G8 (BCX 01008-4) the stable genotypes. The investigated genotypes exhibited varying adaptability in different environments. Genotypes G3 (BCX 09010-9) and G9 (BCX 01008-3) were stable genotypes with high yield over a wide range of environments are promising candidate chickpea varieties..

Keywords: radicle length; radicle weight; organ extract; coleoptile length; coleoptile weight.

SENSORY EVALUATION AND WILLINGNESS TO PAY FOR ORANGE FLESH SWEET POTATO

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ABSTRACT. This study seeks to assess consumers' awareness, acceptability and willingness to pay for orange flesh sweet potato (OFSP) in Kwara State, Nigeria. Primary data, which was collected with the aid of a structured questionnaire, was used for the study. A three stage sampling procedure was used to select the respondents for the study. A total of 240 households were used for the study. The data collected were analyzed using descriptive statistics, contingent valuation method, logistic regression model and Likert-type scale. Result of analysis revealed 65% of the respondents were aware of the health benefits of OFSP, 89.3% of the consumers were most willing to pay above the bid amount for OFSP in the study area. Also, willingness of consumers to pay for OFSP is significantly affected by age of household head, household size, education of household head, bid amount and awareness of the health benefits of OFSP. The constraints to the consumption of orange flesh sweet potato include scarcity of OFSP, technicality of preparation, perishability and the cost of OFSP. The study therefore recommended that the benefits of OFSP over its indigenous counterpart should be more publicized through research institutes, extension agencies, health workers, NGOs and media for the populace to be more aware, which will enhance consumption in order to alleviate vitamin a micronutrients deficiency. Also, OFSP should be made available at reasonable prices, given that bid amount could dissuade consumers who are interested.

Keywords: vitamin A; orange fleshed sweet potato (OFSP); contingent valuation method (CVM); health benefits.

CHARACTERIZATION OF POMEGRANATE CULTIVARS IN PALM GROVES OF THE OUED RIGH VALLEY (SOUTH-EASTERN ALGERIA)

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ABSTRACT. Varietal recognition is a key step for good management of genetic diversity. Indeed, the morphological description of certain organs, such as the leaves, flowers, fruits and seeds, allow a more or less rapid and reliable identification of the varieties or

cultivars. The culture of the pomegranate tree is very known in the valley of Oued Righ in the Algerian Southern, and it constitutes the main fruit species with a number of trees of 27.77 % of total number. The pomegranate tree is found in more than 84% of the farms of the region and its production is complementary of that of the dates. Unfortunately, no study has been realized on the characterization and the valorization of this species. To know and identify the varieties or the existing cultivars, we have undertaken a work of characterization of clones cultivated in the valley of Oued Righ. The plant material constituted by 13 clones of pomegranate tree stemming from various farms. The method of work consists in taking 20 fruits by tree for physico-chemical analyses in the laboratory. The results of analyses on sample of 13 clones described five cultivars, among which some present acceptable characters of fruit from a caliber point of view, contents in sugars and acidity. It shows that the naming of cultivars by the farmers based only on the acid taste of fruits "Hamad" or sweetened "Hlou" is not scientific and remain insufficient. Our results confirm the usefulness of morphological descriptors in the characterization of plant genetic resources. However, more clarification can be achieved by the undeniable contribution of molecular markers.

Keywords: Oued Righ; Sahara; oasis; palm grove, cultivar.

INFORMATION SYSTEM USAGE AND RISK MANAGEMENT AMONG ARABLE CROP FARMERS IN KWARA STATE, NIGERIA

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ABSTRACT. Farmers need to be adequately informed in employing economic strategies to tackle risk situations in agriculture. This study sought to examine the risk management coping strategy employed by the farmers, explore determinants of risk management strategies, and to establish the relationship between information systems and risk management strategy employed. Primary data were used from 141 randomly selected farmers. Pre-tested interview schedule was used for data collection. Descriptive statistics, Likert-type scale, Multinomial logistic regression, and Bivariate correlation analysis were used for data analyses. The results revealed that the majority of the farmers were risk-averse. Gender of household head, the highest level of education attained, household size, farming experience and membership of association had a significant effect on the choice of coping strategies employed by the farmers. Correlation results showed that the more access to information the farmers had to the different risks they encountered, the higher the management strategies they were likely to use. The study concludes that there is a significant relationship between information systems and risk management strategies employed. It was recommended that extension agents should be adequately sensitized on the various sources of information systems available to the farmers so that they can, in turn, pass the information to the farmers.

Keywords: bivariate correlation; crop production; information systems; Nigeria; risk planning.

CULTIVATION OF COTTON IN CHINA AND IRAN WITH CONSIDERING BIOLOGICAL ACTIVITIES AND ITS HEALTH BENEFITS

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ABSTRACT. Cotton (*Gossypium* L.) is one of the most important commercial crops and it is famous as white gold. Cotton has a diversity of applications, principally medicinal and many other usages, such as pigments, derivatives for cattle feed, different uses of the oil extracts and etc. Cottonseed oil has a ration of 2:1 of polyunsaturated to saturated fatty acids and generally consists of 65-70% unsaturated fatty acids, including 18-24% monounsaturated (oleic) and 42-52% polyunsaturated (linoleic), and 26-35% saturated (palmitic and stearic). The most important health benefits of cotton is treat respiratory diseases, treat skin problems, treat wounds, beneficial for breastfeeding mothers, a good cure for rat bite, an appropriate cure for scorpion bite, for joint and eye pains, for swollen legs, for removing bacteria in teeth, and alternative medicine for various diseases such as cancer, HIV and etc. Cotton seed oil mostly extracted from *Gossypium hirsutum* and *Gossypium herbaceum*, that are also grown for cotton fiber and animal feed. Gossypol is one of the most effective ingredients, both in traditional pharmaceutical practices and alternative modern medicinal preparations. It is a toxic polyphenolic bisesquiterpene, which may have antifertility and antiviral properties. The obtained findings suggest potential of cotton as a natural resource in pharmaceutical industries.

Keywords: gossypol; oil; Traditional Chinese Medicine; Traditional Iranian Medicine.

CONSIDERING SOIL WATER CONTENT, NUTRIENTS MOVEMENT, PHENOLOGY AND PLANT GROWTH WITH REFERENCE TO DEVELOPMENT OF FUNCTIONAL FOODS IN A LYSIMETER STUDY

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ABSTRACT Lysimeter is equipped with mechanisms for weighing by load cells enable automated measurements, and the signals resulting from weight changes in the system due to evaporation that are generally recorded in a data acquisition system. According to methods of measuring water content, lysimeters may be divided into weighing lysimeter and non-weighing lysimeter. The weighing lysimeters provide scientists the basic information for research related to evapotranspiration, and they are commonly divided into two types, continuous weighing and intermittent weighing. Weighing lysimeters have been used to quantify precipitation (P) not only in the form of rain or snow, but also dew, fog and rime, and also to determine actual evapotranspiration (ET). Compared to laboratory experiments, out-door lysimeter studies have advantages, like being closer to field environment conditions, it is possible to grow plants and therefore to study the fate of chemicals in soil/plant systems, transformations and leaching. The limitations are costy,

which depend on design, variable experimental conditions, such as environmental/ climatic parameters, which are normally not controlled, the soil spatial variability is normally less, they are not suitable for every plant species and even every soil type. The objective of lysimeter is defining the crop coefficient (Kc), which used to convert ETr into equivalent crop evapotranpiration (ETc) values, and determing agronomical characteristics of crops, which are planted in the field of lysimeter. The duration of a lysimeter study is determined by the objective of the study, but for different crops, it should normally be at least two years. Weighing lysimeters using load cells have the advantage of measuring the water balance in the soil over a short time and with good accuracy. Precipitation should be recorded daily at the lysimeter site. All weather data like air temperature, solar radiation, humidity and potential evporation should be obtained onsite, and the frequency and time of measurements should be at least daily.

Keywords: weighing lysimeter; evapotranspiration; crop coefficient; precipitation; super foods.