

Influence of crop establishment methods on the incidence of rice blue beetle, *Leptispa pygmaea* Baly

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ABSTRACT

Influence of two methods of crop establishment viz., direct seeding and transplanting on the incidence of rice blue beetle, Leptispa pygmaea on rice varieties Jyothi (short duration) and Aiswarya (medium duration) were studied during wet and dry season, 2005. A scoring method for the estimation of damage by L. pygmaea was standardized. Transplanting method of rice establishment was observed to suffer more damage by L. pygmaea than direct seeding method in both the rice varieties during the two seasons. Highest damage of blue beetle was observed at the early tillering stage in both direct seeding and transplanting methods with damage ranging from 31.51 to 45.71 per cent in Jyothi and 19.57 to 29.57 per cent in Aiswarya under direct seeded condition and 68.54 to 75.32 per cent in Jyothi and 36.15 to 46.14 per cent in Aiswarya under transplanted crop. Direct seeding resulted in 34-58 per cent reduction of blue beetle damage in Jyothi, whereas in Aiswarya 36-46 per cent damage was reduced by this method.

Key words: *Leptispa pygmaea, incidence, crop establishment method*

The rice blue beetle, *Leptispa pygmaea* Baly (Coleoptera: Chrysomelidae) hitherto reported as a minor pest (Dale, 1994) has recently assumed a serious status as an emerging problem by causing much concern to the rice cultivation in the state of Kerala particularly in Palakkad, Kannur, Kasaragod and Trivandrum districts. Very little information on the management of the pest is available. Information on the influence of rice establishment methods on the population and damage of *L. pygmaea* is also not available. Hence, the present study has been undertaken to estimate the field damage caused by *L. pygmaea* under two methods of rice establishment viz., direct seeding and transplanting.

MATERIALS AND METHODS

The effect of two methods of rice establishment viz., direct seeding and transplanting on the field incidence of *L. pygmaea* was studied by assessing its extent of damage in the direct seeded and transplanted rice at the Regional Agricultural Research Station, Pattambi, Kerala Agricultural University during wet and dry seasons, 2005. The experiment was conducted with

direct seeding and transplanting methods, each method in two plots of 2000 m² with two varieties viz. a short duration variety (Jyothi) and a medium duration variety (Aiswarya). In the direct seeded plots, sowing of Jyothi and Aiswarya was done by broadcasting @ 80 kg ha⁻¹ at three weeks prior to the planting of seedlings in the transplanted plots. In the plots of transplanting, 21 days old seedlings of the two varieties were planted at a spacing 20x15 cm. The damage incidence of blue beetle in the field was recorded by walking diagonally across the entire direct sown and transplanted plots. Observations were taken on the total number of leaves and the number of damaged leaves from randomly selected 30 hills. The intensity of damage was also rated by standardizing a scoring technique (Table 1) for blue beetle from randomly selected 30 hills at different days after sowing/transplanting during different growth stages. Observations were taken at 30, 40, 50, 60 and 70 days after sowing (DAS) in direct seeded and at 10, 25, 40, 55 and 70 days after transplanting (DAT) in transplanted crop coinciding with different growth stages viz. seedling, early tillering, maximum tillering, panicle initiation and booting of the crop.

Table 1. Scoring method for rating the damage by *Leptispa pygmaea* in rice

Damaged leaves hill ⁻¹ (%)	Score
No damage	0
1-10	1
11-25	3
26-50	5
51-75	7
More than 75	9

RESULTS AND DISCUSSION

Results of the study indicated that transplanted rice suffered more damage than direct seeded crop in both wet and dry seasons, 2005 (Table 2). The leaf damage in Jyothi was observed to be lower in direct seeded than in transplanted crop during different stages of crop growth in both wet and dry seasons. At seedling stage (10 DAT), transplanted rice suffered 60.40 per cent leaf damage in dry season, while direct seeded rice suffered only 10.18 per cent, thus indicating a reduction of 83.15 per cent damage in direct seeded of Jyothi. Highest leaf damage was observed at early tillering stage (40 DAS) in both direct seeded and transplanted (25 DAT) rice in both the seasons. In direct sown crop, the damage score was '5' in both dry and wet seasons, whereas in transplanted rice, a higher damage intensity with a rating of 7 and 9 was observed in dry and wet seasons, respectively. The leaf damage during this stage was 45.07 per cent in direct seeded rice, while it was 68.54 per cent in transplanted crop in wet season. The corresponding values in direct seeded and transplanted methods were 31.51 and 75.32 per cent, respectively during dry season. Blue beetle damage was thus found to increase from seedling to early tillering stage and

thereafter, showed a decline in the later stages of maximum tillering, panicle initiation and the lowest leaf damage was observed at booting (70 DAT) with 15.16 per cent in transplanted while it was 6.86 in direct seeded rice (70 DAS) in wet season. The reduction of damage in direct seeded over transplanted method was more during dry season than in wet season during the early tillering stage which was indicated as the most susceptible stage for the incidence of *L. pygmaea* in rice. In Jyothi, the direct seeding method caused a lower damage score of '5' as against a higher damage rating of '7 and 9' during dry and wet seasons, respectively in the transplanting method of crop establishment.

In general the incidence of *L. pygmaea* was less in Aiswarya as evident from the lower damage score, that ranged from '1' to '5' as compared to the higher score of '1' to '9' in Jyothi during different stages of crop growth (Table 3). In the variety Aiswarya also, the transplanting method again showed a higher incidence of blue beetle damage than the direct sowing method during both wet and dry seasons. The early stage (10 DAT) of transplanted rice showed a higher leaf damage of 37.60 and 24.41 per cent than the direct sown crop (13.44 and 12.50 % at 30 DAS) in dry and wet seasons, respectively. Highest leaf damage with a score of '5' was observed during early tillering stage in dry (46.44 per cent in transplanted and 29.57 per cent in direct seeded rice) and wet seasons (36.15 per cent in transplanted and 19.57 per cent in direct seeded rice). As in Jyothi, the damage gradually declined from the early tillering stage and reached its minimum during booting stage in both transplanted and direct sown rice during wet and dry seasons. Damage was less in direct

Table 2. Influence of direct sown and transplanted rice (variety Jyothi) on the incidence of *L. pygmaea*

DAS	Direct seeded rice				DAT	Transplanted rice			
	Mean damaged leaves hill ⁻¹ (Per cent)		Damage rating (score)			Mean damaged leaves hill ⁻¹ (Per cent)		Damage rating (score)	
	Dry season	Wet season	Dry season	Wet season		Dry season	Wet season	Dry season	Wet season
30	10.18	20.30	1	3	10	60.40	35.24	7	5
40	45.07	31.51	5	5	25	68.54	75.32	7	9
50	31.13	6.99	5	1	40	40.70	59.94	5	7
60	13.81	1.90	3	1	55	20.93	16.40	3	3
70	6.86	0	1	0	70	15.16	5.74	3	1

DAS: Days after sowing, DAT: Days after transplanting

Table 3. Incidence of *L. pygmaea* as influenced by direct sown and transplanted methods of rice (variety Aiswarya) during dry and wet seasons

DAS	Direct seeded rice				DAT	Transplanted rice			
	Mean damaged leaves hill ⁻¹ (Per cent)		Damage rating (score)			Mean damaged leaves hill ⁻¹ (Per cent)		Damage rating (score)	
	Dry season	Wet season	Dry season	Wet season		Dry season	Wet season	Dry season	Wet season
30	13.44	12.50	3	1	10	37.60	24.41	5	3
40	29.57	19.57	5	5	25	46.44	36.15	5	5
50	14.98	5.50	3	1	40	23.54	17.24	5	3
60	6.22	0	1	0	55	12.90	2.67	3	1
70	0	0	0	0	70	11.58	0	3	0

seeding method with a higher plant density (100-150 plants sqm⁻¹) and the incidence was higher with a lower density of plants (50-55 plants sq m⁻¹) during all stages of crop growth in both the seasons. Direct seeding of rice resulted in 64.26 per cent reduction of blue beetle damage over transplanted crop in the seedling stage during wet season, whereas in dry season it was 48.79 per cent. During the most susceptible stage of the early tillering phase, the damage was reduced by 68.1 per cent and 36.36 per cent during dry and wet seasons, respectively in direct seeding method. The incidence of blue beetle was found to be more in dry season than in wet season.

The present study thus indicates that direct seeding by broadcasting of rice could be recommended to reduce the incidence of *L. pygmaea*. Highest damage of rice blue beetle was observed to occur during the early tillering stage. Jyothi, the most popular variety in Kerala, was found to be highly susceptible to rice blue beetle and hence its cultivation has to be avoided in endemic areas. The lower infestation of *L. pygmaea* in direct seeding might be due to closer spacing in direct seeding leading to high plant density (100-150 plants sq m⁻¹) which might not have provided conducive conditions for the development and multiplication of *L. pygmaea*. This finding is in accordance with the

earlier reports on *Dicladispa armigera* (Oliver) (Dhaliwal and Singh, 1979), *Nephotettix cincticeps* (Uhler) and *Cnaphalocrocis medinalis* (Guen) (Seungchan *et al.*, 1997), rice root weevil, plant hoppers and rice thrips and aphids (Liansheng *et al.*, 1999).

REFERENCES

- Dale D 1994. Insect pests of rice plant – their biology and ecology. In Biology and Management of Rice Insects Heinrichs E A. (ed). Wiley Eastern Limited and New Age International Limited. p .779
- Dhaliwal GS, Singh J and Jaswant S 1979. Effect of spacing on rice hispa incidence. IRRI Newsl. 4 : 19
- Liansheng W, Chaokun D, Zhilong D, Xintian D, Ruiquiang S, Huoming H, Wang LS, Deng CR, Dui ZL, Ding X T, Shi, R H and Huang HM 1999. Occurance of major pests in rice field with new cultivation pattern, direct seeding or ridge plot without ploughing and optimum control technique of rice pests in south west mountain area of Zhejiang province. Korean J appl Ent 11: 356-359
- Seungchan L, Kyoung M, Lee SC and Ma KC 1997. Occurrence of major pests of machine transplanted and direct seeded paddy field. Korean J Appl Ent 36: 141-144