

HERBICIDE EFFICACY IN WEED MANAGEMENT OF TOBACCO SEED BEDS

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Weed infested nursery beds results in severe loss of transplants and may host vectors when transplanted result in stunted growth and loss of yield. In general, hand weeding is widely followed in tobacco seed beds which needs more human labour. As labour scarcity is a major concern use of herbicides along with hand weeding was studied to see their effect on tobacco seed germination, in controlling weeds and production of transplantable seedlings. In the first year experiment Pendimethalin, Alachlor, Metribuzin and Oxyfluorfen was tried as pre plant incorporation herbicides. As the germination was affected with doses tried in the first experiment, lower doses were tried in the second year experiment excluding Oxyfluorfen replacing with post emergence herbicide quizalofop-ethyl. The treatments were pre-plant incorporation of Metribuzin @263 g a.i./ha, @ 394 g a.i./ha, @ 525 g a.i./ha, Alachlor @ 1000 g a.i./ha, 1500 g a.i./ha and 2000 g a.i./ha, Pendimethalin @500 g a.i./ha, 750 g a.i./ha and 1000 g a.i./ha, post-emergence application of quizalofop-ethyl @ 60 g ai/ha and hand weeding. The pre-plant incorporation (PPI) of herbicides effectively controlled the weeds upto 25 days after sowing as higher dry weight of weeds were observed from hand weeded plots. Pendimethalin and oxyfluorfen had adverse effect on tobacco seed germination. It caused poor and delayed germination. Significantly higher germination count and transplantable seedlings were observed in hand weeding plots followed by post emergence application of quizalofop-ethyl. PPI of herbicides Alachlor @1000 and 1500, Metribuzin at 263 and 394 g ai /ha doses controlled the weeds effectively and gave optimum no.of seedlings compared to other doses at 5 days before sowing.

INTRODUCTION

Weeds are the serious menace for tobacco seedling production in different parts of the country. Weed infested nursery beds results in

severe loss of transplants and may host vectors when transplanted result in stunted growth and loss of yield. In general, hand weeding is widely followed in tobacco seed beds which needs more human labor. In the present condition labour scarcity is a major concern for any field operations. Hence, the alternate weed control method in the nursery beds is the use of herbicides along with hand weeding. Correct time and dose of application of herbicide is most important as the tobacco seed is very small and germination is very sensitive. Hence, experiments were proposed to study the effect of different herbicides and their dose of application on tobacco seed germination, in controlling weeds in nursery beds and production of transplantable seedlings.

MATERIALS AND METHODS

Field experiments were conducted in nursery area at ICAR-CTRI, Rajahmundry. Herbicides used for controlling weeds in the solanaceous crops were selected and tested for their efficacy as tobacco belongs to the same family. In the first year experiment the treatments consisted of 1. Pre-plant incorporation of Pendimethalin @1500 g a.i./ha, 2. Pre-plant incorporation of Alachlor 2000 g a.i./ha 3. Pre-plant incorporation of Metribuzin @525 g a.i./ha,4. Pre-plant incorporation of Oxyfluorfen @15 g a.i./ha, 5.Hand weeding. Sowing was done on 3rd, 7th and 15th day after incorporation of herbicides on the raised seed beds to study their effect on seed germination and weed control efficiency. Recommended package of practices were followed for raising nursery beds. Hand weeding was done at 25 & 40 days after sowing in all the plots. Observations on weed species, no.of weeds, dry weight of weeds and no. of transplantable seedlings per square metre area were taken. As the germination was affected with

Key Words: Herbicide, preplant incorporation, seed beds, weed dry weight.

doses tried during first year experiment, lower doses were tried in the second year experiment. The modified treatments in the second year experiment consisted of Pre-plant incorporation of Metribuzin @263 g a.i./ha (T₁), @ 394 g a.i./ha (T₂), @525 g a.i./ha (T₃), Pre-plant incorporation of Alachlor @ 1000 g a.i./ha (T₄), @ 1500 g a.i./ha (T₅), @ 2000 g a.i./ha (T₆), Pre-plant incorporation of Pendimethalin @500 g a.i./ha (T₇), @ 750 g a.i./ha (T₈), @ 1000 g a.i./ha (T₉), Post-emergence application of quizalofop-ethyl @ 60 g ai/ha (T₁₀), and Hand weeding (T₁₁). The experiment was conducted in RBD and replicated thrice. Pendimethalin 15 days and Alachlor & Metribuzin 5 days before sowing was incorporated in soil on the raised beds of 3 sq m. Hand weeding was done at 25 and 40 days after sowing in all the treatments. Observations on germination count of tobacco seed, dry weight of weeds and no. of transplantable seedlings per square metre area were taken. Data were subjected to statistical analysis as per the standard methods.

RESULTS AND DISCUSSION

In the nursery beds major weeds found were *Mollugo disticha*, *Trianthema portulacastrum*, *Mollugo nudicaulis*, *Digitaria sanguinalis*, *Panicum repens*, *Cyperus rotundus*, *Cynodon dactylon*, *Phyllanthus niruri*, *Euphorbia hirta*. In first year experiment preplant incorporation of herbicides resulted in differential germination of tobacco seed on seed beds. Data revealed that very less germination was recorded with Pendimethalin at three days of incorporation (Table 1). Effect of herbicide incorporation on germination was evident from reduced number of transplantable seedlings by 17.2, 20.8, 19.4 per cent with Pendimethalin and 0, 8.3, 15.2 percent with oxyfluorfen at 3rd, 7th and 15th day sowing after herbicide incorporation respectively, when compared to hand weeding. Pendimethalin and oxyfluorfen had adverse effect on tobacco seed germination. It caused poor and delayed germination. Germinated seedlings also had very poor growth and were pale yellow in colour in 3rd and 7th day sowing when compared to sowing at 15th day after incorporation of herbicide. Giridhar and Mahadevaswamy (2003) also observed that germination improved significantly when the interval between glyphosate application and

sowing time of tobacco nurseries increased from two to three weeks. Though weeds were controlled satisfactorily with the above herbicides, phytotoxic effect on tobacco seedlings was also observed. Mathiwade *et al.*, (2002) also reported phytotoxicity with Pendimethalin incorporation on tobacco seed beds Metribuzin and Alachlor showed improved germination over the above herbicides. Alachlor recorded 63.7, 66.5 and 72 where as metribuzin 74.8, 74.8 and 79 at 3rd, 7th and 15th day sowing after herbicide incorporation respectively when compared to hand weeding.

Pendimethalin controlled the weed species except nut grass where as *Trianthema* was the major weed found in Alachlor applied plots. Weed dry matter produced was higher in Alachlor and Metribuzin applied plots when compared to other herbicides. Sowing of seed 15 days after herbicide application resulted in higher weed dry matter production. No. of weeds, weed dry weight per square meter area also differed with days of herbicide incorporation and also with herbicide used. Weed number and weed dry weight increased with days of incorporation of herbicides on the seed beds and with all the herbicides used.

In the second year field experiment pre-plant incorporation of (PPI) herbicides effectively controlled the weeds upto 25 days after sowing as higher dry weight of weeds were observed from hand weeded plots (Table 2). PPI of herbicides and post emergence spraying of quizalofop-ethyl recorded lower dry weight than hand weeding treatment. PPI of herbicides killed all the germinated weed seeds whereas post emergence spray of quizalofop-ethyl controlled only monocot weeds. Metribuzin @263 g a.i./ha recorded significantly higher weed dry weight followed by Metribuzin @394 g a.i./h and Alachlor @ 1000 g a.i./ha among PPI of herbicides. Lower weed dry matter production was observed with PPI of Pendimethalin @ 1000 g a.i./ha. PPI of herbicides killed the germinated weed seeds on the seed beds, hence lower dry matter of weeds were found in those plots. Lower dry weight of weeds with herbicide application was observed by Mathiwade *et al* (2008) in tobacco seed beds.

Significantly, higher germination count and transplantable seedlings were observed in hand

Table 1: No. of weeds, weed dry wt (g) and no. of transplantable seedlings per square meter as influenced by herbicide application in nursery beds (First year experiment)

Treatment	Sowing time (days after herbicide incorporation)								
	3	7	15	3	7	15	3	7	15
Herbicide	Weeds (no./sq.m)			Weed dry weight (g/sq.m)			Transplantable seedlings (no/sq.m)		
Pendimethalin @1500 g ai/ha									
25 DAS	10	13	15	1.9	11.2	12.3	62	75	75
40 DAS	13	18	28	24	4.5	12.5			
Alachlor @2000 g ai/ha									
25 DAS	10	16	68	15.5	14.5	29.0	230	240	260
40 DAS	21	35	75	5.0	9.5	29.5			
Metribuzin @525 g ai/ha									
25 DAS	13	19	34	11.1	19.5	31.2	270	270	285
40 DAS	27	36	81	6.0	9.0	19.0			
Oxyfluorfen @15 g ai/ha									
25 DAS	7	8	51	1.0	2.3	16.2	nil	30	55
40 DAS	11	76	76	1.0	7.0	3.0			
Control									
25 DAS		115			38.7			360	
40 DAS		107			29.1				

DAS: Days after sowing

Table 2: Effect of herbicide application practices on no.of seedlings, and dry weight of weeds and seedlings in FCV tobacco seed beds (Second year experiment)

Treatments	Germination Count/ 0.1sqm.	No. of transplantable Seedlings/sqm	weed dry wt (g)/ 3 sqm	10 Seedlings dry weight (g)
PPI of Metribuzin @263 g a.i./ha	89	524	454	14.0
PPI of Metribuzin @ 394 g a.i./ha	80	503	393	13.3
PPI of Metribuzin @525 g a.i./ha	75	494	261	12.0
PPI of Alachlor @ 1000 g a.i./ha	82	510	380	13.0
PPI of Alachlor @ 1500 g a.i./ha	62	491	327	13.7
PPI of Alachlor @ 2000 g a.i./ha	61	425	229	14.0
PPI of Pendimethalin @500 g a.i./ha	50	402	278	12.7
PPI of Pendimethalin @ 750 g a.i./ha	41	342	205	13.1
PPI of Pendimethalin @ 1000 g a.i./ha	21	153	148	13.7
Post-emergence application of quizalofop-ethyl @ 60 g ai/ha	98	543	473	14.3
Control	105	560	664	14.6
S. Em±	1.43	6.87	17.98	0.38
CD(P=0.05)	4.12	20.26	53.06	1.13

weeding plots followed by post emergence application of quizalofop- ethyl. Among PPI of herbicides Alachlor @1000 and 1500, Metribuzin at 263 and 394 g ai /ha controlled the weeds and gave optimum no.of seedlings. Pendimethalin @500 g a.i./ha gave optimum no.of seedlings than other doses tried. Lower germination count and transplantable seedlings were recorded with Pendimethalin@1000g a.i. and this might be due to the fact that the tested dose caused phytotoxicity even 15 days after incorporation. Mathiwade *et al.*, (2002) also reported phytotoxicity with Pendimethalin incorporation on tobacco seed beds

It was concluded that, the pre plant incorporation of Alachlor @1000 and Metribuzin at 263 ai /ha 5 days before sowing on raised seed beds effectively controlled the weeds up to 25 days of sowing and resulted in optimum number

of transplantable seedlings. Post emergence spraying of quizalofop was effective only on monocot weeds. The above herbicides can be used for control of weeds in nursery beds in case of non availability of labour.

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