

Correlation and path analyses of yield and its component characters in scented rice

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ABSTRACT

Correlation and path analyses were studied for grain yield, its components and quality characters in a set of 65 genotypes of scented rice. A very strong positive correlation of grain yield plant⁻¹ at genotypic, phenotypic and environmental levels was observed with harvest-index, while number of effective tillers plant⁻¹ and biological yield plant⁻¹ showed very strong positive association at both phenotypic and genotypic level. Harvest-index followed by number of effective tillers plant⁻¹, biological yield plant⁻¹, kernel length, L/B ratio, fertility percentage and 1000-grain weight emerged as the most important associate of grain yield in scented rice. Path analysis identified biological yield plant⁻¹ and harvest-index as major direct contributors and number of effective tillers plant⁻¹, days to 50% flowering and days to maturity as main indirect contributors

Key words: scented rice, correlation, path analysis, grain yield, components

Germination and vigour of polymer coated CORH 3 hybrid rice seeds under different water holding capacities

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ABSTRACT

CORH 3 hybrid rice seeds were coated with different polymers, namely Genius coat 171, Genius coat 172, Arcus, Myconate and Quick roots and evaluated for various physiological quality parameters at water holding capacities of 30, 40, 50, 60, 70 and 80% in sand medium along with untreated control. The seeds coated with Quick roots polymer performed well even under suboptimal moisture condition like 30% water holding capacity, recorded 18, 15, 11, 13 and 13 per cent higher speed of germination, rate of germination, root length, shoot length, dry matter production and vigour index, respectively over untreated control. The result indicated that the rice seeds coated with Quick roots can tolerate both high as well as low moisture content and produce better germination and seedling establishment

Key words: polymers, seed coating, rice, water holding capacities

Genetic variation in in vitro response of elite aromatic and non aromatic rice varieties

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ABSTRACT

The genetic modification approach in rice can successfully address both biotic and abiotic stresses through minimization of yield losses; can also enhance the nutritional status of the rice grain thus ensuring both

food and nutritional security. As indica rice genotypes are known to vary in their response to culture, production of embryogenic callus having high regeneration potential is a pre requisite for achieving high transformation rates in indica genotypes. The present study is an assessment of the response of new and popular rice genotypes that include both aromatic and non aromatic rice. Results suggest that though significant genotypic differences exist for both callus induction and regeneration, new genotypes like Tapaswini and Satya Krishna were identified that can be used for transformation studies in indica rice as they match the Pusa Basmati 1, the most frequently used genotype for rice transformation, in their in vitro response.

Key words: indica rice, callus induction, regeneration, transformation

Oryza Vol. 50. No. 4, 2013 (334-339)

Influence of potash levels on growth, yield, nutrient uptake and economics in irrigated summer rice of Assam

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ABSTRACT

A field experiment was conducted during the dry season of 2005-06 and 2006-07 at Nagaon, Assam to study the effect of potassium levels (25, 37.5 and 50 Kg K ha⁻¹) and timing of potassium application (full basal, ½ as basal + ½ at maximum tillering stage, 1/3 as basal + 1/3 at maximum tillering + 1/3 at panicle initiation stage and ½ at maximum tillering + ½ at panicle initiation stage) on growth, yield, K uptake and economics of summer rice (var. Joymati) grown under irrigated condition. The results indicated that application of 37.5 Kg K ha⁻¹ recorded significantly higher growth, yield attributes, yield and nutrient uptake as compared to lower levels of Potash. Further application of potassium in 3 equal split (1/3 as basal + 1/3 at maximum tillering + 1/3 at panicle initiation stage) resulted in higher plant growth, yield attributes, yield, K uptake by summer rice, net return, and benefit: cost ratio and significantly superior to K application schedule of full basal and Y₂ as basal + ½ at maximum tillering stage. Application of K in 3 splits resulted in 5.5 to 13.2 % increase in grain yield over the other application timings. Agronomic efficiency and apparent K recovery % were the highest at 37.5 Kg ha⁻¹ application.

Key words: K level, uptake, grain yield, economics, dry season rice

Oryza Vol. 50. No. 4, 2013 (340-343)

Effect of method of irrigation and fertility levels on performance of rice-Ashwagandha sequence cropping system

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ABSTRACT

A field experiment was conducted at Directorate of Water Management, Bhubaneswar during 2006-07 and 2007-08 dry seasons to study the effect of drip irrigation regimes and fertility levels on economics of Ashwagandha [(Withania somnifera (L.), Dunal)] in rice based cropping system. The treatments consisted of three irrigation regimes (drip irrigation at 100% pan evaporation (PE), at 80% PE and at 60% PE) with three fertility levels (100%, 75% and 50% recommended dose of nitrogen, phosphorous and potassium) with control having surface irrigation and soil application of fertilizer. Application of irrigation at 80% PE through drip with recommended dose of fertilizer (RD) through fertigation to Ashwagandha produced the

highest yield (862 Kg of dry roots and 82 Kg of seed ha⁻¹). Rice equivalent yield of Ashwagandha was 9,152 Kg ha⁻¹. Drip irrigation gave more gross return, net return and benefit-cost ratio than surface irrigation and soil application of fertilizer. Application of irrigation at 80% PE and fertigation of 100% RD to Ashwagandha gave maximum net return of `54,000 ha⁻¹.

Key words: Ashwagandha, drip fertigation, economics, rice equivalent yield

Oryza Vol. 50. No. 4, 2013 (344-350)

Yield response of rice genotypes to reproductive stage drought adapted to drought prone rainfed lowland

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ABSTRACT

Drought is one of the most severe constraints in rainfed lowland ecosystem of rice and genetic improvement for drought tolerance focuses on both moderate and severe drought stress at reproductive stress stage. Field screening of a large number of entries [78 genotypes of 100-120 days duration, 29 with more than 120 days duration and 18 high yielding varieties of Bihar] were conducted to identify drought tolerant genotypes using drought tolerance parameters viz., drought susceptibility index and drought tolerance efficiency for grain yield and component characters under severe reproductive stage drought stress. The results suggested the existence of genetic variation for grain yield and yield contributing characters in the population and showed differential reaction of cultivars in their relative adaptation to drought stress environment. Sterility (%) was observed to be governed by additive gene action in both non stress and drought environments. Grain yield had positive correlation with tiller number plant⁻¹ under both the conditions while, sterility (%) had negative association. Most of the genotypes expressed low DSI value (<1) and high DTE for yield and yield contributing characters. Thus, genotypes IR84899-B-183-CRA-19-1, R-RF-65, IR80461-B-7-1, IR82870-11, IR80463-B-39-1, NDR 118 and NDR 97 with the lowest DSI and the highest DTE values were accepted drought resistant genotypes.

Key words: rice, genetic parameters, correlation, path, DSI and DTE

Oryza Vol. 50. No. 4, 2013 (351-357)

Effect of Zn, Fe and FYM application on growth, yield and nutrient content of rice

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ABSTRACT

A field experiment was carried out at Banaras Hindu University, Varanasi during wet season, 2006-07 and 2007-08. Testing variables consisted of two varieties i.e. NDR-359 and HUBR 2-1, two sources of fertilizer application i.e. 100% recommended dose of fertilizer (RFD) of NPK through inorganic source and 75% RFD through inorganic and rest 25% through FYM. Two micronutrients, Zn and Fe through Zn-EDTA and Fe-EDTA were tested in different combinations either on soil or as foliar application or both @ 0.5 and 1.0 Kg ha⁻¹. Amongst varieties, var. NDR-359 recorded significantly higher growth, yield and NPK content of grain than HUBR 2-1, while Zn and Fe content were significantly increased in HUBR 2-1. Fertilizer source as application of 75% RFD through inorganic and rest through FYM recorded significantly higher growth, yield and N, P, K, Zn and Fe content of grain than 100% RFD through inorganic source. Among the different micronutrient treatments, soil application of Zn-EDTA @ 1 Kg ha⁻¹ recorded significantly higher

Zn content in grain, whereas application of Fe-EDTA @ 0.5 Kg ha⁻¹ recorded significantly higher Fe content in grain as compared to other micronutrient treatments.

Key words: rice, growth attributes, harvest index, N, P, K, Zn, Fe content, yield

Oryza Vol. 50. No. 4, 2013 (358-364)

Effect of calcium silicate and need based nitrogen management in aerobic rice

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ABSTRACT

Nitrogen (N) is an important component of rice cultivation system, especially where rice is grown under aerobic condition. This study examined the effects of Silicon (Si) and leaf colour chart (LCC) based N management on yield and N use efficiency in aerobic rice. A field experiment was conducted during wet season 2008 in sandy loam soil at Bangalore-north with split plot design. The treatments consist four main plots viz., control (No N), 60 Kg N ha⁻¹ (No basal + LCC-3), 90 Kg N ha⁻¹ (Urea 30 Kg N ha⁻¹ as basal + LCC-3) and 100 Kg N ha⁻¹ as urea (RDF) and two sub plots viz., with (calcium silicate at 2 t ha⁻¹) and without Si treated plots. Periodical LCC readings were taken and N was applied if the LCC value falls below the prescribed critical value. The results revealed that the highest grain yield was recorded with the application calcium silicate at 2 t ha⁻¹ and with 90 Kg N ha⁻¹ (Urea at 30 Kg N ha⁻¹ as basal + LCC-3) and it was on par with 60 Kg N ha⁻¹ (no basal + LCC-3) compared to recommended N (100 Kg N ha⁻¹) under aerobic rice. Higher fertilizer N-use efficiency was recorded with the application of Si and need-based N management using LCC-3 rather than recommended dose of fertilizer over control.

Key words: nitrogen, management, LCC, nutrient use efficiency, silicon, aerobic rice

Oryza Vol. 50. No. 4, 2013 (365-369)

Effect of organic nutrient management practices on yield and economics of scented rice Gobindabhog

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ABSTRACT

A field experiment was conducted during wet seasons of 2008 and 2009 at Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal to find out suitable organic nutrient management practice in scented rice (cv. Gobindabhog) for higher productivity, net return, nutrient utilization and soil health. All six nutritional treatments comprising FYM, vermicompost and mustard cake either alone or in combination with others recorded higher values of growth parameters, grain and straw yield over unfertilized control. Application of sole mustard cake (50% recommended dose of nitrogen (RDN) as basal + 50% RDN at 21 DAT) recorded highest plant height at harvest (135.3 and 131.3 cm), number of tillers m⁻² at active tillering (304 and 299) and panicle initiation (384 and 369), and leaf area index (LAI) at flowering (4.88 and 4.70). Sole mustard cake in two splits (50% basal + 50 % top dressing at 21 DAT) resulted in highest grain yield (2.68 t ha⁻¹) and N uptake (43.7 Kg ha⁻¹), which was at par with combined use of FYM (50% RDN as basal) and mustard cake (50% RDN at 21 DAT). Integrated use of FYM and mustard cake equivalent to 50 Kg N ha⁻¹ could be recommended as organic nutrient management for indigenous aromatic rice of West Bengal based on overall consideration of pooled grain yield (2.63 t ha⁻¹), residual soil nutritional status, net returns (₹ 19,261 ha⁻¹ and ₹ 19,071 ha⁻¹) and benefit : cost ratio (1:90 and 1.84).

Key words: aromatic rice, organic, nutrient, growth, yield

Biodiversity of insect pests, natural enemies and diseases in SRI and traditional system of rice cultivation in North Eastern region of India

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ABSTRACT

On farm trials were conducted during wet season 2011 and 2012 at Ngorlung village under Ruksin block of East Siang district of Arunachal Pradesh. Two rice varieties viz. CAU R-1 (improved variety) and Itanagar (local variety) were transplanted under system of rice intensification (SRI) and traditional system of cultivation. The results revealed that incidence of stem borer was significantly lower in SRI, mean damage of 5.67 and 6.43 per cent (dead heart) and 13.46 and 14.35 per cent (white ear head) was recorded in CAU R-1 and Itanagar, respectively, as against a higher incidence of dead heart (7.89%) and white ear head (15.67%) in CAU R-1 and 10.72 (dead heart) and white ear head (18.12%) in Itanagar under traditional system. The incidence of leaf folder case worm, blue beetle and Gundhi bug m^{-2} were lower in SRI as compared to traditional system. The occurrence of natural enemies like wolf spiders, lynx spiders, damsel flies, dragon flies and lady bird beetles population was higher in traditional system as compared to SRI. Among all the diseases, blast was lower in SRI with a mean damage of 7.28 and 9.87 per cent in var. CAU R-1 and Itanagar, respectively as against a higher incidence of 9.65 in CAU R-1 and 12.63 per cent in Itanagar. Among Bacterial diseases, bacterial leaf blight incidence was found to be lower in CAU R-1 and Itanagar with the mean 4.94 and 5.88 per cent, respectively under SRI as compared to a higher level of incidence 5.81 in CAU R-1 and 9.88 per cent in Itanagar under traditional system. In both the system of rice cultivation, var. CAU R-1 recorded higher grain yield than the Itanagar. The economic analysis indicated that benefit cost ratio was higher in traditional system as compared to SRI.

Key words: bio-diversity, system of rice intensification, traditional cultivation, insect pests, natural enemies, diseases

Field evaluation of cyazypyr against yellow stem borer and gall midge infesting rice in western Odisha

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ABSTRACT

Field trials conducted during wet seasons of 2010 and 2011 at Regional Research and Technology Transfer Station, Chiplima, Sambalpur to evaluate the efficacy of a new molecule cyazypyr (HGW 86 10%OD) against yellow stem borer and gall midge infesting rice revealed that the test compound at 100 and 120 g a.i. ha^{-1} was highly effective in reducing stem borer incidence (71.01 to 88.80 per cent reduction over control during the period of study), whereas, the compound exercised a moderate effect on gall midge (57.7 to 58.01 per cent reduction over control). The check insecticides like monocrotophos and triazophos were observed to be less effective than the test compound.

Key words: cyazypyr, efficacy, rice, yellow stem borer, gall midge

Variability of cooking and nutritive qualities in some popular rice varieties of West Bengal

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ABSTRACT

Twenty one indigenous and popular rice varieties of West Bengal, India including some aromatic rice varieties were evaluated for 15 different grain quality parameters to assess genetic estimates of the traits and genetic divergence of varieties. Wide range of variation was observed in many traits offering scope for selection. Incorporation of gene from aromatic rice to other high yielding varieties stands out to be an important proposition for improving protein content in rice. The low difference between phenotypic and genotypic coefficient of variation have suggested less environmental influence on the genetic control of these quality parameters. Heritability was high for almost all the traits. Head rice recovery (HRR) and volume expansion ratio showed high GCV, PCV, GA with high heritability indicating that selection to be effective if based on these traits. Canonical analysis revealed that protein%, volume expansion ratio, kernel breadth before cooking, HRR% and kernel breadth after cooking were the main contributors towards divergence. The varieties were grouped into 11 clusters through canonical analysis.

Key words: rice, milling, cooking quality, genetic variability, analysis

Oryza Vol. 50. No. 4, 2013 (386-390)

Economic comparison of paddy production using certified seed and commercial grain in north Bihar

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ABSTRACT

Rice is one of the most important crops of North Bihar, but its yield is quite less. A major constraint of paddy production is non-availability of quality seed in Bihar. Certified seed can be produced, to make farmers self-sufficient in seed and achieve high productivity. An experiment was conducted in Supaul district of N. Bihar in the year 2009 and 2010 at farmers' field, under the supervision of Krishi Vigyan Kendra, Supaul. The objective of the study was to calculate and compare the economics of production of paddy seed variety Rajendra Mahsuri -1 (certified) in farmers' field to commercial paddy grain. The identified village was Jahlipatti under Raghapur block which is located 6 km South to KVK, Supaul. On the basis of the data generated from the experiment of paddy seed production it was found that the benefit cost ratio of commercial grain produced was only 1.7: 1, whereas paddy seed had higher cost benefit ratio of 2.5:1. This implies that the profit which is obtained is more than twice the cost involved in this enterprise. The paddy seed production is a rewarding enterprise for Supaul Farmers giving high monetary returns.

Key words: paddy seed production, commercial paddy grain, benefit cost ratio, certified seed

Oryza Vol. 50. No. 4, 2013 (391-397)

Rice based crop diversification in Odisha

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ABSTRACT

The time series data analysis at the state level for thirty years revealed that the process of crop diversification is very slow and limited to uplands only. The cropping intensity in the state has increased by 10% only in the last three decades. The village survey data shows that rice is the dominant crop in all the land types during wet season followed by pulse crops during dry and summer season. The major constraints to diversification out of rice in the state are lack of market support, irrigation and drainage infrastructure, land rights and development of processing industries. Long-term policies to promote diversification in the state should include investment in rural markets, more investment in crop improvement and system level research, land erosion control measures, establishment of secure rights to land and water, price support,

development of processing industries, and effective insurance institutions, which will not only increase farmers' income and alleviate poverty, but also bring ever green revolution to the state.

Key words: agriculture, diversification, constraints, opportunities, Odisha

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (398-400)

Studies on genetic relatedness among various genotypes of rice using SSR markers

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ABSTRACT

Microsatellite based analysis was carried out to access the genetic relatedness among eight genotypes of rice viz., IR 58025A, Pusa 6A, KMR 3R, BR 827-35-3-1-1-1R, R 710-437-1-1, PRR 78, Swarna and MTU-1010. Of the 45 microsatellite loci analyzed, only nine were identified as polymorphic among the various genotypes. The degree of similarity ranges from one polymorphic locus to six polymorphism among the genotypes studied.

Key words: rice, microsatellite markers, polymorphism, genetic relatedness

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (401-403)

Combining ability studies in rice

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ABSTRACT

Four well adapted lines and eight testers of rice were crossed in Line x Tester fashion to elicit information regarding the desirable parents and crosses for their use in crop improvement programme. Sufficient genetic variability was observed among the parents, lines and crosses for all the traits studied. Analysis of variance revealed significant differences among genotypes, crosses, lines, testers and lines x testers interaction for tiller number, plant height, days to 50% flowering, panicle length, number of spikelets panicle⁻¹, spikelet fertility and grain yield. Variance of SCA were higher than GCA variances for all the traits except for number of filled spikelets panicle⁻¹ which indicated predominance of additive gene action in the inheritance of these traits. The estimates of gca effects revealed that the genotype Pusa-5A among the lines and Dubraj (nagri) among the testers were found to be the best general combiners for grain yield plant⁻¹ and its components. Significant sca effect was exhibited by three crosses viz. PMS-11A/Basmati -370, PMS-11A/MTU-1001 and CRMS-32A/Dubraj (nagri).

Key words: rice, combining ability, variability

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (404-408)

Study of heritability, genetic advance and variability for yield attributing characters in exotic germplasm of rice

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ABSTRACT

The efficiency of selection depends on the magnitude of genetic variability present in the plant population. Parameters of genetic variability were estimated for 123 exotic germplasm of rice including two local checks. Most of the characters showed high values of genotypic and phenotypic coefficient of variation. Number of unfilled grains panicle⁻¹ recorded the highest phenotypic and genotypic coefficient of variation followed by panicle index. Plant height and 1000 grain weight showed moderate values. High heritability with high genetic advance was observed for panicle weight plant⁻¹, number of tillers plant⁻¹, number of effective tillers plant⁻¹, number of grains panicle⁻¹, number of filled and unfilled grains panicle⁻¹, spikelet density, biological yield plant⁻¹, grain yield plant⁻¹ and harvest index which suggests that selection may be effective for these characters.

Key words: rice, variability, genetic advance, heritability

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (409-411)

Effect of planting dates and N levels on grain yield and N uptake by hybrid rice

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ABSTRACT

An experiment was conducted to find out grain yield and nitrogen uptake by hybrid rice under different planting dates and N levels during 2007 and 2008. The hybrid rice planted on July 1 or July 15 produced significantly higher grain yield and N uptake by both grain and straw. The delayed planting between August 1 and August 16 significantly reduced these crop parameters. The reduction of grain yield was to the extent of 21.1% and 36.4%, respectively compared with planting on July 1. Number of effective tillers, grains panicle⁻¹, test weight, grain yield, N concentration and uptake by grain and straw increased significantly with increasing levels of N from 60 to 120Kg N ha⁻¹.

Key words: planting date, N level, N concentration, grain yield, N uptake, hybrid rice

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (412-416)

Influence of age of rice plant on bacterial blight disease development

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ABSTRACT

Gene x Environment (GE) interactions are well known in influencing the gene expression. Bacterial blight (BB) of rice is the most important disease influencing heavy losses under congenial conditions. In the present study response of resistance genes identified against BB is studied under Chhatisgarh condition. Eighty nine genotypes were chosen to study the influence of age of the plant on resistance against bacterial blight development at three growth stages i.e. seedling, maximum tillering and boot to flowering. Results indicated that the genotypes, crop growth stages and their interaction were significant. Two years data indicated that the genotypes IRBB-52; CRMAS-2231-31; IRBB-55; IRBB-54 and CRMAS-2231-34 had the least infection and five genotypes i.e. TN-1; IR-8; Tetep; IR-24 and IR-64 had the maximum infection. The over all general mean of the genotype response at different growth stages clearly indicated that maximum bacterial blight developed at boot stage to flowering stage though; there were exceptions within in the genotypes.

Key words: rice, genotypes, resistance, bacterial blight, *Xanthomonas oryzae* pv. *Oryzae*

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (417-418)

Incidence of *Popillia lucida* Newman on rice in Himachal Pradesh

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ABSTRACT

Investigation on the abundance of *Popillia lucida* Newman on paddy was undertaken during wet season, 2011 at three locations in Kangra district of Himachal Pradesh, India. Rice crop under direct sown and transplanted conditions was observed at weekly intervals upto harvesting for recording the build up of chaffer beetle. The adults of chaffer beetle started appearing during first week of August with the panicle initiation and the maximum mean adult populations observed at three locations viz., Ansui, Amatrahar and Ladoh were 27.63, 15.00 and 19.13 adults 30 hills⁻¹, respectively. The pest activity was observed throughout the flowering period of the crop. Among the various abiotic factors, minimum temperature, relative humidity and rainfall showed positive correlation with adult population at all the three locations.

Key words: rice, chaffer beetle, seasonal abundance

SHORT COMMUNICATION

Oryza Vol. 50. No. 4, 2013 (419-421)

Management of white grub, *Holotrichia longipennis* Blanch through post-sown soil application of insecticides in upland rice

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ABSTRACT

White grubs are a major production constraint in upland rice production in North-Western Himalayas. Field experiment was carried out to evaluate five insecticides viz., chlorpyrifos 20 EC, quinalphos 25 EC, lindane 20 EC, imidacloprid 200 SL and lambda cyhalothrin 5 EC as post-sown soil application in furrows against the white grub, *Holotrichia longipennis* Blanch damaging upland rice in Uttarakhand hills. Imidacloprid 200 SL @ 80.0 g a.i. ha⁻¹ was found to be most effective by registering lowest cumulative plant mortality (3.14%) and grub populations (2.0 grubs pit⁻¹). Highest benefit cost ratio (6.72) was obtained in the treatment of imidacloprid 200 SL (60g a.i. ha⁻¹).

Key words: upland rice, white grub, *Holotrichia longipennis*, insecticide, management