

## **INFRARED THERMAL IMAGING AS AN INNOVATIVE APPROACH FOR EARLY DETECTION INFESTATION OF STORED PRODUCT INSECTS IN CERTAIN STORED GRAINS**

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**ABSTRACT.** Grains of field crops, such as wheat, maize, faba bean and white bean, are considered strategic food for humanity worldwide and Egypt. Unfortunately, percent losses of grains quantity may reach to 15-30%, as a result of stored product insect damage, and the losses increased dramatically in the last years, as an outcome of quickly productions of these pests. Experiments were conducted on infrared thermal imaging that demonstrate early detection of infestation by stored product insects in wheat, maize, broad bean, white bean and bean grains. The imaging is dependent on subtle significant differences in temperature between infested and healthy grains. Because the thermal imaging data are digital, computer programs can be used to analysis differences in temperature and mining figures explained for that. Results revealed that the use of thermal imaging offers an alternative method to detect an insect infestation. Data concluded that thermal imaging has the potential to identify whether the grains of crops that tested are infested or not, but is less effective in identifying which developmental stage is present. Moreover, it could apply this technique easily on a large scale in silos, storage, mills and granaries without negative impact on quality of stored grains.

**Keywords:** thermal camera; pulses; grains; insects.

## **SURVEY THE ALLELOPATHIC EFFECTS OF TOBACCO (*NICOTIANA TABACUM* L.) ON CORN (*ZEA MAYS* L.) GROWTH AND GERMINATION**

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**ABSTRACT.** Allelopathy is the direct influence of chemical released from one plant on the development and growth of another plant. The trial accomplished in seed technology laboratory of Faculty of Agriculture, Islamic Azad University of Isfahan, in 2018. A factorial layout within completely randomized design with four replications was used. Treatments included plant organs extract (leaf, stem, root and total plant), and different tobacco extract densities includes four levels of 0%, 25%, 50% and 100%. Control treatment (0% of tobacco extract) had obtained the highest value of germination rate, germination percentage, coleoptile weight, radicle weight, radicle length and coleoptile length. The maximum germination rate, germination percentage, coleoptiles weight, radicle weight, radicle length and coleoptiles length was related to extract of stem extract which had meaningful differences with other treatments. Both radicle and coleoptile length decreased with increase in concentration of tobacco extract. Tobacco extract has negatively effects on corn seeds by decreasing the germination rate. Tobacco may increase the presence of secondary metabolites, such as alkaloids, all of which may have different effects on seed germination percentage. The highest germination percentage (91.91%),

coleoptile weight (0.046 mg), radicle weight (0.0161 mg), radicle length (7.24 mm), and coleoptiles length (6.45 mm) was related to interaction between control treatment (0% of extract) and stem extract. It is concluded that the extract of *Nicotiana tabacum* had both inhibitory and stimulatory effects on seedling growth of *Zea mays*.

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

## **EFFECT OF DIFFERENT BORON APPLICATION ON COTTON YIELD COMPONENTS AND FIBER QUALITY PROPERTIES**

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**ABSTRACT.** This study was carried out to determine the effect of different boron application methods on cotton yield, plant growth and fiber technological properties. The study was conducted at Siirt University Faculty of Agriculture Department of Field Crops experimental area as randomized complete block design with four replications in 2018. Stoneville 468 cotton variety and boron liquid foliar fertilizer were used as material. Seven different boron applications were performed as (Control, 1000 cc ha<sup>-1</sup> at pre-flowering stage, 2000 cc ha<sup>-1</sup> at pre-flowering stage, 1000 cc ha<sup>-1</sup> at flowering stage, 2000 cc ha<sup>-1</sup> at flowering stage and 1000 cc ha<sup>-1</sup> at boll formation stage, 2000 cc ha<sup>-1</sup> at boll formation stage). The results of statistical analysis showed that there were significant differences between applications methods in terms of plant height and number of monopodial branches. But there were non-significant differences in terms of number of sympodial branches, number of first node of sympodial branch, number of nodes, height/node ratio, number of bolls, boll weight, seed cotton weight of per boll, number of seeds per boll, first picking percentage, 100 seeds weight, ginning percentage, seed cotton yield and fiber technological characteristics. In conclusion different application methods of boron increased plant height and number of monopodial branches of cotton when applied as 1000 and 2000 cc ha<sup>-1</sup> at pre-flowering stages.

**Keywords:** cotton; plant nutrition; plant growth; seed cotton yield.

## **SOIL PHOSPHORUS DYNAMICS OF SWEET POTATO-BASED CROPPING SYSTEM IN A RAINFOREST REGION OF NIGERIA**

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**ABSTRACT.** To guard against soil phosphorus (P) toxicity in tuber production and have optimum tuber yield at lesser cost of P-fertilization, better understanding of the dynamics of phosphorus release in sandy loamy soil is inevitable. Therefore, this work was carried out to investigate the trend of P-release from time of application to its optimum release and its effect on sweet potato growth and tuber production. To achieve this, a 5-week incubation study under laboratory conditions was carried out to study P-release dynamics using different P sources. Similar experiment was conducted on the field using the same P sources and application rate to monitor the influence P-release rate on sweet potato production. Data on number of leaves, vine length, tuber yield, soil extractable phosphorus and phosphorus uptake of the plants were taken. Relationships between P-

uptake and tuber yield, number of leaves, vine length were also established. It was found that the trend of phosphorus release was a sigmoid shape. Leaf production and vine length were improved by P-application, while yield was suppressed. It is recommended that P-fertilizer should not be applied to the soil at short intervals to avoid nutrient toxicity.

**Keywords:** incubation; phosphorus sources; phosphorus uptake; P-release dynamics; tuber yield.

## **SEED GERMINATION AND MORPHO-PHYSIOLOGICAL CHARACTERIZATION OF THREE TOMATO (*LYCOPERSICON ESCULENTUM*) VARIETIES IRRIGATED WITH TREATED WASTEWATER**

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**ABSTRACT.** The ability to reuse treated wastewater (TWW) would be of significant benefit to agriculture whilst at the same time providing a valuable water resource. This study concerned the effects of three various levels of treated wastewater (0%, 50% and 100% TWW) on seed germination and plant development of three different varieties of tomato (*Lycopersicon esculentum*) (*viz.* Toufan, Heinz and Bouzina). Irrigation with TWW persisted 15 days for the germination stage and 120 days for the growth and development stage. A control plot irrigated with a pure water (groundwater) was also set up in order to compare the seeds and the plants response to different concentrations of irrigation water. The final germination was expressed as a percentage of the total number of seeds in each treatment. This study has demonstrated that treated wastewater improves the germination in Heinz variety and had no effect on both Toufan and Bouzina varieties whether it is pure or diluted by half. For the growth stage, the statistical analysis showed that the Toufan variety has tolerated successfully the TWW irrigation with its high and moderate concentrations, and this by analysing all the morpho-physiological parameters studied in this work (leaves numbers, stem and root length and dry biomass, relative water content and rate water loss).

**Keywords:** wastewater reuse; water quality; experimental crops; plant growth; salinity; agriculture.

## **EFFECTS OF CITRUS ROOTSTOCKS ON SOME PLANT NUTRIENT ELEMENTS ABSORPTION OF GRAFTED CULTIVARS**

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**ABSTRACT.** Citrus rootstocks have prime effects on the size of tree and fruit, quality of fruit and micorhyza dependence, which make difference in their leaf mineral elements concentration in leaf of grafted cultivars on them. A pot factorial experiment with two factors including rootstocks (sour orange, Citrange, Rough Lemon, Citrumelo and Yozo) and grafted cultivars (Thomson Navel, Sanguine, Unshiu Tangerine) was carried out in

farm conditions with three replications. The studied traits were concentrations of elements in leaves including nitrogen, phosphorus, potassium, sulfur, magnesium, iron, manganese, zinc and copper. The result of analysis of variance revealed significant mean squares of variety, rootstock and their interaction effects for the elements in leaves. Citrumelo rootstock had mainly effect on nutritional elements in leaves. Unshiu mandarin with Citrumelo rootstock had the most amount of nitrogen and sanguine variety with Citrange rootstock made the highest concentration of phosphorus and potassium in leaves of the grafted cultivar. Significant positive correlation of K with Fe and Zn indicating that all rootstocks with high mean value of K in leaf of grafted cultivar will have high amount of Fe and Zn. Significant positive correlation also detected between N and P of leaf of grafted cultivars in combination with different rootstocks; therefore, most of combinations with high mean value of N had also high mean value of P. Unshiu Tangerine had high variation for P, but Thomson Novel had lowest variation for this mineral element. Due to Significant positive correlation of S with Mg and Mn, most of rootstocks with high amount of S in leaf of grafted cultivar had high mean values of Mg and Mn in their leaf of grafted cultivars.

**Keywords:** concentration; factorial experiment; fruit quality; leaf; vegetative growth.

## **DURATION AND CONCENTRATION OF 1-METHYLCYCLOPROPENE TREATMENT: IMPACT ON RIPENING AND SHELF LIFE OF PARTIALLY RIPENED BANANAS**

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**ABSTRACT.** In order to improve the quality and extend the shelf life of bananas after gassing with ethylene at commercial treatment during transportation and storage the simultaneous application of ethylene and 1-methylcyclopropene were examined. Fruit were treated with  $100 \mu\text{L L}^{-1}$  of ethylene for two consecutive days as a control, followed by 20 min ventilation each day, or simultaneously exposed to 1-MCP at different concentrations (30, 100 or  $300 \text{ nL L}^{-1}$  on the first day or second day, or treated with 1-MCP alone on the third day at  $22^\circ\text{C}$ . Fruit from each treatment were used to evaluate external and internal quality parameters and shelf life. The results showed that shelf life increased significantly, compared to the control when 1-MCP was applied coincidentally with ethylene in the second day and reapplied alone in the third day. The highest increase in shelf life (125%) was obtained when 1-MCP was applied on the second day at  $30 \text{ nL L}^{-1}$  simultaneously with ethylene and at  $300 \text{ nL L}^{-1}$  alone on the third day, compared to the control in both harvest months. We conclude that simultaneous application of 1-MCP is more effective than the more common method of extending banana shelf life through application of 1-MCP after ethylene treatment.

**Keywords:** 1-MCP; ethylene; firmness; quality; weight loss.

## **SUSTAINABLE AGRICULTURAL PRACTICES AND RELATED PROBLEMS AMONG RICE FARMING HOUSEHOLDS IN KWARA STATE, NIGERIA**

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**ABSTRACT.** Farmers in Nigeria are unpredictable unlike other developing countries where a good agronomic practices are used for a sustainable increase in rice production as result, the demand for rice consumption far overweighs rice production. This study presented empirical findings on the sustainable agricultural practices and its constraints among the rice farming households in one selected state of Nigeria. The study utilized primary data collected in 2019 using a four stage random sampling techniques. A total sample of 150 rice farmers was collected with the use of descriptive statistics, Likert-type scale and multinomial logistic regression model for analysis. The result indicates that the recommended sustainable agricultural practices (SAP) least adopted were the use of High Yielding Variety seed and agrochemicals probably due to their high cost. The factors that influences the full usage of SAP in rice farming were farm size, level of education, farming experience, extension contact and access to credit. Also, farm size and access to credit also influenced the partial usage of SAP. The major constraints limiting the usage were high cost of fertilizers, high cost of improved seed and unavailability agrochemicals. The study recommends that extension agents should visit local farmers more often and carry out more demonstrations on the usage of SAP.

**Keywords:** sustainable agriculture; rice farming households; multinomial logit; Kwara State; Nigeria.

## **PARTICIPATION OF RURAL WOMEN IN EXPLOITATION OF NON-TIMBER FOREST PRODUCTS AS A MEANS OF SUSTAINABLE LIVELIHOOD IN SOUTHWESTERN NIGERIA**

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**ABSTRACT.** The study examined the participation of rural women in exploitation of non-timber forest products (NTFPs), as a means of sustainable livelihood in Southwestern Nigeria. A number of 320 respondents were interviewed through pre-tested structured interview schedule in the four purposively selected forest reserves using a multistage sampling procedure. Data collected were presented using appropriate descriptive and inferential statistics. The mean age and mean year of experience in NTFPs exploitation were  $40.9 \pm 11.5$  years and  $16.4 \pm 3.4$  years, respectively. NTFPs participated by the respondents in the study area were palm fruits, vegetables, snails and fire wood among others. Actor categories identify in the NTFPs business chain were collectors, processors, traders among others. In addition, majority of the respondents show willingness to continue in NTFPs exploitation irrespective of alternative livelihood. The findings revealed that age ( $t=2.39$ ), number of hours of collection per week ( $t=3.48$ ), years of experience of NTFPs exploitation ( $t= -3.88$ ) and external orientation ( $t=2.20$ ) of respondents significantly contributed to their participation in NTFPs exploitation. The

study concludes that participation in NTFPs exploitation by the respondents was moderate. It was recommended that more enlightenment programmes should be organized by relevant stakeholders for the rural women to create awareness on the income generation opportunities that abound in the NTFPs activities.

**Keywords:** socioeconomic variables; tropical forest; income generating activities; forest resources.

## **EFFECT OF WATER SOURCES ON THE HEALTH OF RURAL CHILDREN: EVIDENCE FROM HOUSEHOLD SURVEY IN KWARA STATE, NIGERIA**

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**ABSTRACT** Majority of the disease outbreak in developing countries have been attributed to contaminated water with children being the worst hit. Therefore, this study analyzed the effect of water sources on the health status of children under the age of 5 years in Ifelodun Local Government Area of Kwara State, Nigeria. Primary data was obtained through the use of semi-structured interviews; 150 households with at least one child under five years were interviewed however; only 146 questionnaires were completed and found valid for analysis. The data was subjected to descriptive statistics, such as pie chart, bar charts. The results show that majority (58.2%) of the children were males. Also, most (83.5%) of the children were infants, *i.e.* within the age range of 0-2 years. Most (96%) of the households had access to improved water sources of which protected dug well is the most accessible. Many (42%) of the households reported that they experience periods of water shortage, this explains why water washed diseases (disease associated with poor hygiene in the face of water scarcity) was the most predominant diseases reported among the children with 70 reported cases. These were closely followed by the water related insect vector diseases with 64 reported cases and then water borne diseases with 48 reported cases. Water based diseases rarely occurred in the study area. This study, therefore, recommends that effort should be geared towards provision of safe water all year round for the farming households. Also, insecticide treated nets should be made available for the children in the farming households so as to prevent insect bites.

**Keywords:** water washed diseases; incidence rate; dysentery; malaria; improved water sources; water shortage.