CHAPTER VI
6. SUMMARY AND CONCLUSION

The field experiments were conducted during Kharif 1988 and 1989 at the crop Research Centre Amar Singh Post graduate College, Lakhauti (Bulandshahr) U.P. to study the effect of levels of N and time of N application on growth and yield of over-aged seedlings of Rice (variety Saket-4). The experiment was laid out on sandy loam in R.B.D. factorial design with three replications. The salient findings of present investigations are given as under.

1. The grain yield was significantly influenced by the levels of N in field and times of N application. The highest yield was recorded in treatment N₂ T₄ C₁ (4224 kg/ha in 1988, 4490 kg/ha in 1989) and lowest in treatment N₂ T₃ C₂ (3300 kg/ha in 1988, 3290 kg/ha in 1989). The treatments showed significantly (3708 kg/ha in 1988, 3695 kg/ha in 1989) higher yield than control (3107 kg/ha in 1988, 3098 kg/ha in 1989).

2. The grain yield was higher at higher level of N 120 kg N/ha than 60 kg N/ha and when N was given in 3 splits than N was given at initial stages in both years.

3. The grain yield was not influenced by the levels of N in nursery during both years.
4. Significant interaction between level of N in field and time of N application was observed for grain yield in both years. When N₂ T₄ produced significantly more yield (4112 kg/ha in 1988 and 4105 kg in 1989) than others. The interaction between time of N application in field and level of N in nursery was also significant during both years. When T₄ C₁ produced higher yield 3891 kg/ha in 1988 and 3876 kg/ha in 1989).

5. Number of panicles/m² were significantly more in the treatments (477 in 1988 and 479 in 1989). Than in the control (250 in both years). Nursery resulted fertilization/in significantly higher number of panicles. Although the level of N application in field did not influence the numbers of panicles/m² however the numbers of panicles/m² was on higher side at 120 kg N/ha than 60 kg/ha in both years.

6. Panicle length was effected by the levels of N in field, time of N application in both years. The highest length of panicle was observed in treatment N₂ T₃ C₁ (but was at par with N₂ T₁ C₁) (21.5 cm. in both years) and lowest in treatment N₁ T₂ C₁ (19.9 cm. in 1988 and 19.5 cm. in 1989). The treatments showed significantly higher length
(20.5 cm. in both years) than control (19.6 cm. in 1988 and 19.2 cm. in 1989). The panicle length was significantly higher at 120 kg N/ha than 60 kg N/ha when N was given (67 percent at basal and 43 percent at panicle initiation) but was significantly at pan and N was given 50 percent basal and 25 percent each at tillering and panicle initiation.

7. The grain weight per panicle was influenced by level of N in field and time of application in both years. But not influenced by level of N in nursery in 1988. The grain weight/panicle was higher at 120 kg N/ha (1.16 gram in 1988 and 1.20 gram in 1989) than at 60 kg N/ha (1.13 gram in 1988 and 1.14 gram in 1989), and was highest when N was given (67 percent at basal and 43 percent at panicle initiation in both years. The interaction between level of N in field and time of N application was significant in both years. When N2 T3 produced significantly more grain weight/panicle (1.21 gram in 1988 and 1.24 gram in 1989) than others. Significant interaction between time of N application in field and level of N in nursery was observed in both years. When T3 C2 showed highest grain weight/panicle (1.26 gram
in 1988 and 1.27 gram in 1989. The treatments produced significantly higher grain weight/panicle in both years.

The thousand grain weight was significantly more in 1989 (20.3 gram) at 120 kg N/ha than 60 kg N/ha (20.17 gram) and about to statistically more at 120 kg N/ha than 60 kg N/ha in 1988 and also significantly more at zero kg N/ha level of N in nursery than 60 kg N/ha level in nursery, and was higher when N was given/splits. All the main effects demonstrated statistically similar thousand grain weight as in the control in both years.

Percentage of ripened grains tended to show a slight reduction but not significantly as the level of N in field raised. It was 84.6 percent in the control 83.2 percent at 60 kg N/ha and 80.8 percent at 120 kg N/ha in 1988. And 84.4 percent in the control 83.3 percent at 60 kg N/ha and 88.8 percent at 120 kg N/ha in 1989. With the increase in the level of N in field a decrease was seen in the number of filled grains while the number of unfilled grains increased.

Straw yield was significantly more at higher level of N in field and nursery, and when N was applied in splits (50 percent at basal, 25 percent
at tillering and panicle initiation (including N application at panicle initiation) in both years. The highest straw yield was recorded in treatment $N_2 T_4 T_1$ (10462 kg/ha in 1988, 10430 kg/ha in 1989). This had a reflection on grain/straw ratio when the ratio was recorded to be significantly less in the treatment (0.471 in 1988, 0.470 in 1989), than in the control 0.613 in 1988 and 0.612 in 1989). Nursery fertilization reduced the grain yield, significantly increased the straw yield and so significant reduction was seen in grain straw ratio (0.453 in 1988, 0.446 in 1989) as compared with non fertilization of nursery (0.490 in 1988 and 0.490 both).

11. Taller plants were significantly observed at maturity when 120 kg N/ha was given in field as compared with 60 kg N/ha in both years, treatments were statistically significant to control.

12. Significant interaction between level of N in field and time of application was observed at tillering and panicle initiation both, when $N_4 T_1 C_2$ produced significantly more tillers (406 in 1988 and 396 in 1989) than others at tillering and 650 in 1988 and 670 in 1989) than others at panicle initiation but in 1988, It was
similar to \(N_2 T_4 C_1\) but at maturity significantly more tillers were produced in the treatments than the control, higher number of tillers were observed at panicle initiation and maturity in both years when nursery was fertilized.

13. Dry matter production was affected at all stages of growth in both years. Significantly more dry matter was produced in the treatments than in the control at all three stages. Higher levels of N produced more dry matter than lower levels at all three stages in both years. At maturity more dry matter was observed at higher levels of N in field and in nursery and when N was given in 3 splits (50 percent at basal and 25 percent each at tillering, panicle initiation) in both years.

14. The number of days taken to panicle initiation heading and maturity were significantly less in control than in the treatments. Level of N in field and in nursery affected the time taken to heading while time of N application affected days taken to heading and maturity in both years.

15. Total N percentage at different growth stage was influenced by the treatments and with few exceptions, showed a closed relationship with the
amount N applied. It was maximum during the tillering stages and gradually decreased towards the maturity in both years. Highest protein percentage was observed in treatment $N_2T_4C_2$ in both years (7.742 percent in 1988 and 7.762 percent in 1989) and $N_2T_4C_1$ (7.704 percent in 1988 and 7.566 in 1989) while lowest percentage was recorded in treatment $N_1T_1C_1$ (5.370 percent in 1989 and 5.470 percent in 1989).

16. N uptake was influenced significantly by the treatments in both years. Uptake of N by grains was not effected by nursery fertilization but straw yield and uptake of N by straw showed increase when N was applied in nursery, N level in field showed a decrease in N recovery percentage though not significantly. N recovery percent was higher when the nursery was fertilized and one of the splits included N application at panicle initiation ($T_3$ and $T_4$) in both years.

On the basis of these findings it can be recommended that over-aged seedlings should be fertilized with 120 kg N/ha in 3 splits (50 percent as basal and 25 percent each at tillering and panicle initiation) in field. And there was no need to fertilize the seedlings in nursery as this did not increase the yield except ensuring robust
and healthy seedlings. This may be due to extra 60 kg N/ha nitrogen added. These findings strongly disapprove of the previous notion, of fertilizing the nursery and application of N (2/3rd or 3/4th at basal) in the main field. Further it also approves of the blanket application of 120 kg N/ha in case of old seedlings because they can utilize the higher dose of N effectively when applied in 3 splits.

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