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ENTOMOPATHOGENIC NEMATODES AND THEIR EFFICIENCY IN DIFFERENT HOST

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Abstract: The term 'Entomophilic nematodes' includes all relationships of insects and nematodes ranging from phoresis to parasitism and pathogenesis. 'Entomogenous nematodes' are those that have a facultative or obligate parasitic association with insects. Entomogenous nematodes have several deleterious effects on their hosts including sterility, reduced fecundity, longevity and flight activity, delayed development, or other behavioral, physiological and morphological aberrations and in some cases, rapid mortality. The entomopathogenic nematodes possessing balanced biological control attributes belong to genera *Steinernema* and *Heterorhabditis* and are having mutualistic association with bacteria of the genus *Xenorhabdus* for Steinernematidae and *Photorhabdus* for Heterorhabditidae. Entomopathogenic nematodes being highly lethal to many important insect-pests, are safe to nontargetorganisms and working with their symbiotic bacteria kill the insects within 24-28 hours as compared to days and weeks required for insect killing in other biological control agents. Their infective juveniles (IJs) have been reported to tolerate short-term exposure to many chemical and biological insecticides, fungicides, herbicides, fertilizers and growth regulators, hence providing an opportunity of tank-mixing and application together. The EPNs have the great potential to be used in integrated pest management systems and work done have been reviewed in this article to facilitate the students and researchers to have an overview of the work done and proceed further to undertake the advanced research in different aspects related to entomopathogenic nematodes.

Keywords: Entomopathogenic nematodes (EPN), *Heterorhabditis*, *Photorhabdus*, *Steinernema*, *Xenorhabdus*.

MINOR FRUITS OF JAMMU SUBTROPICS POSSESS *IN VITRO* CYTOTOXICITY AGAINST HUMAN CANCER CELLS

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Abstract: The present research work was carried out to examine the *in vitro* cytotoxic effect of four minor fruits of kandi belt of Jammu region viz., *Embllica officinalis* (amla), *Morinda citrifolia* (shehtoot), *Olea europaea* (jaitun), *Ziziphus mauritiana* (ber) against nine human cancer cell lines from eight different origins such as A-549 (lung), A-498 (renal), HCT-116 (colon), MCF-7 (breast), MDA-MB-435 (melanoma), OVCAR-5 (ovarian), PC-3 (prostate), SF-295 (CNS), T-47D (breast). Methanolic extracts of fruits were used as test material and *in vitro* cytotoxicity was determined at 100 µg/ml via SRB assay. Results revealed that all the minor fruits (except shehtoot) showed *in vitro* cytotoxic efficacy against one or the other human cancer cell line with growth inhibition range of 70-99%. Maximum growth inhibition against more number of human cancer cell lines was produced by amla followed by ber and jaitun. When evaluated at lower concentrations, ber fruit exhibits significant *in vitro* cytotoxic potential (79% & 70%) at 50 and 30 µg/ml respectively against lung cancer cell line (A-549). Ber also suppressed 70% proliferation of melanoma cancer cell line (MDA-MB-435) at 50 µg/ml. To conclude, ber possesses certain constituents with cytotoxic properties that will be effective against melanoma and lung cancer cells.

Keywords: Amla, Ber, Cancer Cells, *In vitro* cytotoxicity, SRB assay

KNOWLEDGE AND ADOPTION LEVEL OF VALUE ADDED TECHNIQUES AMONG POTATO GROWERS OF ANAND AND KKHEDA DISTRICT OF GUJARAT STATE

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Abstract: The present study was undertaken in Anand and Kheda district of Gujarat state. This study was conducted in 12 purposively selected villages of four purposively selected talukas i.e. Anand and Umreth of Anand district and Nadiad and Kapadwanj taluka of Kheda district. A total of 120 potato growers having experience more than 5 years were selected randomly. Aim of the study was to ascertain knowledge and adoption level of value added techniques among potato growers. The data were collected through personal interview using interview schedule. Half (50.00 per cent) of the respondents had low level of knowledge, followed by 38.33 per cent had medium level, 6.66 per cent had high level and 5 per cent had very high knowledge level of value added techniques of potato. According to knowledge of potato growers, value added techniques were ranked in following manner; a variety of potato suitable for processing (Rank I), an international variety of potato introduced to Gujarat for processing high quality of french-fries (Rank I), APMC as agency for marketing agricultural produce (Rank I), correct temperature for storing potato (Rank II), chemical useful for sprout inhibition (Rank III). Great majority (91.66 per cent) of respondents had very low adoption level, followed by 8.33 per cent had low level of adoption level. According to adoption level of potato growers, value added techniques were ranked as, packing of potatoes (Rank I), sorting of potatoes using cold storage (Rank II), grading of potatoes (Rank III). Value added technique fully adopted by majority of the respondents were selling potatoes to other districts (78.33 per cent); partially adopted by majority of the respondents was curing after harvesting (21.67 per cent); not adopted by majority of the respondents was, use of colour card for identifying colour of potato chips (100.00 per cent), Packaging of value added products before selling (100.00 per cent), buying and selling potato or potato products online (100.00 per cent) selling potatoes to other states (100.00 per cent).

Keywords : Knowledge, Adoption, Value-added techniques

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YIELD AND YIELDS PARAMETER OF MAIZE GENOTYPES AS INFLUENCED BY FUNGICIDAL SPRAY

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Abstract: Among the genotypes, irrespective of the fungicidal spray significantly higher grain yield was recorded in the genotype Mograon (80.32q) compare other genotypes. Next followed by Pinnacle (80.28 q) and were on par with each other. Next genotype which was recorded higher grain yield was Prabal (66.62 q) and significantly least grain yield was recorded in the genotype Arjun (34.07 q) and followed by GH 0727 (49.54 q). genotypes Super 900 M recorded numerically higher starch content (71.50%) followed by CP 818 (71.20%), NK 6240 and Shimsha 517 (71.00%). Lowest starch content of 69.30 per cent was recorded in Arjun. Prabal recorded highest oil content of 4.90 % followed by CP 818 and Super 900M (4.75 %), CP 818 and Kaveri 244(4.73%), Shimsha 517 (4.70 %), GH 0727 and Arjun (4.68 %), All rounder (4.60 %), Pinnacle (4.58 %), MAH 957 (4.55 %) and NK 6240 (4.48 %) and were on par with each other. Least oil content of 4.28 per cent recorded in DKC 9133

Keywords: Genotypes, Yield, Fungicidal spray, Maize

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PHYSIO-CHEMICAL PROPERTIES OF SOIL IN KINNOW ORCHARD IN IRRIGATED AREA OF SRIGANGANAGAR DISTRICT IN RAJASTHAN

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Abstract: The experiment was conducted on “Physio-chemical properties of soil in kinnow orchard in irrigated area of sriganganagar district in rajasthan” during April, 2016 to April, 2017. The ninety soil samples with three depths *i.e.*, 0-30, 30-60 and 60-90 cm were collected from thirty kinnow orchards from different five tehsil (suratgarh, Raisinghnagar, sri vijaynagar, sri karanpur and sriganganagar) of sriganganagar district. The soil samples were analyzed for physio-chemical property of kinnow orchards being grown at farmer’s field. The kinnow orchard soils in this investigation were found the results showed that the pH and electrical conductivity of soil samples decreased with increasing soil depth, whereas, reverse trend was observed in calcium carbonate content. The kinnow orchard soils were found low in organic carbon.

Keyword: Orchard, Depth, Soil, L (location), Sample.

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REACTION OF SORGHUM GENOTYPES FOR SHOOT AND PANICLE PESTS IN TIMELY AND LATE SOWN CROP

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Abstract: A field experiment entitled “Reaction of Sorghum Genotypes against Shoot and Panicle Pests in Timely and Late sown Crop was carried out in a Randomized Block Design during *Kharif* season, 2015-16 at College of Agriculture, Indore (M.P.). Based on the objectives the observations were recorded to study the combating ability, including impact of two dates of sowing on the insect pests viz, shoot fly (*Atherigona soccata* Rondani), stem borer (*Chilo partellus* Swinhoe), ear head worm (*Cryptoblabes gnidiella* Mab.), ear head bug (*Calocoris angustatus* Leth.) of sorghum. Among 43 varietal genotypes less incidence of shoot fly (dead hearts per cent) was recorded in timely sown crop as compared to late sown crop. The stem borer infestation as well as ear head pests recorded numerically higher in timely sown crop. The lowest shoot fly attack was recorded in both the resistant checks IS 18551 and IS 2205 in timely and late sown condition. Eleven entries were found resistant in timely sown crop while, nine entries were susceptible in late sown crop. The lowest stem borer leaf injury (%) was observed in SPV 2294 (2.33%) and maximum in DJ 6514 (14.00%). However at 45 DAE, the lowest damage was recorded in resistant checks. The lowest dead heart per cent was recorded in susceptible check Swarna (45.33%). Whereas under late sown condition minimum dead heart per cent was recorded in SPV 2367 (3.78%) on with eight another entries. The stem tunneling due to stem borer per cent under timely sowing ranged between 3.62% and 19.83%, finally all the entries exhibited resistance against the insect. Whereas, under late sown condition range of stem tunneling ranged between 1.19% and 9.49%. Under timely sown crop condition bug and worm count ranged between 3.33 and 12.60, 3.03 and 15.33 respectively. However, under late sown condition the population of bug and worm ranged from 1.67 to 6.67 and 2.33 to 7.67. Under both timely & late sown crop, the maximum grain yield (Kg/ha) was 1675.73 & 600.72 in genotype SPV 2368 respectively

Keywords: Sorghum genotypes, Reaction of sorghum pest, Timely, Late sown crop

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EFFECT OF DIFFERENT SOURCES OF NUTRIENTS ON PRODUCTIVITY AND QUALITY OF ONION (*ALLIUM CEPA* L.)

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Abstract: A field experiment was conducted during Rabi season 2016-17 to find out the effect of FYM and Vermi Compost with or without PSB and Azotobacter and rates of organic manures (50% and 100% RND) on growth attributes and yield parameters of onion (Agri found dark red) on a clay loam soil. The treatments comprised of organic, inorganic fertilizer and biofertilizers with ten treatments 100% RDF through inorganic, 100% RDF through FYM (N Basis), 100% RDF through vermicompost, 50% RDF through Inorganic Fertilizers + 50 % through FYM, 50% RDF through Inorganic Fertilizers + 50 % through vermicompost, 50% RDF through Inorganic Fertilizers + 50 % through FYM + PSB, 50% RDF through Inorganic Fertilizers + 50 % through vermicompost + PSB, 50% RDF through Inorganic Fertilizers + 25 % vermicompost + PSB, 100% RDF through FYM (N Basis) + PSB + Azotobacter and 100% RDF through vermicompost + PSB + Azotobacter. Results revealed that the application of organic manure significantly influenced the plant height (cm), number of leaves, fresh weight of leaves (g plant^{-1}) and dry weight of leaves (g plant^{-1}), diameter of bulb (cm), bulb weight (g), bulb yield (q ha^{-1}), total soluble solid ($^{\circ}\text{B}$) and allyl propyl content (ppm) significantly increased with 100% RDF through Vermicompost + PSB + Azotobacter). were significantly influenced with 100% RDF through Vermicompost + PSB + Azotobacter at 30 and 60 days of transplanting. Application of 100% RDF applied through vermicompost + PSB + Azotobacter (T_{10}) recorded maximum gross returns, net return and cost benefit ratio of onion crop.

Keywords: FYM, Growth, Onion, Vermicompost, Yield

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COMPARATIVE BIO-EFFICACY OF BIO-INSECTICIDE, *METARRHIZIUM ANISOPLIAE* (METCHNIKOFF) SOROKIN AGAINST CHILLI THRIPS, (*SCIRTOTHRIPS DORSALIS* HOOD).

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Abstract: The field investigation was carried out during Kharif season of 2014-15 in the research farm of College of Agriculture, Indore (M.P.) in randomized block design with eight treatments and three replications with plant spacing of 45x60 cm on Pusa Jwala variety of chilli against thrips. Six repeated application of Metarrhizium annisoplae in the name of Met 52 with different doses at 10 days interval were made and it was also alternated with thiacloprid and different doses of fipronil 5 S C The treatments were named as T_1 . Untreated control, T_2 . Fipronil 5 SC @ 1000 ml/ha and alternated with Thiacloprid 21.7 SC @ 300 ml/ha, T_3 . Met52@ 250ml/ha foliar spray, T_4 . Met52@ 500ml/ha foliar spray T_5 . Met52@ 1000ml/ha foliar spray, T_6 . Met52@250ml/ha foliar spray alternated with Fipronil 5 SC @ 850 ml/ha, T_7 . Met52@ 500ml/ha foliar spray alternated with Fipronil 5 SC @ 900 ml/ha and T_8 . Met52@ 1000ml/ha foliar spray alternated with Fipronil 5 SC @ 950 ml/ha The population of thrips was counted at ten days interval on five tagged plants from each plot and five leaves from each plant with the help of 10X magnifying lens. Overall population reduction was calculated based on pre treatment observation and last observation of final spray. The overall highest population reduction was also calculated in T_5 (99.63%), and followed with T_4 (99.27%), T_3 (98.65%), T_8 (97.36%), T_7 (96.45%), T_6 (95.13%) and T_2 (85.52%). The highest dried chilli yield with highest cost benefit ratio was noted in T_5 (2256kg/ha. and 2.34) and differed significantly with all the treatments.

Keywords: Alternation, Bio-insecticide efficacy, Chilli, insecticides, Metarrhizium annisoplae, Scirtothrips dorsalis

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ESTIMATE THE DEMAND FOR HYBRID COTTON SEEDS IN NORTH KARNATAKA

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Abstract: Seed is a very vital input and dynamic instrument for increasing agricultural production. It has been one of the miraculous inputs responsible for green revolution in India and elsewhere. A multistage random sampling was adopted as appropriate sampling procedure for the study. As the research study focuses on the aspect such as estimating demand of hybrid cotton seeds in North Karnataka the secondary data required for the study was collected from the publications sources of the Department of Agriculture, Districts Statistical Office (DSO), Directorate of Economics and Statistics (DES), Ministry of Agriculture, Ministry of Communication & IT, Government of India and other related departments. To estimate the demand for hybrid cotton seeds ARIMA technique was used for the study. Projected demand for hybrid cotton seeds in Dharwad and Haveri district were expected to be decrease from 66664.23 kgs in 2014-15 to 53129.65kgs in 2019-20 in Dharwad district, and in Haveri district is expected to be decrease from 71876.5 kgs in 2014-15 to 64905.20 kgs in 2019-20. This is due to decrease in the cotton area and lack of assured and remunerable price and it's a result that area switching over to other commercial crops.

Keywords: ARIMA, Demand, Hybrid cotton, Seed

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CONSTRAINTS AND SUGGESTIONS IN ADOPTION OF RICE VARIETIES

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Abstracts: The present study conducted during 2015-16 to 2016-17 in Chhattisgarh plains. 320 respondents were selected randomly for the data collection. 71.88 per cent respondents said that the lack of demonstration of IGKV released rice variety in farmer's field was barriers of speedy adoption because of farmers believe in varieties, after varietal production result. 15.63 per cent respondents said that extension worker also not aware about the new IGKV rice varieties. 71.88 per cent of the respondents suggested conducting a demonstration of IGKV released rice varieties in villages because most of the respondents believed in rice variety after their output.

Keywords: Constraints, Demonstration, Suggestions, IGKV rice varieties