

EVALUATE SOME NEW INBRED RICE AND MALE STERILE VARIETIES UNDER DUS AND VCU EXPERIMENTS

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ABSTRACT. The main objective of study are evaluated some new inbred rice and male sterile varieties under Distinct, Uniform and Stability (DUS) and Value of Cultivated and Used (VCU) Experiments. A number of 7 rice varieties were used, Sakha 101, Sakha 102, Sakha 104, Giza 177, Giza 178, Giza182 and Egyptian yasmine; moreover, GZ. 10154 and GZ 8564-Sp 70, as well as EGMS and CMS1 as promising lines to evaluating by DUS and VCU. The data were recorded on morphological and yield characters. The results could be concluded that: regarding to qualitative characteristics (PQ and QL), from 24 PQ and QL characters, the nine rice varieties recorded the same score for 19 characters; moreover, the rice varieties Egyptian jasmine was dissimilar in the score No. 24, 39, and 60, that referred to this variety belong to *Indica* type, while the rice varieties Sakha 101 and Giza 178 were similar only in score no.11, which belong to *Japonica* and *Indica japonica* types, that meaning these varieties were highly uniform and stability in qualitative characters than the other promising line GZ10154. Regarding to quantities characteristics (QN), from 27 QN characters, 9 rice varieties recorded the same score for 20 characters; moreover, the rice varieties Sakha 101, Sakha 102, Sakha 104, Giza 177, Giza 178, Giza 182, Egyptian yasmine and GZ 8564-Sp70 were similar in the score no. 1, 12, 23, 48, 49 and 50, while the promising line GZ 10154 was dissimilar in these scores during the two seasons, meaning that all these varieties were highly uniform and stability than the other promising, line GZ 10154. These results were conformed to VCU results, where the studied varieties recorded the highest grain yield/day. From these results could be concluded that all the varieties, except GZ 10154, accepted as a new rice release variety, but the promising line GZ 10154 required to more recurrent selection to increase their uniform, as well as CMS line was accepted could be evaluated under different conditions, but EGMS should be evaluated under heat stress conditions.

Keywords: DUS: Distinctness, Uniformity and Stability; VCU: Value for Cultivation and Used..

EVALUATION OF COTTON (*GOSSYPIUM* SPP.) GERMPLASM FOR HEAT TOLERANCE UNDER NORMAL AND LATE PLANTING TIME

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ABSTRACT. The objective of this study was to determine cotton (*Gossypium* spp.) germplasm for heat tolerance under normal and late planting time. For this aiming 200 cotton genotypes and five check varieties (Gloria, SG 125, Flash, Ozbek 105 and Candia) were evaluated under two different temperature regimes and experiments were conducted according to the augmented design with four blocks. Field studies were carried out at the GAP International Agricultural Research and Training Center's experimental area in Diyarbakır, Turkey, in 2016 cotton growing season. In the study heat susceptibility index was used for discriminate to the genotypes for heat tolerance. Genotypes were

classified into four groups based on the heat susceptibility index. The results of this study indicated that five cotton genotypes (TAM 139-17 ELS, CIM-240, Haridost, MNH-990 and AzGR-11835) were in highly heat tolerant, 28 genotypes were found heat tolerant, 56 genotypes were in the moderately heat tolerant and other 120 genotypes were observed susceptible for heat tolerance. Based on the heat susceptibility index, five cotton genotypes can be used as parent for heat tolerance improvement in the cotton breeding program where high temperature is a limiting factor for seed cotton yield.

Keywords: cotton; abiotic stress; susceptibility; resistance; yield.

THE EFFECT OF COMMERCIAL ORGANIC AND INORGANIC FERTILIZERS AND RHIZOBIUM INOCULATION ON YIELD AND YIELD COMPONENTS OF FABA BEAN (*VICIA FABA* L.) AND PEA (*PISUM SATIVUM* L.)

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ABSTRACT. This research was conducted to determine the effect of organic and inorganic fertilizers and bacteria inoculation on yield and its components on pea and faba bean in Dicle University Agricultural Faculty, Diyarbakir, Turkey, during 2018 and 2019 growing seasons. The experiment was laid out following a split-plot in completely randomized block design, with three replications. Fertilization treatments and cultivars were designed as main and sub factors, respectively. Data on plant height, plant biomass, pod weight, seed yield per plant, number of pods and number of seeds per plant, biological yield, seed yield and 100-seed weight were recorded at harvest. Number of nodules and nodule dry weight were record in flowering time. The effect of inorganic nitrogen, organic fertilizers and bacteria inoculation on grain yield, seed yield per plant, biological yield was significant at both pea and faba bean. Inorganic fertilizer (urea) was increased the grain yield (2147 kg/ha) and biological yield (4956 kg/ha) in faba bean, but close to control (2080 kg/ha and 4690 kg/ha). Organic-1, Organic-2 and bacteria treatments were decrease the grain yield and biological yield on pea and faba bean, and this decrease on pea was almost half over control. The effect of treatments on number of nodules per plant on pea and faba bean was significant. The highest number of nodules per plant on pea was in bacteria inoculation (125.9) and control (121.5), and differences among nitrogen (109.1), Organic-1 (97.3) and Organic-2 (109.3) treatments was no significant.

Keywords: pea; faba bean; fertilization; nodule; yield.

NOVEL APPLICATION OF *TRICHILIA HEUDELII* PLANCH: EFFECTIVENESS OF DIFFERENT POLARITY OF ORGANIC SOLVENTS OF LEAF AND STEM BARK EXTRACTS ON THE CONTROL OF COWPEA BEETLE

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ABSTRACT. *Callosobruchus maculatus* (cowpea beetle) is a field-to-store pest causing over 90% losses of cowpea. The search for new plant-derived crop protectant that can be explored as alternative to synthetic pesticides is urgently needed. Thus, the phytochemical

screening, as well as the bioactivity of different polarity of organic solvents of leaf and stem bark extracts of *Trichilia heudelotii* (Meliaceae), was investigated against the field-to-store insect pest *Callosobruchus maculatus* in laboratory bioassay. The non-polar (hexane) and polar (ethanol) extracts [0.0 (control), 0.5, 1.0 and 1.5 ml] of the leaf and stem bark were added to 100 g of cowpea. The following parameters of the cowpea weevil life cycle were analysed at the various concentrations: adult mortality, oviposition rate, number of larvae and pupae, and emergence of first filial progeny. The phytochemical screening revealed the presence of flavonoids, terpenoids, alkaloids, saponins in both the non-polar and polar extracts. Furthermore, the various treatments used were significantly ($p < 0.05$) effective in controlling *C. maculatus* from 1 and also 30 days after treatment (DAT) for both the non-polar and polar extracts when compared to the control. However, the most effective treatment was observed with the polar (EtOH) stem bark extract at 1.5 ml, which caused more mortalities and fewer emergence of the insect. Our findings suggest that the non-polar and polar leaf and stem bark of *T. heudelotii* extracts could serve as a sustainable and potential alternative to synthetic chemicals in pest control.

Keywords: *Callosobruchus maculatus*; *Trichilia heudelotii* extracts; bio-pesticide; insect pest control.

ADAPTIVE PERFORMANCE OF GARLIC VARIETIES UNDER HIGH GANGES RIVER FLOODPLAIN SOIL (CALCAREOUS) OF BANGLADESH

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ABSTRACT. Any variety needs to evaluate at different locations, along with variable soils for assess their yield potentiality after its releasing. Thus, an experiment was conducted at Multi Location Testing (MLT) site, Kushtia Sadar Upazila, under High Ganges River Floodplain (AEZ-11) in Bangladesh, during three consecutive Rabi seasons of 2013-2014 to 2015-2016. The objective of this study was to evaluate the performances of garlic varieties and economic profitability of these varieties at farmer's field. There were three garlic varieties, namely BARI Rashun-1, BARI Rashun-2 and a local cultivar, which were evaluated at six dispersed locations as replications. Results observed that the highest yield (8.34-9.80 t ha⁻¹) was obtained from BARI Rashun-1, which was followed by BARI Rashun-2 (7.43-9.48 t ha⁻¹) and the local one (7.12-9.15 t ha⁻¹). BARI Rashun-1 produced 3-12% higher yield over BARI Rashun-2 and 7-20% over the local cultivar, respectively in three consecutive years. Correlation analysis showed that there were positive and significant correlation among bulb yields with bulb length and individual bulb weight. Regarding the functional relationship, the traits like crop duration, plant population, plant height, bulb length, bulb width, individual bulb weight had positive contribution on the bulb yield. It was dependent on those traits, and accounted for 12, 36, 0.05, 45, 41 and 55% of the total bulb yield variation, respectively. The highest gross return (Tk. 3, 63,700 ha⁻¹) and gross margin (Tk. 2,19,425 ha⁻¹) were obtained from BARI Rashun-1. As such, this variety performed as the best, in respect of higher bulb yield potential, as well as the highest economic return among the tested varieties, which was followed by BARI Rashun-2. Therefore, the result of this study could be helpful for improving bulb production of garlic under High Ganges River Floodplain soil (calcareous soils) in Bangladesh.

Keywords: *Allium sativum* L.; yield potentiality; functional relationship; economics efficiency; adaptation.

EFFICACY OF JATROPHA CURCAS L. SEED EXTRACT ON MORTALITY OF CABBAGE CROP LARVAE (*CROCIDOLOMIA BINOTALIS* ZELLER: LEPIDOPTERA: PYRALIDAE)

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ABSTRACT. Along with the awareness to obtain quality plant products, the use of plant-based insecticides is increasingly being used. One of the plants used as a plant-based insecticide is *Jatropha curcas* L. (Jarak pagar) because it contains toxic ingredients to kill cabbage caterpillar pests (*Crocidolomia binotalis*). This study aims to determine the effectiveness of *Jatropha curcas* L. on the mortality of *Crocidolomia binotalis* cabbage caterpillars. The research method used was a Completely Randomized Design (CRD) 7×3 , consisting of seven treatment concentrations (0,000 ppm, 10,000 ppm, 20,000 ppm, 30,000 ppm, 40,000 ppm, 50,000 ppm, 60,000 ppm), with three replications. Observations were made at 24, 48, 72, 96, 120, 144 hours after application (HAA) of *Jatropha*. The research activities were carried out in two stages, namely 1) the extraction stage of *Jatropha curcas* L. seeds and the breeding of the *Crocidolomia binotalis* test larvae and 2) the testing stage with seven concentration levels of *Jatropha curcas* L. extract as a plant-based insecticide. ANOVA test showed that the treatments of *Jatropha curcas* L. extract gave the death effect on larvae [$F_{\text{count}} > F_{\text{table}}$ (116.8 > 2.37)]. Dead larvae change color to black and their body shape will curve. The fastest larval death occurs 24 HAA, with a concentration of 40,000 ppm, which is 50%. At lower concentrations (30,000 ppm), which can kill larvae up to 50%, occurs 120 HAA. With a concentration of 50,000 ppm, 90% of larvae can be killed occurring 96 HAA.

Keywords: plant-based insecticide; *Jatropha curcas* L., *Crocidolomia binotalis*, mortality; concentration.

ASSESSMENT OF CASSAVA PROCESSING TECHNOLOGIES USAGE AMONG RURAL WOMEN IN KWARA STATE, NIGERIA

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ABSTRACT. Technology usage has been identified as a major driver of increased productivity, waste management and economic efficiency. However, there seems to be some barriers to technology usage among rural women cassava processors Nigeria. This study therefore analysed the characteristics and constraints to technology usage among rural women processors in Ifelodun local government area of Kwara State, Nigeria. A two-stage sampling technique was used to randomly select 120 respondents from six districts, namely Igbaja, Idofin, Oke-Ode, Omupo, Ora and Share. Primary data were used for the study and the data were collected by means of an interview schedule. Descriptive statistical tools, such as precision counts, frequencies and percentages, were used in analysing the data, while Pearson Product Moment Correlation (PPMC) analysis was used

to test the hypothesis. The findings revealed the level of usage of cassava processing among rural women in the study area is moderately high. Major constraints to the adoption of cassava processing technologies includes: high cost of machines and maintenance, low level awareness and training, as well as inadequate finance. PPMC analysis showed that educational level and cassava processing experience was significantly related to the usage of improved cassava processing technologies in the study area with $p \leq 0.05$. Based on findings, training and effective monitoring by relevant stakeholders, adequate financing, sensitization and enlightenment campaigns will further boost cassava processors knowledge and attitude towards cassava processing technologies and automatically increase usage by the respondents.

Keywords: increased productivity; characteristics; adoption, constraints.

ESSENTIAL OIL COMPOSITION OF *THYMUS FALLAX* FISCH. & C.A. MEY. AT DIFFERENT GROWING ALTITUDES IN MAZANDARAN, IRAN

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ABSTRACT. *Thymus fallax* Fisch. & C.A. Mey. (*Lamiaceae*) is a permanent plant that grows in some mountain rangelands of Mazandaran province in Iran. The aerial parts of *Thymus fallax* were collected during flowering stage from mountain rangelands of Mazandaran province, in North of Iran. Around samples were collected from three altitudes (2400 m, 2700 m and 3000 m a.s.l.), in mountain regions of Mazandaran province. The goal of current research was to assess the effect of altitude on the chemical composition and function of essential oil in *Thymus fallax*. The essential oil were obtained by hydrodistillation and analyzed by gas chromatography (GC) and gas spectrometry (GC-MS). Based on the results, the essential oil content is between 1.12 - 1.61% at different altitudes. The result of study show that the highest concentrated essential oil (1.61%) was extracted in the lowest altitude (2400 m), while it was opposite, (0.1.12%) in the highest altitude (3000 m). The main compounds of essential oil are: thymol (5.95% - 10.06%), carvacrol (13.63% - 69.04%), *p*-cymene (4.19% - 12.18%) and borneol (4.72% - 5.66%). According to the results, altitude has a negative effect on the percentage of essential oils and essential oil decreases with increasing altitude. The altitude has a negative effect on the percentage of thymol and the content of thymol decreased with increasing altitude. The altitude has a positive effect on the percentage of carvacrol and the content of carvacrol increased with increasing altitude.

Keywords: carvacrol; mountain rangelands.

EFFECT OF MARKET PARTICIPATION ON FOOD SECURITY AMONG SMALLHOLDER SORGHUM FARMERS IN KWARA STATE, NIGERIA

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ABSTRACT. It is paradoxical to note that food insecurity remains a menace among many African farmers' households. There are arguments for and against smallholder farmers'

market participation as a pathway for ensuring household food security. The paper therefore examined the market participation- food security relationship using smallholder sorghum farmers in Kwara State, as a case study. Primary data were obtained from 112 sorghum farming households using the semi-structured interview survey method. Descriptive statistic (frequencies and percentages), Crop output market participation index, Logistic regression model and Tobit regression model was used to analyse the data obtained. The result revealed that market participation positively and significantly contributes to the food security status of the sorghum farmers. Also, household size, farm output quantity, access to market information, access to credit and farm power types were the factors influencing the level of market participation in the study area. Therefore, all factors that will aid farmers' market participation should be pursued.

Keywords: food insecurity; tobit regression; farm output; credit.

THE IMPORTANCE OF QUINOA (*QUINOA CHENOPODIUM WILLD.*) CULTIVATION IN DEVELOPING COUNTRIES: A REVIEW

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ABSTRACT Quinoa is a dicotyledonous species for seeds and, therefore, is not known as a cereal grain and is a pseudo-grain, which is introduced nowadays as a new crop in the world. Population growth and the need for more food put additional pressure on the environment, especially on water resources and agronomic ecosystems. This has led to more attention to plants that grow at different latitudes and altitudes. Climatic and environmental changes affect agricultural inputs, especially water resources. So, the best way of adapting to the current situation is the introduction of low-water, salt-resistant, and drought-tolerant plants to the recent climatic changes. Water scarcity has become a serious problem in many countries. This restriction has had a significant impact on the development of countries. The plants which grow in arid and semi-arid regions are often exposed to adverse environmental factors, such as drought or salinity. Salinity and drought stress, more than any other factor, decrease crop yields around the world. These two abiotic stresses are the main limiting factors for crop production, especially in arid and semi-arid regions of the world. Quinoa is an exceptional plant that can adapt to adverse conditions and can serve as a solution to the challenge of global food security. Recent droughts that occurred in the world have prompted governments to include plants in their development plans, which are adapted to the country's existing water and soil conditions and have high nutritional value. This way, quinoa cultivation can ensure their food security in the coming years.

Keywords: food security; food value; global needs; drought; salt; nitrogen.