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Contents

RESEARCH ARTICLES

EFFECT OF *CRY*1AC PROTEIN EXPRESSED IN DIFFERENT IR-64 *BT* RICE EVENTS ON TARGET INSECT YSB, *SCIRPOPHAGA INCERTULAS* (WLK)

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Abstract: The studied was undertaken at the Ttransgenic containment facility, Department of Plant molecular biology and Biotechnology, College of Agriculture, Raipur during 2014 and 2015. The confirmation of different Bt transgenic rice events for insect bioassay against YSB, *Scirpophaga incertulas* to observed the effect of proteinase inhibitor (m*CryIAc*) gene on the growth and development of the insects by different methods such as cut stem and whole plant bioassay. The highest larval mortality of YSB(81.25%) was reported in IR64-3 followed by IR64-2 and amount of stem eaten after four days was lowest on IR64-4(0.0225 g) as against control plants IR64(C), (0.319 g) Whereas, in whole plant bioassay, on the leaf damage basis out of four transgenic lines and one control line the highest percentage dead heart of transgenic rice lines by whole plant assay of YSB was observed highest (36.46%) in IR64-4 followed by IR64-1 (29.17%) and lowest in IR64-2 (20.84%) while in control event percentage of dead heart was recorded more than 50 percent i.e. 60.42, 80.21&72.92 percent in IR64-C, TN-1&PTB-33, respectively.On the basis of this investigation, the effect of *Cry*1Ac protein expressed on target YSB in different IR-64 Bt rice events was exhibited significantly.There is an urgent need to generate biosafety data for Bt. rice under controlled conditions for taking policy decision about its cultivation in the country.

Keywords: Insect bioassay, YSB, *Scirpophaga incertulas,* Target insect, Effect of m*CryIAc*gene on YSB

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DEVELOPMENT OF MANUAL EXPERIMENTAL PLOT SEEDER

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Abstract: The basic purpose of mechanization is to raise agricultural productivity, increase profitability and thus improve quality of life of farming community. The improvement of machine for sowing of experimental plots is a continuing problem facing by plants breeders, agronomists, plant pathologists and other agricultural scientists. Most part of the country, old traditional method is used for sowing. Traditional sowing method adversely affects result in improper placement of the seed into the soil at the correct soil depth, failure to properly keep the seeds firmly in the soil, uneven placement of the seeds at the correct interval in a row. Seed sowing is the most labour intensive operation. The labour requirement in manual sowing of gram seed is as high as 30 labour-ha^{-1} and time requirement for sowing is also high. Keeping this in mind, manual experimental plot seeder was developedfor gram. The field capacity of experimental plot seeder was observed to be 0.0547 ha h^{-1}(Digvijay variety of gram) and 0.0864 ha h^{-1} (Kripa variety of gram) &the field efficiency was observed to be 75.95 %(Digvijay variety of gram) and 80 %(Kripa variety of gram).

Keywords: Plot seeder, Field experiment, Crop, Productivity

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EFFECT OF FOLIAR APPLICATION OF BIO-REGULATORS AND NUTRIENTS ON PHYSICO-CHEMICAL PROPERTIES OF LEMON (*CITRUS LIMON* BURMA.) CV. PANT LEMON-1 UNDER SUBTROPICAL CONDITION OF GARHWAL REGION

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Abstract: The present investigation was carried out at Horticultural Research Centre and Department of Horticulture, Chauras campus, H.N.B. Garhwal University, Srinagar Garhwal, Uttarakhand, India during 2008-09 growing seasons to study the effect of foliar application of bio-regulators and nutrients on quality of lemon (*Citrus limon* Burma.) cv. Pant Lemon-1. On the basis of overall performance of treatments on quality characters of fruits, it can be concluded that the values for fruit set, days to maturity, yield of fruits per plant, fruit length, fruit juice, total soluble solids, total sugars, shelf-life of fruits, have been obtained maximum under GA_3 (20 ppm) treatment, while the minimum fruit cracking and the maximum fruit weight, fruit volume, acidity were recorded with NAA (50 ppm). However, the maximum vitamin C was recorded under NAA (10 ppm) foliar application.

Keywords: Foliar application, Nutrients, Bio-regulators, Lemon

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SCREENING OF *GOSSYPIUM HIRSUTUM* ENTRIES/ BREEDING MATERIAL OF COTTON FOR RESISTANCE TO DIFFERENT DISEASES UNDER RAINFED CONDITION

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Abstract: A field experiment was laid out with the two replications in different entries of cotton (*G. hirsutum*) and two rows of each entries were sown of total thirty one (31) with one check (LRA 5166) at Regional Cotton Research Station (RCRS), NAU, Bharuch, Gujarat entitled as the Screening of *Gossypium hirsutum* entries/ breeding material of cotton for resistance to different diseases under rainfed condition. Differences in resistance to all the diseases were found in the material tested under natural condition. Results revealed that the entries may vary in grade respectively. This study concludes that screening of different entries of cotton for resistance to diseases is an important factor in developing varieties/hybrids with improved resistance to different diseases in cotton crop.

Keywords: Cotton, Screening, Bacterial leaf blight, *Alternaria*, Wilt, Diseases, Resistance

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FORAGING BEHAVIOUR OF ROCK BEE, *APIS DORSATA* ON LAJWANTI GRASS (*MIMOSA PUDICA)* IN SURGUJA OF CHHATTISGARH

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Abstract: An observation was undertaken for foraging activity of *Apis dorsata* on lajwanti grass (*Mimosa pudica*) and found that the maximum activity of *Apis dorsata* was at 1000-1100hrs and the lowest was at 1600-1700hrs and followed by at 0800-0900hrs. In different hours of the day low average population was recorded at 0800-0900hrs (52.44 bees/5min/m^2) and reached its peak population at 1000-1100hrs (140.33bees/5min/m^2) and found decreased lowest at 1600-1700hrs (16.22 bees/5min/m^2).

Keywords: *Apis dorsata*, Foraging behaviour, Lajwanti grass

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IMPACT OF VARIOUS INSECTICIDES ON NATURAL ENEMIES IN COWPEA ECOSYSTEM

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Abstract: A field study was conducted to evaluate the safety of insecticides against natural enemies associated with insect pests of cowpea. The results revealed that all the treatments exerted significant impact on the populations of natural enemies (coccinellids, syrphid flies and spiders). However, thiamethoxam 30 FS was found to be relatively safe insecticide against these natural enemies. Combinations (seed treatment with thiamethoxam 70 WS + spray with imidacloprid 17.8 SL, seed treatment with thiamethoxam 30 FS + spray with imidacloprid 17.8 SL, seed treatment with imidacloprid 17.8 SL + spray with thiamethoxam 30 FS), imidacloprid 17.8 SL and spinosad 45 EC were moderate toxic while quinalphos 25 EC was the most toxic for the same. Thus, thiamethoxam, imidacloprid or their combinations as seed treatment and spray, and spinosad can be used in cowpea ecosystem for better pest management as they are less toxic for natural enemies.

Keywords: Insecticides, Natural enemies, Predators, *Vigna unguiculata*

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EFFECT OF TOP-DRESSING OF NITROGEN ON SORGHUM FORAGE YIELD AND QUALITY UNDER DIFFERENT AGRONOMIC PRACTICES

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Abstracts: A field experiment was conducted during summer season. The effect of various agronomic factors on the growth, forage yield, quality and economics of summer sown forage sorghum at IGKV, Raipur. A Field experiment was laid out in randomized block design with 12 treatments. The treatment T_{11} was found better with regards to plant height, dry mater production, No. of leaves and crop growth rate as campared to other treatments.The crop irrigated at an interval of 10 days and top-dressing of nitrogen @ 30kg ha^{-1} given at 30 DAS recorded maximum green and dry forage yield, protein yield and net returns as compared to rest of the treatments. The sorghum yielded more fodder during first cutting.Treatment T_{11} was found to be more remunerative and economical as compared to other treatments under study.

Keywords: Forage yield, Quality of forage, Sorghum

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GROWING STOCK ESTIMATION AND SOIL PHYSIO-CHEMICAL PROPERTIES UNDER TEAK AND SHISHAM PLANTATION OF DEHRADUN, UTTRAKHAND, INDIA

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Abstract: The soils under two Plantations i.e Teak (*Tectona grandis*) and Shisham (*Dalbergia sissoo*) were analysed for physio-chemical properties and growing stock. Soil samples were analyzed for texture, water holding capacity, pH, available potassium, available phosphorus, total nitrogen, organic carbon, electrical conductivity, calcium and magnesium. Average available potassium was maximum (102 ppm) in *Tectona grandis* plantation, whereas it was (32.00ppm) in shisham plantation. Similarly available phosphorus was highest in Teak (18.17ppm) whereas in shisham it was (2.75ppm). Organic carbon and total nitrogen were also maximum under teak plantation. The soil pH under eucalyptus was near neutral, whereas it was slightly acidic in shisham. The average available calcium and magnesium were also higher in teak plantation. The average electrical conductivity in both the plantations was 0.03dsm^{-1}. The maximum growing stock was recorded under Teak. A positive correlation was found between G.S and soil organic matter and organic carbon.

Keywords: Organic matter, Growing stock, Teak, Shisham

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STUDIES ON SEASONAL INCIDENCE AND EXTENT OF DAMAGE CAUSED BY DIAMONDBACK MOTH, *PLUTELLA XYLOSTELLA* (L.) IN CAULIFLOWER

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Abstract: Survey of seasonal incidence and extent of damage caused by DBM (*Plutella xylostella* Linn.) was conducted at three locations having appreciable areas under cauliflower cultivation during the first fortnight of December to second fortnight of March. It was found that the pest infestation started on cauliflower crop from the first fortnight of January and the activity continued until second fortnight of March. The peak period of infestation was recorded in the second fortnight of February with an average of 7.1 larvae/plant leading to 32.9 per cent plant infestation. In general the incidence of DBM remained low to moderate from the first fortnight of January to the second fortnight of January. The maximum activity of *P. xylostella* confined in the second fortnight of January to the second fortnight of February. Hence, maximum plant protection measures should be taken up against the pest during this period. The plant infestation by the DBM on the cauliflower crop was observed from the first fortnight of January to the second fortnight of March. The maximum infestation of 32.9 per cent, out of which 12.5, 10.3 and 10.1 per cent plants were observed having less, moderate and high degree of damage, respectively. In the first and second fortnights of March the per cent plant infestation was suddenly decreased.

Keywords: Cauliflower, Diamondback moth damage, Population, Seasonal Incidence