Environment & Ecology 27 (4B) : 2050—2052, 2009
 ISSN 0970-0420

Performance of Improved Biasi Operation Implement on Growth and Yield of Paddy Over Traditional Practice

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Abstract

The trial was conducted during kharif season of 2001 at five farmers fields to assess the productivity, soil properties, yield and economics under biasi system of rice production with improved and traditional biasi operation implements. Result revealed that field capacity (0.15 ha/day), weeding efficiency (83.62%), maximum grain yield (33.57q/ha) and economics (Rs 506.53/ha) were recorded from intercultural plough. In the line seeding rice, Ambica paddy weeder showed maximum weeding efficiency (83.87%) with grain yield of 33.57 q/ha and cost of operation (Rs 915.47/ha).

Key words : Biasi, Implements, Weeding efficiency, Rice productivity.

"Biasi" a traditional practice of intercultural operation in direct sown rice is popular in eastern states of India (i.e. M. P,Bihar, West Bengal and Orissa) and about 75% of total paddy area (25.5 mha) is covered under biasi system. In this system the bushening operation was performed when crop attained age of 28 days and the bullock drawn country plough was run in the standing crop having 10 cm submergence followed by seedling redistribution and chalai operation. But the traditional biasi operation requires large energy, cost and also have high plant mortality (1). Poor soil physical properties lead to low return from the system. Therefore, to increase the yield of rainfed rice system with minimizing operational cost and energy, the introduction of proper implement technology for biasi system is required. Hence the present study was undertaken to assess the performance of traditional and improved biasi implement on rice productivity, cost and energy economics of biasi system of rainfed rice production system.

Methods

A field experiment on farmers field located near by zonal Research Station, Darisai was conducted during khaki season of 2001. The soil was acidic in reaction PH (5.0–5.6), low in organic matter content (0.16—0.34%), available N (260—310 kg/ha), available P (5.6—19.6 kg/ha), available K (56—137.2 kg/ha). The experiment was laid out in split plot design with main plot treatment—variety (IR-36, Kanak) while in sub-plots different Implements were taken. The plot size was 20× 20 m with a seed rate of 120 kg/ha for broadcasting, 100 kg/ha for behind the plough and 80 kg/ha for seed drill. Spacing was maintained at 20 cm row to row. A fertilizer doses of 70 kg N, 40 kg P and 20 Kg/ha K were applied. Full dose of P, K and 1/3rd N were applied as basal dose at the time of sowing and 1/3rd of N after biasi and remaining 1/3rd N at panicle initiation stage. The general soil properties of the farmers field are presented in Table 1.

Results and Discussion

Field Capacity

Table 2 shows that the average maximum field capacity of 0.17 ha/day was obtained by Birsa ridger plough followed by 0.15ha/day by deshi plough. The Birsa ridger plough is significantly better than deshi plough and deshi plough is better than intercultural plough with regard to field capacity. Average field capacity of 0.05 ha/day (Table 3) was found by Japanese paddy weeder which was followed by cono paddy weeder (0.058 ha/day) and minimum of 0.057 ha/day was obtained by Ambica paddy weeder which was statistically significant to each other.

Broadcasting method of sowing has no effect on field capacity of bullock drawn biasi implement. The

Table 1. Different soil properties of the experimental field.

Farmer no.	pH	Organic Carbon (%)	Available nutrient (kg/ha) N	P	K
1.	5.0	0.33	297.90	8.2	103.6
2.	5.2	0.22	279.10	7.1	56.0
3.	5.6	0.16	276.00	5.6	100.8
4.	5.3	0.34	260.30	11.2	123.2
5.	5.1	0.31	310.20	19.6	137.2

average field capacity of 0.15 ha/day was found in both varieties. Average maximum field capacity of 0.059 ha/day (Table 2) was found when behind the plough method of sowing was used which was followed by seed drill sowing in which the average field capacity of 0.057 ha/day.

Effect of Biasi Implement on Weeding Efficiency

The maximum weeding efficiency of 83.62% (Table 2) was obtained by Birsa ridger plough followed by intercultural plough (83.04%) and minimum of 82.56% was obtained by deshi plough. However, the weeding efficiencies of these three implements are non-significant. In manual operated biasi implement a maximum weeding efficiency of 83.87% was obtained by using Ambika paddy weeder (Table 3)

Table 2. Effect of bullock drawn implements on field capacity, weeding efficiency, grain yield and econoics of operation.

	Field capacity (ha/day)	Weeding efficiency (%)	Grain yield (q/ha)	Economics of operation (Rs/ha)
Main plot Variety				
Improved variety	0.15	82.30	36.86	474.70
Local variety	0.15	83.34	28.1	470.58
sub plot-Implement				
Desi plough	0.15	82.56	32.37	490.75
Birsa ridger plough	0.17	83.62	31.50	420.64
IC plough	0.14	83.04	33.57	506.53
CD 5%				
V	NS	NS	8.15	NS
I	0.09	NS	0.41	71.65
I × V	NS	NS	10.78	NS

followed by using Japanese paddy weeder with 82.58% weeding efficiency and minimum of 71.42% was obtained by using cono paddy weeder. The maximum weeding efficiency was obtained by using Birsa ridger plough that may be due to slight curvature in board by which the weeds were buried into the soil, whereas there is no curvature either in intercultural plough or in desi plough. Advantage of mechanical weeding over conventional system was reported earlier by Singh et al. (2), while studying mechanical weeding and conventional weeding in direct sown rice. Among manual operated intercultural implements the weeding efficiency of Ambika paddy weeder was found to be less efficient due to low penetration of weeding.

Effect of Biasi Implement on Grain Yield (q/ha)

Maximum grain yield of 33.57 q/ha (Table 2) was obtained by using intercultural plough followed by desi plough in which grain yield of 32.37 q/ha was obtained, when different bullock drawn biasi implements were used. Among different manual operated implements the maximum average grain yield of 33.95q/ha was obtained after using Ambica paddy weeder

Table 3. Effect of manually operated implements on field capacity, weeding efficiency, grain yield and economics of operation.

	Field capacity (ha/day)	Weeding efficiency (%)	Grain yield (q/ha)	Economics of operation (Rs/ha)
Main plot-Variety				
Improved variety	0.059	78.08	36.92	875.81
Local variety	0.058	80.50	28.87	888.23
Sub-plot-Implement				
Japanese paddy weeder	0.059	82.58	33.14	848.91
Cono weeder	0.058	71.42	31.60	851.67
Ambica paddy weeder	0.057	83.87	33.95	915.47
CD 5%				
V	0.007	NS	2.8	NS
I	0.006	4.41	2.45	NS
I × V	0.008	NS	8.02	NS

followed by 33.14 q/ha (Table 3) by using Japanese paddy weeder and minimum of 31.6 q/ha obtained by using Cono paddy weeder. Table 2 shows that yield under seed drill sowing, was slightly higher (32.94 q/ha) than sowing behind the plough (32.85 q/ha). The grain yield by using intercultural plough was found to be better due to high values of yield attributing agronomic character. The improved variety performs better than the local variety because of their better genetic potential. Yield increase in rice with various weed control methods viz. no weeding , manual and mechanical weed control was reported by Bernard and Jones (3).

Effect of Biasi Implement on Economics of Operation

Table 2 indicates that among different bullock drawn biasi implements the Birsa ridger plough had minimum cost of operation (Rs 420.64/ha) followed in desi plough (Rs 490.75/ha) and intercultural plough (Rs 506.53/ha). Among different manual operated implements (Table 3) the maximum cost of operation of Rs 915.478 /ha was found with Ambica paddy weeder followed by Cono weeder (Rs 851.67/ha) and minimum was obtained after using Japanese paddy weeder Rs 848.91/ha. High net return by using improved mechanical weeder was also reported earlier (4).

Dhus it may be concluded that improved rice varieties and mechanical measures of weed control irrespective of bullock drawn or manually operated implement may increase the productivity and profitability of the biasi system prevailing in the area.

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