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Review

Neem in IPM : Problems and prospects

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ABSTRACT

Putting tonnes of synthetic pesticides in the environment and killing all the organism alike is certainly not a right approach of solving pest problems. Escalating costs due to depleting natural reserves coupled with ever increasing doses to overcome resistance problem, synthetic insecticides are becoming an unprofitable important input in crop production. Neem, *Azadirachta indica* has emerged as single most important source of safe pesticide. About 500 species of insects, 44 nematodes and almost equal number of fungi and a few bacteria have already been reported susceptible to neem. The lists include almost all the key pests of agriculture. Neem has diverse biological effects on insects and the sensitivity of insects to each biological effect varies greatly irrespective of genera or species. How to use simple neem seed extracts with successful examples of evaluation against a few key crop pests such as *Helicoverpa armigera*, *Bactrocera dorsalis, B. cucurbitae*, *Idioscopus nitidulus*, *Nilaparvatha lugens*, cotton bollworms, *Chilo partellus* and stored grain pests such as *Trogoderma granarium*, *Callosobruchus chinensis* and *Lasioderma sericorne vis-à-vis* sensitivity of the above pests are given. Neem oil volatiles evaluated for the first time exhibited high fumigant toxicity at a incredibly low concentration against adults of *Callosobruchus maculatus*, *Corcyra cephalonica*, *Sitotroga cerealella* and *Trogoderma granarium*. Further research for effective utilization of volatiles as substitute to synthetic fumigants is discussed. Neem was found highly compatible with Nuclear Polyhedrosis Virus. A marked reduction in lethal time was recorded when used in combination with NPV against *Spodoptera litura*. Neem extracts were found compatible with *Bacillus thuringiensis* and one of the extracts even synergised the effect when used against *Plutella xylostella* on cabbage. Field evaluation of Neemark, a commercial neem formulation, plus cypermethrin offered far better control of cotton bollworms than either used alone. Low damage of pods and higher yield were recorded when aqueous extract of seed kernel was alternated with either fenvalerate or cypermethrin for the management of *Helicoverpa armigera* in pigeon pea. Problems such as variations in sensitivity of insects, doses, timing of application, stability etc., in the utilization of neem products are discussed. Neem seed kernel has about 55 biologically active compounds. No study has been done on the identification of gene responsible for production of these compounds and their consequent transfer in other plants. Azadirachtin is the most important biologically active compound and its quantity varies greatly in neem trees so is the case with oil and other compounds. A survey must be conducted immediately to identify elite trees with different objectives for development of new varieties for future propagation. Neem grows widely in Asian countries. It is cheap, effective, safe, available and renewable source of pesticide and fits-in-well in sustainable agriculture as well as the life style of Asian farmers. Because of presence of large number of compounds which work in harmony, the chances of development of resistance seem to be remote. Neem can be grown easily on almost all types of soils. With little efforts farmer in this region can be easily trained how to grow (does not compete with crop) and use neem tree for solving their pest problems.

Key words : *Azadirachta indica*, utilization, insect pests, constraints, IPM, prospects

Organic Farming

Integration of organic nutrient sources to sustain the system productivity and soil fertility in organic basmati rice based cropping systems

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ABSTRACT

An experiment for management of different sources of nutrients in basmati rice based cropping systems was initiated in *kharif* 2004 and was further continued for five years up to 2008-2009 to maintain the soil fertility and productivity under organic mode of cultivation. Among the various organic sources of nutrient management practices followed, significantly higher total productivity in term of RGEY (43.02q ha^{-1} and 46.44q ha^{-1}, respectively) was obtained with vermicompost and farm yard manure in 2006-07 (39.17q ha^{-1}) and with application of vermicompost with non edible oil cake (NEOC) in 2007-08 & 2008-09. The physico-chemical properties of soil after harvest of *rabi* crops showed that integration of different sources of nutrients was found useful in improving the bulk density, water holding capacity and available NPK status of soil. Maximum change over initial after five years in organic carbon (39.8%), available N (40.7%) & available K (61.5%) were recorded with the application of FYM + VC as compared to the control. However, comparatively maximum change in available P was observed with the application of all four sources of nutrition (¼EC + ¼VC + ¼NEOC + ¼FYM).

Key words: Vermicompost, enriched compost, RGEY, non edible oil cakes, *Sesbania aculeata*

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ABSTRACT

An experiment for management of different sources of nutrients in basmati rice based cropping systems was initiated in *kharif* 2004 and was further continued for five years up to 2008-2009 to maintain the soil fertility and productivity under organic mode of cultivation. Among the various organic sources of nutrient management practices followed, significantly higher total productivity in term of RGEY (43.02q ha^{-1} and 46.44q ha^{-1}, respectively) was obtained with vermicompost and farm yard manure in 2006-07 (39.17q ha^{-1}) and with application of vermicompost with non edible oil cake (NEOC) in 2007-08 & 2008-09. The physico-chemical properties of soil after harvest of *rabi* crops showed that integration of different sources of nutrients was found useful in improving the bulk density, water holding capacity and available NPK status of soil. Maximum change over initial after five years in organic carbon (39.8%), available N (40.7%) & available K (61.5%) were recorded with the application of FYM + VC as compared to the control. However, comparatively maximum change in available P was observed with the application of all four sources of nutrition (¼EC + ¼VC + ¼NEOC + ¼FYM).

Key words: Vermicompost, enriched compost, RGEY, non edible oil cakes, *Sesbania aculeata*

Effect of zinc application and crop residue incorporation on yield and micronutrient uptake of crops under rice-wheat cropping system in calciorthents of Bihar

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ABSTRACT

A field experiment was started during *kharif*, 1994 in a zinc deficient calcareous soil in split plot design with crop residue levels in main plots and zinc levels in subplots. After completion of 18th cycle, rice and wheat as 35th and 36th crops in rotation were grown for present investigation. Long term application of crop residues along with Zn increased grain yield (36.3 to 47.3q ha^{-1}) and straw yield (50.7 to 66.0q ha^{-1}) in rice and 31.2 to 41.3q ha^{-1} and 48.7 to 64.4q ha^{-1} of wheat grain and straw, respectively, and nutrient uptake by rice (153.4 to 367.1g Zn, 36.7 to 64.8g Cu, 719.0 to 1030.0g Fe and 512.0 to 676.0g Mn ha^{-1}) and wheat (150.4 to 321.0g Zn, 41.4 to 64.5g Cu, 576.0 to 917.0g Fe and 395.0 to 813.0g Mn ha^{-1}). The highest yield in both the crops was recorded in treatment receiving 10.0kg Zn ha^{-1} as starter dose along with incorporation of 100 per cent of the straw produced by each crop. The residual value of 5.0kg Zn ha^{-1} + 100 per cent of crop residue was the next promising treatment in enhancing the yield of the crops.

Key words: Crop residues, micronutrient, calcareous soil, yield, uptake, rice-wheat cropping system.

Influence of FYM, poultry manure, neem cake and fertilizer on growth, yield of rice (*Oryza sativa* L.), soil nutrient status and microbial population under system of rice Intensification

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ABSTRACT

The experiment was laid out in Randomized Block Design (RBD) with ten treatments replicated thrice. The treatments consisted of 100, 75, 50 & 25 per cent Recommended Doses of Nutrients (RDN) through chemical fertilizers and 25, 37.5 & 50 per cent RDN through organic sources like farm yard manure, poultry manure and neem cake. Application of Recommended Dose of Nutrients (120:60:40kg N:P:K ha^{-1}) along with 10 t of FYM ha^{-1} recorded significantly higher plant height (88.2cm), more No. of Tillers $hill^{-1}$ (38.7), number of filled grains per panicle (154.3), panicle length (21.07cm), and grain yield (52.6q ha^{-1}).

Key words: Organic, inorganic, INM, SRI.

Judicious grouping of N-nitroso-N-ethyl urea induced polygenic variability in lentil (*Lens culinaris* Medik.)

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ABSTRACT

The seeds of a *Macrosperma* cv., 'Precoz Selection' of lentil were treated with three doses viz., 0.005, 0.01 and 002 per cent of N-nitroso-N-ethyl urea (NEU). The M_1 material in each treatment was classified into four groups of mutagenic damage. On the basis of macromutations induced and intra- and interfamily selection exercised in each treatment in M_2 generation, different progenies were classified into three broad groups and raised

as macromutational, selected and unselected populations in M_3. Wider range and substantial amount of variability (CV) for different polygenic traits than control in both positive and negative directions along with positive shift in character means in both the groups of mutagenic damage (HH and LL) in M_2 and M_3 generations were observed. Higher estimates of h^2 and GA, particularly in the HH group of mutagenic damage in M_2 and in the selected and macromutational populations in M_3 indicated tremendous scope for the improvement of seed yield and its components following selection.

Key words: Heritability, induced mutations, *Lens culinaris*, chemical mutagen, polygenic variability

Effect of different levels of nitrogen and biofertilizers on growth and yield of barley (*Hordeum vulgare* L.)

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ABSTRACT

Nitrogen at different levels and biofertilizers effects were studied on growth and yield of Barley. An experiment was conducted in a factorial randomized block design with three replications. Treatments included 3 levels of nitrogen (40, 60 and 80kg ha^{-1}) and bio-fertilizers on four levels (not inoculation, *Azotobacter*, *Azospirillum* and *Azotobacter* + *Azospirillum*). The results revealed that fertilizer N @ 80kg ha^{-1} with both (*Azotobacter* + *Azospirillum*) inoculations was found to be the most responsive, with significantly increased in the growth parameters *viz.* plant height, maximum number of tillers and grain yield of barley. *Azospirillum* inoculation, *Azotobacter* inoculation and uninoculated control significantly differed between each other.

Key words: *Azotobacter*, *Azospirillum*, inoculations, biofertilizers.

Effect of compost teas on phylloplane microflora of *Chrysanthemum morifolium* Ramil

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ABSTRACT

Compost teas play a potential role in controlling the plant diseases. An experiment was carried out to study the role of compost teas CT1 (Vermicompost), CT2 (CT1 + *Pseudomonas fluorescens*1%), CT3 (CT1 + *T. viride*1%), CT4 (Dung 75% + Paddy Straw 25%), CT5 (CT4 + *P. fluorescens* 1%), CT6 (CT4 + *T. viride* 1%), CT7 (Dung 75% + Neem Powder 20% + Fish meal 5%), CT8 (CT7 + *P. fluorescens* 1%), CT9 (CT7 + *T. viride* 1%) on phylloplane microflora of Chrysanthemum. Spraying of fungicide (iprodione 25%+carbendazim 25%) at 0.1% (23 X 10^6cfu ml^{-1}) has significantly reduced the microflora than in control (145.02 X 10^6cfu ml^{-1}). In case of CT1 (364.04 X 10^6cfu ml^{-1}), CT2 (366.11 X 10^6cfu ml^{-1}), CT3 (394.08 X 10^6cfu ml^{-1}), CT4 (162.01 X 10^6cfu ml^{-1}) and CT6 (181.01 X 10^6cfu ml^{-1}) there was a substantial increase, where as in case of compost teas there was a reduction in microflora in CT7 (28.01 X 10^6cfu ml^{-1}), CT8 (55.04 X 10^6cfu ml^{-1}) and CT9 (103.01 X 10^6cfu ml^{-1}). CT5 has no effect on total population.

Key words: Chrysanthemum, compost teas, microflora, phylloplane

Protection of photosynthetic system from photoinhibition in chickpea and maize seedlings through ascorbate

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ABSTRACT

Photo-oxidative damage developed in chickpea (*Cicer arietinum*) and maize (*Zea mays*) the C_3 and C_4 plants by using continuous light intensity 52 µmol m^{-2} sec^{-1} (PAR) to assess study effect of photo-inhibition, revealed that excessive illumination inhibited per cent germination and the amylase activities. Application of ascorbic acid (50mM) after a week of illumination showed excess in carotenoids, chlorophyll contents and growth in both the chickpea and maize plants.

Key words: Photo protection, photosynthetic system, ascorbate, chickpea (C_3 plant), maize (C_4 plant).

Comparison of the quality of organically and conventionally grown mango in new alluvial zones of West Bengal

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ABSTRACT

The quality profile of organic and conventional mango grown in new alluvial zones of West Bengal were compared. In total 450 fruits (both growing system) were analyzed for a range of quality parameters. Data were evaluated by ANOVA followed by Tukey's test. Compared with conventional system organic fruits are rich in mineral elements like K, Fe, Mn and Ca, while conventional fruit resulted more content of N and P. Different growing system did not significantly affect the fruit weight. Maximum (43.12kg $tree^{-1}$) fruit yield was recorded under conventional system. Biochemical parameters were also higher in organic fruits as compared to conventional one. Finally, it is suggested that organic system can be recommended for the purpose of maximum quality parameters.

Key words: Organic farming, fertilizers, mango qualities

Entomology

Effect of bioinoculants in combination with insecticides against major insect pests of mungbean (*Vigna radiata)*

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ABSTRACT

Some bioinoculants were evaluated in combination with insecticides against major insect pests (white fly jassid and thrips) of mungbean (Var. HUM -12) at Agricultural Research Farm, Banaras Hindu University,Varanasi during *Kharif* of 2008. Among the microbial and chemical insecticides, *Beauveria bassiana* + Profenophos gave better response and was found most effective against white fly, jassid and thrips, whereas, Imidacloprid + Profenophos against white fly, *Beauveria bassiana* + *Pseudomonas fluorescens* against jassid and *Pseudomonas fluorescens* + *Beauveria bassiana* against thrips also minimized the pest population but were found least effective.

Key words: Bioinoculants, insecticides, mungbean, white fly, jassid, thrips.

Impact of border cropping coupled with green insecticides in insect pest management of okra

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ABSTRACT

Field trials on okra var. Varsha Uphaar was laid out in eight treatments with or without border crops along with a control. All the treatments were effective except the one without border crop at 40th, 47th and 54th day after sowing (DAS) in lowering leaf hopper population. Okra border cropped with baby corn was effective against whiteflies on 40 DAS. On 47th and 54th day, both the treatments of baby corn and one treatment each of sorghum and cluster bean exhibited effectiveness against whiteflies. Per cent infestation due to shoot and fruit borer on number basis varied from 6.68-10.98 per cent, while it was 16.27 per cent in control. Similarly, on weight basis, per cent infestation ranged from 6.05 to 10.54 per cent as compared to 16.42 per cent in untreated check. Treatment of Okra + Cluster bean - Novaluron @ 75 g a.i. ha^{-1} Novaluron @ 75 g a.i. ha^{-1} and Okra + Baby corn – flubendiamide @ 25 g a.i. ha^{-1} – Novaluron @ 75 g a.i. ha^{-1} were most effective in lowering fruit borer infestation.

Key words : Border cropping, green insecticides, okra.

Effect of organic manures and biopsticides on the incidence of sucking pest of moth bean

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ABSTRACT

The influence of organic manures and biopesticides on the incidence of sucking pets of moth bean was studied. Application of neem cake has significantly reduced the population of all by changing the insecticidal composition of the host plant. *Fusarium semitectum* also reduced the incidence of aphids, leaf hoppers and bugs.

Key words : Moth bean, organic manures, biopesticides

Management of insect pests in cabbage (*Brassica oleracea* var*. capitata* L.) with border cropping and biopesticides

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ABSTRACT

A field experiment was conducted during *rabi* seasons of 2009-10 and 2010-11 on cabbage, *Brassica oleracea* var. *capitata* L. with twelve treatment combinations consists of field pea, coriander, marigold, fenugreek and onion as border crops in which one set each was foliar sprayed with namely insecticides *viz*., Neem baan @ 3ml l^{-1} and Spinosad @ 75 g a.i ha^{-1} and one set unsprayed. In both crop seasons, cabbage border cropped with marigold and sprayed with Neem baan- Spinosad combination recorded the lowest mean population of mustard aphid (27.86 and 28.69 $plant^{-1}$), diamond back moth larvae (1.50 and 1.85 $plant^{-1}$) and cabbage butterfly larvae (4.83 and 4.84 $plant^{-1}$) as compared to sole cabbage (72.39 and 74.04), (3.44 and 5.34) and (14.86 and 15.88) respectively during 2009-10 and 2010-11. However, border cropping with marigold, coriander, fenugreek and onion by themselves also reduced the overall pest population. The population of coccinellids was high on border crop fenugreek (5.03 and 5.27 nos $plant^{-1}$) which were at par with coriander (5.03 and 5.15 nos $plant^{-1}$). Consequently higher number of coccinellids in maincrop, cabbage were observed i.e. 2.47 and 2.80 nos $plant^{-1}$, 2.77 and 2.45 nos $plant^{-1}$ and 2.23 and 2.07 nos $plant^{-1}$ when border crop with fenugreek, coriander and marigold respectively during 2009-10 and 2010-11. All the border crop treatments except field pea significantly reduced the mustard aphid, diamond back moth and cabbage butterfly and had harboured more number of coccinellids population.

Key words: Mustard aphid, diamond back moth, butterfly larvae, border crops and biopesticides

Predicting rice yellow stem borer activity through pheromone traps and degree days

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ABSTRACT

The trends in pheromone trap catches of rice yellow stem borer, *Scirpophaga incertulas* Walker during summer, 2012 showed varied peaks with test locations viz., Chiplima (three), Ranital (two) and Balipatna (one) owing to varieties adopted and climatic conditions. The temporal relationship between the trap catches and accumulated degree days (ADD) was worked out during summer and *kharif* 2012. At Ranital, the thermal ranges of 19.5 to 32.4^{0}C and 25.9 -32.8^{0}C prevailed during summer and *kharif* crop seasons appeared to favour YSB development. The ADD of 32.8–36.7 (early tillering stage) and 69.4–114.2 (late tillering stage) or pheromone trap catch thresholds of 2-4 (summer rice) / 10 (*kharif* rice) might serve as predictive criteria for timing the insecticides.

Key words: Rice, yellow stem borer, *Scirpophaga incertulas,* pheromone trap, degree days.

Effect of microbial agents and biopesticides against the natural enemies in FCV tobacco

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ABSTRACT

Natural enemies are a key component of IPM, and they are often recommended as the first line of defence in an IPM program. Over use of pesticides has led to the outbreaks of pests and destruction of natural enemies. It has also led to the development of resistance in insects to pesticides and also causes environmental pollution. To assess the effect of microbial agents and biopesticides against the natural enemies experiments were

carried out in out from 2011-2012 at ZARS, Shimoga, Karnataka in FCV tobacco. The result indicates that *Nomuraea rileyi* (1.2 x 10^9) and spinosad 45 SC were safe to coccinellids, chrysopa, syrphids, and spiders. Ha NPV (1.5x10^9 POBs) and novaluron 10 EC were safe to chrysopa and spider population and also these chemicals were effective in managing the tobacco bud worm, *Helicoverpa armigera* in FCV tobacco.

Key words: Tobacco, natural enemies, biopesticides, microbial agent and *Helicoverpa*,

Eco-friendly control of brinjal shoot and fruit borer

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ABSTRACT

The field experiment conducted during winter 2011-12, with brinjal cv. Blue star showed that six sprays at 10 days intervals either with chlorantraniliprole 18.5 SC or spinosad 45 SC had restricted the fruit damage by *L. orbonalis* both quantitatively (7.8 to 10.0%) and qualitatively (8.3 to 10.4%). On the contrary, spraying cow urine (10%) + starch (1%) alternatively with chlorantraniliprole 18.5 SC was found to be equally effective as the above insecticides in restricting the fruit damage (< 9.5%). Similarly, alternate application of wood ash @ 50kg ha^{-1} + kerosene @ 1per cent and spinosad 45 SC at 10 days interval also minimized the fruit damage (<12.2%) by the borer in comparison with the untreated control (>25.2%). Such combinations of indigenous materials and safe molecules in the management of *L. orbonalis* not only found to be cost-effective, but also reduced the insecticide loads in brinjal crop.

Key words: Brinjal, eco-friendly strategies, control, shoot & fruit borer

Insecticidal activity of azadirachtin against pulse beetle (*Callosobruchus maculatus* Fab.) (Coleoptera: Bruchidae) infesting cowpea (*Vigna unguiculata* L.)

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ABSTRACT

The toxicity of Azadirachtin (commercial product Nimbicidine®) was tested on three life stages of *Callosobruchus maculatus viz.*,egg hatchability, larval survival and adult emergence. The concentrations used in the present experiment were 0.5, 1.0, 1.5, 2.0, 2.5 ml $100g^1$ of seeds. There was no egg hatching, larval survival and adult emergence in the highest dose level (2.5 ml $100g^{-1}$ seeds). It was also observed that the mean per cent egg hatching inhibition, per cent larval mortality change and per cent adult emergence suppression was highest in the higher dose of treatment 2.5 ml $100g^{-1}$ seeds (100 per cent) followed by other doses. Amongst all treatments tested for ovicidal, larvicidal and adulticidal potencies the treatment containing higher concentration with 2.5 ml $100g^{-1}$ seeds showed the significant effect in all the developmental stages.

Key word : Azadirachtin, pulse beetle, *Callosobruchus maculatus* Fab., *Vigna unguiculata* L.

Effect of abiotic factors on the incidence of *Helicoverpa armigera* (Hubner) and correlation with weather parameters on Chickpea

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ABSTRACT

Experiments were carried out on the weather based relationship of pod borer, *Helicoverpa armigera* (Hubner) during rabi 2011-13 at the Main Agricultural Research Station, Dharwad and attempts were made to determine the relationship of larval population with weather factors. The analysis comprised correlations between the foliage damage with prevailing weekly meteorological parameters during 1, 2, 3 and 4 weeks lead time (prior) and same week of the observations revealed the following results. Larval population in early sown crop, exerted significant negative association with wind speed and significant positive relationship was noticed with evaporation in both varieties. Foliage damage correlated with aforesaid weeks revealed maximum temperature (4 weeks before) is consistently significant and negatively correlated, but evaporation was highly significant and positively correlated in crop sown during September last week (early sowing). Whereas, maximum temperature was highly significant and positively correlated with per cent foliage damage in crop sown during 2nd week of October. No significance influence was recorded in normal sown crop.

Key words: *Helicoverpa armigera*, weather parameters, foliage damage and forecasting.

Plant Pathology

Wilt complex of chickpea suppressed by *Trichoderma viride* BHU-2953 2% W.P. formulation at different agroclimatic conditions

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ABSTRACT

A formulation of *Trichoderma viride* BHU-2953 2% WP was tested under field conditions at the experimental farms of Banaras Hindu University, Varanasi and SASRD, Medziphema. The trials were conducted in two seasons during 2007-08 & 2008-09 to test the bioefficacy of the formulation against the wilt complex of chickpea cause by one or more of the pathogens viz., *Fusarium oxysporum* f. sp. *ciceris*, *Rhizoctonia solani, Sclerotinia sclerotiorum* and *Scleriotium rolfsii*. The *Trichoderma* formulation was applied either as seed treatment or furrow application and the results were compared with 0.2% bavistin. The results revealed that both seed and furrow application of the *T. viride* formulation significantly reduced plant mortality and increased pod yield in chickpea. Moreover, the *T. viride* was not phytotoxic at any of the doses of the formulation on chickpea. Further, the *T. viride* formulation also did not show any adverse effect on the beneficial rhizospheric microbes like *Rhizobium* and Arbuscular Mycorrhizae (*Glomus* spp.) in chickpea rhizosphere at all dosages. The results thus can be interpreted in a way that the

T. viride 2% W.P. formulation is safe and effective for using against the chickpea wilt complex to manage the problem.

Keywords: *Trichoderma viride*, wilt complex, chickpea, field evaluation.

Selection of chrysanthemum somaclonal regenerants resistant to *Alternaria alternata* (Fries) Kiessler.

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ABSTRACT

Chrysanthemum (*Chrysanthemum morifolium* Ramil) is one of the most important flower crops. Among Chrysanthemum diseases, leaf blight caused by *Alternaria alternata* (Fries) Keissler is a serious disease which affects the yield. An attempt has been made to induce somaclonal variability against *Alternaria alternata* toxin. Among all the treatments only four treatments were successful in producing calli resistant to *Alternaria alternata* toxin. The treatments V1M2C3 (IIHR-6-UV rays-toxin125ppm), V1M1C3 (IIHR-6-Sodium azide-toxin 125ppm), V2M1C3 (Raichur-Sodium azide-toxin 125ppm) and V2M2C3 (Raichur-UV rays–toxin 125ppm) produced 53.34 per cent, 33.34 per cent, 23.34 per cent and 16.67 per cent of calli. The number of days taken for calli induction was significantly different among the four treatments with 10.67, 8.67, 15 and13 days respectively. Four regenerants from V1M1C3, four from V1M2C3, two from V2M1C3 (Raichur-Sodium azide-toxin125ppm) and two from V2M2C3 (Raichur-UV rays-toxin125ppm) have shown resistance to *Alternaria alternata* under *in vivo* conditions after hardening.

Keywords: *Alternaria alternata*, chrysanthemum, sodium azide, somaclonal variantion, toxin, UV radiation.

Weed Management

Studies on bio-efficacy of oxyfluorfen in transplanted rice under *tarai* region of Uttarakhand

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ABSTRACT

An experiment was conducted in transplanted rice variety Sarjoo 52 at Norman E. Borlaugh Crop Research Center of GBPUA&T, Pantnagar (27.3 E longitude and 29´ N latitude), during *kharif* 2008-2009. There were seven weed control treatments viz. oxyfluorfen (0.35%G) at two doses i.e. 100 and 150g ha^{-1}, pretilachlor 750g ha^{-1}, thiobencarb 1000g ha^{-1}, butachlor 1500g ha^{-1}, weed free and weedy check. There were five weed species infesting the experimental area among the all *Echinochloa colona* and *Fimbristylis miliacea* was the most prominent species. Among the herbicidal application, oxyfluorfen at 150g ha^{-1} was the most efficient having lowest weed population as well as dry matter accumulation of weeds. The yield and the yield attributing characters (number of panicles and grains per panicle) were influenced according to the effectiveness of the treatments. The application of oxyfluorfen at 150g ha^{-1} being the highest yielded treatment among the herbicides and comparable to weed free situation.

Keywords: TPR, herbicides, weed control, yield

Post Harvest Technology

Effect of pretreatment and packaging on the quality of minimally processed mango cubes

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ABSTRACT

The effect of dipping in 1 per cent calcium chloride solution and packing in polypropylene and polystyrene trays on the quality of minimally processed mango cv. Dashehari cubes during storage was studied. Ripe mango fruits were peeled, cut into cubes, dipped in 1 per cent $CaCl_2$ solution and stored in polypropylene and polystyrene packaging at 4±1^{0}C for 10 days. The samples were evaluated at 2 days interval for TSS, acidity, total carotenoids, microbial and sensory parameters. Results indicated that mango cubes given 1 per cent $CaCl_2$ dip treatment and packed in polypropylene trays carried lesser microbial load than untreated cubes and minimally processed mango cubes retained their total carotenoids content during storage.

Key words: Minimal processing, mango cubes, $CaCl_2$, packaging.

Effect of growth regulators on the shelf life of sweet orange cv. Sathgudi (*Citrus sinensis* Osbeck.) at low temperature

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ABSTRACT

Postharvest losses can be reduced and the storage life of fruits can be improved by several methods. Among them low temperature storage and postharvest dip in growth regulators, wax solutions, fungicides are commonly used to enhance the shelf life. Hence, an attempt was made to study the effect of different growth regulators along with fungicidal wax on the shelf life of sweet orange at low temperature. Sathgudi fruits were treated with the 2,4-D 500ppm + wax (6%), GA_3 500ppm + wax (6%), Benzyl adenine 50ppm + wax (6%), wax (6%) and stored at 10±1^{0}C. Various physico-chemical parameters like physiological loss in weight (PLW), juice content, peel content, firmness, spoilage, colour index, shelf life, total soluble solids, acidity, sugars and ascorbic acid were analysed at an interval of 15 days. Experimental findings revealed that, among the growth regulators BA 50ppm + wax 6% recorded the lowest PLW, spoilage and colour index followed by 2,4-D 500ppm + wax (6%). The highest juice content, peel content and firmness was found in BA 50ppm + wax (6%) and lowest in control fruits. Quality changes like TSS, acidity, sugars and ascorbic acid indicated that the fruits treated with BA 50ppm + wax (6%) was improved by preserving the quality compared to other growth regulators. The study concluded that Sathgudi fruits treated with BA 50 ppm + wax (6%) and storing at 10±1^{0}C improved the shelf life by 54.52 per cent (109.00 days) over untreated control fruits (70.54 days).

Keywords : Growth regulators, juice content, firmness, low temperature, spoilage, sweet orange.

Technology of stuffed parwal sweet production

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ABSTRACT

A method was standardized for the production of parwal sweet, since large variations in the chemical composition and sensory properties were observed in market samples. Parwal (pointed gourd) belonging to family Cucurbit, was used in the preparation of traditional sweet using three kind of khoa made from cow milk (K1), buffalo milk (K2) and mixed milk (K3). The average yield of parwal sweet was recorded to be 43.74, 45.80, and 44.67 per cent in K1, K2 and K3 respectively. The yield of parwal sweet increased significantly with the levels of added sugar in the khoa used for filling. There was no significant difference noticed in the flavour scores of aforesaid three types of khoa. A positive and highly significant correlation values were obtained for body & texture, general appearance and colour of parwal sweet ($P<0.01$).

Key words: Khoa, parwal, traditional khoa sweet.

Salicylic acid and oxalic acid for controlling anthracnose disease of mango cv. Dashehari

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ABSTRACT

Mango fruits are subjected to various post-harvest treatments to enhance shelf life by controlling post harvest pathogens or to slowdown the process of ethylene evolution. Uses of salicylic acid in systemic resistance to pathogen, inhibiting ethylene biosynthesis and delaying senescence have been reported. The objective of this study was to assess the safe chemicals to control post harvest pathogen especially anthracnose (*Colletotrichium gloeosporoides)* and thereby enhance the shelf life of mangoes under ambient conditions. Green mature fruits of mango cv. Dashehari were harvested and divided into two lots, the first lot was inoculated with *C. gleosporides* and after 24 hours treated with safe chemicals such as oxalic acid (60ppm) and salicylic acid (50ppm) and the second lot of fruits served as control and stored under ambient conditions (34 ± 2^0C and 50±2% R.H.). The fruits were assessed for physico-chemical parameters at regular intervals of 0, 5, 7 and 9 days of storage. The firmness of the fruits, titratable acidity decreased, while the TSS and total carotenoids content of the fruit increased on the 9^{th} day of storage. The CPLW percentage of the control fruits was maximum, while that of salicylic acid was minimum on the 9^{th} day of storage. There was no disease development in fruits treated with oxalic acid 60ppm and salicylic acid 50ppm while, control fruits had 25 per cent disease on the 9^{th} day of storage. From the above studies it can be concluded that oxalic acid 60ppm and salicylic acid 50ppm can effectively control anthracnose (*Colletotrichium gloeosporoides)* and increase the marketability of the fruits.

Key words : Anthracnose, salicylic acid, oxalic acid, mango, Dashehari, shelf life.

Water Management

Physico-chemical properties of industrial and ganga water with their impact on growth and development of cultivated crops

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ABSTRACT

The air, water, food, shelter etc. are essential elements for the existence of human beings, animals and plants. Among these, importance of water is rated as the highest. As a result of civilization, industrialization, urbanization, population explosion and other developmental activities, most of our water resources have become polluted. Physio-chemical properties like temperature, pH, DO, BOD and COD were observed for industrial and Ganga water. The impact of this water was recorded for growth and development of selected cultivated crops *viz. Citrullus lanatus, Lycopersicon esculentum* and *Tagetes erecta.* Temperature was highest (28.2^{0}C) in industrial water followed Ganga water (26.0^{0}C). pH increases with increasing pollution level. The highest concentration of sulphate, chloride, iron, copper, chromium, nickel, manganese, zinc and lead was reported in industrial water. The total hardness, BOD and COD was highest in industrial water followed by Ganga water. The growth and development of these selected crops in industrial effluent at all the concentrations *i.e.* 25, 50, 75 and 100 per cent showed poor results than the control. In Ganga water better results have been obtained at 75, 50 and 25 per cent than control while at 100 per cent showed poor results.

Key words: Ganga water, industrial water, *C. lanatus, L. esculentum, T. erecta*