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TRADITIONAL AGROFORESTRY SYSTEMS AND SOCIOECONOMIC STATUS OF FARMERS IN KANGRA VALLEY OF NORTH WESTERN HIMALAYA, INDIA

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Abstract: The study was conducted to evaluate the existing agroforestry systems and socio-economic status of the farmers in Kangra district of Himachal Pradesh, India. A total number of 220 farmers were selected randomly from four group's viz., marginal, small, medium and large based on landholding capacity by dividing the district into three altitudinal zones namely zone-I (<500 m amsl), zone-II (500-1000 m amsl) and zone -III (>1000 m amsl) for survey and data collection. The main forms of traditional agroforestry systems found in the study area are the agrisilvicultural (AS), agrisilvihorticultural (ASH), agrihorticulture (AH), agrisilvipastoral (ASP), pastoralsilviculture (PS) and silvipastoral (SP) systems. The survey data were collected with a pre-structured questionnaire in personal interviews with household heads and data for family structure, education status of heads of households, literacy rate of family, status of off farm employment, land use statistics was recorded.

Keywords: Agroforestry, Socioeconomic, Farmers, Kangra, Western Himalaya

DEVELOPMENT OF CENTRIFUGAL ASPIRATOR OF PNEUMATIC METERING MECHANISM PLANTER OF RAINFED SEEDS

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Abstract: A pneumatic metering mechanism for planting of different seed was developed for precise planting for groundnut, cotton, okra, sesameseeds. Centrifugal aspirator with radial blade was designed for creating the required vacuum pressure that pressure is required to pick the single seed. The optimum vacume pressure was found to be 5, 2, 2 and 0.3 kPa for groundnut, cotton, okra, and sunflower. The airflow velocity 3.3 m/s gave the best results, with minimum lateral displacement of the seed. Effect of the different shapes of the seed plate orifice, upon the pneumatic planting of different shaped was analyzed which showed that the proper orifice shape was circular for spherical seed and elliptical for longer and flatter seed. The dimension of the seed plate orifice was 3mm diameter circular plate for okra seed, where as for groundnut, cotton and sesame seed, the elliptical shaped orifice with dimension (5,4.5), (3,3.5), (2.24,0.80) mm longer and shorter axis gave best result. The sizes of the different shaped orifices were analyzed to the effect of seed box exposed area upon the seed picked per orifices. The result for all shaped orifices clearly indicated that the meeting rate increases with the increase in the seed exposed area.

Keywords: Pneumatic metering mechanism, Orifice plate, Centrifugal aspirator, Vacuum pressure

INTEGRATED PEST AND DISEASE MANAGEMENT THROUGH ORGANIC FARMING APPROACHES IN MUSTARD

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Abstract: Field experiment was conducted to study the effect of the different organic modules for management of *Alternaria blight* and *Powdery mildew* diseases of Indian Mustard (*Brassica juncea*)(L.) Czern & Coss) Efficacy of different organic modules were also tested against aphid management in successful growing of organic mustard. Treatment module comprising of seed treatment with *Trichoderma viride*@8g/kg seed +foliar spray of Azadirachtin @3ml/lit.at 5-10DAS+Neem oil spray@2% at 10-20DAS+NSKE spray@5% at 30-40 DAS+cow urine spray@10% at 50-60DAS+milk whey spray @10% at 60-75 DAS was found significantly superior over control and gave maximum seed yield of mustard 13.65q/ha. in comparison to control which gave only 10.16q/ha. mustard seed yield. This organic module was found superior in respect to disease control also, and effectively controlled both the diseases and record minimum disease intensity of *Alternaria blight*(15.94%) and *Powdery mildew* 17.67%. Where as in control 38.32% and 48.15% disease intensity was observed respectively. This module gave the highest net return of Rs.23294/over control with maximum B:C ratio of 1.88, 1.83 and 1.84 in year 2012-13 & 2013-14 & 2014-15 respectively.

Keywords: Mustard, *Alternaria blight*, *Powdery mildew*, Aphids *Trichoderma viride*, Milk whey, Azadirachtin

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PRODUCTIVITY AND COMPATIBILITY OF WHEAT (*TRITICUM AESTIVUM* L.) AND INDIAN MUSTARD (*BRASSICA JUNCEA* L.) INTERCROPPING AS INFLUENCED BY FARMYARD MANURE AND FERTILIZER LEVELS

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Abstract: A field experiment was conducted during winter (*rabi*) seasons of 2010-11 and 2011-12 at Institute of Agricultural Sciences, Banaras Hindu University, Varanasi to evaluate the productivity, compatibility and economics of wheat and Indian mustard intercropping as influenced by row proportions, farmyard manure (FYM) and fertilizer levels under irrigated conditions. Among row proportions, 8:1 row proportion of wheat and Indian mustard intercropping recorded significantly the highest yield attributing characters *viz.*, grain spike⁻¹, spikelet length and yield in case of wheat, and number of siliqua plant⁻¹ and number of seed siliqua⁻¹ in case of Indian mustard. The seed yield and stover yield of mustard were higher in 6:2 row proportion which was remained at par with 8:2 and 10:2 row proportions. There was also recorded significantly higher land equivalent ratio, aggressivity index with 8:1 row proportion of wheat + Indian mustard intercropping over 10:2, 8:2 and 6:2 row proportions. Conversely, the highest net return as well as B: C ratio was recorded in 10:2 row proportion which was at par with 8:1 row proportion. To achieve higher yield advantage and efficient resource utilization in wheat + mustard intercropping, the application of 100% RDF along with 30 kg N through FYM observed significantly higher yield attributes, yield, competitive indices and economics of wheat and Indian mustard, but it was remained at par with 100% RDF plus 15 kg N through FYM.

Keywords: Farmyard manure, Fertilizer level, Intercropping, Mustard, Row proportion, Wheat

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PERFORMANCE EVALUATION OF VACUUM TYPE METERING MECHANISM UNDER LABORATORY AND FIELD CONDITION FOR BOLD SEEDS

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Abstract: Groundnut, pigeonpea and maize are major bold seeds crop in India. Planting of these bold seeds is a very drudgery and time consuming operation. To address this issue, vacuum type metering mechanism is done. Vacuum is created in this rod and goes down the vacuum cylinder. The metering cylinder rotates over rod and pick up the seeds through the seed hopper while passing through it. To evaluate the working of vacuum cylinder pickling % & metering efficiency of metering mechanism were considered under different suction pressure i.e. for groundnut seed 4500 Pa, 5000 Pa and 5500 Pa, for maize seeds 3500 Pa, 4000 Pa and 4500 Pa while for pigeonpea seeds 1500Pa, 2000 Pa and 2500 Pa. On the basis of superior performance the optimum suction pressure inside the vacuum cylinder for groundnut seed was found to be 5000 Pa with a metering efficiency of 106.67 % and maximum picking percentage of 96%. Similarly the optimum suction pressure for maize seed was found to be 4000 Pa with a metering efficiency of 108.88 % and maximum picking percentage of 97% while for pigeonpea seed these values were found to be 2000 Pa, 110 % and 92 %.

Keywords : Vacuum type metering mechanism, Vacuum cylinder

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INFLUENCE OF *GLOMUS FASCICULATUM* AND BIO FORMULATIONS ON GROWTH OF JAMUN (*SYZYGIUM CUMINII* SKEELS)

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Abstract: An experiment was conducted at Horticulture Research Station, Bijapur (Tidagundi) to know the influence of *Glomus fasciculatum* and bioformulations on growth of jamun stocks. Rootstocks treated with *Glomus fasciculatum* had registered highest stock height (23.85cm and 30.70cm in both *in-situ* and *ex-situ* respectively), stock diameter (6.31mm and 7.56mm in both *in-situ* and *ex-situ* respectively) and number of leaves (25.97 and 28.15 in both *in-situ* and *ex-situ* respectively) in both *in-situ* and *ex-situ*. Among sub-treatments, stocks treated with microbial consortia had recorded significantly highest stock height (23.45cm and 30.52cm in both *in-situ* and *ex-situ* respectively) stock diameter (6.19mm and 7.47mm in both *in-situ* and *ex-situ* respectively) and number of leaves (24.79 and 26.88 in both *in-situ* and *ex-situ* respectively) in organic conditions.

Keywords: *Syzygium cuminii*, *Glomus fasciculatum*, Bioformulations

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PROCESS TECHNOLOGY FOR PREPARATION OF JAMUN JAM AND SQUASH AND QUALITY EVALUATION

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Abstract: Jamun has a shelf life of 2-3 days only, it is harvested and marketed daily under unhygienic conditions which further reduces its self life. To make this jamun fruit available in off season we have to preserve it. The jamun jam was preserved by boiling fruit pulp with sugar to a consistency of 68-70% TSS. Jamun squash was prepared by adding sugar syrup of 45% TSS to the juice and the cooled. Jamun jam and squash was stored for a period of 4 weeks, then the variations in protein content, ascorbic acid content, carbohydrates, and total lipids of jamun jam and squash was observed. The quality parameters remained constant and these parameters was similar to that of fruit except that of carbohydrate content of jam which was 58% compared to 17% in the fruit.

Keywords: Jamun jam, Jamun squash, Preservation of Jamun jam, Squash

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IMPACT OF ABIOTIC FACTORS AND AGE OF HOST PLANT ON PURPLE BLOTCH OF ONION CAUSED BY *ALTERNARIA PORRI* (ELLIS) AND ESTIMATION OF YIELD LOSSES

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Received-16.03.2017, Revised-07.05.2017

Abstract: An experiment was conducted on the impact of abiotic factors and age of host plant on purple blotch of onion (*Allium cepa* L.) caused by *Alternaria porri* (Ellis) and estimation of yield losses. The experiment was carried out in the Department of Plant Pathology, cage house and experimental field of Horticulture farm, Rajasthan College of Agriculture, Udaipur during 2014-2015. Sixty-days-old plants were more susceptible for infection of *A. porri*. However, susceptibility increased with increased age and after 60-days age decreased in susceptibility was recorded. In field trial conducted for yield loss estimation revealed that maximum yield loss (50.11%) was obtained in control plots followed by one, two and three spray of Mancozeb @ 0.2 per cent concentration. In relation to environmental factors study, temperature ranged from 13 to 32°C, relative humidity more than 75 per cent, wind velocity 2.4 Kmph, sunshine 8.4 hrs and optimum rainfall was found favourable for purple blotch disease development.

Keywords: Purple blotch, Onion, Abiotic, Age of host, Yield loss

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EFFICACY OF BIOCONTROL AGENTS, PLANT EXTRACTS AND ORGANIC AMMENDMENT AGAINST BLIGHT, POWDERY MILDEW AND WILT DISEASES IN CUMIN

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Abstract: Field experiment was conducted to study the effect of the different organic modules for management of *Alternaria blight*, *Powdery mildew* and wilt diseases of cumin (*Cuminum cyminum* L.). Treatment module comprising of seed treatment with *Trichoderma herzeanum* @ 8g/kg seed + three foliar spray of Azadirachtin @ 2ml/lit. at 45-60DAS + 60-75DAS + and at 90-100 DAS was found significantly superior over control and gave maximum seed yield of cumin 5.76q/ha. in comparison to control which gave only 3.43q/ha. cumin seed yield. This organic module was found superior in respect to disease control and effectively controlled all three diseases and record minimum disease intensity of *Alternaria blight* (12.49%), *Powdery mildew* 14.93% and wilt (6.20%). Where as in control 26.33%, 28.66% and 12.28% disease intensity was observed respectively. This module gave the highest net return of Rs.28013 /over control.

Keywords Cumin, *Alternaria blight*, *Powdery mildew*, *Trichoderma viride*, *Azadirachtin*

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AWARENESS AND INVOLVEMENT OF PEOPLE IN CONSERVATION ACTIVITIES OF WESTERN GHATS OF KARNATAKA, INDIA

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Abstract: The Uttara Kannada (U.K) district being a bio-diversity hotspot and 80 percent of its area forested, need to be conserved by creating awareness regarding conservation among the forest dwellers. Thus there is a growing need for concentrated efforts on making people of U.K. district aware about forest conservation, involving them in protecting the forest and communicating to others about conserving the Western Ghats. Hence, in the present paper an effort is made to study the awareness level, involvement of people in forest conservation and their socio economic correlates. The results revealed that majority of the respondents were on medium level of awareness with a awareness index of 86.33 and more than eighty percent were involved in forest conservation activities and the major conservation activities were regeneration, plantation and fire control along with replacement of non conventional energy resources with fossil fuels.

Keywords: Betta lands, Conservation, Awareness, Conservation activities

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HERBICIDAL WEED CONTROL IN INDIAN MUSTARD (*BRASSICA JUNCEA* L.)

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Received-02.05.2017, Revised-12.05.2017

Abstract: Field investigations were carried out at Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (U.P.) during the winter (*rabi*) seasons of 2010-11, 2011-12 and 2012-13 to assess the effect of different herbicidal weed control practices on yield and economics of Indian mustard (*Brassica juncea* L.). The treatments comprised pre-emergence applications of pendimethalin 1.0 kg/ha, oxadiargyl 0.09 kg/ha, oxyfluorfen 0.15 kg/ha and isoproturon 1.0 kg/ha, quizalofop 0.06 kg/ha, clodinafop 0.06 kg/ha and isoproturon 1.0 kg/ha 30 days after sowing (DAS), weedy check and weed free. Broadleaved weeds like *Chenopodium album* L., *Anagallis arvensis* L., *Melilotus indica* (L.) All., *Vicia sativa* L. and *Rumex acetosella* L. were more predominant than grass and sedge weeds, accounting for 57.9% of total weed flora. Based on the three years studies, weeds in mustard annually caused 23-42% loss in yield. Among all herbicidal treatments, oxadiargyl 0.09 kg/ha was found to be the most effective in reducing the population of broadleaved weeds, grasses and sedges as compared to other herbicidal treatments. Pre-emergence application of oxadiargyl at 0.09 kg/ha recorded minimum weed population and dry weight of weeds which was found to be the most effective and gave maximum seed yield of mustard. Herbicide, oxadiargyl 0.09 kg/ha gave higher net return due to weed control over other treatments and also resulted in highest net return per rupee invested (1.69) on weed control.

Keywords: Herbicidal weed control, Mustard, Yield, Economics

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RESPONSE OF PRECISION APPLICATION OF WATER AND FERTILIZER ON PRODUCTIVITY AND ECONOMICS OF BT COTTON

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Received-12.05.2017, Revised-25.05.2017

Abstract: A field experiment was conducted during the *kharif* season of 2013-14 and 2014-15 at Agricultural Research Station (MPUAT), Banswara, Rajasthan to find out the response of precision application water and nutrient through drip with fertigation on productivity and economics of Bt cotton hybrid (*Gossypium hirsutum* L.). The treatments comprised of three irrigation regimes viz. 0.6 Etc (I_1), 0.8ET_C (I_2) and 1.0 Etc in main plot and three nutrient management practices viz. 100% RDF (120:60:40kg NPK/ha) (N_1), 75 % RDF (N_2) and 50 % RDF (N_3) in sub plot of split plot design with three replications. Results indicated that scheduling irrigation at 1.0 Etc was produced significantly higher seed cotton yield (3443kg/ha) over rest irrigation scheduling. Application of 100% RDF gave significantly higher seed cotton yield (3556kg/ha) compared to lower doses of nutrients. The maximum seed cotton yield (3851kg/ha) recorded at the interaction

of 1.0 Etc with 100% RDF which was at par with 0.8 Etc with 100% RDF and found significantly superior over rest interactions. Contribution of yield attributes was significantly reflected on economical yield. The water requirement at 0.6, 0.8 and 1.0 was 75.79, 96.45 and 177.77 mm/ha respectively, compared to 183.6 mm/ha under 0.6 IW/CPE ratios. Maximum water use efficiency (6.11kg/ha-mm) recorded at the interaction of 1.0 Etc with 100RDF which was at par with 0.8Etc at 100% RDF and 75% RDF and significantly superior over rest interactions. Highest nitrogen use efficiency (47.62kg/kgN/ha) was recorded at the interaction of 1.0 Etc with 50% RDF which was at par with 0.8Etc at 75% RDF and significantly superior over rest interactions. Maximum B:C ratio (3.40) recorded with interaction of 1.0Etc at 100RDF which was at par with 0.8 Etc at 100RDF and 1.0Etc at 75% RDF and found significantly higher than other interactions. Overall, it is concluded that drip fertigation at 0.8 Etc with 75% RDF found more precision technique for Bt cotton hybrid under humid condition of Rajasthan.

Keywords: Seed cotton yield, Bt cotton, Fertigation, Water use efficiency, B:C ratio

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COMPARATIVE EVALUATION OF ENTOMOPATHOGENIC FUNGI AND CHEMICAL INSECTICIDES AGAINST WHITE GRUB (*HOLOTRICHIA* SP.) IN SUGARCANE

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Abstract: Field trials were conducted in sugarcane crop for management of white grub (*Holotrichia* sp.) using talc based formulations of entomopathogenic fungi *Metarhizium anisopliae* and *Beauveria bassiana* and chemical insecticides namely carbofuran 3G, Chloropyriphos 20 EC and Fipronil 40%+ Imidacloprid 40% WG. Pretreatment count of white grub larvae was taken for every individual microplot. Fipronil 40%+ Imidacloprid 40% WG @ 375 gm/ha proved to be the best treatment against white grub and provided up to 100% control of white grub. Chloropyriphos was second most effective treatment and checked 100% soil population of white grub followed by *M. anisopliae* which resulted in 80.97% decrease in soil population of white grub. After economic analysis *M. anisopliae* appeared to be significantly cost effective as compare to Fipronil 40%+ Imidacloprid 40% WG. Net return of Rs. 31153/ha was recorded in this treatment whereas, net return of Rs. 27816/ha was recorded in case of *M. anisopliae*.

Keywords: White grub, *M. anisopliae*, *B. bassiana*, Biological control, Chemical control

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PRODUCTIVITY AND PROFITABILITY OF INDIAN MUSTARD (*BRASSICA JUNCEA* L.) UNDER SULPHUR LEVELS AND WEED MANAGEMENT PRACTICES

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Abstract: Field investigations were carried out during winter seasons of 2015-16 and 2016-17 at Varanasi to evaluate the effect of sulphur levels and weed management practices on density and dry matter of weeds and crop-weed competition for sulphur in Indian mustard (*Brassica juncea* (L.) Czernj and Cosson). Amongst sulphur levels, minimum weed density and dry matter production was recorded with the application of 60 kg S/ha which was found to be significantly superior to other sulphur treatments. Amongst weed management treatments, the minimum weed density and weed dry matter production was observed with pendimethalin (0.75 kg/ha) + Hand weeding (HW) at 30 DAS and was at par with the hand weeding twice during both the years, and in second year this was statistically similar to oxyfluorfen (0.2 kg/ha) and oxadiargyl (0.1 kg/ha).

More seed yield was observed with 60 kg S/ha (2.19 t/ha) in first year, and in second year more yield was associated with 40 kg S/ha (2.07 t/ha). During the first year, maximum seed yield was registered with oxyfluorfen (0.2 kg/ha) amongst herbicidal treatments, and was at par with all treatments except weedy check, fluchloralin (0.75 kg/ha) and oxyfluorfen (0.15 kg/ha), and in the second year highest seed yield was recorded with the hand weeding twice (20 and 40 DAS), and was statistically at par with the oxyfluorfen (0.2 kg/ha), pendimethalin (0.75 kg/ha) + HW at 30 DAS and oxadiargyl (0.1 kg/ha). In main plot treatments, the least nutrient uptake by weeds was recorded with the application of 60 kg S/ha. Within sub-plot treatments, the least nutrient depletion by weed was registered with hand weeding twice during both the years of data and was at par with pendimethalin (0.75 kg/ha) + HW at 30 DAS. Economics revealed that application of 60 kg S/ha gave the maximum net return (₹ 19,380). However, highest benefit: cost ratio (2.03) was registered with the application of 40 kg S/ha. The highest net return (₹ 19,950) was observed with the hand weeding twice (₹ 19,950/ha), and was followed by application of pendimethalin (0.75 kg/ha) + HW at 30 DAS (₹ 19,850/ha). Maximum benefit: cost ratio (2.06) was recorded with the application of oxyfluorfen (0.2 kg/ha) and was closely followed by pendimethalin (0.75 kg/ha) + HW at 30 DAS (1.91).

Keywords: Economics, Sulphur level, Mustard, Nutrient uptake, Weed management, Yield

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RESPONSE OF MARIGOLD (*TAGETES ERECTA* L.) CV. DOUBLE ORANGE TO LIQUID FORMULATIONS OF EM CONSORTIA WITH GRADED LEVELS OF NPK ON FLOWER YIELD, QUALITY AND XANTHOPHYLLS YIELD

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Abstract: The present investigation entitled “response of Marigold (*Tagetes erecta* L.) cv. Double Orange to liquid formulations of effective microbial consortia with graded levels of NPK on flower yield and quality traits” was carried out in Department of Horticulture, College of Agriculture, Shivamogga, Karnataka, during 2014-15. The experiment was laid out in Randomized Block Design with 15 treatments replicated thrice. Studies showed significant effect on flower weight (8.37 g), flower diameter (8.04 cm), number of petals per flower (323.12), number of flowers per plant (91.34), flower yield per plant (572.86 g), flower yield per plot (20.62 kg) and flower yield per hectare (12.70 t) was recorded in the treatment which received 75 % RDF + *Azotobacter* + *Bacillus megaterium* + *Frateuria aurentia* (T₁₄). Petal meal yield per kilogram of fresh flower (90.84 g), petal meal yield per hectare (1156.40 kg), xanthophyll content (42.21 g) per kilogram of petal meal and xanthophyll yield per hectare (48.61 kg) were also recorded maximum with the same treatment *i.e.*, T₁₄ (75 % RDF + *Azotobacter* + *Bacillus megaterium* + *Frateuria aurentia*) compared to cent per cent RDF.

Keywords: Marigold, EM consortia, Flower yield, Quality, Xanthophyll

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EFFECT OF STORAGE TEMPERATURE ON SHELF LIFE OF AONLA FRUIT (*EMBLICA OFFICINALIS* G.)

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Abstract: The changes in aonla fruit quality were evaluated over 9 days storage at different storage temperatures (10, 25°C and room temperature) packaged in cardboard boxes. Samples were analysed at two days interval for physiological loss in weight, decay loss, acidity and specific gravity. The results showed that fruits of aonla stored at 10°C showed minimum physiological loss in weight, decay loss with the highest shelf life as compared to the other treatments whereas fruits of aonla stored at 25°C had maximum physiological loss in weight and decay loss during all periods of storage. Specific gravity and acidity content decreased during storage at all the temperatures.

Keywords: Aonla, Decay loss, Shelf-life, Temperature

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RESPONSE OF DIFFERENT LEVELS OF ZINC AND MOLYBDENUM ON GROWTH AND YIELD OF BLACKGRAM (*VIGNA MUNGO* L.) UNDER AGRO-CLIMATIC EAST UTTAR PRADESH

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Abstract: A field experiment was conducted during the *Zaid* season 2016 at the Crop Research farm of Agronomy, Naini Agricultural Institute, SHUATS, Allahabad (U.P.) to Field evaluation of blackgram (*Vigna mungo* L.) under Agro-climatic zone of Allahabad. The experiment was conducted to find out the effect of different levels of zinc and molybdenum on growth and yield of blackgram (*Vigna mungo* L.) laid out in RBD with 9 treatment and 3 replications. The treatment consisted of three levels of zinc (0, 5 and 7.5 kg ha⁻¹), three levels of molybdenum (0, 0.5 and 1.0 kg ha⁻¹). results revealed that the maximum plant height (9.76 and 15.11 cm at 15, 30 DAS), number of branch (4.33 and 7.40 at 30 and 45 DAS), dry weight (0.80, 3.10, 6.73 and 19.73 g at 15, 30, 45 and 60 DAS), test weight (40.23gm), harvest index (23.49 %) and grain yield (1.18 t ha⁻¹), However significantly the highest straw yield (4.14 t ha⁻¹) in (T₆) R.D.F + Zinc 5 kg ha⁻¹ + Molybdenum 1.0 kg ha⁻¹.

Keywords: Blackgram, Zinc, Molybdenum

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EFFECT OF NUTRIENT MANAGEMENT ON YIELD AND QUALITY IN INDIAN MUSTARD (*BRASSICA JUNCEA* L.)

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Abstract: A field experiment was conducted during *rabi* season, 2015-16 to study the Effect of nutrient management on yield and quality of Indian mustard (*Brassica juncea* L.) variety Pusa Bold at Crop Research Centre Chirori, Meerut. The experimental results revealed that significantly maximum growth parameters (plant height at harvest, and yield attributes (silique length, silique plant⁻¹, seeds silique⁻¹ and test weight), yield (grain and stover), compared to rest of the treatments. The increment in seed yield under application of 100% NPK+40 kg S+1.5 B+20 kg Zn ha⁻¹ was 25.32 % over 100% NPK..Maximum gross return, net return and B: C ratio was also recorded with the application of 100% NPK+40 kg S+1.5 kg B+20 kg Zn ha⁻¹. Besides, this combination also improves quality of produce and physico-chemical properties of soil.

Keywords: Nutrient management, Indian mustard, Quality

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EFFECT OF PLANT NUTRIENTS AND INSECTICIDES INTEGRATION AGAINST RICE LEAF FOLDER, *CNAPHALOCROCIS MEDINALIS* (GUENEE)

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Abstract: Studies were carried to evaluate the influence of plant nutrients @ 50:30:20kg/ha (50% recommended NPK level), 100:60:40kg/ha (100% recommended NPK level) and 150:90:60kg/ha (150% recommended NPK level) on insecticide toxicity at 24hrs, 48hrs, 72hrs and 96hrs after spray against leaf folder, *Cnaphalocrocis medinalis* (Guenee) in *kharif* 2015 and 2016. Among the tested insecticides, Rynaxypyr 18.5%SC and Cypermethrin 25%EC recorded the highest percent mortality followed by Fipronil 5%SC, Monocrotophos 36%SL. Moderate toxicity was recorded by Imidacloprid 17.8%SL and Acephate 75%SP. Under different nutrient levels *i.e.*, 50%, 100% and 150%NPK leaf folder mortality was not affected in treatments Rynaxypyr 18.5%SC (90.83, 87.50 and 86.67% in *kharif* 2015; 90.00, 87.50 and 87.50% mortality in *kharif* 2016) and Cypermethrin 25%EC (85.00, 84.92 and 83.33% in *kharif* 2015; 83.00, 83.00 and 82.67% mortality in *kharif* 2016). Toxicity of Monocrotophos 36%SL (77.50, 71.67 and 66.67% mortality; 75.83, 71.67 and 67.50% mortality in *kharif* 2015 and 2016, respectively) was affected moderately with change in plant nutrition levels. Mortality of leaf folder in treatments Fipronil 5%SC (83.33, 74.17 and 65.00% mortality; 84.17, 74.17 and 65.83% mortality in *kharif* 2015 and 2016, respectively), Imidacloprid 17.8%SL (65.00, 56.67 and 48.33% mortality; 65.00, 58.33 and 49.17% mortality in *kharif* 2015 and 2016, respectively) and Acephate 75%SP (66.67, 58.33 and 50.83% mortality; 67.50, 57.50 and 50.83% mortality in *kharif* 2015 and 2016, respectively) were highly affected by different NPK levels *i.e.*, 50%NPK, 100%NPK and 150%NPK.

Keywords: Host plant nutrition, NPK levels, Insecticides, Rice leaf folder

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EFFECT OF GA₃ AND NAA ON GROWTH AND FLOWERING OF OKRA (*ABELMOSCHUS ESCULENTUS* L.) CV. GUJARAT OKRA- 2

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Abstract: A field experiment was conducted at Horticulture Instructional Farm, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during the *Kharif* season 2012, respectively to study the effect of GA₃ and NAA on growth and flowering of Okra. Growth parameters like plant height and stem thickness (90 DAS), average length of interned and leaf area per plant (60 DAS) and number of nodes per plant and flowering parameters like days taken for initiation of first flower, days taken for flower initiation to edible maturity, days taken for sowing to first picking and days taken for sowing to last picking were analyzed. The experiment consisted of 16 treatments combination involving two growth regulators with four levels each (0, 25, 50 and 75 ppm). GA₃ and NAA (75 ppm) was found to be the most effective in increasing more stem thickness (1.95 cm), average length of interned (4.98 cm), Minimum days taken for flower initiation to edible maturity (5.88) and days taken for sowing to first picking (115.38). Treatment combination of (g₃n₂) increasing plant height (85.96 cm) and leaf area per plant (2427.86). Were as maximum number of nodes per plant (18.34) found combination with (g₃n₃) and minimum days taken for initiation of first flower (42.09) and days taken for sowing to first picking (49.10) was found treatment combination of (g₀n₁) respectively.

Keywords: Okra, GA₃, NAA, Growth, Flowering

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EFFECT OF PLANT GROWTH REGULATORS ON GROWTH AND FLOWER YIELD OF PETUNIA (*PETUNIA HYBRIDA* L.)

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Abstract: Effect of Plant Growth Regulators on Growth and Flower Yield of Petunia (*Petunia hybrida*) was carried out at research field of Department of Horticulture, Allahabad School of Agriculture, SHIATS Allahabad. The experiment included 10 treatments and three replications. It was concluded that application of GA₃ -200 ppm in treatment T₂ was found to be superior on plant height, plant spread, number of branches, number of leaves, number of flowers per plant, and higher yield and the application of CCC - 500 ppm in treatment T₅ was found superior on size of flower, fresh weight of flower and dry weight of flower and the application of NAA - 30 ppm in treatment T₇ was found superior on early bud flower bud emergence was observed as compared with control.

Keywords: Plant Growth Regulators, GA₃, CCC, NAA, Petunia