EFFECT OF BIO FERTILIZERS AND INORGANIC FERTILIZERS ON GROWTH, PRODUCTIVITY AND QUALITY OF BREAD WHEAT CULTIVARS

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ABSTRACT. Integrated nutrient management strategies involving chemical and biological fertilizer is a real challenge to stop using the high rates of agrochemicals and to enhance sustainability of crop production. In order to study the effects of biofertilizers (Cerialin and Nitrobein) and chemical nitrogen levels (0, 85,170 and 250 kg N ha^{-1}) on yield and yield attributes of two wheat cultivars (Sakha 94 and Gemmeiza 10), an agricultural experiment in the form of strip-split factorial design with three replications was conducted in Kafr El-Sheikh region, Egypt, in 2014/2015 and 2015/2016 growing seasons. The objective of this study was evaluation of the effects of these fertilizers separately and in integrated forms, and setting out the best fertilizer mixture. The results showed that treatment with biofertilizers and chemical nitrogen increased the growth, yield attributes, biological and grain yield. Both grain and biological yield produced a better result during the combination of nitrogen fertilizer and biofertilizers than using either method alone. Using bioferti-lizers increased biological yield through increase in number of grains $spike^{-1}$, number of spikes m^{-2} and 1000 grain weight, which cause to increase in grain yield with significant changes in harvest index, as well as protein content. We may conclude that using biofertilizers (Cerialin or Nitrobein) and chemical nitrogen fertilizer (170 or 250 kg N ha^{-1}) together had the maximum impact on yield. Then, we can decrease use of chemical fertilizers through using biofertilizers.

Keywords: chlorophyll content; protein content; leaf area inde; wheat; grain yield.

ALLELOPATHIC EFFECTS OF SHEESHAM EXTRACTS ON GERMINATION AND SEEDLING GROWTH OF COMMON WHEAT

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ABSTRACT. Interactions between plants represent an important aspect of ecology, which enables them to properly utilize the available resources in the given environment. The interactions are medi-ated by different mechanisms, among which allelopathy is a significant one. During allelopathic interactions, plants tend to suppress competitors plants or stimulate those which can help them adjust in the environment in a better manner. Such interactions are triggered by the release of chemical compounds termed, as allelochemicals, which have an important role in agricultural modulation. The objective of this experiment was to evaluate the allelopathic effects of leaf and bark extracts of sheesham (*Dalbergia sissoo* L.) on germination data of wheat (*Triticum aestivum* L.) cv. Auqab. Different concentrations (7 g/l, 14 g/l, and 21 g/l) of sundried leaf and bark extracts, obtained after 12, 24 and 36 h of soaking duration were tested for germination %, mean germination time (MGT), plumule and radicle length and seedling dry weight. It was observed that germination % was negatively affected by 21 g leaf and bark extract concentration at 36 h soaking duration, but not by lower concentration or soaking durations. MGT was significantly increased by leaf and bark extracts at three concentration levels, as well as soaking durations. Plumule and radicle length responded negatively to both leaf and bark extracts at higher concentration and when soaking duration was increased. Seedling dry weight was increased by 7 g leaf extracts at 36 h, but reduced by 21g at 12 and 24 h soaking durations. On the other hand, 21 g of bark extracts at 12, 24 and 36

h soaking duration resulted in significantly increased dry biomass. These results suggest negative allelopathy of Sheesham on studied germination parameters of wheat, except radicle length and dry biomass.

Keywords: allelopathy; agro-ecosystem; competition; plant interactions; rhizosphere.

ECONOMIC EVALUATION OF MAIZE INTERCROPPED WITH SOME MAJOR FOOD CROPS IN SOUTHWESTERN NIGERIA

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ABSTRACT. In Nigeria, the traditional farmer finds it more satisfactory to plant a diversity of crops than planting sole. It is cheaper for farmers to grow many crops of their own requirements than to buy them. Hence, intercrop has remained the traditional farming practice in many other developing nations. Maize is a major cereal crop grown by all farming households all over Nigeria in combination with other crops. There are many studies on intercropping of maize with other food crops in Nigeria; however, many of these studies do not bother to look into the economics of intercrop. Therefore, this study examines the economic profitability of maize intercropped with major food crops in Southwestern Nigeria. Multi-stage sampling technique was employed in the study. A total of 138 questionnaire were used for analysis. Information was collected on socio-economic characteristics of the farming households, cropping systems, cost of labour input, cost of seeds, fertilizer and chemicals; yield and price of output. Data analysis involved the use of descriptive analysis, which includes frequency distribution, mean and percentages. Also, benefit-cost ratio and net farm income analyses were employed. The results showed that the average farm size was 1.5 ha, 75% of the farmers intercropped maize with other crops and six varieties of maize were planted in the study area. Among all the crop combinations, sole maize has the least cost, while maize intercropped with cassava and yam has the highest cost. Benefit-cost analysis showed that for every N 1 spent in maize intercropped with cassava and yam, N 1.26 would be realized as profit. It is therefore, recommended that for optimal use of resources and crop combinations, both public and private extension workers should advice farmers on this finding and the most profitable crop combinations.

Keywords: enterprise; sole cropping; net farm income; benefit-cost.

ALLELOPATHIC EFFECT OF *FICUS BENJAMINA* LEAF EXTRACT, LITTER, AND MULCH ON GERMINATION AND GROWTH OF SUNFLOWER

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ABSTRACT. Allelopathy is an important biological process, which has direct or indirect effects on the germination and growth potentials of plants. Awareness about the allelopathic properties of plants which prevail in agricultural systems can help growers to amend crop cultivation patterns accordingly. In this study, we evaluated the allelopathic effects of *Ficus benjamina* on germination and early seedling growth of four hybrids of sunflower (Oliver, Parsun-3, SFH-80 and NK- S- 278). Ethanolic and hot-water aqueous extracts from leaves, while litter and mulches of the test allelopathic plant significantly

reduced germination, radicle and hypocotyle growth of sunflower. Germination percentage was drastically reduced in all the four sunflower hybrids by ethanolic, hot-water and litter extracts; however, compared to control, mulching assay significantly increased germination in hybrids Oliver (76%), Parsun-3 (42%), SFH-80 (78%) and NK-S-278 (30%) at 2, 4, 8 and 12g extract concentration, respectively. Hypocotyle and radicle length of test hybrids were significantly reduced in each assay type. Among tested assays, ethanolic extracts revealed more drastic effects on the studied parameters than hot-water, litter, and mulching. Sunflower hybrid NK-S-278 was more severely affected, while Parsun-3 exhibited resistance to the allelopathic stress. Inhibitory effects were more prominent with increasing concentration of the extracts. The order of the phytotoxic effects of tested bioassays was ethano-lic extract> hot-water> litter> mulching. The study suggested that *Ficus* leaves may possess potent allelochemicals with growth inhibitory effects on sunflower seedlings. It is suggested that further study might be required to check the allelopathic effect of *Ficus benjamina* on germination and growth of these sunflower hybrids in field conditions.

Keywords: allelopathy; weed control; growth inhibition; weeping fig; secondary metabolites; agroecosystem.

EVALUATION OF THE NEMATICIDAL AND ANTIFUNGAL ACTIVITY OF AQUEOUS EXTRACTS OF *MORINGA OLEIFERA* LEAVES AND SEED IN CUCUMBER FIELD

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ABSTRACT. This aim of the two-year study was to evaluate the nematicidal and antifungal activity of *Moringa oleifera* extracts against *Meloidogyne incognita* and fungi infestation in cucumber field. The aqueous extracts of leaves and seeds of *M. oleifera* were used to treat the plants. The findings of the present study revealed that the plant extracts were active against the test pathogens. All treated plants were significantly higher than the control with respect to number of leaves and branches, vine length, fruit weight, and yield. Of the two varieties of cucumber used, combination of cucumber market with moringa aqueous leaf extracts gave higher results. The phyto-chemical screening revealed the presence of alkaloids, flavonoids, glycosides, saponins, and tannins. These possess nematicidal and antifungal activities. Combination of variety 2, Market More with *Moringa* leaves aqueous extract is being recommended to farmers for management of nematode and fungal diseases. Organic amendments have the advantage of controlling environmental effluence.

Keywords: *Meloidogyne incognita;* anti-fungi; phytochemicals; *Cucumis sativus*.

PERFORMANCE OF SESAME (*SESAMUM INDICUM* L.) AS INFLUENCED BY 2,4 – DICHLOROPHENOXYACETIC ACID AND NPK FERTILIZER

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ABSTRACT. The Guinea savannah zone of Nigeria is beset by increasing population and

infrastructural development, thereby putting pressure on available land with rapidly declining fertility due to low organic matter content, soil erosion, high temperature and seasonal bush burning. Sesame is cultivated in this zone and the yield has remained very low, compared to yield in other parts of the world. This could be attributed to poor nutrient status and poor cultural practices used by peasant farmers. A field experiment was conducted at the Teaching and Research Farm, University of Ilorin, Nigeria, in a southern Guinea savannah zone in 2015 and repeated in 2016 crop-ping season to determine the effects of 2,4-Dichlorophenoxyacetic acid (2,4-D), a plant growth regulator and NPK fertilizer on the growth and yield of sesame. The experiment was laid out as a factorial arrangement, fitted into a randomized complete block design replicated thrice. The factors imposed were 2,4-D (0, 5 and 10 ppm ha^{-1}) and NPK 15:15:15 (0, 100, 200 and 300 kg ha^{-1}). Data were collected on vegetative traits (plant height, number of leaves, leaf area) and yield components (number of capsules per plant; yield per plant and per hectare). The data were subjected to analysis of variance (ANOVA) using the Genstat statistical package 17th edition and significant means were separated by using the least significant difference at 5% level of probability. The result revealed that using plant growth regulator and NPK fertilizer had significant effects (p<0.05) on plant height (151 cm) and yield per hectare (530 kg/ha). The qualitative and quantitative analysis of the seeds further reaffirmed the presence of bioactive compounds, such as saponins, tannins, flavonoids and phenolic compounds, which are important health promoting food in the seeds.

Keywords: plant growth regulator (PGR); NPK fertilizer; growth; yield; sesame.

PHYSICOCHEMICAL TRAITS OF SEEDLESS BARBERRY (*BERBERIS VULGARIS* L.) FRUITS STORED UNDER REFRIGERATION AS AFFECTED BY HEAT AND CALCIUM CHLORIDE TREATMENTS

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ABSTRACT. The loss of chemical characteristics and quality of the fresh seedless barberry fruit during storage and qualitative losses of its dried fruit are the most important postharvest challenges in barberry industry and its exports. The fresh harvested fruit samples were dried using an electrical drier at 50°C to 50% moisture content. Thereafter, the effects of hot water alone (65°C for 45 sec), and hot water + 2% calcium chloride were carried out on the quality maintenance and chemicals during the cold storage of seedless barberry. The results showed that the samples treated with calcium chloride stored at 2°C had the highest TSS over time, whereas the titratable acidity of barberry fruits was not significantly affected by postharvest treatments. Hot water alone or in combination with calcium chloride treatment increased redness and chroma values result in better appearance quality than control. In addition, the treatments reduced the variable L^* and thereby enhanced fruit lightness. The highest antioxidant content (% 77.92) was observed in hot water treated samples and the lowest (% 54.28) was obtained on control. Also, the highest amount of anthocyanins and antioxidants were obtained from samples treated with hot water. Only calcium chloride treatment had a significant effect on Ca content of the samples. The results revealed that postharvest application of hot water and calcium chloride treatments improved the appearance quality and nutritional values of fresh seedless barberry fruit, as well as extend the cold storage life, likely due to reduced pathogen contamination.

Keywords: anthocyanins; antioxidants; hot water treatment; quality; postharvest.

HETEROPTERA (HEMIPTERA) SPECIES DETERMINED IN PISTACHIO ORCHARDS OF SİİRT PROVINCE WITH A NEW RECORD FOR FAUNA OF TURKEY: *YOTVATA NERGAL* LINNAVUORI, 1993

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ABSTRACT. This study was carried out at pistachio orchards of Siirt province (Merkez and Aydınlar) between 2008-2009. The insect species obtained with this study in pistachio orchards were; *Palomena mursili* Linnavuori, 1984, *Stagonomus bipunctatus* Linnaeus, 1758, *Macroscytus brunneus* Fabricius, 1803, *Lethaeus cribratissimus* Stål, 1858, *Stenodema turanica* Reuter, 1904, *Pseudoloxops sangrudanus* Linnavuori, 2006 , *Psallus perrisi* Mulsant and Rey, 1852 *Macrolophus glaucescens* Fieber, 1858, *Acrorrhinium atricorne* Linnavuori, 2006, *Campylomma diversicornis* Reuter, 1878, *Nanopsallus carduellus* Horváth, 1888, *Camptocera glaberrima* Walker, 1872, *Anthocoris minki* Dohrn, 1860, *Yotvata nergal*, *Alloeotomus cyprius* Wagner, 1953, *Calocoris roseomaculatus angularis* De Geer, 1773, *Horistus orientalis* Gmelin, 1790, *Deraeocoris serenus* Douglas and Scott, 1868, *Beosus quadripunctatus* Müller, 1766, *Megalonotus maximus* Puton, 1895, *Nysius cymoides* Spinola, 1837, *Cantacader quadricornis* Lepeletier and Serville, 1828 , *Lethaeus picipes* Herrich-Schäffer, 1853, *Acrorrhinium conspersus* Noualhier, 1895, *Trigonotylus pulchellus* Hahn, 1834 and *Alloeomimus kurdus* Hoberlandt, 1953. Y*otvata nergal* Linnavuori, 1993 is a new record for entomo-fauna of Turkey.

Keywords: pistachio; Heteroptera; fauna; new record; *Yotvata nergal*.

MORPHOLOGICAL CHARACTERISTICS AND SEED GERMINATION IMPROVEMENT OF TWO ECOTYPES OF *ASTRAGALUS ARMATUS* WILLD. SUBSP. *ARMATUS* IN ALGERIA

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ABSTRACT. *Astragalus armatus* Willd. subsp. *armatus* is an endemic shrub of the Northern Africa. Its cultivation and domestication are very limited because of difficulty with seed germination and establishment. In this study, we investiga-ted some plant morphological characteristics in real time and in situ (leaves, fruit and seeds) of different ecotypes of *A. armatus*, collected from two sites in Algeria (Arid Steppe of Aïn Naga and Condorcet Mountain), which elevation and climate data are very different. Moreover, the role played by the seed coat in seed dormancy of these two different populations was tested by the effects of the pretreatment and its duration on the performance of seed germination, by considering the final germination percentage (FGP) and the mean germination time (MGT). These parameters are estimated for 10 days in Petri dishes and stored in darkness at (25°C). Pre-sowing treatments included immersion in concentrated sulphuric acid for 30, 60 and 90 min, and immersion in hot water (100°C) for 10 min. Statistical analysis showed that the treatment and the eco-types effects on both FGP and

MGT were highly significant ($p< 0.0001$). Untreated seeds of both ecotypes of *A. armatus* failed to germinate (except for a few of Condorcet Mountain ecotypes). For both populations, the most effective treatment was immersion in sulphuric acid for 60 min for the ecotype of Arid Steppe of Aïn Naga, and only 30 min for Condorcet Mountain. An excellent germinative strength is characterized by a higher FGP and a reduced MGT. The morphological characteristic and seed germination could be attributed to intraspecific variations resulting from the natural selection of the same species.

Keywords: *Astragalus armatus*; desert shrub; ecotype; germination; scarification.

DIETARY EFFECTS OF ALGERIAN SODIUM BENTONITE ON GROWTH PERFORMANCE AND BIOCHEMICAL PARAMETERS IN BROILER CHICKENS

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ABSTRACT The present experiment was conducted to investigate the effect of supplementing poultry feed with graded levels of Algerian sodium bentonite (Na-B) on growth performance and the development of villus height in jejunum and some biochemical parameters during 50 days in broiler chickens. A number of 420 one-day old broiler chicks (Arbor Acres) were obtained from a commercial hatchery. The birds were randomly allocated into six groups (A, B, C, D, E and F). The treatments were 0 (control), 1%, 2%, 3%, 4% and 5% of Algerian Na-B levels. The results obtained indicate clearly that weight gain in the chickens fed treatments containing 4% Na-B had greater weight gain than the chickens fed different treatments (0, 1%, 2%, 3% and 5% Na-B). Feed conversion rate (FCR) was lower birds supplemented with Na-B 4% (2.45) than control group (3.06). Maximum feed consumption was observed in the birds' control (5,655.3 g), while the lowest was noted in the chickens with diet added 4% Na-B (5,009.5 g) ($p< 0.05$). The weight of duodenum, jejunum and ileum was decreased for the Algerian Na-B supplemented group, compared with the control group. The villus height was affected by dietary treatments (1%, 2%, 3% and 5%) on days 18 and 50 ($p< 0.05$). Feeding the supplemented graded levels Na-B resulted in an increase in plasma cholesterol, triglyceride and HDL concentrations at 50 days of age, compared with the control group. These results showed clearly that the Na-B from Algeria can improve the growth performance in broiler chickens. Thus, dietary inclusion of Na-B had positive effect on plasma triglyceride, cholesterol and HDL values in broiler chickens at the end experiment.

Keywords: Algeria; clay; growth performance; feed supplementary; poultry.