

HOW MUCH, LEAVES NEAR THE EAR CONTRIBUTE ON YIELD AND YIELD COMPONENTS OF MAIZE ?

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ABSTRACT. In order to study the role of leaf position on yield and yield component of maize, this research was conducted based on randomized complete block design with three replicates at the research field of Urmia University, Urmia, Iran, in 2011. For determine the role of leaf position in maize yield, we used the leaf removing (clipping) treatments. Leaf clipping treatments contain ear leaf clipping, above ear leaf clipping, below ear leaf clipping and control (without leaf clipping) that imposed at one week after ear initiation. Leaf removing had a significant effect on all measured traits (number of seed per row, row number per ear, ear length, 1000 seed weight, seed yield, biological yield), except harvest index. Removing of above leaves decreased 6.68% the number of seeds on ear compare to control. The highest 1000 seed weight (274 g) was observed in plants without leaf clipping. Ear leaf clipping and below ear leaf defoliation ranked second for 1000 seed weight. Whereas plants without any leaf clipping had the utmost seed yield (8.77 t ha^{-1}) but defoliating of leaf above ear lead to lower seed yield (6.77 t ha^{-1}). Leaf removal above ear decreased 22.80% biological yield compared to control. The correlation analysis showed that all traits had positive correlation with seed yield. The most correlation was between ear length and number of row per ear ($r=0.89^{**}$). Also, number of seed per row ($r=0.71^{**}$), 1000 seed weight ($r=0.67^{**}$), ear length ($r=0.65^{**}$), biological yield and harvest index ($r=0.59^{**}$) showed the most correlation with seed yield, respectively. Results revealed that the most reduction in all traits accrued in maize plants with above ear leaf clipping, this results indicated that the important roles of leaves position especially the role of above ear leaves in yield and yield components of maize.

Key words: Ear leaf; Leaf above ear; Leaf clipping; Seed yield.

A STUDY OF INTERCROPPING OF MAIZE WITH SWEET BASIL AND BORAGE

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ABSTRACT. Intercropping is one of the environmental friendly ways to improve the use of resources and weed control. A field experiment was performed on maize intercropped with sweet basil and borage under weed free and infestation conditions. The experimental design was a factorial based on randomized complete block design with three replicates. Factors included weed infestation levels (weed free and weed infested) and intercropping ratios (100:0, 75:25, 50:50, 25: 75, and 0:100, maize: sweet basil or borage). The intercropping treatments decreased weeds biomass compared to the monocultures of borage and sweet basil. The weeds biomass and density in maize monoculture was lower than the monocultures of the other two plants. Under sole crop condition, the plants yield was higher than intercropping treatments. Weed interference decreased the yield of plants, while this decrease was less in intercropping treatments. Area-time equivalent ratio value showed that the ratios of 50:50 maize: sweet basil, maize: borage and 25:75 maize: borage provided the yield advantages of 11%, 11% and 36% under weed infestation, respectively. Also, area-time equivalent ratio values were higher in weed infestation compared to weed free treatments. The leaves essential

oil of sweet basil under intercropping treatments, especially in weedy condition, was further than monocropping treatments. Intercropping of maize with sweet basil was more successful than intercropping with borage in reducing weeds biomass and density. In general, the intercropping of maize with sweet basil was more efficient compared to intercropping with borage.

Key words: Area-time equivalent ratio; Essential oil; Plant height; Weeds population.

EFFECTS OF SOME COVER CROPS ON LIGHT EXTINCTION AND WEED COVERAGE IN SUNFLOWER FIELD

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ABSTRACT. In order to evaluate the effects of some cover crops on extinction coefficient and weed cover percentage in sunflower, a field experiment was conducted based on a randomized complete block design with nine treatments and three replicates at the Agricultural Research Station, Tabriz University of Iran, during growing season 2012-2013. Treatments were triticale, hairy vetch, rapeseed, triticale + hairy vetch, triticale + rapeseed, hairy vetch + rapeseed, application of trifluralin herbicide, and controls (weed infested and weed free without planting cover crop). Result indicated that once established, living mulches can rapidly occupy the open space between the rows of the main crop and use the light that would otherwise be available to weeds. In the all cover crops treatments, the light extinction coefficient was increased and weed cover percentage was reduced. Highest reduction in total weed species was observed in hairy vetch + rapeseed and triticale + rapeseed cover crop 61.92% and 61.43 %, respectively, compared to weed infested, so this treatment was better than trifluralin application. It concluded that cover crops could be considered as integrated strategies for weed sustainable management.

Key words: Hairy vetch; Light extinction coefficient; Rapeseed; Triticale; Weed Sustainable Management.

THE EFFECT OF HALO- AND HYDRO-PRIMING ON GERMINATION CHARACTERISTICS OF MILLET SEEDS UNDER SALINITY STRESS

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ABSTRACT. Low seed germination and seedling emergence is one of the main problems in saline areas. Seed priming technique has been known as a challenge to improve germination and seedling emergence under different environmental stresses. The objective of this research was to evaluate the effect of seed priming with NaCl and water on growth and seed reserve utilization of millet seeds under salinity stress. Treatments were combinations of four levels of salinity stress (0, -4, -8 and -12 bar) and three levels of seed priming and control with three replicates. Results showed that with increase in salinity stress, germination components such as germination percentage, germination index, mean time to germination, normal seedling percentage, seedling length, seedling dry weight of utilized (mobilized) seed and seed reserve utilization efficiency decreased, but seed priming showed lower reduction. The highest germination characteristics and seed reserve utilization was obtained by halo-priming in

control conditions. It is concluded that priming results in improvement in germination components of millet in salinity stress conditions.

Key words: Seed priming; Salinity stress; Germination characteristics; Seed reserve utilization.

ANALYSIS OF THE ESSENTIAL OILS OF *THYMUS KOTSCHYANUS* L. (10 POPULATIONS) FROM IRAN

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ABSTRACT. *Thymus* species are well known as medicinal plants because of their biological and pharmacological properties. *Thymus kotschyanus* seeds (10 populations) were collected from various provinces of Iran and transferred into a new uniform environment. This study was carried out at Badiiei Research Station (Qom Province, Iran) in 2008, under field conditions. The experiment was carried out as a randomized complete block design with three replicates. The content of essential oils of this species was assessed during the flowering stage, and the chemical composition of the essential oils were obtained by hydrodistillation and analyzed by gas chromatography (GC) and gas chromatography/mass spectrometry (GC-MS). According to populations, 17 components representing 84.57-97.08% of the total components, were identified. Oxygenated monoterpenes were the main group of constituents in all samples (87.14-98.93%). thymol (2.45-78.65%), carvacrol (1.84-49.38%), α -terpineol (1.79-17.1%), borneol (.68-3.8%), linalool (.5-39.05%), 1,8cineole (.53- 8.39%), p-cymene (.38 -7.74%) represented the mager compounds. The highest oil yields were obtained from Mazandaran 2 (2.5%) and Rudbar (2.3%) populations and lowest oil yields were obtained from Avan (1.1%) and Alamut (1.09%) populations. The highest level of thymol was obtained from Piranshahr (78.65%) and Semnan (60.80%) populations and lowest level of it obtained from Mazandaran 2 (2.45%), Siahkal (3.95%) populations. The highest level of carvacrol was exist in Mazandaran 2 (49.38%) and Rudbar (39.68%) populations. In this study, the linalool and α -terpineol were found as the main constituents of essential oil.

Key words: *Thymus kotschyanus*; Gas chromatography; Gas chromatography/ mass spectrometry; Medicinal plants; Oil yield.

THE EFFECT OF SALINITY STRESS ON GERMINATION CHARACTERISTICS AND CHANGES OF BIOCHEMICALLY OF SESAME SEEDS

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ABSTRACT. Objective of this study was to evaluate the effect of salinity stress on germination characteristics and biochemical changes of sesame seeds. Salinity stress at osmotic potentials of 0 (as control), - 3, -6, -9 and -12 bar were adjusted using NaCl before the start of the experiment. Our results showed that, the effect of salinity stress for all traits was significant. By increases of salinity stress, germination percentage, germination, normal seedling percentage, seedling length and dry weight were reduced the ascorbate peroxidase and

catalase activity, also proline content were at minimum at control and increased with increase in salinity stress, expressed by the osmotic potential.

Key words: Salinity stress; Germination characteristic; Ascorbate peroxidase; Catalase; Proline.

BIOASSAY OF INSECTICIDES AGAINST THREE HONEY BEE SPECIES IN LABORATORY CONDITIONS

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ABSTRACT. A study was conducted at the Eco-toxicology laboratory in the Department of Agricultural Entomology, University of Agriculture Faisalabad, against three species *Apis florea*, *A. dorsata* and *A. mellifera* of honey bees, to check long-term survival of honeybees when exposed to different insecticides. In this study, we used a modeling approach regarding survival data of caged bees under chronic exposure to seven insecticides (Carbosulfan, Chlorpyrifos, Bifenthrin, Spinosad, Indoxacarb, Emamectin benzoate and Imidacloprid), having three replicates and four concentrations (1000, 500, 250, 125 and 0 ppm). We demonstrate the chronic toxicity induced by these insecticides. Laboratory bioassay of these insecticides showed that carbosulfan and imidacloprid were the most toxic at their high dose (1000 ppm) with LT_{50} of 4 hours in each case for *A. mellifera*, chlorpyrifos and imidacloprid were the most toxic at their high dose (1000 ppm) with LT_{50} of 5 hours in each case for *A. florea* whereas chlorpyrifos was the most toxic at high dose (1000 ppm) with LT_{50} of 5 hours for *A. dorsata*. However, LT_{50} of spinosad was increased up to 18 hrs with decreasing concentrations at 125 ppm against *A. mellifera*, LT_{50} of spinosad was increased up to 15 hrs with decreasing concentrations at 125 ppm against *A. florea* as well as LT_{50} of spinosad and Emamectin benzoate was increased up to 20 hrs with decreasing concentrations at 125 ppm against *A. dorsata*. However, LT_{50} of all controlled species was 91-103 hrs.

Key words: Honey bees; Chlorpyrifos; Imidacloprid; Concentrations; Toxicity.

FOOD PREFERENCE OF THE GERMAN COCKROACH, *BLATTELLA GERMANICA* (L.) (DICTYOPTERA: BLATTELLIDAE)

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ABSTRACT. The German cockroach, *Blattella germanica* (L.), is a common indoor pest in low-income housing. Cockroaches not only spoil food but also transfer pathogens and cause allergic reactions and psychological distress. The 72 h-starved cockroaches were given choices among eight food items: four carbohydrate-rich foods (bread, biscuit, banana, and potato) and four protein-rich foods (minced meat, cooked cheese, white cheese, and luncheon). Modified four-chamber arenas were used for this food preference experiment. Each kind of

food was placed in each chamber of the arena with 20 of starving cockroaches placed at the center. This experiment was done three times, one with the four carbohydrate-rich foods, the other with the four protein-rich foods, and the last with the preferred food from carbohydrate and protein. Another food preference experiment was conducted in the different modified four chamber arenas to determine the food consumption as the Rodgers's index. The two arenas were observed after 3 days in the laboratory, the first one to estimate percent of attracted adults to different food items, while the second one to calculate the food consumption by using Rodgers's index. The percentage of adults attracted to carbohydrate foods (biscuit and banana) and protein food (cooked cheese) was significantly higher than (bread and potato) and (luncheon, minced meat and white cheese) at $p \leq 0.05$ in both type of food, respectively. Data showed that banana was high attracted to cockroach and gave significant difference between cooked cheese and luncheon and the lowest attracted was seen in biscuit when adults exposed to carbohydrate and protein food items in the same choice arenas. Data showed significance level of variation in food consumption (mg) by German cockroach adults were analyzed with ANOVA, Tukey's $P \leq 0.05$. Data showed that biscuit was avoided food, whereas banana was preferred food item.

Key words: Food preference; Arena; *Blattella germanica*; Food consumption.

THE EFFECT OF PHOSPHORUS DOSES ON CHICKPEA CULTIVARS UNDER RAINFALL CONDITIONS

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ABSTRACT. This study was conducted to investigate the effect of different phosphorus doses (0, 15, 30, 40 and 70 kg ha⁻¹) on chickpea (*Cicer arietinum* L.) cultivars at Diyarbakir, Southeast Anatolia of Turkey over two years at late spring. The effect of phosphorus on plant height and number of branches plant⁻¹ was non-significant. Number of branches plant⁻¹ was different response to phosphorus doses, although statistically was not significant. Number of pods and seeds plant⁻¹ were affected by phosphorus treatment. Although 100 seed weight was not affected by phosphorus applications, cultivar x doses interaction was important. Phosphorus doses were significant for yield, but yield apparently did not increase. Start dose, 15 kg phosphorus ha⁻¹, was initially increased the yield, and 30 kg phosphorus ha⁻¹ application slightly was increased. The highest number of pods and seeds at 30 and 70 kg P ha⁻¹, compared only one of these control and 15 kg P ha⁻¹. Grain yield was increased to 16 and 12% with the application of 30 and 40 kg P ha⁻¹, respectively, when compared with control dose. Chickpea cultivars showed low response to P application. Phosphorus fertilization could not be effective due to late sown. Early sown and irrigation supply can be advisable for more effectiveness phosphorus intake in this region.

Key words: Chickpea; *Cicer arietinum* L.; Phosphorus; Yield.

MANAGEMENT OF *CERCOSPORA* LEAF SPOT OF GROUNDNUT (*CERCOSPORA ARACHIDICOLA* & *CERCOSPORIDIUM PERSONATUM*) THROUGH THE USE OF SYSTEMIC FUNGICIDES

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ABSTRACT. Various fungal diseases reduce groundnut yield but *Cercospora* leaf spot commonly called, Tikka disease is most detrimental one. A field experiment was conducted to evaluate the efficacy of different fungicides and their doses on *Cercospora* leaf spot of groundnut. Five different fungicides (Chlorothalonil, Propineb, Mancozeb, Nativo and Triazole) having three different doses (prescribed, half & prescribed+half) were used to control *Cercospora* leaf spot of groundnut. Groundnut variety (YH-14) highly susceptible to *Cercospora* leaf spot was used. The experiment was laid down in RCBD design. The data were analyzed statistically by Fisher's analysis of variance technique. Results showed that maximum disease control with high pod yield was observed with Nativo and Triazole treatments. Efficacy of Chlorothalonil was also better than Mancozeb and Propineb. Maximum disease control and pod yield was observed when Nativo was used @ 0.97g/L of water, followed by @ 0.65g/L and 0.32 g/L, respectively. Propineb was the least effective in controlling *Cercospora* leaf spot of groundnut as well as having minimum pod yield.

Key words: *Cercospora*; Leaf spot; Fungicide; Groundnut; Disease development; Yield.
CLS = *Cercospora* leaf spot

ISOBOLOGRAPHIC ANALYSIS OF THE INTERACTION OF TRAMADOL WITH ANTICONVULSANT DRUGS IN MICE

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ABSTRACT. Experimental research followed by clinical studies have demonstrated the existence of several types of pain, thus the pain classification according to the mediation has widely extended. In addition, the study of the interactions with pharmacodynamic mechanism expanded very much during the last years; therefore in the new theories appear significant changes concerning synergism, addition and subadditivity in binary combinations. The investigations in this paper were aimed the demonstration of the antinociceptive of some drugs with anticonvulsant action and the analysis of their binary combinations with tramadol, using isobolar analysis. As model of nociception has been used the test of abdominal constrictive response in mouse induced by Zymosan A. the test substances were administered orally alone or in fixed proportion combinations. The data obtained were subjected to isobolar analysis. According to the statistical analysis the following have been observed: the binary combination tramadol-VA has proven to be synergistic ($Z_{mix} < Z_{add}$, $f = 0,5$, $p_1 = 677$, $T_c = 3.936$, $T_t = 3,529$, $c = 12.78$, $F_t = 4.46$, $p < 0.05$), while the binary combination tramadol-CBZ has proven to be borderline additive ($Z_{mix} < Z_{add}$).

Key words: Isobolographic analysis; Valproic acid; Tramadol; Carbamazepine; Antinociceptive effect.