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Short Communication

Crop-Weed Competition in Clusterbean under Rainfed Conditions

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Clusterbean (*Cyamopsis tetragonoloba* (L.) Taub) is an important rainy season drought resistant grain legume grown extensively on drylands of Indian plains. Poor weed control measures are one the important factors for low yield in this crop (Yadav *et al.*, 1993). The time of weed removal reflects its impact in terms of growth and yield potential of the crop.

Hence, to identify the critical period of crop-weed competition in clusterbean, a field experiment was conducted during rainy seasons of 1992 and 1993 at CCS Haryana Agricultural University, Regional Research Station, Bawal. The soil of the experimental field was loamy-sand with pH 8.3. The treatments consisted of weedy conditions for 15, 30, 45 and 60 days after sowing (DAS), and weed free up to 15, 30, 45 and 60 DAS besides weedy and weed free checks. The experiment was laid out in randomized block design with three replications. Clusterbean cv. HG 75 was sown (keeping 45 cm row spacing) in the last week of July during both the seasons and it was harvested at around 115 DAS. The predominant weed flora in the experimental field comprised of *Trianthema portulacastrum*, *Digera arvensis*, *Amaranthus viridus*, *Cyperus rotundus* and *Cynodon dactylon*. During crop growth season of 1992, the rainfall received was 137.7, 112.9, 67.8, 33.0 and 14.6 mm in July, August, September, October and November, respectively, where as, in 1993, it was 349.6, 59.4, 93.0, 0.0 and 0.0 mm in corresponding months. Dry weight of total weeds was recorded and weed control efficiency (WCE), expressed in percentage, was worked out by (X-Y)/X*100, where, X and Y are dry weight of weeds in unweeded check and weed control treatments, respectively.

The dry weight of weeds increased from 121.6 to 415.0 g m^{-2} in 1992, and from 75.4 to 509.5 g m^{-2} in 1993 with the corresponding increase in the weedy period for first 15 DAS to harvesting stage (Table 1). However, reverse (100 g m^{-2} in 1992 and 93.7 g m^{-2} in 1993) was true in the treatments where weeds were not allowed to grow. Consequently, weed control efficiency decreased with the corresponding increase in the length of weedy period and increased with the length of weed free period during both seasons (Table 1). Crop-weed competition did not have any significant adverse effect on plant height and yield attributes like number of grains pod^{-1} and 1000-seed weight (Table 2). Also, there was no significant difference in respect of number of branches $plant^{-1}$ and number of pods $plant^{-1}$ among the plots kept weed free up to 15 DAS or beyond during both seasons (Table 2). It clearly indicated the importance of early

Table 1. Effect of crop-weed competition on dry weight of weeds, weed control efficiency and grian yield of clusterbean

Treatment	Dry weed weight (g m^{-2})		WCE (%)		Grain yield (kg ha^{-1})	
	1992	1993	1992	1993	1992	1993
Weedy upto						
15 DAS	121.6	75.4	70.7	85.2	1477	965
30 DAS	144.0	152.8	65.3	70.0	1360	882
45 DAS	172.2	253.2	58.5	50.3	1332	706
60 DAS	290.1	398.9	30.1	21.7	1271	598
Harvest	415.0	509.5	0.0	0.0	1000	590
Weed free upto						
15 DAS	100.1	93.7	75.9	81.6	1485	993
30 DAS	80.0	73.8	80.7	85.5	1488	1039
45 DAS	48.0	46.8	88.4	90.8	1496	1084
60 DAS	24.1	24.9	94.2	95.1	1510	1156
Harvest	0.0	0.0	100.0	100.0	1526	1164
CD (P=0.05)	26.7	102.5	–	–	241	141

crop-weed competition. However, there was significant reduction in number of branches $plant^{-1}$ when weeds were allowed to grow up to harvest in 1992 and even when plots kept unweeded up to 15 DAS in 1993. Weeds adversely affected number of pods $plant^{-1}$ when these were allowed to grow for 45 DAS and beyond in 1992, and up to 60 DAS and beyond in 1993.

Grain yield of clusterbean increased significantly when plots were kept weed free up to 15 DAS or beyond in 1992, and on the other hand, it was reduced significantly in the plots kept unweeded up to 60 DAS or beyond in 1992 (Table 1). However, in 1992, there was significant reduction in grain yield in the plots which remained weedy up to 15 DAS or beyond and weedy treatments

Table 2. Effect of crop-weed competition on growth and yield attributes of clusterbean

Treatment	Plant height (cm)		Branches $plant^{-1}$ (No.)		Pods $plant^{-1}$ (No.)		Grain pod^{-1} (No.)		1000-grain weight (g)	
	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993
Weedy upto										
15 DAS	66.2	125.3	6.53	6.20	64.3	43.4	6.96	7.73	35.7	23.8
30 DAS	63.6	121.2	6.30	5.60	54.5	40.3	6.43	8.30	35.2	23.6
45 DAS	61.7	123.8	6.00	5.30	51.1	36.3	6.10	8.40	34.6	23.1
60 DAS	60.8	122.3	5.87	5.00	50.1	33.2	5.72	6.60	35.6	23.3
Harvest	57.2	120.0	4.17	4.56	43.6	29.5	5.66	7.40	34.6	23.5
Weed free upto										
15 DAS	66.2	126.2	6.6	6.83	64.2	42.1	6.73	8.30	35.8	23.7
30 DAS	67.2	127.9	7.00	7.06	65.9	456	6.96	8.20	35.9	23.5
45 DAS	65.1	128.5	7.10	7.27	65.5	47.3	7.06	8.40	35.1	23.1
60 DAS	68.5	129.1	7.20	7.47	66.3	48.1	7.10	8.50	35.0	23.7
Harvest	68.9	128.6	7.20	7.47	68.4	48.2	7.33	8.73	34.8	23.8
CD (P=0.05)	N.S.	N.S.	1.62	1.11	11.0	6.6	N.S.	N.S.	N.S.	N.S.

up to 15 DAS and 30 DAS were at par. The weed free conditions maintained up to first 15, 30 and 45 DAS were also at par in terms of grain yield in 1993 (Table 1). The grain yield was more in 1992 as compared to that in 1993 (Table 1), however, the reverse was in respect of plant height (Table 2). This might be due to differential distribution of rainfall during the two crop seasons. Higher grain yields in 1992 could be due to well distributed rainfall throughout the crop season, while greater plant height and lower yields in 1993 might be due to heavy rains at early growth season of crop and no rain during maturity period. However, the results clearly indicate the importance of early crop-weed competition and early weed removal (15 to 45 DAS). Critical period (maximum period tolerated without affecting final crop yields or the point after which weed growth does not affect final yield) in different beans has already been reported to range from 4-6 weeks after sowing (Dawson, 1964, 1970; Nieto *et al.*, 1968). Since the crop seedlings are tender at 15 DAS, these might be damaged at this stage, if interculturing is done, but at later stages (45 DAS), it might be difficult due to vigorous growth of crop plants and weeds. It is, therefore, suggested to go for weeding in this crop between 30 and 45 DAS under rainfed conditions, which seems to be critical period.

References

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