

ABSTRACT

EFFECT OF CROP ESTABLISHMENT AND WEED CONTROL PRACTICES IN THE PRODUCTIVITY AND NITROGEN UPTAKE IN BASMATI RICE

The leading aromatic fine quality rice in the world trade, popularly known as Basmati, are traditionally grown in the north and north-western part of Indian sub continent (DRR, 1992) Yet, Basmati rice of the sub continent commanded the highest premium and are priced about three times that of high quality non-basmati types rice. From an areas of about 8 lakh hectares under Basmati cultivation in Punjab, Haryana and Western U.P. nearly 6.5 lakh tones of milled rice was produced annually. Basmati exports account for 63.6 per cent of foreign exchange earned from agricultural products.

Present field investigation was made during *Kharif* 2000 and 2001 in which different crop establishment and various weed control practices was compared each other.

for this purpose, an experiment consisting of following 21 treatments was conducted in a 4-replicated spilt plot design for two years.

A. Main Plot treatments

1. Transplanting rice in puddled soil.
2. Transplanting rice in unpuddled soil.

3. Direct seeding in unpuddled soil.

B. Sub plot treatments

1. Chemical weed control
2. Stale seed bed
3. Stale seed bed followed by chemical weed control.
4. Stale seed bed followed by hand weeding.
5. Chemical weed control followed by hand weeding.
6. Weed free check
7. Unweeded check

The soil of experimental field was Sandy loam having pH of 7.8 moderately fertile being low in available nitrogen and medium in phosphorus and potassium. The experiment with Cv. Pusa Basmati-1 was laid out a split plot design with four replication.

The weed control practices of the treatments were measured in terms of weed density, dry matter accumulation, and N-uptake by various weed. Crop response to the treatments were measured in terms of various quantitative and qualitative indices. For this purpose crop of basmati rice characters like plant height, dry matter, number of shoots/m², number of days taken to panicle emergence number of days taken to 50%

flowering, number of days taken to maturity, number of panicles/m², panicle length, total number of grains/ panicle, Grain weight per panicle, 1000, grain weight, Grain yield, straw yield, Harvest index, N-uptake by grain and straw, weight of root, volume of root, length of root, Economics of various treatments in both the years of field investigation.

These field study provided a reliable measure of efficacy of methods of planting as well as weed control practices. The salient findings are summarized here under.

A. Effect of Crop :

Plant growth and development parameters i.e. number of shoots/m² and dry matter accumulation were immensely influenced by adopting different planting methods and weed control practices in basmati rice. Direct seeding of rice in unpuddled soil condition was most effective in early growth period. The basmati rice transplanted in puddled soil recorded significantly higher values of plant height, number of shoots/m² upto the maturity of the basmati rice. Transplanted basmati rice in unpuddled soil condition was observed better than the rice was sown direct seeding in unpuddled soil condition.

Weed control practices showed their obvious response on crop development unweeded check growth stunted plant height, number of shoots/m² and dry accumulation significantly reduced the above growth characters. Weed free check was observed significantly higher plant height, number of shoots/m² and dry weight accumulation at all the growth stage of Basmati rice over chemical weed control followed by hand weeding. Stale seed bed followed by hand weeding, stale seed bed followed by chemical weed control and only stale seed bed practices of weed control in both the years of field investigation. Weed control practices provided superior over unweeded control for development studies of basmati rice in both the years of field investigation.

B. Harvest Studies:

Classical yield components like number of panicles/m², panicle length, total number of grains/panicle, Grain weight per panicle and 1000, grain weight increased in basmati rice was transplanted in puddle soil condition followed by the basmati rice was transplanted in unpuddled soil condition over the direct seeding in unpuddled soil in both the years of field investigation. Direct seeding in unpuddled soil condition failed to enhance the

yield attributes when compared to the rice was transplanted in puddle soil condition in both the years of field investigation. The yield of basmati rice significantly increased both grain and straw in the basmati rice was transplanted in puddled soil conditions in both the years of field investigation.

Weed control practices provided superior over unweeded control for yield and yield traits in both the years of field trial. Higher values of all yield and yield attributes were recorded with weed free treatment significantly higher with chemical weed control followed by hand weeding, stale seed bed followed by hand weeding, stale seed bed followed by chemical weed control and stale seed bed over rest weed control practices in both the years of field investigation. The unweeded check control was recorded significantly lowest yield attributes and yield of grain and straw in both the years of field trial.

C. Up-take Studies:

Profound effect of planting methods of Basmati rice and weed control practices were observed in respect of nitrogen up take of grain and straw. The nitrogen uptake by rice grain was found significantly higher with the rice was transplanted in puddled soil condition in both the years of field investigation, but

the unweeded check control was obtained significantly lowest up take of nitrogen by grain and straw in both the years of field trial.

D. Development Studies:

The number of days taken to panicle emergence was delayed in the basmati rice was transplanted in puddled soil condition over the rice was direct seeding in unpuddled soil and number of days taken to 50% flowering and days taken to maturity of rice crop significantly delayed in the transplanted rice in puddled soil condition. The weed free treatment also delayed the number of days taken to panicle emergence, 50% flowering and the maturity of the rice crop as compared to unweeded check in both the years of field investigation.

E. Weed Studies:

Weed flora of upland rice consisted of 20 weed species including grasses, broad leaved weeds and sedges weeds. *Cynodon dactylon*, *Echinochloa Colomnum*, *Echinochloa Crusgalli* of grasses, *Cyperus rotundus* of sedges and *Commelina benghalensis* of broad leaved weeds were the dominant weed species during both the years of field investigation.

In weedy check plots density and percent composition of sedges decreased with time but reverse trend was noticed in broad leaved weeds and the maximum percent composition was recorded before harvesting the rice crop. However, percentage of grasses did not vary noticeably with time. Density of weeds *viz.* grasses, broad leaved weeds and sedges weeds and overall density had varied significantly with different planting methods of basmati rice during both the years of field study. The minimum weed density and weed dry weight were recorded under the rice was transplanted in puddle soil followed by the rice was transplanted in unpuddled soil, whereas maximum with direct seeding in unpuddled soil condition.

Weed control practices effectively controlled the density of grasses, broad leaved weeds and sedges weeds and dry matter of weeds against unweeded check. The weed free check was no weeds but the applied chemical weed control followed by hand weeding significantly lowest weed density and dry matter accumulation over the rest weed control practices in both the years of field investigation.

F. Root Studies:

The planting methods of basmati rice were also significantly affected the root length, root volume and root weight of rice in both the years of field trial and with the rice was

transplanted unpuddled soil condition all the above parameters significantly increased as compared to rest planting methods.

Weed control practices were also significantly influence the root length, root volume and root weight of basmati rice in both the years of field trial and weed free was recorded significantly higher above traits in both the years of field experiment.

G. Economics:

The gross, net return (Rs./ha) and net return/Rs. Invested were maximum with the rice was transplanted in puddled soil in both the years of field trail. The second best method in terms of economics was rice transplanted in unpuddled soil.

All the weed control practices resulted in higher gross, net return over unweeded check. The chemical weed control practices.

CONCLUSION:

On the basis of two years field experiment made during Kharif 2000 and 2001, followed conclusion could be drawm.

1. Transplanted basmati rice in puddled soil condition were found to be the best method of rice transplanting as for as the growth parameters and yield of rice crop are concerned.

2. The density of population of various types of weeds was significantly reduced under puddled soil condition and transplanted method of basmati rice establishment.
3. Weed free condition obviously provided conducive environment for better rice growth. However, chemical weed control followed by hand weeding were most effective in controlling weeds.
4. In case of weeds only nitrogen removal was affected by both the methods of planting as well as weed control measures. Minimum nitrogen removal was recorded in puddled soil rice transplanted method and use of chemical weed control followed by hand weeding.
5. In case of the nutrient removal by rice crop, the significant effect of both methods of planting puddled and unpuddled and weed control practices was apparent nitrogen removal was all influenced. Maximum removal of nitrogen was observed under puddle transplanted method of rice and with application of chemical weed control.
6. As far as the economics of treatment are cornered the transplanting of basmati rice in puddled soil condition was

found to be the best which gave maximum net return Rs./ha as also maximum net return Rs. investment.

RECOMMENDATION:

It view of the above conclusion it may be recommended that the age old practice of transplanting basmati rice in puddled soil condition with control of weeds through chemical followed by hand weeding shall be most beneficial practice for irrigated basmati rice cultivation in Bulandshahr (West Region).