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NOTE

Crop Weed Competition in Grain Amaranth (*Amaranthus hypochondriacus*)

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Abstract

Field experiments were conducted during *rabi* seasons of 2002-03 and 2003-04 to study the critical period of crop weed competition in grain amaranth. *Cyperus rotundus, Digitaria ciliaris, Cleome rutidosperma* and *Trianthema portulacastrum* were the predominant weeds. First 20—40 days after sowing (DAS) were the most critical period for crop-weed competition. Grain yield of grain amaranth was reduced by 14.8 and 31.6% due to weeds during the first 20 and 40 DAS, respectively. Yield loss due to weeds competing throughout the crop season was 62%. Weeds emerging after 40 DAS caused only 5.5% reduction in yield and there was no advantage on yield due to further increase in initial period of weed free condition in grain amaranth.

Key words : Grain amaranth, Critical period, Weed dry weight, Weed index.

Grain amaranth (*Amaranthus hypochondriacus*) a potential pseudo-cereal is grown in different parts of India as a subsidiary food crop. Weed management is an integral part of crop husbandry and weeds alone account for 70% losses in crop yield (1) depending upon their nature and duration. Poor weed control measures are one of the important factors for low yield. The time of weed removal has an important effect on the growth and yield potential of the crop. Therefore, it is imperative to identify the critical period of crop weed competition to render the weed management practices more effective and more economical. Keeping this in view, the present study was undertaken.

Field experiments were carried out during *rabi* seasons of 2002-03 and 2003-04 at Central Research Farm, Orissa University of Agriculture and Technology, Bhubaneswar in a sandy loam soil with pH 5.6 low in organic carbon and total nitrogen (228 kg/ha) medium in phosphorus (21.6 kg/ha)and potassium (280 kg/ha). Grain amaranth cv BGA2 was sown on 18 November in both the years, with a spacing of 45 cm × 15 cm (between rows and plants). Treatments consisting of weed free for 20, 40, 60, 80 days, weed free upto harvest and weedy upto 20, 40, 60, 80 and upto harvest were arranged in a randomized block design with four replications. A uniform dose of 40 kg N, 40 kg P and 20 kg K was applied to the test crop. Weed population was recorded periodically using a quadrate of 0.25 m^2 from two spots per plot and dry matter was recorded. The data of both the years were pooled and analyzed.

The predominant weed flora of the experimental plot comprised *Cyperus rotundus, Acanthospermum hispidum, Cleome rutidosperma* and *Trianthema*

Table 1. Effect of crop weed competition on dry matter accumulation by weeds (pooled of two years).

Treatment	Weed dry weight (g/m^2) on days after sowing				
	20	40	60	80	At harvest
Weedy for DAS					
20	48	–	–	–	–
40	46	268	–	–	–
60	49	270	318	–	–
80	45	281	328	301	–
Harvest	51	262	314	312	290
Weed Free for DAS					
20	–	108	166	190	184
40	–	–	38	89	106
60	–	–	–	12	28
80	–	–	–	–	–
Harvest	–	–	–	–	
CD (0.05)	6	21	28	32	24

Table 2. Effect of crop weed competition on grain yield and yield attributes of grain amaranth (pooled of two years).

Treatment	Plant height (cm)	Inflorescence length (cm)	Grain yield (kg/ha)	Weed competition index (%)	Straw yield (kg/ha)
Weedy for DAS					
20	134.5	44.4	1026	14.8	4856
40	130.0	38.8	828	31.6	3428
60	118.5	30.8	686	43.5	2765
80	102.6	24.6	583	51.6	2402
Harvest	88.2	18.2	458	62.0	2271
Weed Free for DAS					
20	126.8	32.8	994	17.4	4664
40	138.5	37.9	1138	5.5	5525
60	144.6	38.1	1160	3.6	5540
80	144.8	43.8	1178	2.2	5638
Harvest	146.2	48.5	1204	–	5710
CD (0.05)	8.34	3.68	68.64	–	115.82

portolacastrum during both the years. All weed free periods resulted in lower dry weight of weeds in comparison to weedy throughout the crop season. It showed that keeping weed free upto 40 DAS resulted in low emergence of weed at weed at further growth stages (Table 1). This indicated that better canopy development at later stages of crop growth did not allow the weeds to come. The plots kept weed free for the initial 40 days accumulated the minimum weed dry weight of 106 g/m^2 (Table 1) as compared to 290 g/m^2 in the weedy check at harvest. On the contrary, the dry weight of weeds in plots kept weedy for 40 DAS (268 g/m^2) was statistically at par with the dry weight of weeds obtained in the weedy plot at harvest (290 g/m^2). The loss in yields increased with the increase in duration of initial weedy condition. The weed competition index due to weedy condition for the first 20 DAS was 14.8%, which increased to 62% due to competition with weeds for the full crop season.

Weed competition index (WCI) due to weeds emerging after 40 DAS was 5.5% which decreased with increase in the initial weed free condition (Table 2). However, the grain yield from weed free upto 40 DAS (1138 kg/ha) did not show any significant different with that of weed free upto harvest (1,204 kg/ha). On the basis of weed dry weight and grain yield data, the first 40 DAS seem to be the most critical period for crop weed competition and two hand weedings upto 40 DAS may be recommended for economic weed management in grain amaranth.

Reference

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