THE EFFECT OF HORMONE TYPE WEEDICIDES ON SAFFRON THISTLE AND GOLDEN THISTLE

By W.T. PARSONS

SUMMARY

Experimental work on Saffron Thistle (an annual) with various forms of 2,4-D and MCPA is reported for two stages of growth.

The earlier stage is the more susceptible.

The forms of the material used are important in the later stages only.

Flowers formed after treatment produce some fertile seed.

Experimental work on Golden Thistle (a perennial) with various hormone type weedicides at one stage of growth is reported.

The MCPA - 2,4-D group is the most important in the early growth stage.

A. SAFFRON THISTLE

I. INTRODUCTION

Saffron Thistle (Carthamus lanatus L.) is susceptible to the MCPA - 2,4-D group of hormone substances and these are often used in Victoria to control the weed in pastures and cereal crops. This experiment was designed to determine which member of this group is the most effective and at what rate it should be used. It was also aimed to show the effects of the treatments at various growth stages of the plant. A heavily infested area of Saffron Thistle was selected on pasture land in the Victorian Wimmera as the experimental site.

II. METHOD

The initial trial was carried out in August 1953 using four of the most commonly used weedicides in this group - sodium salt of MCPA, sodium salt of 2,4-D, triethanolamine salt of 2,4-D and the ethyl ester of 2,4-D. These were used at $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 and 2 pounds of acid equivalent per acre and applied in 20 gallons of water per acre. To measure

the infestation before and after treatment five fixed quadrats were used on each plot. Each plot was replicated four times. The plants at the time of spraying were in the seedling to rosette stage of growth, mostly with four leaves formed.

Similar trials were carried out every two to three weeks until the flowering stage, but only two are recorded here - the original trial and one carried out in the late pre-budding stage (early December). In this stage a few buds were just forming but no flowers had been produced.

III. RESULTS

Statistical analysis has given the following summarized results.

(a) Seedling-rosette stage - There is no significant difference between any of the materials used at this stage.

The average percentage kills were $\frac{1}{4}$ lb/acre = 96%; $\frac{1}{2}$ lb = 99%; $\frac{3}{4}$ lb = 100%; 1 lb = 100%; and 2 lbs. = 100%. The few plants which survived these treatments were retarded so much that they died in the summer before producing seed.

(b) Late prebudding stage - There is no significant difference between the amine and ester forms of 2,4-D but both are significantly better than the sodium salt of 2,4-D (1% level). There is also no significant difference between the sodium salts of 2,4-D and MCPA but amine 2,4-D is significantly better than MCPA (5% level).

The average percentage kills with the amine and ester 2,4-D are significantly greater than the average of the sodium salts of 2,4-D and MCPA (1% level).

Table of Average Percentage Kills

Treatment	Rate (pounds per acre)				
	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	2
Amine 2,4-D) Ester 2,4-D)	67	83	95	97	100
Sodium 2,4-D) Sodium MCPA)	58	68	79	89	98

When the survivors of these treatments reached maturity samples of the heads were collected from as many plants as possible. The average number of seeds produced in these was lower than in the untreated heads but in no treatment was it greatly reduced. The average for all the treated

W/Par/8612

plots was 5.3 seeds per head compared with 7.1 for the untreated.

Germination tests were also carried out on these seeds. In all cases the percentage germination was lower than on the control plots but in no treatment was it greatly reduced. The average percentage germination for all the treated plots was 51% compared with 66% for the untreated plots.

IV. DISCUSSION

Saffron Thistle can be controlled readily with hormone type weedicides containing MCPA or 2,4-D, the most susceptible stage of growth being the seedling to rosette stage. At this stage ¼ lb/acre of any of the materials used gave excellent control.

As the plant matures, the rate of application must be increased to obtain comparable results. In the late prebudding stage the ester and amine forms of 2,4-D gave consistently better results than the sodium salts of 2,4-D and MCPA. A rate of ¾ - 1 pound of ester or amine 2,4-D per acre was necessary in this stage to give comparable results with the ¼ pound rate in the seedling-rosette stage.

The plants which were not killed by the treatments in the late prebudding stage continued growing and formed flowers which set slightly less seed than the untreated plants. These seeds also showed a slightly lower percentage germination than the untreated samples.

B. GOLDEN THISTLE

I. INTRODUCTION

Golden Thistle (Scolymus hispanicus L.) is a perennial which has only recently become established in Victoria. It now covers many acres of river flats in the central parts of the state, the Loddon River system in particular. In 1953 it was decided to determine its susceptibility to a range of hormone type substances.

II. METHOD

This trial was carried out on a dense patch of the weed on the Loddon River in late August 1953. The growth at this time of the year consisted mainly of regrowth from

the old crowns and a few young seedlings. The regrowth was in the form of rosettes 2 to 8 inches in diameter. The materials used were the sodium salt of MCPA, sodium salt of 2,4-D, triethanolamine salt of 2,4-D, ethyl ester of 2,4-D, butyl ester of 2,4,5-T and a mixture in equal proportions of the esters of 2,4-D and 2,4,5-T. These were applied as 0.1%, 0.2% and 0.3% solutions of acid equivalent and used as spot sprays to thoroughly wet the foliage of all plants in the plot.

III. RESULTS

Observations made a fortnight after spraying showed that MCPA was having a more severe effect on the plants than any of the 2,4-D treatments. The 2,4,5-T and the mixed esters also appeared more effective than the 2,4-D's. Nevertheless all treatments were giving some distortion of the plants.

Observations made five months after treatment when the untreated plants were in full flower showed that no plants on any of the plots had reached the flowering stage. The 0.3% MCPA and 0.3% ester 2,4-D had both given a complete kill but slight regrowth had occurred on all other plots. The 2,4-D and MCPA treatments were generally more effective than the 2,4,5-T or mixed esters but all treatments gave fair control.

Observations eleven months after treatment show the same general pattern. The ester 2,4-D and sodium MCPA are still the most effective but only slightly better than sodium 2,4-D and amine 2,4-D. This group is more effective than the 2,4,5-T and mixed esters.

IV. DISCUSSION

It is obvious from this trial that the MCPA - 2,4-D group of chemicals offer a practicable method of eradicating this perennial thistle. Further research is planned for the coming season to determine the practicability of boom spraying at various stages of growth.