MECHANICAL DAMAGE TO CORN SEEDS

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ABSTRACT. The objective of this research was to evaluate and model the mechanical damage to corn seeds under impact loading. The experiments were conducted at moisture contents of 7.60 to 25% (wet basis) and at the impact energies of 0.1, 0.2 and 0.3 J, using an impact damage assessment device.

The results showed that impact energy, moisture content, and the interaction effects of these two variables significantly influenced the percentage of physical damage in corn seeds (p<0.01). Increasing the impact of the energy from 0.1 to 0.3 J caused a significant increase in the mean values of damage from 23.73 to 83.49%. The mean values of physical damage decreased significantly by a factor of 1.92 (from 83.75 to 43.56%), with an increase in the moisture content from 7.6 to 20%.

However, by a higher increase in the moisture from 20 to 25%, the mean value of damage showed a non-significant increasing trend. There was an optimum moisture level of about 17 to 20%, at which seed damage was minimized. An empirical model composed of seed moisture content and energy impact was developed for accurately describing the percentage of physical damage to corn seeds. It was found that the model has provided satisfactory results over the whole set of values for the dependent variable.

Keywords: mechanical damage; harvesting; handling; processing; impact; corn.

EFFECT OF STORAGE CONTAINERS AND LENGTHS OF STORAGE ON THE GERMINATION, MOISTURE CONTENT AND PEST INFESTATION OF WHEAT SEED

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ABSTRACT. A laboratory experiment was conducted at the Department of Agronomy, Hajee Mohammad Danesh Science and Technology University, Dianjpur-5200, Bangladesh to evaluate the storage containers and duration of seed storage on the germinability and health of wheat seeds. The experiment was carried out in two factors, *viz.* three storage containers naming i) sealed tin container, ii) plastic container, iii) gunny bag, and four storage periods of i) 15 days, ii) 30 days, iii) 45 days, and iv) 60 days. Completely randomized design (CRD) was used in this experiment with eight replications. The results revealed that the germination percentages (GP) of the seeds stored in the gunny bag decreased quickly from 66.1 to 32.8% due to contained with high moisture content in seed. But, slowly decreasing trends of GP from 80.4% to 69.2% was observed in the sealed tin container seeds with lesser moisture content than that of gunny bag and plastic container. The reduction of GP was so higher of 50.38% in the seeds contained in gunny bag than that of only 13.93% in the seeds contained sealed tin container. Wheat seeds stored in sealed tin container, plastic container and gunny bag significantly increased moisture content in ambient condition for 60 DAS. The moisture content of the seeds stored in gunny bag was found to rise remarkably more than other containers. This escalation of seed moisture content was closely related to the surrounding

environmental conditions, like tempera-ture and relative humidity where seeds were stored. The rate seed deterioration in gunny bag and plastic container paralleled the level of invasion by storage insect was found. During storage period, insect infected the seeds, and the insect bitten seeds were also found higher in gunny bag and plastic container, but lower in sealed container. Wheat seeds should be stored in air tight sealed container and drying should be done after some days of storage (45-60 DAS).

Keywords: wheat; containers; duration; germination; moisture content; biotic factors

EFFECTS OF GA_3 AND ABA ON THE GERMINATION OF DORMANT OAT SEEDS

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ABSTRACT. Oat seed with dormancy characteristics, which can germinate after one season or one year, are used to build and maintain vegetation to protect soils from been damaged by desertification in Northern China. The aim of this study was to estimate the effects of endogenous and exogenous GA_3 and ABA on oat seed (var. Baiyan 7) germination. The results showed that seeds without peel hull had lower endogenous ABA content and the ratio of ABA/GA_3 than seeds with peel hull. The best GA_3 treatment duration for milky ripe, wax ripe, full ripe seeds were 60 min or 120 min, 60 min and 30 min, respectively. Seed germination rate, germination potential and germination index increased before they declined with the increasing of GA_3 concentrations. The best GA_3 concentration treatment was 100 mg/l, while the turning point was 200 mg/l. The dormancy rate of low temperature storage seeds were higher than those of room temperature storage seeds at each storage time, and both decreased with the increase of the storage time. For the seeds which were new or stored for 1-2 months, the germination rates were enhanced significantly by exogenous GA_3. For the seeds that had been stored for over three months, GA_3 treatment had no effect on germination rate. Germination rate decreased with the increase of ABA concentrations. The most inhibitive effect, which leaded to a seed germination reduction by 37.7% and 4.0%, appeared, when the concentration of ABA was 500 mg/L and 1000 mg/l, respectively. GA_3 could abate the effect which ABA inhibited seed germination.

Keywords: dormancy oats; Baiyan; germination index; germination potential.

ISOLATION AND IDENTIFICATION OF TRICHODERMA SPECIES AND INVESTIGATING THEIR SEED TREATMENT EFFECT ON RAPESEED (*BRASSICA NAPUS* L.) GERMINATION

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ABSTRACT. *Trichoderma* fungus species are highly populations of fungi in world that they can colonize roots as plant symbiosis. Various types of *Trichoderma* are free-living fungi that are, generally, saprophytic on the remains of soil. In addition to its role in biological control, this fungus increases plant yield and growth. So far, many studies have

been conducted to examine the ability of this agent to reduce biological tensions and biological control of plant pathogens. Thus, this study was conducted to isolate and identify species of *Trichoderma* fungus from rapeseed fields in Golestan and Qazvin province from Iran, and also to study isolated species on germination percentage and growth parameters of rapeseed seedlings in a randomized complete block design with three replications *in vitro*. Based on the results, three species of *T. harzianum*, *T. virens*, and *T. atroviride* were identified, which the isolate of *T. harzianum* T_{a19} showed a significant effect on the control group and other treatments in increasing germination percentage, root length and stem; whereas, the seeds treated with the isolate *T. atroviride* T_{a11} showed no significant difference with the control group in spite of the increase in seed germination rate in comparison with the control and other treatments. According to the results, the use of *Trichoderma* fungus as a seed treatment like other researches on different products is recommended for increasing the growth of rapeseed.

Keywords: Fungus species; seed; root; stem; germination; colonization.

SALINITY TOLERANCE OF BLACK GRAM CULTIVARS DURING GERMINATION AND EARLY SEEDLING GROWTH

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ABSTRACT. A laboratory experiment regarding germination and seedling growth test was conducted with three black gram genotypes tested under three salinity levels (0, 75 and 150 mM), for 10 days, in sand culture within small plastic pot, to investi-gate the germination and seedling growth characteristics. Different germination traits of all black gram genotypes, like germina-tion percentage (GP), germination rate (GR), coefficient of velocity of germination (CVG) greatly reduced, as well as mean germination time (MGT) increased with increasing salt stress. At high salt stress, BARI Mash-3 provided the highest GP reduction (28.58%), while the lowest was recorded (15.79% to control) in BARI Mash-1. Salinity have the negative impact on shoot and root lengths, fresh and dry weights. The highest (50.32% to con-trol) and lowest reduction (36.39%) of shoot length were recorded in BARI Mash-2 and BARI Mash-1, respectively, under 150 mM NaCl saline conditions. There were signifi-cant reduction of root lengths, root fresh and dry weight, shoot length, shoot fresh and dry weight in all genotypes under saline condition. The genotypes were arranged as BARI Mash-1 > BARI Mash-3 > BARI Mash-2, with respect to salinity tolerance.

Keywords: *Vigna mungo*; NaCl; vigour index.

ONION (*ALLIUM CEPA* L.) GROWTH, YIELD AND ECONOMIC RETURN UNDER DIFFERENT COMBINATIONS OF NITROGEN FERTILIZERS AND AGRICULTURAL BIOSTIMULANTS

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ABSTRACT. Two field experiments have been conducted to study the effects of application of nitrogen fertilizer, bio-fertilizers and organic compounds on growth, yield and economic of onion production in 2014/2015 and 2015/2016 seasons. From the data it was found that combination of N fertilization of onion plants with 100 kg N fed.$^{-1}$ (hectare = 2.38 feddan) and foliar with humic acid at the rate of 1 kg fed.$^{-1}$ is the best in this study, for giving the highest bulb yield with the highest net returns of 12580 EGP (1USD = 17.80 EGP), with a benefit: cost ratio (B:C ratio) of 2.35. While, the highest cost of cultivation was obtained by 120 kg N fed.$^{-1}$ and spraying onion plants with humic acid followed by compost tea. Also, from the economic view, the revenue of EGP is higher when used some biofertilizers and organic fertilizers if compared with chemical fertilization only.

Keywords: onion plant; bio-fertilizers; mineral N-fertilizer; growth; bulbs yield.

ALTERNARIA AND CERCOSPORA LEAF SPOT DISEASES OF NIGER (*GUIZOTIA ABYSSINICA* CASS.) – A TRADITIONAL TRIBAL CROP OF SOUTH GUJARAT, INDIA, WITH COST BENEFIT RATIO IN RELATION TO DIFFERENT FUNGICIDES

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ABSTRACT. Niger (*Guizotia abyssinica* Cass.) is an important minor oil seed crop grown in dry areas grown mostly by tribal and interior places as life line of tribal segment. Tribal people mainly use its oil for cooking purpose, above than that there were also other uses. Hence, the niger crop should be protected from the infection. The crop is affected by number of fungal diseases. Therefore, a field experiment was formulated for three years with the four replications at the Niger Research Station (NRS) at Navsari Agricultural University (NAU), Vanarasi, Navsari (Gujarat) on the foliar diseases of GN-1 variety of niger crop. In this experiment, six different fungicides along with one control have been evaluated to control the Alternaria and Cercospora leaf spot diseases, out of which all the fungicidal treatments were significantly superior over the control. Here, foliar spray on the incidence of diseases was compared with the control (without any treatment). All the fungicidal treatments were significantly superior over the control to reduce Alternaria and Cercospora leaf spot diseases of Niger crop. Treatment of Carbendazim + Mancozeb (0.2 %) with two sprays first from the initiation of the disease and second after the interval of 15 days recorded the lowest incidence of Alternaria (14.56) and Cercospora (14.94) leaf

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spot diseases of niger and recorded the highest seed yield 337 seed yield kg/ha along with the net return with cost benefit ratio graph.

Keywords: niger*;* fungicide; Alternaria; Cercospora; cost benefit ratio; residue analysis.

STUDIES ON BIOLOGY AND ANTIBIOSIS RESISTANCE IN MANGO (*MANGIFERAE INDICA*) VARIETIES AGAINST MANGO MEALY BUG, *DROSICHA MANGIFERAE* GREEN (HEMIPTERA: MARGARODIDAE)

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ABSTRACT. Mango is known as king of fruits. Among mango pests, mango mealy bug, *Drosicha mangiferae* (MMB), is considered one of the most destructive pests of mango orchards and other plantations. Whenever it enters in any orchards it is difficult to eradicate it from those orchards. The experiment was conducted at Entomological Research Sub Station, Multan-Punjab, Pakistan, during 2009 and 2010, to evaluate fitness of mango mealy bug on different varieties of mango and biology on 'Chaunsa' variety. Mango mealy bug, *Drosicha mangiferae* Green (Hemiptera: Coccoidea: Margarodidae), is matter of concern, as it is widespread pest of woody plants even in urban areas. A study was conducted on cultivar resistance and fecundity of mango mealy bug. The 'Chaunsa' cultivar of mango proved highly susceptible to mango mealy bug with maximum number of eggs laid, *i.e.* 335.90, and maximum weight, *i.e.* 0.239 g of the female, was recorded on the cultivar 'Chaunsa'. The maximum length, *i.e.* 1.63 cm, and width, *i.e.* 0.80 cm of female, was observed on 'Chaunsa', which showed a susceptible response and did not differ significantly with the width of female on 'Black Chaunsa'. Regarding biology, the 1st instar male and female duration on an average is 56.3 days, whereas the 2nd instar has 26 days. In case of the 3rd instar, female has duration 19.5 days and male has three days. Male has pupal stage, while it is absent in female. On an average two study years, the ranking of susceptibility of mango cultivars was as under: 'Chaunsa' > 'Black Chaunsa' > 'Malda' > 'Fajri' > 'Retaul-12' > 'Langra' > 'Sensation' > 'Sindhri' > 'Dusehri' > 'Sufaid Chaunsa' > 'Anwar Reutul' and > 'Tukhmi'.

Keywords: giant coccids; culivars; 'S.B. Chaunsa' mango; lifecycle; biological interaction; Punjab, Pakistan.

VARIABILITY INFLUENCE OF THE VOLATILE COMPOUNDS OF THREE ALGERIAN DATE CULTIVARS (*PHOENIX DACTYLIFERA* L.) ON INFESTATION RATES OF THE DATE MOTH [(*ECTOMYELOIS CERATONIAE* ZELL. (LEPIDOPTERA: PYRALIDAE)]

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ABSTRACT. The date moth *Ectomyelois ceratoniae* Zeller (Lepidoptera; Pyralidae) is a serious pest for the dates production in Algerian oasis. Its dangerousness resides in its

wide geographic distribution on various bioclimatics stages and his polyphagia on various hosts. In this context, to find out the impact of the dates volatile compounds on the date moth oviposition behavior. To do this, we conducted the following study, which is divided into two parts, one in the field and the other in the laboratory. This study investigated the effect of the biochemical profiles of three Algerian date cultivars (Deglet-Nour, Ghars and Degla-Beidha) on the infestation rates of the date moth. The monitoring infection rates in the field produced the following results: during the campaigns from 2011/2012 to 2014/2015 at the INRAA Sidi Mahdi-Touggourt station (Algeria), revealed that the cultivar Deglet-Nour is the most affected with a rate of 18.84%, followed by Ghars with 10.28% then Degla-Beidha with 6.66%.

As for the extracts analysis of the three date cultivars with hexane were identified and quantifie *via* coupling gas chromatography / mass spectrometry (GC/MS). The analysis of the volatile compounds of the cultivars studied allowed to identify 110 compounds distributed in eight chemical classes (hydrocarbons (saturated aliphatic hydrocarbons, unsaturated aliphatic hydrocarbons, unsaturated monocyclic hydrocarbons, saturated monocyclic hydrocarbons, aromatic hydrocarbons, terpene hydrocarbons), alcohols, aldehydes, esters, ketones, amides, phenols and carboxylic acids), whose compounds are distributed as follows: 72 compounds for the Deglet-Nour, 38 compounds for the cultivar Ghars and 29 compounds for Degla-Beidha.

Keywords: date moth; infestation; *Phoenix dactylifera* L.; allelochemical compound; extraction; Lepidoptera, Pyralidae.

THE IMPORTANT RECORD OF *MONOLEXIS FUSCICORNIS* FORSTER, 1862 (HYMENOPTERA, BRACONIDAE, DORYCTINAE) IN TURKEY WITH NOTES ON *TROGOXYLON IMPRESSUM*(COMOLI, 1837)

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ABSTRACT In the present paper, *Monolexis fuscicornis* Förster, 1862 (Hymenoptera, Braconidae, Doryctinae) is recorded in Turkey for the second time and it is documented as parasitoid of *Trogoxylon impressum* (Comolli, 1837) (Coleoptera: Bostrichidae), firstly pest *T. impressum* (Comolli, 1837) record on fig plants. This damage to the fig plant and nutritional behavior with exit holes was observed for the first time with this work. In additionally, this record was firstly reported in the Southeast Anatolia region of the pest. Harmful has the potential to cause significant damage to fig plants over the years. It is necessary to studies whether the natural enemy detected on the pest is under the pressure of this pest. In this study, *M. fuscicornis* Förster,1862 is recognised as larva-pupa parasitoid of *T. impressum*, important pest in fig tree plantations in Turkey. This interaction could have significant implication in biodiversity conservation and pest management. Hence, this new parasitoid-host interaction on fig plants has highly significance in pest manage-ment and biocontrol, because it is thought that the damage will increase in the future.

Keywords: parasitoid; new record; Middle East; *Ficus carica*; host; biocontrol; pest management.