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Studies on the Control of Parthenium

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ABSTRACT

MSMA (Ansar 529 at 4 lit in 400 lit water) sprayed on matured parthenium weeds gave good check and took only 20 days for causing 90 per cent death of the weed. The use of 2,4-D sodium salt (1 kg)+Ansar 529 (2 lit in 400 lit water) gave good control of the weed and this combination could be conveniently used on slightly younger plants. The use of Glyphosate @ 1 to 2 kg/ha, Bromacil @ 2 kg/ha and Spontox (10% solution of 2,4-D+2,4-5-T) @ 30 gal/ac gave complete kill of matured parthenium plants.

INTRODUCTION

Parthenium weed (*Parthenium hysterophorus* Linn.) is presumed to have been introduced from America to India through imported food grains about two decades ago (Rao, 1956). It has gained entry into all agricultural and horticultural crops (Krishnamurthy *et al.*, 1975). In addition, evidences within Karnataka and outside are also available amply on its health hazards as well (Krishnamurthy 1975; Lonkar *et al.*, 1974). This weed besides causing allergic symptoms on the allergic human beings, it is also reported to have direct effect on livestocks (Dr. D. E. Seaman, personal Communication, 1975).

Manual Weeding: It was observed that manual weeding would cost Rs. 250 to Rs. 300 per acre for removal of the weed for once. Around 6 to 10 per cent of the labourers used for hand pulling are sensitive to it and therefore it is too risky. This effort was not successful in keeping the weed under check (Dr. D. E. Seaman, Personal Communication, 1975). This method could be resorted to the control of a few stray plants through uprooting. The cutting of the stem accelerate vigorous growth with many more branches (Krishamurthy, 1975).

The use of flame gun may not prove economical under present conditions of high cost of mineral oils. Perhaps this may yield reasonable control where the weeds have dried completely.

Biological control: Though several insect pests have been observed feeding on this weed, the use of such pests for effective control of parthenium is yet to be indentified. In addition, such agents should be host specific to make biological control effective.

Chemical control: As far as the present day need, use of herbi-

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cides in non-agricultural fields can be taken as most effective and quick method of controlling this weed.

The work in this direction has been attempted at several places. In series of studies conducted on control of this weed at West Indies, it was observed that both paraquat and diquat were ineffective on *P. hysterophorus* plants of 15 to 30 cm tall when applied @ 0.5 to 1 lb/ac. However, Ciba 6313 [N-(4-bromo 3- chlorophenyl) - N' methoxy-N-methyl urea] when sprayed at 1 to 2 lb/ac gave long lasting control. Similar indication of mere scorching of the weed was observed with paraquat when sprayed @ 0.5 lb/ac (Parker, 1968). Likewise, 2,4-D sodium salt @ 1 to 2 lb/ac and 2, 4-5-T @ 0.5 to lb/ac gave good control of this weed, but the low rates allowed some regrowth of seedlings (Anon., 1968). Even at Trinidad, Kasasian and Seeyave (1969) observed that both diquat and paraquat (0.5 to 1 lb/ac) gave an excellent top kill, but the low rate allowed much regrowth, after 5 weeks. Even the combination spray of diquat and paraquat (at 0.5 lb/ac) gave insufficient control. Tthe use of MSMA (monosodium methanearsonate) at 4 lb/ac gave complete kill of white top. In another study, the ten per cent solution of 2, 4-D + 2, 4-5-T (as Spontox) applied at 30 gal/ac gave complete kill of parthenium (Solomon and Bhapkaa, 1966).

In a study at Bangalore, Javachandra (1971) obtained cent per cent control of the weed at flowering stage when sprayed with bromacil @ 2 and 4 kg/ha. The herbicide took a fortnight for complete kill of the weed and no regrowth was observed. Subsequently, Hammerton (1972) observed no effect of nitralin, trifluralin (both @ 1.1 kg/ha) and A-820 (@ 2.2 and 4.5 kg/ha) on the control of the weed. While, the use of glyphosate [N-(phosphonomethyl) glycine] @ 1.1 to 2.25 kg/ha was quito effective on all growth stages of the weed as an overall spray on weedy fallow land and as a directed spray under tree crops (Hammerton, 1973). He observed slight epinasty and chlorosis after 2 to 3 days of the spray and this became marked untill collapse. In addition to complete control of the weed in about 8 days, it prevented regeneration of the weed.

Muniyappa *et al.* (1976) indicated that Ansar 529 when sprayed @ 4 l in 400 lit water gave 98 per cent control of the matured weed in about 30 days (Table). The authors observed that the toxic effect on weed though was slowe initially with Ansar 529, its toxic effect enhanced when once it get translocated in to the plant system. The rapid herbicidal action of the Ansar 529 facilitated in complete kill of the weeds including root zone in about 20 days.

The chemicals varied considerably with regard to the control of fresh sprouts from fallen seeds. The weed sprouts was maximum in 2, 4-D ethyl ester and 2, 4-D sodium salt + Paraquat combination sprayed plots, as compared to other herbicides (Table). Neverthless, none of the herbicides tried showed good control of the

TABLE. Effect of different herbicides on mortality and sprout of parthenium at Shastrinagar, Bangalore*

Treatments	+Weed mortality, %	Number of plants unkilled		Days to 90% weed death	Number of sprouts from fallen seeds in 500 cm²	Cost of the chemical/acre, Rs.
		a+sq m	100m² area±			
WeedoneEC48	87.5	27	4	40	108	136
Weedar 96	97.4	5	—	30	67	178
Ansar 529	98.4	3	—	20	64	104
2,4-D sodium salt	86.8	26	5	43	61	80
2,4-D sodium salt Ansar 529	95.8	7	—	38	72	92
2,4-D sodium salt+paraquat	77.0	38	20	36	110	172
Control	—	—	—	—	88	—
C.D. (P=0.05)	2.5	5.9	NA	NA	29	NA

+Count was taken 30 days after the spray;
±Observation was taken 50 days after the spray;
NA-Not analysed.
*(T. V. Muniyappa, T. V. Ramachandra Prasad, K. Krishnamurthy, 1976).

possible sprouts from the fallen seeds. Though the spray of Ansar 529 was quite effective on the weed, it could not prevent the fresh sprouts from the fallen seeds, perhaps due to lesser herbicidal persistance in the soil (Robinson, 1975).

Based on the trial, the authors have worked out the relative economics in using herbicides for the control of parthenium and a brief account of it is as follows. Though 2, 4-D sodium salt was quite cheap (Rs. 80/- per acre, as the cost of the herbicide), it was not effective on the weed at this stage. The use of Ansar 529 appeared to be quite promising in controlling the weed (matured) at a relatively cheaper rate (Rs. 104/-per acre) in non-cropped areas. If the weeds are relatively small, 2, 4-D sodium salt + Ansar 529 can give reasonable control of the weed. The use of 2,4-D amine was quite costly (Rs. 178/-per acre), while other herbicides seemed to be less effective in killing the weed, besides being expensive.

Based on these results and on the availability of chemical, it could be suggested that Ansar 529 (MSMA) is to be sprayed @ 4 lit in 400 lit water for effective and quick control of matured weed at a relatively cheaper rate. The use of this herbicide neither leave any residual hazards in the soil nor would pose any threat to human beings or livestocks. Its toxicity to human beings is below and/or same as that of consuming analgin (as per the technical bullettin issued by the M/s. Farm Chemicals Pvt. Ltd.). Since the herbicide does not persist in the soil, the fresh sprouts of parthenium emerged from the fallen seeds could be controlled at a cheaper cost with 2,4-D sodium salt sprayed @ 1 kg in 400 lit water.

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