

AGROCHEMICAL EVOLUTION OF THE CHERNOZEMIC SOIL IN THE SUPERFICIAL HORIZON BY DIFFERENTIATED NITROGEN FERTILIZATION

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ABSTRACT. Soil fertility, upon which plant growth and hence crop yield and quality depend, embraces its content of plant food (nutrients), its organic matter content, its structure, its ability to supply water and its depth. Excessive use of fertilizers with nitrogen products of ion nitric accumulation in the soil (temporary) and in plants, which disturbs the balance of photosynthesis, causes the appearance of necrosis and burns on leaves, severe intoxication and even death by asphyxiation phenomena and cyanosis at ruminants, children and old people. One of the ways of soil pollution through agricultural technology is over-fertilization and, in particular, the administration of high doses of nitrogen fertilizers. Excess of nitrogen fertilizers, as well as their empirical application, have negative effects on harvest quality. The main aim of this study was to determine the effect of five nitrogen levels and different type of fertilizers on the agrochemical evolution of the chernozemic soil in the superficial horizon. Field experiments were conducted at the Agricultural Research and Development Station (ARDS) Suceava, Romania, in two growing seasons (2017 and 2018) with five nitrogen levels (80 kg/ha, 120 kg/ha, 160 kg/ha, 200 kg/ha and 240 kg/ha) and two type of nitrogen fertilizers (ammonium nitrate and urea).

Keywords: ammonium nitrate; urea; chemical fertilizers; chernozemic soil.

CULTIVATION POSSIBILITIES OF SOME COMMON BEANS VARIETIES UNDER SECOND CROP CONDITIONS

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ABSTRACT. This research was carried to determine the yield and yield components on some common bean (*Phaseolus vulgaris*) varieties in 2017 and 2018 years, in Diyarbakir, southeast Anatolia of Turkey. In the experiment, Onceler-98, Karacasehir-90, Yunus-90, Akman-98, Goynuk-98, Aras-98, Terzibaba, Adabeyazi, Cihan and Noyanbey cultivars were used. Experiment was set up in randomized complete block design with three replications. Plots were 6 m length with five rows, the inter-row and intra-row spacing were 0.7 m and 0.10 m. Seeds were sown after wheat harvest as second crops. The differences among cultivars were significant for number of days of flowering and maturity, plant height, number of pods and seeds per plant, grain yield and 100 seed weight. Number of days to flowering ranged from 48.0 to 62.8; number of days to maturity ranged from 99.8 to 113.8. The number of pods and seeds per plant varied from 12.8 to 30.8, and 24.3 to 105.6, respectively. Grain yield ranged from 792.3 kg ha⁻¹ (Cihan and Noyanbey) to 2709 kg ha⁻¹ (Goynuk-98 and Onceler-98). In the experiment area, high heat temperature and high evaporation throughout July and August, negatively affected the blooming, pollination and fertilization on cultivars of dwarf and determinate plant

habit types. Brushy type and late-maturing varieties should be preferred under second crop conditions.

Keywords: dry bean; *Phaseolus vulgaris*; yield.

EFFECT OF COLD STRATIFICATION ON SEED GERMINATION OF THE MULTIPURPOSE FRUIT SHRUB, *ZIZIPHUS LOTUS* (L.) LAM. (RHAMNACEAE)

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ABSTRACT. Shrubs and trees of the genus *Ziziphus* are a good example of naturally occurring multipurpose plant species with great potential in arid regions. This study was conducted to investigate the effect of cold stratification on seed germination and seedling growth of *Ziziphus lotus* (L.) Lam. Seeds were subjected to 0, 45, 90 and 120 days of cold stratification at 5°C. We also examined fruit, kernel and seed morphology. For each treatment period, four replicates of 50 seeds were incubated in plastic containers between two layers of moist sand at 15% and under greenhouse conditions for 15-day period. At the end of the experiment, the final germination percentage (FGP), shoot length and root length were assessed. The results clearly indicated that increasing duration of cold stratification improved seed germination. The most effective stratification period was 120 days where *Z. lotus* recorded 83% of FGP and 16.5 cm of total seedling length. Cold stratification treatments significantly increased shoot height, root length, as well as seedling total length. 120 days stratification treatment resulted in the highest shoot and root length (6.80 cm and 9.75 cm, respectively). An overview on the emergence of *Z. lotus* seedlings during a 15-day period was also illustrated.

Keywords: agriculture; arid region; buckthorn; Jujube; medicinal plants; seed quality.

BIOMASS YIELD ENHANCEMENT OF DHAINCHA (*SESBANIA SPECIES*) THROUGH CULTURAL PRACTICES

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ABSTRACT. Three separate field experiments were conducted to exploit biomass yield potential of dhaincha (*Sesbania* species) by different cultural practices. A total of six accessions from three *Sesbania* species, viz. *S. bispinosa* (#05, 71, 77 and 109), *S. cannabina* (#28) and *S. sesban* (#81), were used as experimental materials. Experimental treatments were population densities, viz. 180, 240 and 300 plants m⁻²; sowing dates, viz. 30 April, 15 May, 30 May and 15 June, and fertilizer doses, viz. 0 (without N/control), 10, 20 and 30 kg N ha⁻¹. All the experiments were designed following randomized complete block design with three replications. Experiments on population density and sowing dates were conducted in control condition (without any fertilizer application). The N-fertilizer was applied as top dress at 30 days after sowing (DAS) and crops were harvested at 60 DAS. The maximum biomass (10.07 t ha⁻¹) was obtained from 240 plants m⁻². At 30 April sowing, plants produced the tallest height (199.69 cm), widest base diameter (1.02 cm), highest fresh weight (62.07 t ha⁻¹) and biomass yield (14.73 t ha⁻¹).

There were no significant differences in biomass yield and yield contributing descriptors between 20 and 30 kg N ha⁻¹. Among the species, *S. bispinosa* was the best performer in terms of biomass yield and yield contributing descriptors. It may be concluded that *S. bispinosa* (accession #71) could be cultivated with the population density 240 plants m⁻², at 30 April, without any fertilizer application. In case of later sowing/cultivation, the 20 kg N ha⁻¹ could be applied for the maximization of biomass yield.

Keywords: green manure crop; population density; sowing time; fertilizer management; total dry matter.

THE ROLE OF PRETREATMENT PARAMETERS ON SEED GERMINATION AND SEEDLING GROWTH OF TWO FENNEL CULTIVARS

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ABSTRACT. Fennel is one of the most important medicinal and spice plants and has become one of the most important economical medicinal plants in Mediterranean, and the Middle East. The germination ability and percentage are fundamental characteristics which influence the viability of the plants. Prechilling has meaningful influence on coleoptile length, radicle length, seedling length, germination percentage, mean time for germination and germination rate, but uniformity of seed germination did not significantly influenced by it. The cultivar effect was significant on coleoptile length, radicle length, seedling length, germination percentage and germination rate. However, mean time for germination and uniformity of seed germination did not significantly affected by cultivar. All experimental characteristics, except uniformity of seed germination, significantly influenced by hormone. The maximum coleoptile length, radicle length, seedling length, germination percentage and germination ratio was related to 45 days moist prechilling treatment. Isfahan cultivar also had obtained the highest coleoptile and radicle length, seedling length, germination percentage and germination ratio compare to Shiraz cultivar. It seems that application of endogenous GA₃+KI and BA+KI concentration, which is provided mostly by chilling treatment, is the most effective factor for breaking the seed dormancy. On the basis of the results, usage of 45 days moist prechilling accompanied with application of GA₃+KI and BA+KI in Isfahan cultivar was appropriate.

Keywords: kinetin; gibberellic acid; benzyladenine; germination percentage; germination rate.

SEED GERMINATION AND SEEDLING ESTABLISHMENT OF CHERIMOYA (*ANNONA CHERIMOLA* MILL.) AT DIFFERENT TEMPERATURES

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ABSTRACT. Cherimoya (*Annona cherimola* Mill.) has an exceptional flavor and aroma, which makes it a fruit with great potential. However, little is known about its propagation by seeds. According to the scientific literature, the germination of cherimoya seeds is affected much more by external conditions than by internal conditions. Germination of

cherimoya variety ‘Concha Lisa’ were tested for germination at constant temperatures of 25, 30, 40°C, and at room temperature, varying from 20-25°C, coupled with total darkness. Seeds were sown in Petri dishes (0.8% agar water), for 25 days of incubation. The kinetics of germination was determined according to five closely related parameters, viz. final germination percentage (FGP), mean germination time (MGT), coefficient of velocity of germination (CVG), time to 50% germination (T50) and seedling length (SL). The temperature of 30°C was found optimally suitable with 70.8% FGP, 17.5 days MGT and 3.91 cm SL, while the room temperature of 20-25°C slightly improved germination with only 25% FGP. Furthermore, significant decrease in FGP and SL was observed at 25°C and 40°C of temperature in comparison to 30°C. The analysis also revealed that cherimoya seed germination, day 10-15 after seed sowing is suitable for final counts. An overview on the emergence of cherimoya seedlings, during a 12-week period in pots is presented.

Keywords: agriculture; Annonaceae; custard apple; exotic fruit; fruit tree; seed quality.

EFFECT OF FARMER-HERDSMEN CONFLICT ON POVERTY STATUS OF FARMING HOUSEHOLDS IN KWARA STATE, NIGERIA

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ABSTRACT. This study examines the effect of farmer-herdsmen conflict on poverty status of crop farming households in Kwara State, Nigeria. Primary data was used for the study and a three stage sampling technique was adopted in the selection of the respondents. A structured questionnaire was used for the purpose of extracting needed information from 110 crop farming households selected for the study. The data collected were analyzed using Descriptive Statistics, Foster-Greer-Thorbecke (FGT) Index, and Tobit regression model. The result of prevalence of poverty among the farming households, who experienced conflict and those who didn't in the study area, was 19.23% and 10.34%, while the intensity of poverty was 1.38 and 0.99%, respectively. The severity of poverty, which measures the extent of poverty, shows poverty was more severe among the poor who experienced conflict with a poverty index of 0.0002 than the poor who didn't experienced conflict, who had index of 0.0001. The Tobit regression model, which measured the effects of farmer-herdsmen conflict on poverty status of the farming household, indicates that the likelihood of being poor were more with large farming households, non-educated farming household heads, small farm size, low farm income households, low off-farm income and occurrence of conflict. The study therefore recommends that governments should designate some areas for the herdsmen as grazing field and also establish grazing reserves and communities in all the states, so as to reduce farmers-herdsmen conflict.

Keywords: expenditure; pastoralist; Foster-Greer-Thorbecke (FGT); tobit regression.

EFFECT OF LEVENTIS FOUNDATION YOUTH AGRICULTURAL EMPOWERMENT PROGRAMME ON TRAINEES' FOOD OUTPUT IN OSUN STATE, NIGERIA

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ABSTRACT. The study assessed the effect of Leventis Foundation Youth Agricultural Empowerment Programme (LFYAEP) on trainees' food output in Osun State, Nigeria. A total of 248 ex-trainees of LFYAEP were selected and interviewed in the study area through a systematic random sampling technique using list of Leventis Foundation Agricultural School, Ilesa ex-trainees between the year 2010 and 2017 as sample frame. Data collected were presented using appropriate descriptive and inferential statistics. The mean age of the respondents was 30.0 ± 6.2 and their farming experience was 7.2 ± 4.4 . About 74.7 and 77.6% got information about the empowerment through their community leaders and media respectively; also, they all participated to better their lot in life. In addition, there were high knowledge and skill proficiency in all the farm enterprises engaged in after the empowerment. Furthermore, the respondents recorded increased food output in all the farm enterprises engaged in after the empowerment. The findings revealed that at $p < 0.05$, respondents' reasons for participation ($\chi^2 = 31.612$) had significant association with their food output. Furthermore, at $p < 0.05$, farming experience ($r = 0.483$), age ($r = 0.322$), years of formal education ($r = 0.153$), knowledge possessed ($r = 0.148$) and skill proficiency ($r = 0.221$) of respondents had significant relationship with their food output. Finally, there was significant difference between food output before and after the empowerment ($F = 65.59$). The study concludes that there was a significant improvement in the quantity and quality of food produced by the ex-trainees after the empowerment programme. It was recommended that similar empowerment should be put in place for all youth to enhance productivity.

Keywords: food security; farm management; ex-trainees.

A REVIEW ON PLANT GENOMES OF SOME IMPORTANT TRADITIONAL CHINESE FRUITS AND HERBS

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ABSTRACT. Chinese medicinal herbs and fruits have grown rapidly and significantly in recent years and have a positive influence on improving people's attention to their health and organic life style. According to the advancement of sequencing technologies and reduced costs, the genome sequencing data of medicinal plants are accumulating rapidly. Our aim was to review plant genomes of three important medicinal plants in China. There is an ample genetic diversity of plants with medicinal importance around the globe and this pool of genetic variation serves as the base for selection, as well as for plant improvement. Plant genomes are characterized by large variations of genome size and ploidy level. Comparative genomics provides a method to unravel the relationship between genomes, by describing conserved chromosomes or chromosomal regions between related species. It is also clear that it is possible to use plant genome as a tool for improving breeding strategies. However, certain limitations represent a number of challenges for the generation and utilization of genomic resources in many important

medicinal plant species. This review has focused on plant genomes of some important horticultural plants, which are famous in traditional Chinese medicine, namely ginger, ginseng and goji berry. However, more researches are needed to introduce the genome research of medicinal plants.

Keywords: gene sequencing; ginger; ginseng; goji berry; horticultural crops; organic life.

THE EFFECT OF SALICYLIC ACID ON DIFFERENT PLANT PROCESSES – A REVIEW

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ABSTRACT Salicylic acid (SA) is a well-known signaling molecule that plays an important role in resistance against pathogens, as well as adaptation to some abiotic stress factors, such as drought, heavy metal toxicity, chilling, heat and osmotic stress and can be a factor effective treatment for plants. The impact of SA on different plant processes under optimal environmental conditions is controversial. Also, SA as a plant growth regulator may have a positive effect on the regulation of physiological and biochemical processes of different plant species, such as seed germination, seed production, respiration, vegetative growth, flower formation and photosynthesis. In addition, SA as a regulator of cell growth, could contribute to maintaining cellular redox homeostasis by induction of the alternative respiratory pathway and the regulation of antioxidant enzymes activity and to regulating gene expression by inducing a RNA-dependent RNA polymerase. However, SA may act as a stressor, and may have a negative impact on different plant processes. Recent results indicate that the exogenous application of SA to plants have affect several on many physiological processes, such as control of ion absorption, stomatal closure and transport, reducing of stress and stimulation of growth and differentiation of plants, and also the controlled levels of SA in plants are important for improving performance and adaptation to environmental stimuli and emphasize its important role in plant health and protection. The present study investigated the effect of SA on different plant processes.

Keywords: signaling molecule; plant processes; stress.