

N O T E

CONTROL

RAIN AFTER 2,4,5-T APPLICATION — EFFECT ON GORSE

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ABSTRACT

Trial results suggest that the occurrence of heavy rain only 5 minutes after the application of the butyl ester of 2,4,5-T to gorse (Ulex europaeus) does not influence the herbicidal effect. When rain fell, 10, 15, 30, or 60 minutes after spray application, control of gorse was better than when there was a 24-hour time-lag.

INTRODUCTION AND METHOD

There has been considerable discussion (Chavasse, 1975) on factors which influence effectiveness of herbicidal sprays on gorse — growth stage of plant, time of day, quantity of diluent, temperature, fog, drizzle, and rain. A trial was conducted to quantify the influence of rain, occurring at various times after spraying, on the herbicidal effect of 2,4,5-T butyl ester on gorse.

Rooted cuttings of gorse were grown in 6-litre pots in a glass-house until foliage was mature and the plants were flowering — that is, until August/September some 13-14 months after setting. Plants were watered and fertilised to maintain vigorous growth. When regrowth had reached 18-20 cm in length, the 60 most vigorous plants were selected for treatment. Six pots were used in each of 10 treatments (Table 1) with 3.6 kg a.i. 2,4,5-T in 330 litres water/ha. No surfactant was used. Temperature, relative humidity, duration of sunlight, and amount of rain (both artificial and natural) were recorded at time of spraying (Table 1) and during the early part of the trial.

“Rain” was applied to all treatments with a coarse-droplet sprinkler for the first 45 minutes of treatment, after which natural precipitation occurred for a further 14 hours. In the first 45 minutes after completion of spraying of Treatment 8, a total of 25 mm of rain equivalent was recorded. Another 23 mm of rain

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TABLE 1: TIMING OF 2,4,5-T APPLICATION, WITH CLIMATIC CONDITIONS AT EACH SPRAYING

Treatment No.	Time of Application (h)	Interval between Spray and Rain	Temperature (°C)	Relative Humidity (%)	Sun/Cloud (0-8 scale)
1	1500*	24 h	21.0	81	0/8
2	900	6 h	17.5	44	4/8
3	1300	2 h	19.0	40	6/8
4	1400	1 h	18.8	50	0/8
5	1430	30 min	17.0	46	0/8
6	1445	15 min	17.2	44	0/8
7	1450	10 min	17.4	44	6/8
8	1455	5 min	17.8	48	8/8
9	1500	0 (sprayed during rain)	18.0	84	8/8
10	Control (unsprayed but did receive rainfall)				

* Treatment 1 was sprayed on 20.12.77, the others on 21.12.77.

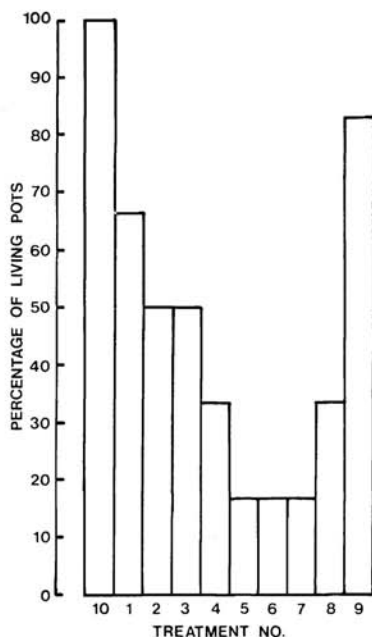


FIG. 1: Number of pots of live gorse plants at 12 months, expressed as a percentage of total pots sprayed per treatment.

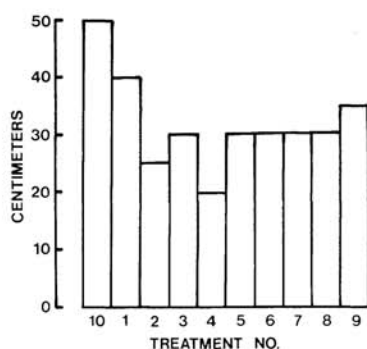


FIG. 2: Maximum height of surviving gorse plants (cm).

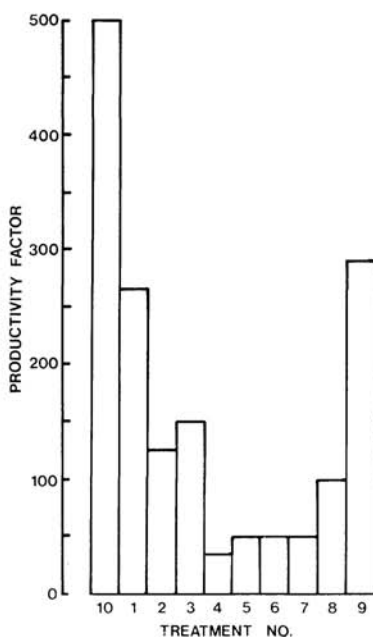


FIG. 3: *Productivity Factor*:
$$\frac{\text{Survival (\%)} \times \text{Total height (cm)}}{100}$$

fell in the next 17 hours, and for the following day conditions were overcast and mild (temperature range 8-15°C) with high humidity (62-90%). The weather generally cleared to become fine and sunny with warmer temperatures and lower daytime humidity 4 days after spraying.

RESULTS AND CONCLUSIONS

By the third day after spraying, Treatments 1-7 exhibited some effect of the 2,4,5-T application in the form of distortion and curling of the soft apical portions of the stems. Treatments 8 and 9 did not show any effects until the fifth day. At 4 weeks from spraying, differences in degree of desiccation were visible, with Treatment 9 showing less brown-out of foliage than any of the other sprayed treatments, and by 3 months regrowth was occurring on four of the six pots in this treatment. At this time there was also regrowth on one pot in Treatment 1. At 12 months differences were more striking (Figs. 1, 2, and 3).

The most obviously effective treatments (fewest surviving plants) were those in which herbicide was applied 10, 15, and 30 minutes before rain (Fig. 1). Figure 2 graphs the check in plant height resulting from 2,4,5-T application, in relation to time of rainfall. The decline in height growth is considerable in Treatments 2 to 8. Treatments 1 and 9 exhibited less set-back. A correlation of height \times survival (= Productivity Factor or vigour) with time-lag between spraying and rainfall is presented in Fig. 3.

The overall pattern of plant vigour shows that application of herbicide during rain (Treatment 9) was least successful. Treatment 1 (sprayed 24 hours before rain) was only slightly better, but the difference between these two is not great enough to be important and it is suspected that the poor result in Treatment 1 may have been due to ambient conditions (21°C, full sunlight) and the physiological condition of the plants during spraying. They could have been hardened by a fairly hot, dry, sunny day even though the soil in the pots was wet and cool. On the other hand, the time-lag between spraying and rain could have been the cause.

However, these conjectures are less important than the facts that:

- (a) Heavy rain falling soon after application of 2,4,5-T did not greatly affect the effectiveness of the herbicide;
- (b) Herbicide effectiveness increased as the time between spraying and rainfall decreased, to an optimum time-lag of 10 to 60 minutes.

REFERENCE

- Chavasse, C. G. R. (compiler), 1975. The use of herbicides in forestry in New Zealand. *N.Z. For. Serv., For. Res. Inst. Symp. No. 18.*