

## Effect of 2,4-D at Graded Doses and Intervals of Application on the Control of White Horsenettle (*Solanum elaeagnifolium* Cav.)

By

C. KAILASAM<sup>1</sup>, A. V. RAJAN<sup>2</sup>, S. BALU<sup>3</sup>, S. SANKARAN<sup>1</sup> and Y. R. MORACHAN<sup>3</sup>

### ABSTRACT

A field experiment was conducted during 1972-74 at Udumalpet to study the cumulative effect of repeated application of 2,4-D on the control of white horsenettle. The treatments comprised of five levels of 2,4-D *v/z.*, 0.5, 1.0, 1.5, 2.0 and 2.5 kg a.i./ha each under three intervals (monthly, bimonthly and trimonthly) of application and one untreated control. The herbicide was applied as per the treatments upto one and half years. After the final applications, the population of white horsenettle was estimated at different stages. Results indicated that the population in 2,4-D applied plots were always less when compared to untreated control. Among the five levels of 2,4-D the differences in the population were not significant. Application at monthly intervals had significantly less population than bimonthly and trimonthly intervals of application.

### INTRODUCTION

Research work carried out in Tamil Nadu and elsewhere on the control of white horsenettle showed that 2,4-D controlled the weed temporarily in fallow field (Wiese, 1969; Smith and Wiese, 1970; Kailasam *et al.*, 1974). The herbicide 2,4-D was reported to be successful for controlling the weed in wheat (Balasubramaniam and Sakharam Rao, 1968), maize (Rajan *et al.*, 1974) and ragi (Thangavel and Sankaran, 1974) without appreciable phytotoxic residues in soil. In the above studies 2,4-D was applied only once or twice. Although there was very good control of the weed for about 30 days after application of 2,4-D, thereafter the weed put forth new growths. When a second application was done the weed

followed the same course but the number of regrowths was reduced considerably. Therefore it was felt that if 2,4-D is applied repeatedly at regular intervals, the weed may be effectively controlled. With this objective, the present study was carried out to find out the cumulative effect of graded doses of 2,4-D each applied at different intervals on the control of white horsenettle under fallow field conditions.

### MATERIALS AND METHODS.

The experiment was conducted during 1972—74 at Udumalpet in black cotton soil infested with white horsenettle severely and uniformly with an average population of about 60/m<sup>2</sup>. The land was ploughed twice and the experiment was laid out in randomised

1-5 Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore-641003.

block design with three replications. The sixteen treatments consisted of fifteen combinations of five doses of 2,4-D (0.5, 1.0, 1.5, 2.0 and 2.5 kg a.i./ha) and three intervals of application, *viz.*, monthly, bimonthly and trimonthly and one untreated control. The plot size was 3 x 3m. After the lay out, the weed was allowed to grow for 20 days to attain 4-leaf stage and the treatments commenced at the end of August, 1972. Thereafter 2,4-D was applied as per schedule upto one and a half years and final applications were made at the end of February 1974. In all, nineteen, ten and seven sprayings were made under monthly, bimonthly and trimonthly treatments respectively. After the final applications the population of the weed was esti-

mated at different stages using a 0.5x 0.5m quadrant at four randomly marked places in each plot. The weed population was estimated at 30, 90, 180 and 270 days after the final applications of 2,4-D.

## RESULTS AND DISCUSSION

The weed population (Table I) in the untreated control was compared with the mean population of the fifteen 2,4-D applied treatments. At all the stages it was significantly less in 2,4-D applied treatments. At 30 days the population was only 2/m<sup>2</sup> and increased to 10/m<sup>2</sup> at 90 days and after that there was not much change in the population till 270 days. Among the five doses the differences in the

TABLE. Number of white horsenettle/m<sup>2</sup> at different stages after the final application of 2,4-D

| Treatments   | Stages    |           |           |           |
|--|-----------|-----------|-----------|-----------|
|  | 30 days   | 90 days   | 180 days  | 270 days  |
| Untreated control  | 55 (7.49) | 62 (7.85) | 48 (6.94) | 59 (7.67) |
| Rest (Mean of all 15 combinations)                               | 2 (1.62)  | 19 (4.32) | 18 (4.19) | 21 (4.63) |
| SE   | — (0.26)  | — (0.55)  | — (0.61)  | — (0.48)  |
| CD (P=0.05)  | — (0.53)  | — (1.13)  | — (1.25)  | — (0.98)  |
| 2,4-D at 0.5 kg a.i./ha (Mean of three intervals of application) | 1 (1.50)  | 18 (4.25) | 17 (4.13) | 22 (4.70) |
| 2,4-D at 1.0 kg a.i./ha ..                                       | 3 (1.98)  | 17 (4.12) | 18 (4.30) | 20 (4.51) |
| 2,4-D at 1.5 kg a.i./ha ..                                       | 1 (1.34)  | 18 (4.19) | 15 (3.91) | 18 (4.24) |
| 2,4-D at 2.0 kg a.i./ha ..                                       | 1 (1.41)  | 20 (4.46) | 19 (4.40) | 24 (4.88) |
| 2,4-D at 2.5 kg a.i./ha ..                                       | 3 (1.89)  | 21 (4.60) | 18 (4.19) | 24 (4.84) |
| SE   | — (0.25)  | — (0.31)  | — (0.34)  | — (0.27)  |
| CD (P=0.05)  | N. S.     | N. S.     | N. S.     | N. S.     |
| Monthly intervals (Mean of five levels of 2,4-D)                 | 2 (1.78)  | 11 (3.25) | 10 (3.23) | 15 (3.89) |
| Bimonthly intervals ..   | 1 (1.49)  | 18 (4.27) | 17 (4.13) | 20 (4.48) |
| Trimonthly intervals ..  | 2 (1.61)  | 30 (5.45) | 27 (5.20) | 31 (5.53) |
| SE ..  | — (0.11)  | — (0.24)  | — (0.27)  | — (0.21)  |
| CD (P=0.05)  | — N. S.   | — (0.49)  | — (0.54)  | — (0.43)  |

Figures in parentheses are transformed values. N. S.—Not Significant

weed population were not significant in all the stages. The population was negligible at 30 days, slowly increased upto 90 days and remained static thereafter. At 270 days, the weed population ranged from 18 to 24/m<sup>2</sup> in 2,4-D treatments compared to 59/m<sup>2</sup> in untreated control.

The weed population was pooled over all the doses of 2,4-D to study the effect of different intervals of application. At 30 days the differences in the population under three intervals of application were not significant. But they were significant at 90, 180 and 270 days after the final applications of 2,4-D. In all the three stages the weed population was the lowest 11, 10 and 15/m<sup>2</sup> at 90, 180 and 270 days respectively where 2,4-D was applied at monthly intervals when compared to bimonthly and trimonthly intervals. The weed population in the bimonthly intervals (18, 17 and 20/m<sup>2</sup> at 90, 180 and 270 days respectively) were lesser than the trimonthly intervals (30, 27 and 31/m<sup>2</sup> at 90, 180 and 270 days respectively). At 270 days the mean of white horse nettle control was 75, 66 and 47 per cent respectively in monthly, bimonthly, and trimonthly treatments as compared to untreated control when pooled over the doses of 2,4-D.

It may be inferred that about 75 per cent of the weed population was controlled for more than nine months after the final application by applying 2,4-D at 0.5 kg a.i./ha for nineteen

times at monthly intervals. Doses higher than 0.5 kg a.i./ha do not give increased control of the weed.

#### REFERENCES

- BALASUBRAMANIAN, M. and J. SAKHARAM RAO. 1968. Effects of a few herbicides on *Solanum elaeagnifolium* Cav. - A recent weed in Coimbatore district. *PANS* 14:282-9.
- KAILASAM, C., A. V. RAJAN, S. SANKARAN and Y. B. MORACHAN. 1974. Evaluation of herbicides on the control of white horse nettle (*Solanum elaeagnifolium* Cav.) - A perennial weed in the cultivated fields of Tamil Nadu. *Madras agric. J.* 61:619-23.
- RAJAN, A. V., C. KAILASAM, S. SANKARAN and Y. B. MORACHAN. 1974. A note on the control of white horse nettle (*Solanum elaeagnifolium* Cav.) in maize. *Madras agric. J.* 61:758-60.
- SMITH, D. T. and A. F. WIESE. 1970. Herbicidal control of Silver leaf nightshade, Ground cherry, Buffalober and Nutsedge. *Texas Agr. Exp. Sta. Prog. Rept.* 2850.
- THANGAVEL, S. and S. SANKARAN. 1974. Studies on the control of white horse nettle (*Solanum elaeagnifolium* Cav.) in ragi (*Eleusine coracana* Gaertn.). *Madras agric. J.* 61:427-32.
- WIESE, A. F. 1969. Perennial weed control in North West Texas. *Texas Agr. Exp. Sta. Misc. Pub.* 828.