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INFLUENCE OF INORGANIC N FERTILIZER ON PLANT CHARACTERS, YIELD GENERATION AND THE INCIDENCE OF YELLOW STEM BORER *SCIRPOPHAGA INCERTULAS*, WALKER IN THE FIELD OF LOCAL SCENTED PADDY CULTIVAR *TULAIPANJI*

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ABSTRACT : To determine the effect of inorganic N fertilizer on the incidence of yellow stem borer (YSB), *Scirpophaga incertulas* Walker and on grain yield, yield attributes and bio-chemical characters of local paddy cultivar *Tulaipanji*, a field experiment for three consecutive years (2007-2009) was carried out by randomized block design in pesticide untreated field. Treatments comprised of seven different dose of inorganic N fertilizer *viz* 20,40,60,80,100,120,140 kg/ha respectively. Field with no fertilizer application was considered as control. In all the cases higher the doses of inorganic N fertilizer, higher would be the incidence of adult YSB population and accordingly the extent of damage was intensified. Incidence of dead heart (DH) and white head (WH) was 175.74% and 206.72% higher than the control field when the field was fertilized by 140 kg N/ha. Yield attributing characters differed considerably among the treatments. Maximum panicle length (1.71cm), Effective tiller number/ hill (62.01), filled grain number/ panicle (66.12), tiller number/hill (11.27), leaf number/hill (48.11) and leaf width (9.11 mm) was noted when the field was fertilized with 100 kg N. But no significant improvement of yield attributing characters except the number of filled grain number/ panicle was noted when the dose of fertilizer was increased after 100 kg N/ha. Insignificant variation of grain amylose and protein content, total phenol and *ortho-dihydroxy phenol* (OD phenol) amount under different fertilizer treatment was noted. Plant moisture content, however, was increased as the dose of N fertilizer was improved. Field application of 100 kg N/ha is thus suggested for *Tulaipanji* cultivation.

Key words: *Tulaipanji*, yellow stem borer, extent of damage, yield attributes, bio-chemical parameters

INTRODUCTION

Production of aromatic basmati rice on scientific scale has already been commercialized to a great extent both for internal consumption and export (Das *et al.,* 2000). But, on the other hand, non-basmati aromatic cultivars though posses good economic potentiality, are still grown in regional pockets by conventional practices (Raju *et al*., 1990). Northern part of West Bengal offers a diversified agro-ecological conditions enduring high number of local scented cultivars (Sen, 2008). *Tulaipanji* is supposed to be one of the archaic indigenous aromatic rice varieties which are being cultivated in some native 'pocket' villages covering the block Raiganj of the district Uttar Dinajpur, West Bengal. Grossly, *Tulaipanji* is low N responsive paddy cultivar and thus claim no special nutrient management strategy (Sen *et al*., 2005). But extensive cultivation due to high market demand with the input of high doses of inorganic N fertilize has created an environment that is conducive for insect pest growth and multiplication.

The trends of rice production must increase to 65% more than today to meet the food demand by 2025. If the presently available technologies remained constant, the input of N will require almost 300% more than the present to meet such requirement. N is the most indispensable mineral nutrient for plant growth and development. But it has been noted that the excessive application causes substantial vegetative growth and lower harvest index, plant lodging and vulnerability to disease and insect pests, resulting in an asymptotic or parabolic association between crop yield and nitrogen dose (Sinclair, 1988). Further, injudicious application of inorganic N in the field of scented cultivars often causes loss of aroma and also undermines grain quality (Imayavaramban *et al*., 2004). N alters morphological, biochemical and physiological characters of host plants and improves nutritional conditions for herbivore insect pests (Simpson *et al*., 1990). Judicious and integrated application of inorganic N fertilizer in relation to paddy growth stage can suppress the pest incidence without any conciliation of the yield generation (Bhaskaran *et al*., 2009). Stem borers (SBs) are important group of insect pests of paddy (Dhaliwal *et al.,*1996). Among the borers, yellow stem borer (YSB), *Scirpophaga incertulas,* Walker is distributed throughout India and is considered as the most dominating and destructive species (Catling *et al.,* 1987). So need of assessment of the applied N on the incidence of YSB is of prime importance.

Therefore, optimization of management practices to increase field N efficiency in rice production is urgently required (Bernays, 1990). In this contemplation relative efficacy of seven different dose of inorganic N fertilizer (urea) on the incidence of adult YSB, extent of damage, yield attributes and bio-chemical properties of paddy cultivar *Tulaipanji* were tested at Raiganj, Uttar Dinajpur, West Bengal where no such experiment even of preliminary in nature was carried out earlier.

MATERIAL AND METHODS

Experimental layout: Field experiment was conducted with transplanted 35-day old seedlings of the local cultivar *Tulaipanji* during three consecutive season of 2007-2009 at Raiganj [26º35´15´´(N) – 87º48 ´37´´(W)], Uttar Dinajpur, West Bengal. The soil of the field was sandy loam with PH value 6.7 and EC value 0.31 mmhs/cm. During the first trial, field N, P_2O_5 and K_2O was 292, 78 and 378 kg/ha respectively. Experiment was conducted by randomized block design (RBD). Seedlings were transplanted with 5 seedlings/hill and at 15x10 cm spacing. There were seven fertilizer treatments (T1-T7), each with three replications for each year. Field without fertilizer treatment (T8) was considered as control. Each plot was 35 x 35 m by size. Inorganic N (urea) was applied in two equal splits, first half during land preparation and the rest part at about 55-60 days after seedling transplantation (DAT) respectively. Other necessary field inputs and required field management for all the plots were done in due course of time following the national protocol with minor modifications. No pesticide was applied in all the plots.

Assessment on yield attributes: Five hills in each plot were randomly selected and tagged for recording filled grain number /panicle, tiller number/hill, leaf number/hill and percentage of effective tillers/hill. 20 individual panicles were selected randomly from each plot and the average length (in cm.) was recorded. Leaf width (in mm) was measured from 25 selected leaves in each plot at maximum growth stage. After threshing, proper cleaning and sun drying the final yield was recorded.

Assessment on YSB incidence: 10 hills were randomly selected from each plot at vegetative and reproductive growth stage of paddy respectively. The presence of adult YSB individuals at this two growth stage was noted and the value was averaged.

YSB larvae bore into the paddy tillers by feeding internodal soft tissue, grow and cause the characteristic symptoms of ‘dead hearts’ (DH) or ‘white head’ (WH) depending on the stages of the standing crop. Infestation by YSB from each fertilizer treated plot was recorded in terms of numerical abundance of DH and WH during vegetative and reproductive growth stages of paddy plant respectively. The percentage of DH and WH of individual plot was calculated by applying the following formula as delineated by Singha and Pandey (1997).

$$\text{DH and WH \%} = \frac{\text{Number of DH / WH x 100}}{\text{Total number of tillers}}$$

Assessment on biochemical characters:

Estimation of grain starch (amylose) content (McCready *et al*. 1950)*:* 500 mg each of fresh paddy leaf was homogenized with 10 ml of 80% ethanol and then centrifuged at 2000 rpm for 20 min. The residual mass obtained after centrifugation was suspended in 5.0 ml of water and subsequently 6.5 ml of 52% perchloric acid was added to it after stirring of the mixture, the contents were again centrifuged for 20 minutes at 2000 rpm. The supernatant was decanted and collected and the whole procedure was repeated thrice. Supernatant of each step were then poured and the total volume was made up to 100 ml with distilled water. The mixture was then filtered through whatman filterpaper (No.42) 1.0 ml of aliquot of this filtrate was analyzed for starch (amylose) content.

Estimation of grain protein content:

1. Analytical reagents:

a) 50 ml of 2% sodium carbonate mixed with 50 ml of 0.1 N NaOH solution (0.4 gm in 100 ml distilled water.)

b) 10 ml of 1.56% copper sulphate solution mixed with 10 ml of 2.37% sodium potassium tartarate solution.

c) Prepare analytical reagents by mixing 2 ml of (b) with 100 ml of (a)

Folin - Ciocalteau reagent solution (1N) Dilute commercial reagent (2N) with an equal volume of water on the day of use (2 ml of commercial reagent + 2 ml distilled water). 2ml of chilled $NaPO_4$ buffer (PH-7.1) is added with 200 mg of rice grain, grinded properly and then centrifuged at 4^oC for 20 minutes at 10,000 rpm. Supernatant is used as crude protein and was kept at frozen temperature for further analysis. Aliquot of 0.1 ml of the homogenate was taken in attest tube and 0.1 ml distilled water is mixed with it. 5 ml of reagent (c) was added, mixed thoroughly and kept for 10 minutes at room temperature.0.5 ml of 1 ml folin reagent was added to this mixture and kept for 30 minutes in dark for colour development. For the preparation of the standard curve 5 different concentration of bovine serum albumin (BSA) ranging between 0.05-1.0 mg/ml were used. For reagent 'blank' distilled water was used instead of protein solution. All the sample solutions were read at 660 nm wavelength of light by spectro-photometer. Light absorbance of unknown sample was assessed and the protein concentration of the grain sample was determined using standard curve of BSA.

Estimation of total phenolic content of *plant part* (Malick *et al.,* 1980): 250 mg of healthy leaves were crushed with 2ml of 80% ethanol and subsequently centrifuged for 30 minutes at 10,000 rpm. Supernatant was evaporated in vacuum at 40^oC, re-dissolved in 2ml of distilled water, diluted ten times for a working standard. In each test tube 0.5 *Folin-Ciocalteau* reagent (1N) was added. After 3 minutes, 2ml of 20% Na_2CO_3 solution was added, shaked well subsequently heated on a hot water bath for 1-2 minutes and then cooled it by running water. Absorbance was measured at 650 nm by spectrophotometer against a blank solution considered as control. Total phenolic content (mg/gm) was evaluated in catechol equivalent after comparing with standard curve prepared form distilled catechol.

Estimation on ortho di-hydroxy phenol content of *plant part* (Mahadevan *et al*., 1986): 250 mg of healthy leaves were boiled and crushed in 2ml alcohol for 15 minutes, slurry was centrifuged at 3000 rpm for 20 minutes, and supernatant was taken for OD phenol estimation. 1 ml of alcoholic tissue extract was taken with 2ml of 0.5(N) HCL, 1ml of Arnow's reagent ($NaNO_2$ -10gm,Na_2Mno_4 -10gm,distilled water 100ml), 2ml of 1(N) NaOH were thoroughly mixed. The solution was raised to 10ml, and OD value was assessed by spectrophotometer against control with all the components except tissue extract. Standard curve was prepared with the help of different concentrations of catechol and the result was expressed as mg/gm weight tissue.

Estimation of leaf moisture (Paul *et al*., 1992): Fresh leaves were thoroughly cleaned and oven dried at 60°C until the weight become constant. Moisture content was calculated depending on the percentage of weight loss after woven drying.

$$\text{Moisture content \%} = \frac{\text{weight of fresh leaves-weight of oven dried leaves x100}}{\text{total number of tillers}}$$

Statistical analysis: Data obtained from field experiment was statistically analyzed by INDOSTAT-ANOVA and accordingly CD value was determined (Chandel, 1984). Fisher's analysis of variance technique was followed at 5% probability level.

RESULTS AND DISCUSSION

Incidence of YSB population and the plant characteristics under seven different dose of fertilizer were carried out in the field of local scented paddy cultivar *Tulaipanji* during three consecutive crop seasons of 2007-2009 at Raiganj, Uttar Dinajpur, West Bengal, India. The results are delineated below:

In consideration of incidence of adult YSB individuals and the extent of damage: Higher the dose of applied fertilizer, higher would be the incidence of adult YSB population (Table 1). Grossly the incidence of YSB population ranged from 0.74 to 2.04 individuals/hill .Minimum YSB incidence (0.74 individuals/hill) was noted when no fertilizer was applied. While the maximum (2.04 individuals/hill) was observed when the field was fertilized by 140 kg N. But such maximum incidence was statistically at par with the field fertilized with 100 kg N. In comparison to control, percentage of increase of incidence of YSB population was lowest at 20 kg N/ha (6.75%), very low at 40 kg/ha (24.32%), low at 60 kg/ha (51.32%), moderate at 80 N/ha (89.19%), fair at 100 kg N/ha (121.60%), good at 120 kg N/ha (154.10%) and highest at 140 kg N/ha (175.70%).

Table 1. Impact of different doses of inorganic N fertilizer on the incidence of adult YSB in *Tulaipanji* field

Treatments	Incidence of adult individuals (number/hill)				Increase of incidence over control (%)
	2007	2008	2009	Mean	
T1	0.78 (1.13)	0.76(1.12)	0.81(1.15)	0.79(1.13)	6.75
T2	0.87(1.17)	1.01(1.23)	0.88(1.17)	0.92(1.19)	24.32
T3	1.07(1.25)	1.16(1.29)	1.12(1.27)	1.12(1.27)	51.35
T4	1.33(1.35)	1.42(1.39)	1.47(1.40)	1.40(1.38)	89.19
T5	1.60(1.45)	1.65(1.47)	1.68(1.48)	1.64(1.46)	121.6
T6	1.86(1.54)	1.83(1.53)	1.94(1.56)	1.88(1.54)	154.1
T7	2.01(1.58)	2.07(1.60)	2.05(1.60)	2.04(1.59)	175.7
T8	0.72(1.10)	0.80(1.14)	0.70(1.09)	0.74(1.11)	-
CD(P=0.05)	0.47	0.51	0.58	0.42	-

Significant variation of the extent of damage in consideration of different dose of fertilizer was also noted. Year to year variation in consideration of the extent of damage was also evicted. As the dose of fertilizer was increased, incidence of DH and WH was increased accordingly (Table 2 and 3). Lowest number of DH was scored when the field was fertilized with 0 kg N/ha (1.80%).

This was followed by 20 kg N/ha (1.91%), 40 kg N/ha (2.23%), 60 kg N/ha (2.71%), 80 kg N/ha (3.41%), 100 kg N/ha (3.99%), 120 kg N/ha (4.56%) and 140 kg N/ha (4.96%) in ascending order. In comparison to control, percentage of increase of DH was 5.93%, 23.89%,50.74%, 89.63%, 121.85%, 153.52% and 175.74% at 20,40,60,80,100,120 and 140 kg N/ha respectively. Similarly, lowest number of WH was scored when the field was treated by 0 kg N/ha (0.84%). This was followed by 20 kg N/ha (0.94%), 40 kg N/ha (1.42%), 60 kg N/ha (1.39%), 80 kg N/ha (1.74%), 100 kg N/ha (2.35%), 120 kg N/ha (2.42%) and 140 kg N/ha (2.59%) in ascending order. For all the treatments incidence of DH was higher than WH in all the years. In comparison to control, percentage of increase of WH was 11.46%, 65.22%, 68.38%, 106.72%, 178.66%, 186.96% and 206.72% at 20,40,60,80,100,120 and 140 kg N/ha respectively.

Table 2. Impact of different doses of inorganic N fertilizer on the incidence of DH in *Tulaipanji* field

Treatments	**Incidence of DH (%)**				**Increase of incidence over control(%)**
	2007	2008	2009	Mean	
T1	1.89 (1.55)	1.85(1.53)	1.98(1.57)	1.91(1.55)	5.93
T2	2.11 (1.62)	2.45(1.72)	2.13(1.62)	2.23(1.65)	23.89
T3	2.61(1.76)	2.81(1.82)	2.72(1.79)	2.71(1.79)	50.74
T4	3.23(1.93)	3.45(1.99)	3.56(2.01)	3.41(1.98)	89.63
T5	3.88(2.09)	4.01(2.12)	4.09(2.14)	3.99(2.12)	121.85
T6	4.53(2.24)	4.45(2.22)	4.71(2.28)	4.56(2.25)	153.52
T7	4.89(2.32)	5.02(2.35)	4.98(2.34)	4.96(2.34)	175.74
T8	1.76(1.50)	1.95(1.57)	1.69(1.48)	1.80(1.52)	-
CD(P=0.05)	0.37	0.51	0.39	0.46	-

Table 3. Impact of different doses of inorganic N fertilizer on the incidence of WH in *Tulaipanji* field

Treatments	**Incidence of WH %)**				**Increase of incidence over control (%)**
	2007	2008	2009	Mean	
T1	0.92(1.19)	0.97(1.21)	0.93(1.20)	0.94(1.20)	11.46
T2	1.46(1.40)	1.63(1.46)	1.17(1.29)	1.42(1.39)	68.38
T3	1.21(1.31)	1.52(1.42)	1.45(1.40)	1.39(1.37)	65.22
T4	1.62(1.46)	1.73(1.49)	1.88(1.54)	1.74(1.50)	106.72
T5	1.89(1.55)	2.51(1.73)	2.65(1.77)	2.35(1.69)	178.66
T6	2.37(1.69)	2.43(1.71)	2.46(1.72)	2.42(1.71)	186.96
T7	2.49(1.73)	2.59(1.76)	2.68(1.78)	2.59(1.76)	206.72
T8	0.78(1.13)	0.88(1.17)	0.87(1.17)	0.84(1.16)	-
CD(P=0.05)	0.56	0.29	0.48	0.37	-

In consideration of yield attributing characters: Dose of applied fertilizer insignificantly affected panicle length. Grossly, panicle length ranged from 19.44-19.69 cm. However, the highest (19.69 cm) and lowest panicle length (19.44 cm) was recorded under 140 kg and no fertilizer application respectively. Percentage of effective tillers was highest when the plot was fertilized with 140 kg N. But, it was statistically at per when the field was fertilized with 80 kg N/ha.

No significant alteration of the number of effective tiller was noted when further dose of N was added. Significant variation of tiller number/hill was noted only up to 80 kg N/ha application. But the number of tillers was statistically insignificant when additional dose of N was added. On the other hand number of leaf/hill increased only up to 100 kg N application and it was significant statistically; while the dose was further increased the number of additional leaf number differed insignificantly. Number of filled grains/panicle slowly increase when the applied dose was improved from 20 kg N /ha to 60 kg N /ha. With additional N dose, filled grain number increased gradually. However, numerically, maximum grain number (62.83/panicle) was noted at 140 kg N and minimum (45.17/panicle) at no fertilizer application. In average, application of 80 kg N/ha has registered maximum grain weight. Grossly, leaf width under different treatment ranged from 8.80 to 9.07 mm and it was statistically insignificant.

In consideration of incidence of bio-chemical parameters of Tulaipanji: No significant difference of grain amylose and protein content under different fertilizer treatment was noted. Grain amylose and protein content of the cultivar *Tulaipanji* was thus fertilizer dose independent. The range of amylose and protein content was 26.69-28.03 and 6.97-7.28 respectively. However, significant effect of fertilizer on the plant moisture content was noted. With the additional dose of fertilizer the plant water content improved considerably. Plant moisture was 23.87%, 27.34%, 39.43%, 45.32%, 56.21%, 62.37% and 69.43% at 20, 40,60, 80, 100, 120 and 140 kg N/ha respectively. Similarly, quantity of total phenol (mg/gm) and OD phenol (mg/gm) was insignificantly influenced by the applied dose of N fertilizer. Plant total phenol was 8.92, 9.07, 9.34, 9.55, 9.78, 9.92 and 10.05 mg/gm at 20, 40, 60, 80, 100, 120 and 140 kg N/ha respectively. Further, OD phenol was 1.98, 2.01, 2.06, 2.17, 2.23, 2.29 and 2.32 mg/gm at 20,40,60,80,100,120 and 140 kg N/ha respectively. Thus N fertilizer has no definite effect on both plant total phenol and OD phenol content. Incidence of YSB population was thus more profoundly influenced by plant moisture than the total phenol and OD phenol content.

Table 4. Impact of different doses of inorganic N fertilizer on the incidence of WH in *Tulaipanji* field

Treatments	Panicle length (cm)	Tiller/hill (at 65 DAT)	Leaf/hill (at 75 DAT)	Effective tiller hill (%)	Filled Grains/ panicle	Leaf width (mm) (at 75 DAT)
T1	19.47	8.78	42.12	56.32	45.17	8.86
T2	19.51	9.05	42.87	58.39	47.72	8.89
T3	19.58	10.21	43.05	60.16	53.78	8.91
T4	19.61	11.03	43.96	60.69	55.21	8.94
T5	19.63	11.08	44.68	61.07	56.43	8.97
T6	19.67	11.17	45.35	61.34	58.21	9.01
T7	19.69	11.23	46.89	61.59	62.83	9.07
T8	19.44	11.27	42.04	56.28	45.12	8.80
CD(P=0.05)	0.29	1.02	2.07	1.21	1.67	0.56

References pertaining to the impact of inorganic N fertilizer on YSB incidence and grain quality mostly cover high yielding varieties. Among the cereals, rice contains 'better-quality' protein because major N serve protein is glutein, where as prolamin predominates in other cereals (Hauston *et al*. 1970). The influence of only inorganic N fertilizer on the incidence of stem borer has been reported by Raj *et al.* (1973), Palanichamy *et al.* (1978), Saroja and Raju (1981) and Prasad *et al*. (2004). All these findings corroborate the positive impact of high doses of inorganic N on the incidence of YSB. Prasad *et al*. (2004) have recorded maximum level of DH at 200 kg N / ha (6.2%) followed by 120 kg N / ha (5.4%) and lowest at no N/ha application (4.8%).

Table 5. Impact of different doses of inorganic N fertilizer on yield of paddy cultivar *Tulaipanji*

Treatments	Yield(q/ha) under different treatments				Increase of incidence over control (%)
	2007	2008	2009	Mean	
T1	15.65(4.02)	15.72(4.03)	15.81(4.04)	15.73(4.03)	3.19
T2	15.92(4.05)	16.34(4.10)	16.11(4.08)	16.12(4.08)	5.80
T3	16.45(4.12)	16.49(4.12)	16.58(4.13)	16.51(4.12)	8.31
T4	16.78((4.16)	16.71(4.15)	16.81(4.16)	16.77(4.16)	10.02
T5	16.87(4.17)	16.81(4.16)	16.84(4.16)	16.84(4.03)	10.50
T6	16.91(4.17)	16.96(4.18)	17.08(4.19)	16.98(4.08)	11.44
T7	17.02(4.19)	17.08(4.19)	17.06(4.19)	17.05(4.12)	11.90
T8	15.11(3.95)	15.09(3.95)	15.52(4.00)	15.24(4.16)	-
CD(P=0.05)	0.47	0.51	0.38	0.42	-

Table 6. Impact of different doses of inorganic N fertilizer on some selected bio-chemical properties of paddy cultivar *Tulaipanji*

Treatments	amylose content (%)	protein (%)	plant moisture (%)	total phenol (mg/gm)	OD phenol (mg/gm)
T1	26.75	7.02	23.87	8.92	1.98
T2	26.87	7.09	27.34	9.07	2.01
T3	26.92	7.11	39.43	9.34	2.06
T4	27.31	7.14	45.32	9.55	2.17
T5	27.53	7.18	56.21	9.78	2.23
T6	27.68	7.23	62.37	9.92	2.29
T7	28.03	7.28	69.43	10.05	2.32
T8	26.69	6.97	21.47	8.47	1.69
CD(P=0.05)	1.82	0.92	2.56	0.17	0.05

Yein (1988) have also reported that the incidence of DH and WH was influenced positively by N fertilizer. Positive effects of N on the incidence of YSB was also been documented by Ma *et al.*(1996), Tan (1986) and Swaminathan *et al.*(1985). Singh *et al* (1990) have reported that higher doses of N increased the susceptibility of rice crop to rice stem borers. Saha and Saharia (1970) have documented the quantum jump of the extent of damage from 8.36% to 20.12% when the field was fertilized with 100 Kg/ha against the field of no fertilizer application. N fertilizer significantly influenced yield attributing characters which in turn dictate the YSB incidence. Application of higher doses of fertilizer induces metabolic activity of plants, increases the girth and internodal length of the stem making it more spacious for larval boring and subsequent accommodation and hence imparts greater survival value to the larvae. Further increase in moisture content makes the plant more succulent with higher palatability ensures higher survival value to the neonates due to successful boring. Similar to the present observation Majumder *et al*. (1984) have noted broader paddy leaf facilitate pest infestation. Ghosh (1962) have noted that higher doses of inorganic N facilitates high paddy plant water content which indulges stem borer for oviposition and the neonates to survive.

Total phenolic content and OD phenol are inconsonance with the plant resistance level. Higher the total phenol and OD phenol more was the plant tolerance to pest infestation. Satya *et al.,* (2004) have suggested that phenolic compounds play vital role in germplasm resistance. Jain *et al*., (2003) have reported that increase in phenol content of fresh leaves of rice cultivar imparted resistance to various diseases. But no significant effect of N fertilizer on total phenol and OD phenol in the present study was noted. Significant improvement in yield and yield attributes with N application was reported by Singh *et al*. (1990) and Singh *et al*. (1993).The result of them corroborates to the present observation. But in the present observation application of higher doses of inorganic N was not economically judicious.

CONCLUSION

Grossly, incidence of adult YSB and the extent of damage was N fertilizer dose dependent. Application of 100 kg N/ha was found economically prudent for *Tulaipanji* production. Though yield increased marginally, with the further additional dose of N but there was a quantum jump of YSB infestation maximizing the extent of damage. Grossly, most of the yields attributing characters like panicle length, effective tiller number/hill, filled grains / panicle, leaf width, leaf number/hill were significantly influenced at moderate dose of 100 kg N/ha. No significant change of yield attributing characters was noted when the dose was further improved. Only the number of filled grains/ panicle showed a linear positive relation with the applied N dose. Insignificant variation of grain amylose and protein proportion was also noted. Plant moisture proportion, total phenol and OD phenol content showed significant positive relation with the applied N fertilizer and accordingly imparted significant positive effect on YSB incidence. It is therefore recommended to apply 100 kg N/ha to economize the yield generation and to minimize the yellow stem borer incidence for the paddy cultivar *Tulaipanji*.

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