

Bio-efficacy of Herbicides Against *Cuscuta* in Blackgram [*Vigna mungo* (L.) Hepper]

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Cuscuta, commonly known as dodder, is becoming a major problematic parasitic weed in blackgram, especially in rice-fallows. Rao and Gupta (1981) reported that among pulses, blackgram was found to be the most susceptible to *Cuscuta*. The reduction in yield due to the infestation of *Cuscuta* in blackgram cultivars varied from 12.7 to 39.3% (Kumar and Kondap, 1993). Frequent inter-row cultivation or hand pulling before the parasite attaches to the host plant is the most common method being followed for its management. However, this method is laborious, time consuming and often not effective. Therefore, an experiment was undertaken to find out the efficacy of available herbicides for controlling *Cuscuta* in blackgram.

A field experiment was conducted under rainfed conditions during **kharif** 2003 at the National Research Centre for Weed Science, Jabalpur. The soil was clay loam in texture with neutral pH. Fifteen treatments (Table 1) were evaluated in a randomized block design with three replications. All the weeds except *Cuscuta* were removed from the plots manually as and when required. Herbicides were applied as spray using 500 l of water per hectare. Blackgram (cv. TU 98-14) was sown along with counted seeds of *Cuscuta* (50 m⁻²) in rows 25 cm apart in 1 m² micro plots on July 7, 2003. *Cuscuta* seeds were treated with concentrated sulfuric acid for 30 min before broadcasting them in the field to break dormancy and facilitate their germination. Hundred plants of blackgram were maintained at 25 days after sowing. All the recommended package of practices were adopted to raise the experimental crop. The crop received a total rainfall of 1152 mm during the season.

Application of herbicides significantly reduced the germination of *Cuscuta* in blackgram. Pre-emergence application of pendimethalin at 1.0 kg ha⁻¹ being at par with fluchloralin 1.0 kg ha⁻¹

significantly reduced the emergence of *Cuscuta*. Liu *et al.* (1990) reported that pendimethalin inhibited cell division and formation of spindle microtubules in the cells of germinated *Cuscuta* seedlings. Trifluralin and oxyfluorfen were not effective. Among the post-emergence herbicides, imazethapyr at 50-100 g ha⁻¹ and glyphosate at 12-50 g ha⁻¹ significantly checked the *Cuscuta* infestation as compared to control. Maximum leaf area (848 cm²) and dry matter (4.03 g plant⁻¹) were obtained from weed-free plot. Pendimethalin, fluchloralin, squadran (PE) and imazethapyr (50 g) significantly increased the leaf area and plant dry weight as compared to *Cuscuta*-infested plots. Post-emergence application of pendimethalin (500 g), squadran (1500 g) and imazethapyr (100 g) was, however, phytotoxic to blackgram. Yield attributes viz., pods plant⁻¹, seeds pod⁻¹ and 100-seed weight under pendimethalin and fluchloralin were comparable to weed-free plot but these were significantly higher than *Cuscuta*-infested plots. Application of fluchloralin provided the highest seed yield, which was at par with weed-free and pendimethalin at 1.0 kg ha⁻¹ as pre-emergence. Rao and Gupta (1981) also reported that fluchloralin at 1250 g ha⁻¹ controlled *Cuscuta* infestation completely.

REFERENCES

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Table 1. Effect of herbicides on germination of *Cuscuta* and growth, yield attributes and yield of blackgram

Treatment	Dose (g ha ⁻¹)	Time of application	No. of <i>Cuscuta</i> plantsm ⁻² 10 DAS	Blackgram plants infested with <i>Cuscuta</i> (%) at 25 DAS	Leaf area (cm ² plant ⁻¹) 35 DAS	Dry weight (g plant ⁻¹) 35 DAS	Pods plant ⁻¹	Seeds pod ⁻¹	100-seed weight (g)	Seed yield (kg ha ⁻¹)
Fluchloralin	1000	PPI	4.0	18.8 (10.8)	636	2.8	20	6.6	4.08	1453
Pendimethalin	1000	PE	2.7	4.05 (0.0)	600	2.5	20	6.6	3.92	1430
Pendimethalin	500	10 DAS	12.0	25.3 (18.3)	206	1.1	22	6.3	3.51	646
Squadran*	3000	PE	6.3	19.6 (11.3)	550	1.8	20	6.0	3.32	1013
Squadran	1500	20 DAS	10.0	43.7 (47.6)	205	1.3	16	5.3	3.16	400
Imazethapyr	100	20 DAS	11.0	33.0 (29.6)	305	1.1	23	6.3	3.44	790
Imazethapyr	50	20 DAS	15.0	42.9 (46.3)	609	1.9	21	5.6	3.45	886
Imazethapyr+ 0.1% S+250 g A	100	20 DAS	15.3	39.8 (41.0)	372	1.6	22	5.6	3.24	540
Glyphosate	50	20 DAS	11.7	35.2 (33.3)	426	1.7	17	6.0	3.57	1123
Glyphosate	25	20 DAS	20.7	47.5 (54.3)	209	1.2	19	5.6	3.54	753
Glyphosate	12	20 DAS	20.7	51.3 (61.0)	365	1.6	17	6.0	3.52	860
Oxyfluorfen	200	20 DAS	23.3	40.0 (41.3)	541	1.3	19	5.6	3.82	740
Trifluralin	1000	PPI	23.3	84.6 (99.3)	327	1.9	23	6.0	3.27	946
<i>Cuscuta</i> infested			21.7	84.0 (99.0)	472	2.0	17	6.0	3.83	793
<i>Cuscuta</i> free			-	4.05 (0.0)	846	4.0	23	6.6	3.88	1450
LSD (P=0.05)			3.4	3.3	57	0.3	5	1.3	0.62	130

Sin X-1 transformed. Values in parentheses are original. PE-Pre-emergence, PPI-Pre-plant incorporated, DAS-Days after sowing, S : Surfactant-Cyspread), A : (Adjuvant-Ammonium sulphate), *Squadran (Ready mix of pendimethalin and imazaquinin).