

Report on Glyphosate ("Roundup") herbicide trial conducted
in 1978

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Glyphosate is a broad spectrum herbicide manufactured as an aqueous solution, under the name "Roundup" by Monsanto Co. It is absorbed through foliage and other photosynthetically active portions of the plant and readily translocated through the root system. Soil applications are ineffective because of strong adsorption by soil, but glyphosate is not considered a persistent herbicide. Its toxicity to wild-life and humans is low, but contact with the eye should be prevented (Herbicide Handbook, WSSA. 1974.). It is supplied in 1 U.S. gallon drums which contain 3 lb. active ingredient, and costs \$65 per drum.

Work in Ontario shows that 2-1 cedar does not tolerate glyphosate, red pine tolerates 0.5 lb active ingredient (a.i.) per acre and spruce perhaps 1 lb a.i. per acre. Work conducted at Oregon State University and reported to the symposium at Seattle, by Mike Newton (Roundup Forestry Seminar 2 June 77) indicates Douglas fir tolerates 1.5 lb a.i. per acre and Sitka spruce more than this rate. Preliminary work at Koksilah in 1977 indicated the concentrations to be tested should be between 0.5 and 2 lbs a.i. per acre. Work carried out in 1978 was designed to test the effect of different concentrations within the useful range, and times of application.

Methods

In this study glyphosate was tested at 0.6, 1.1 and 2.2 kg active ingredient (a.i.)/ha, and applications were made at different numbers of weeks after sowing, as follows (1) 0, (2) 2, (3) 4, (4) 6, (5) 2+6, (6) 2+4+6. Rates and times of application were applied factorially in replicated and randomized plots to coastal Douglas fir and Western red cedar at Koksilah

nursery and to coastal Douglas fir and interior spruce at Surrey nursery. Further details of methods are fully described in the working plan E.P. 693.19 1978.

Results

The number of seedlings per m of drill was significantly reduced by the 2.2 kg/ha rate of glyphosate in coastal Douglas fir and interior spruce beds, though not in western red cedar beds. The absence of reduction by the high rate in western red cedar may have been related to the low and irregular germination of this species. Douglas fir and interior spruce seedling numbers also showed a significant interaction between rate of application and time of application (Figs 1 and 2). Although there was some inconsistency it seemed that greatest numbers of seedlings were obtained in the 2 and 4 week treatments at 0.6 and 1.1 kg/ha, and effects were essentially similar at both nurseries on the coastal Douglas fir, which was the same seed lot.

Seedling dry weight results were closely similar to seedling number data (Figs 3 and 4) showing a significant interaction between time and rate of application except for western red cedar. Largest seedlings generally occurred on plots receiving 0.6 and 1.1 kg/ha 2 or 4 weeks after sowing. Application at sowing was reasonably well tolerated by Douglas fir at Koksilah. Only time of application affected western red cedar size, but again 2 or 4 week applications produced the largest seedlings. Applications at 2+6 weeks also seemed well tolerated by interior spruce at Surrey and may prove a useful treatment.

Only time of application had a significant effect on weeding time and number of weeds at Koksilah (Fig. 5), but there was not a particularly heavy weed population in the area of the nursery used for this experiment.

However it is clear that application 2 or 4 weeks after sowing reduced weeding time 50 to 70%. Retreating at 6 weeks reduced weeding time further, but it is not certain that seedling can tolerate this.

At Surrey nursery there was a significant interaction between rate and time of application on the first (29 June) weeding date (Fig. 6). Of the treatments providing an acceptable crop at Surrey, the 1.1 kg rate applied 4 weeks after sowing reduced weeding time about 50% and the 1.1 kg rate applied at 2+6 weeks reduced weeding time about 87%. Only time of application showed any significant effect in subsequent weedings at Surrey (Fig. 7), but it was clear that a small weed controlling effect persisted at the higher rates at least through July.

Recommendations

Glyphosate should be tested operationally on a small scale at 1.1 kg a.i. per hectare applied 4 weeks after sowing. It can be applied to coastal Douglas fir and interior spruce. A further experiment should be done to:

- (1) test application times around the 4 week mark with or without a second application, and
- (2) test concentrations close to 1.1 kg a.i. per ha.

FIG 1

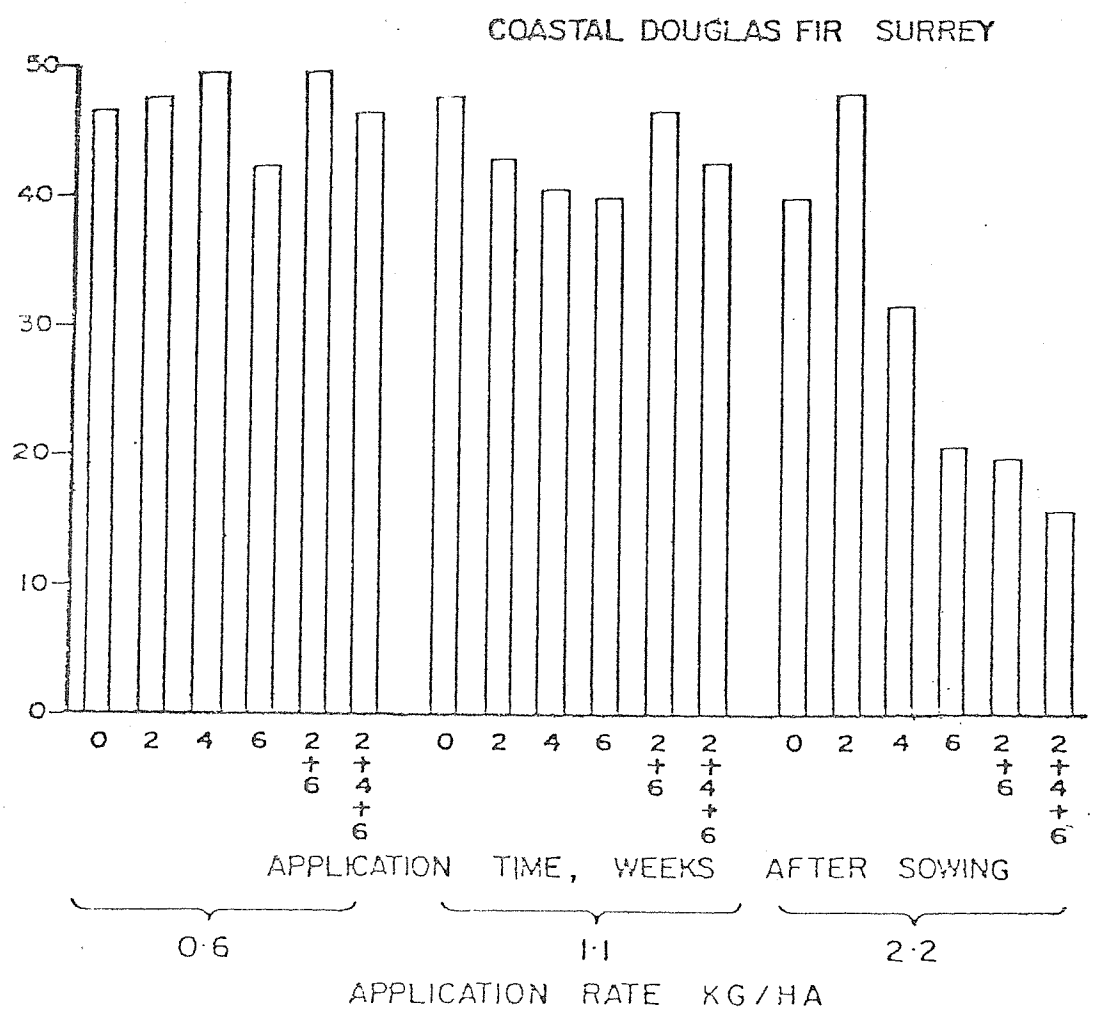
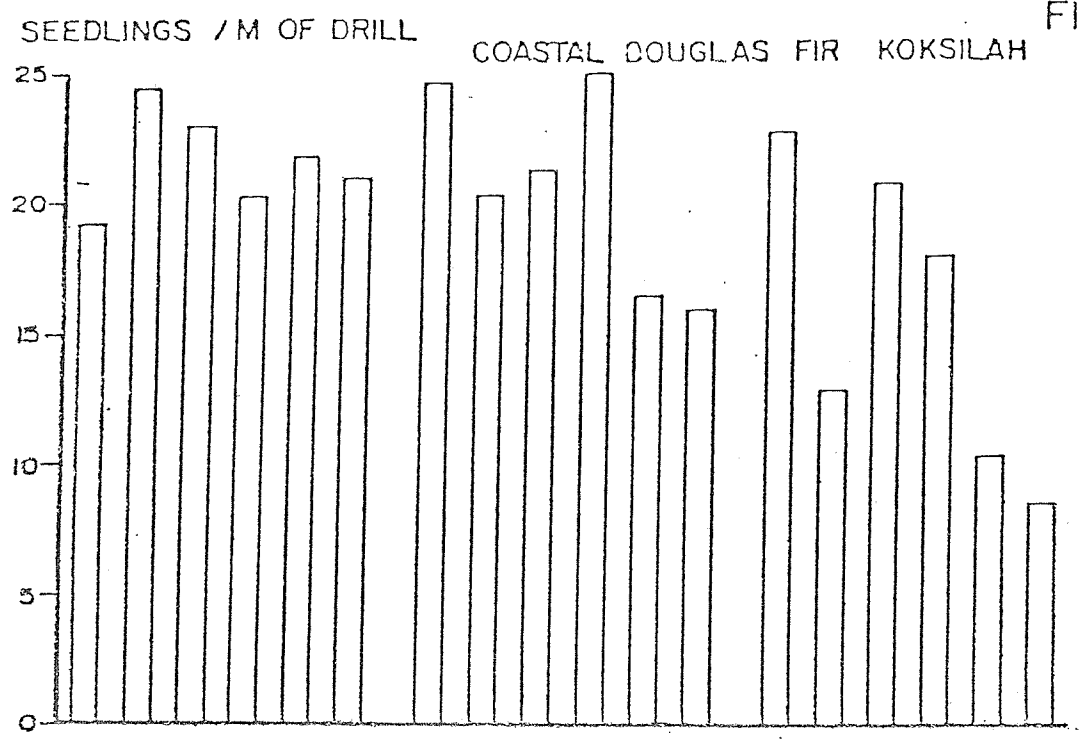
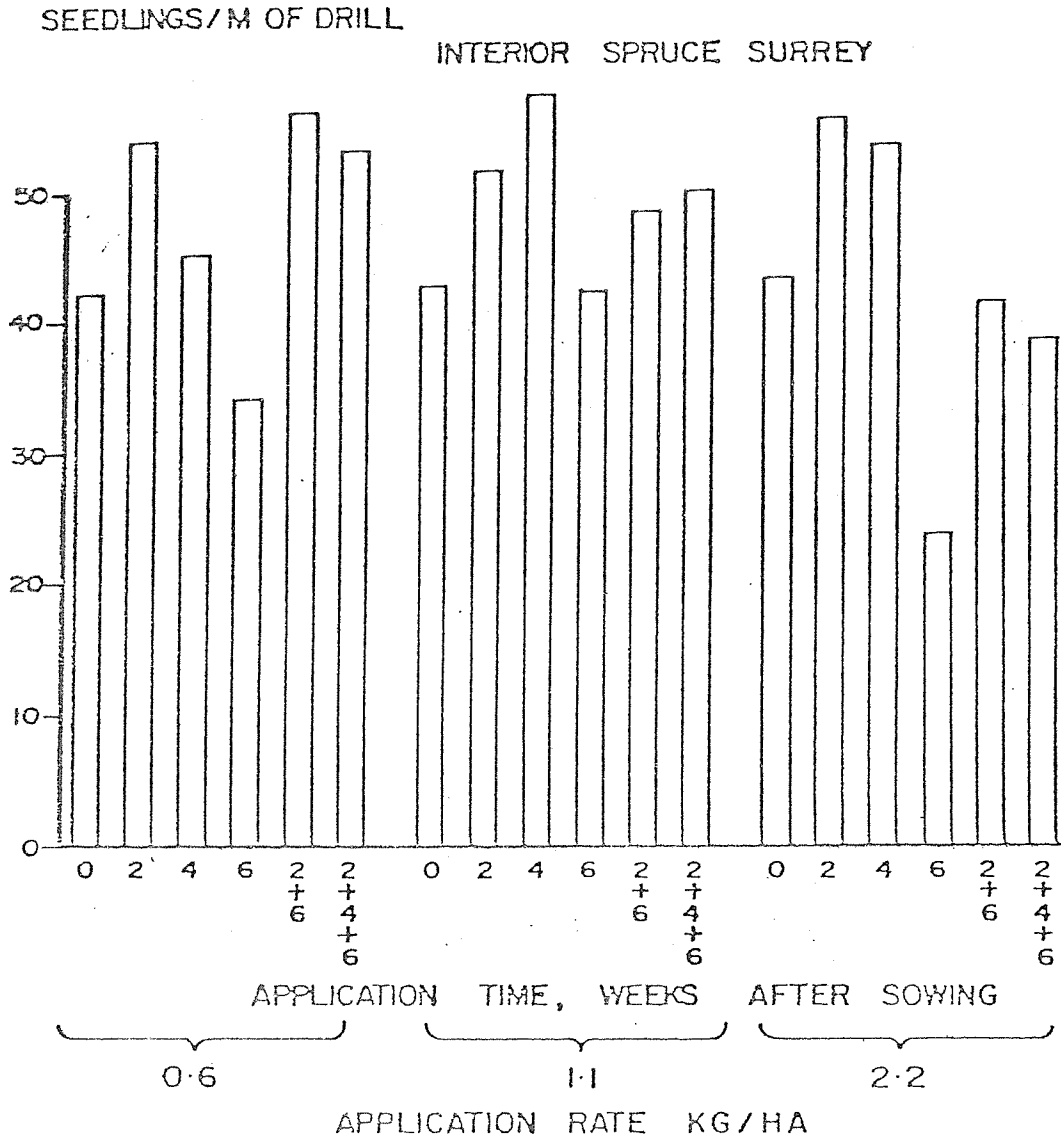


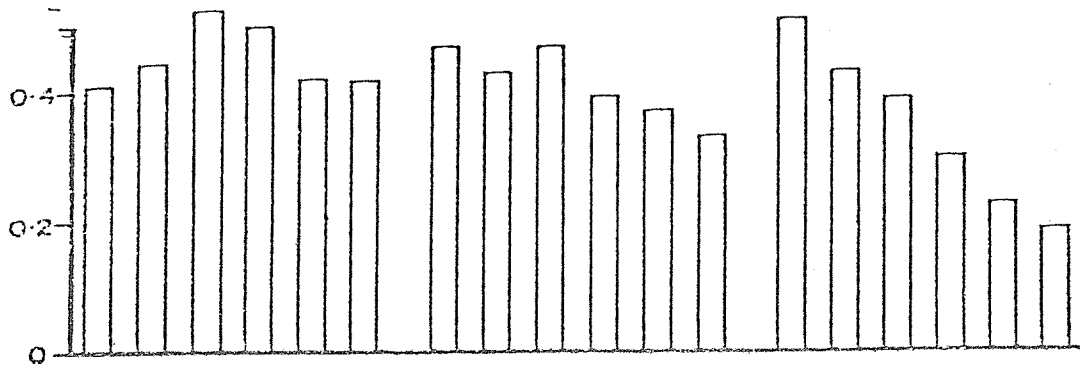
FIG 2



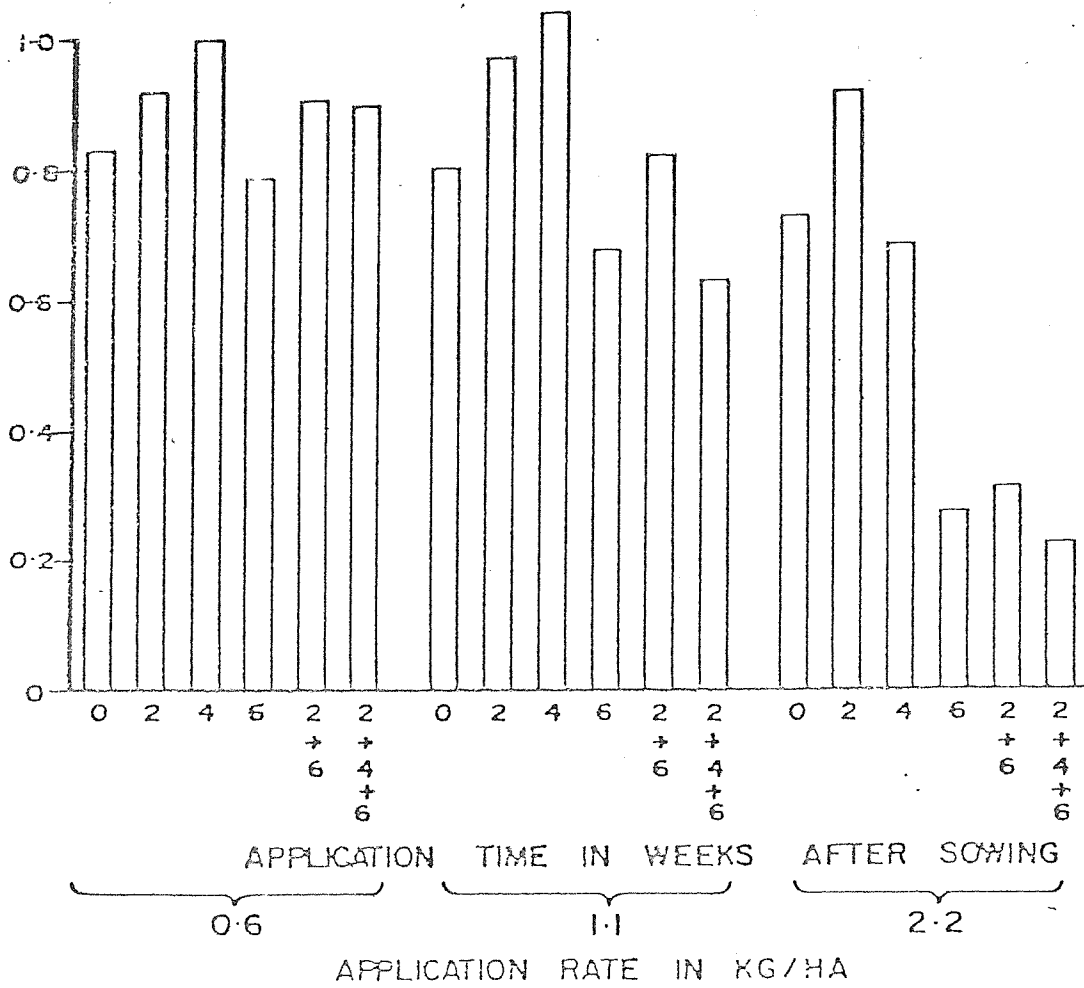
SEEDLING DRY WEIGHT, g

FIG 3

COASTAL DOUGLAS FIR, KOKSILAH



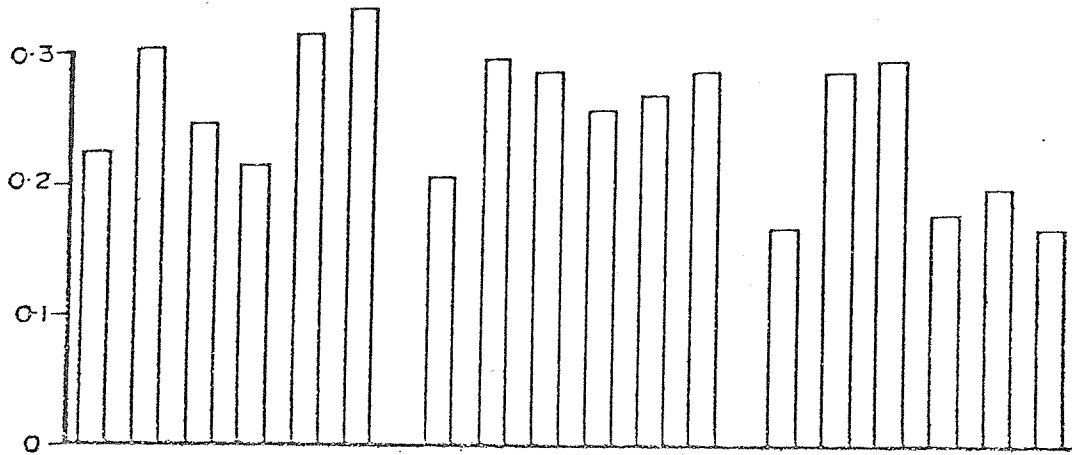
COASTAL DOUGLAS FIR, SURREY



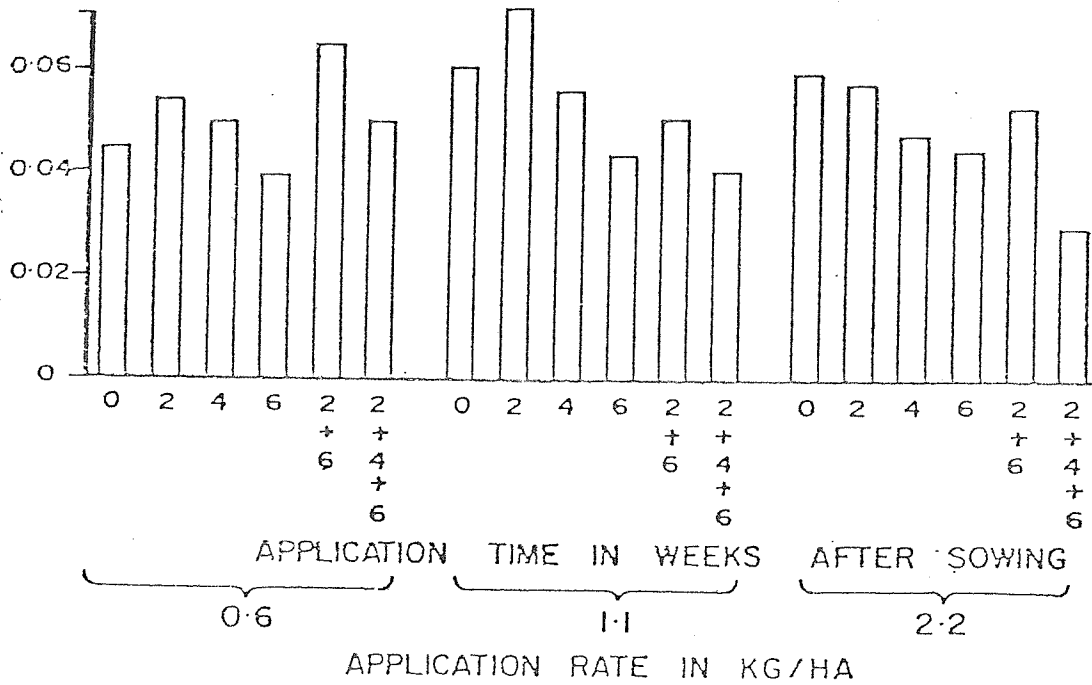
SEEDLING DRY WEIGHT, g.

INTERIOR SPRUCE, SURREY

FIG 4



WESTERN RED CEDAR, KOKSILAH



APPLICATION TIME IN WEEKS AFTER SOWING

0.6

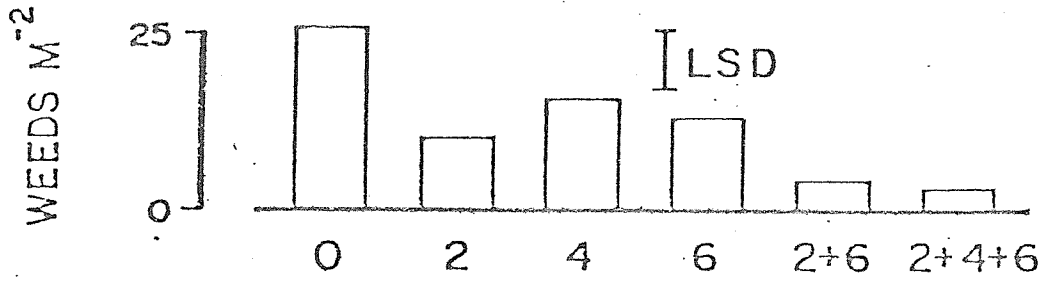
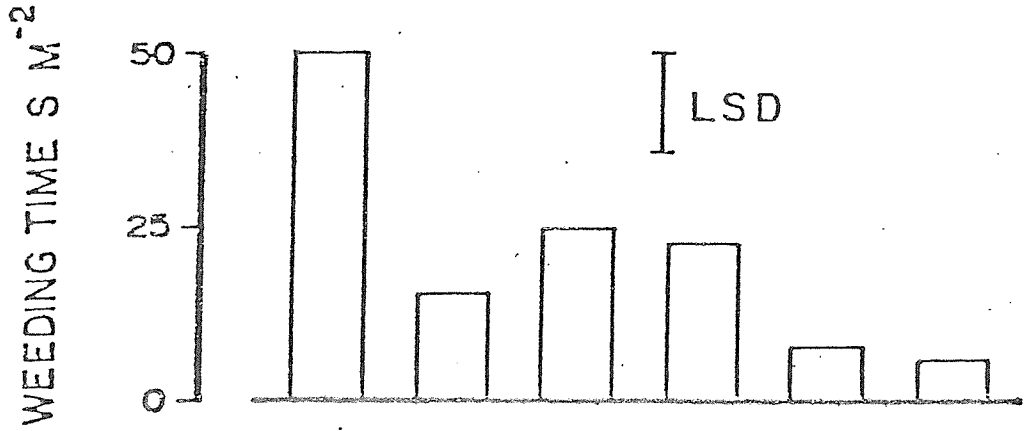
1.1

2.2

APPLICATION RATE IN KG/HA

KOKSILAH JULY

FIG 5



APPLICATION TIME, WEEKS AFTER SOWING

SURREY 29 JUNE

FIG 6

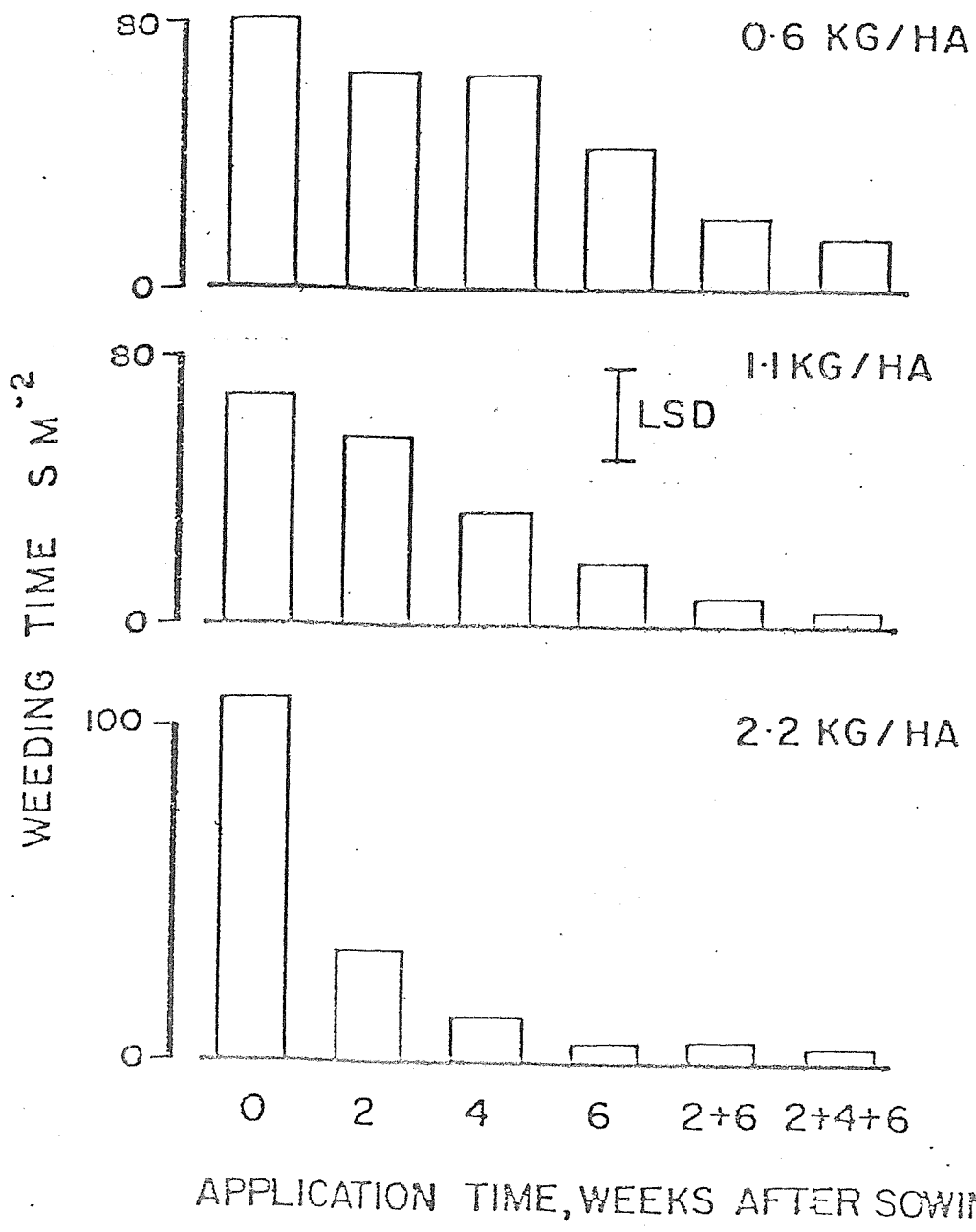


FIG 7

