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Effect of Herbicides in the Control of White Horsenettle (*Solanum elaeagnifolium* Cav.)

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ABSTRACT

Five herbicides, *viz.* 2,4-D, bromacil, picloram, San H. 9789 and dicamba were tried individually and in different combinations. 2,4-D at 2.0 kg a.i./ha and dicamba at 5.0 kg a.i./ha controlled the weed for 30 days and picloram at 5.0 kg a.i./ha for six months. Bromacil at 20.0 kg a.i./ha gave complete weed-free condition one and a half years after the application. San H. 9789 at 20.0 kg a.i./ha although affected the morphology and physiology of the weed, complete weed-free condition was not obtained. Coimbnation of bromacil and picloram was more advantageous for allround control of white horsenettle.

INTRODUCTION

White horsenettle (*Solanum elaeagnifolium* Cav.), a deep rooted broad leaved perennial weed, spreads by its seeds and root cuttings. It is not possible to control the weed mechanically (Narayanan and Meenakshisundaram, 1955) while application of 2,4-D killed the top growths only (Wiese, 1969; Smith and Wiese, 1970, Kailasam *et al.*, 1974 a). Rea (1962) found that the infestation of white horsenettle was reduced by four or more applications of dicamba at 2.2 kg/ha. Hernandez (1965) reported that application of bromacil at 2.64 kg/ha gave excellent control of white horsenettle. However, complete weed free condition could not be obtained with the herbicides by earlier workers. The present studywas carried out to test the effectiveness of some of the herbicides at high doses and also to know whether the combination of any two of these herbicides will be useful for the total control of white horsenettle.

MATERIALS AND METHODS

The field experiment was conducted during 1974-75 in a private holding at Peedampalli, Coimbatore district where the weed infestation was severe and uniform under fallow field conditions. The soil type was red sandy loam. The infested area was ploughed twice and plots of size 4.0 x 2.5 M were formed. The experiment was laid out in randomised block design with three replications and sixteen treatments. (Table). The herbicides were applied at three to four leaf stage of the weed. The population of the weed was estimated at monthly intervals after the application of herbicides.

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RESULTS AND DISCUSSION

There was complete control of the weed 30 days after application of picloram, dicamba, 2,4-D + picloram, bromacil + picloram, picloram + San H. 9789 and picloram + dicamba (Table) There was effective control in the treatments with 2,4-D (3/m²) and 2,4-D + dicamba (14/m²). The weed was not controlled with bromacil (144/m²) San H. 9789 (155/m²), 2,4-D + bromacil (145/m²) and bromacil + San H.9789 (126/m²). In the rest of the treatments there was partial control of the weed. At 60 days complete control was obtained with picloram, 2,4-D + picloram, bromacil + picloram, picloram + San H. 9789 and picloram + dicamba. The weed population was not reduced in the treatments wherein there was no control at 30 days. In the case of the other treatments the weed was controlled only partially.

At 120 days weed-free condition was maintained in the treatments with picloram, 2,4-D + picloram and picloram + dicamba. Few regenerating shoots were noticed in bromacil + picloram (9/m²) and picloram + San H. 9789 (5/m²). The population increased in the treatment with 2,4-D (115/m²) and bromacil + dicamba (114/m²) and was on par with control (182/m²). In the remaining treatments there was only partial control of the weed. Complete weed free condition was maintained upto 180 days with picloram only. Few regenerating shoots were recorded in picloram + dicamba

TABLE. Number of white horsenettle weeds/m² at different stages

Treatments	Stages								
	30th day	60th day	120th day	180th day	240th day	300th day	360th day	420th day	480th day
Unweeded control	163	159	182	116	126	103	172	145	113
2,4-D (2.0 kg a.i./ha)	3	48	115	99	147	82	175	132	76
Bromacil (20.0 kg a.i./ha)	144	126	80	71	67	35	20	12	0
Picloram (5.0 kg a.i./ha)	—	—	—	—	7	4	23	28	86
San H. 9789 (20.0 kg a.i./ha)	155	155	79	88	103	61	173	129	81
Dicamba (5.0 kg a.i./ha)	—	51	73	98	122	71	133	103	74
2,4-D+bromacil (1.0+10.0 kg a.i./ha)	145	132	109	80	80	37	29	8	2
2,4-D+picloram (1.0+2.5 kg a.i./ha)	—	—	—	11	24	29	48	62	23
2,4-D+San H. 9789 (1.0+10.0 kg a.i./ha)	92	66	113	93	131	90	164	152	118
2,4-D+dicamba (1.0+2.5 kg a.i./ha)	14	50	61	67	131	70	143	97	93
Bromacil+picloram (10.0+2.5 kg a.i./ha)	—	2	9	17	32	21	30	7	2
Bromacil+San H. 9789 (10.0+10.0 kg a.i./ha)	126	134	81	89	96	59	39	27	3
Bromacil+dicamba (10.0+2.5 kg a.i./ha)	42	91	114	81	106	61	64	18	5
Picloram+San H. 9789 (2.5+10.0 kg a.i./ha)	—	3	5	19	52	33	85	106	68
Picloram+dicamba (2.5+2.5 kg a.i./ha)	—	—	—	6	35	42	71	60	69
San H. 9789+dicamba (10.0+2.5 kg a.i./ha)	21	57	63	86	99	74	121	149	101
Significant at 5% level*	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig

* Statistical analysis was made after transformation of data.

(6/m²), 2,4-D + picloram (11/m²), bromacil + picloram (17/m²) and picloram + San H. 9789 (19/m²). There was partial control of the weed in bromacil (71/m²) and 2,4-D + bromacil (80/m²). In all other treatments the weed pupulation was on par with control (116/m²).

At 240 days weed free condition was not recorded in any of the treatment. However, the population of the weed was very less in picloram (7/m²) 2,4-D + piclorm (24/m²), bromacil + picloram (32/m²) and picloram + dicamba (35/m²). There was partial control of the weed in picloram + San H. 9789 (52/m²), bromacil (67/m)², 2,4-D + bromacil (80/m²) and bromacil + San H. 9789 (96/m²). In the remaining treatments the population of the weed was on par with that of control (126/m²)

At 300 days also there was weed free condition in none of the treatments. Picloram (4/m²) and bromacil + picloram (21/m²) had very less weed population. There was partial control of the weed in the treatments which had either picloram or bromacil. In the rest of thetreatments the weed population was on par with control (103/m²). At 360 days picloram (23/m²) and bromacil (20/m²) had the lowest population of the weed followed by the treatments wherein either picloram or bromacil was included. In the other treatments the population was on par with control.

In the treatments involving bromacil the weed population was reduced very much at 420 days. The treatments involving picloram except bromacil + picloram had more weed population than the treatments involving bromacil but was not on par with control. In the rest of the treatments the weed population was on par with control indicating that their effect on the weed is lost. At 480 days thetreatments involving bromacil attained almost a weed-free condition while the population in the treatments which involved picloram (except bromacil +picloram) increased considerably which indicated that the effect of picloram is also lost completely by that time. Although the weed population was not reduced with the application of San H.9789, severe morphological changes of the weed were noticed. The weeds exhibited chlorotic symptoms and crinkling of leaves and were killed gradually. Subsequent new regrowths of weeds with purple colour also followed the same course. Weed-free condition was not obtained at any stage of the experiment but none of the weeds was healthy at any time after the application of San H.9789. When dicamba was combined with San H.9789 there was reduction in the population at the early stages due to the dicamba. The effect of San H.9789 was more pronounced at later stages. Dicamba alone was effective only for 30 days just like 2,4-D.

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