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Effect of foliage clipping on grain yield of basmati rice

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ABSTRACT

Field experiment was conducted to study the effect of extent and stage of foliage clipping on the grain yield of basmati rice. The results revealed that the maximum grain yield (2.9 t ha^{-1}) was registered in case of clipping of one-third foliage from the top at 30 days after transplanting followed by clipping at the time of transplanting (2.5 t ha^{-1}). Similarly, foliage clipping of one-third from the top produced higher grain yield than clipping one-half foliage from top. The foliage clipping only once produced higher grain yield than clipping twice at 30 and 60 days after transplanting.

Key words: *Basmati rice, clipping, growth, yield*

Basmati rice is characterized by its superfine kernels, exquisite aroma, soft texture, sweet taste, linear elongation with least breadth - wise expansion and non sticky nature on cooking. Due to these characteristics, it has tremendous export potential and fetches premium price in the international market. However, yield of basmati rice is generally low mainly due to its tall stature making it liable to lodging particularly under high fertilizer dose. Reducing the height of plant is recognized as an effective means to reduce lodging (Mancuro and Caviness, 1991). Lodging can be controlled by cutting the foliage during initial vegetative stage (Ghosh and Sharma, 1998; Ahmed *et al.*, 2001) However, there is little information on the effect of foliage clipping on basmati rice. Field experiment was conducted to study the effect of foliage clipping on grain yield of basmati rice at Gurdaspur during the dry season of 2001. Thirty days old seedlings of variety Basmati 386 were transplanted (two hill^{-1}) on 17 July 2001 at 20 cm x 15 cm spacing. Total 10 treatments (combinations of different timings, number and extent of foliage clipping) were arranged in randomized complete block design with three replications. A basal dose of 30 kg P_2O_5 ha^{-1} in the form of single super phosphate was applied at the time of field preparations. Nitrogen as urea was applied @ 20 kg ha^{-1} in two equal splits at 20 and 40 days after transplanting. All other recommended agronomic practices were adopted. The crop was harvested in the first week of November.

The extent (one-third or one-half) and stage (30, 45 or 30 and 60 days after transplanting) of foliage clipping significantly influenced the grain yield through their marked influence on plant height and yield attributes except number of panicles m^{-2} (Table 1). The maximum grain yield (2.9 t ha^{-1}) was registered in case of clipping of one-third foliage from the top at 30 DAT followed by clipping at the time of transplanting just above the growing point (2.5 t ha^{-1}). Angrish (2000) found that cutting of excessive foliage of tall statured varieties of rice did not cause any adverse effect on grain yield.

Grain yield linearly decreased with each successive delay in clipping from 30 to 60 DAT and the difference between 30 (2.6 t ha^{-1}) and 60 DAT (1.9 t ha^{-1}) was significant (mean of one-third and one half foliage clipping). Similarly, foliage clipping only once (irrespective of the stage and extent of clipping) produced higher grain yield (1.9-2.9 t ha^{-1}) than clipping twice at 30 and 60 DAT (1.5-1.7 t ha^{-1}). Such reduction was significant as compared to clipping once at 30 (2.6 t ha^{-1}) or 45 DAT (2.3 t ha^{-1}). Similarly foliage clipping of one-third portion from the top produced higher grain yield (2.2 t ha^{-1}) than clipping one-half foliage from top

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Table 1. Effect of foliage clipping on plant height, yield attributes and grain yield of basmati rice

Foliage clipping		Plant height	Panicles	Panicle (cm)	Grains	Grain yield
Extent of clipping from top of the plant	Days after transplanting	(cm)	m^{-2}	length	$Panicle^{-1}$	(t ha^{-1})
One third	30	118.9	357.3	24.8	84.7	2.9
One half	30	112.8	326.0	25.2	77.5	2.5
One third	45	109.9	324.0	24.3	73.0	2.4
One half	45	108.5	324.0	22.8	61.8	2.2
One third	60	114.7	313.3	22.3	60.2	1.9
One half	60	105.0	308.0	22.3	55.8	1.9
One third	30 + 60	98.3	304.0	20.5	58.5	1.7
One half	30 + 60	94.9	299.3	19.5	49.7	1.5
Just above growing point	Seedling transplanting	129.8	350.3	78.2	24.8	2.5
No clipping	-	128.0	314.0	23.3	65.0	2.2
CD (P=0.05)		9.3	NS	2.3	13.2	0.5.2

(2.0 t ha^{-1}). Clipping once at 60 DAT or twice at 30 and 60 DAT resulted in lower grain yield as compared to control where no foliage clipping was done.

Various yield attributes followed the trends of grain yield (Table 1). Plants seem to have better ability to withstand clipping shock at 30 DAT (active growing and maximum tillering stage) as indicated by improvement in yield attributes and higher grain yield. Ghosh and Sharma (1998) reported higher number of grains $panicle^{-1}$ of non-basmati rice from early than late leaf cutting. Ahmed *et al.* (2001, a) also reported significant reduction in yield attributes and grain yield of non-basmati rice with leaf cutting done at 35 DAT as compared to no cutting or cutting made at 21 DAT. Further delay in leaf cutting to 49 DAT significantly decreased the grain yield over the cutting at 35 DAT (Ahmed *et al.*, 2001a). Earlier Das and Mukherjee (1992) reported similar adverse effect of delayed leaf cutting.

Lower yield in case of clipping made at time of transplanting of seedlings as compared to that of 30 DAT might be due to lesser ability of plants to withstand clipping shock because the seedlings at this stage were also under transplanting shock. On the other hand, foliage clipping at 45 and 60 DAT might have adversely influenced the subsequent growth and possibly took more time to recover from such shock leading to reduced grain yield. Leaf clipping at panicle initiation was more detrimental than that of active tillering stage (BRRI 1986). Clipping of only one-third foliage from the top was found better than clipping to one-half.

Thus, partial foliage clipping up to one-third portion from top at 30 DAT has beneficial effect on traditional tall basmati rice.

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