dormancy, while reserves would have been recouped photosynthetically on the December sprayed plots.

Seasonal regrowth of silverleaf nightshade in the Wagga area appears in late September or early October. In general the weed population is sufficiently well developed to make a pre-harvesting (November) spray application feasible. Thus it seems probable that the effect of the rapid rate of regrowth after 2,4-D or fenoprop treatments could be overcome by sequential treatments. An initial spray application in November, followed by a second application in February, would probably minimize the amount of regrowth and also further reduce root reserves by extending the period without photosynthesis.

In so far as winter pasture development is concerned the response is similar to that of wheat when skeleton weed growth is suppressed on the fallow (Cuthbertson 1969). The general increase in production together with the apparent absence of any difference in treatment response suggests, once again, that suppression and not method of suppression is the operative factor.

WEED CONTROL AND ROW CROPPING STUDIES IN DRYLAND GRAIN SORGHUM IN NORTH WEST NEW SOUTH WALES

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Average yields of dryland sorghum in north west New South Wales are low (1.5-2.0 t/ha). Weed competition and moisture stress appear to be the main factors responsible.

Summer growing grasses and broad-leaf weeds resistant to phenoxy herbicides are widespread and cause heavy yield losses in dryland grain sorghum in this area. Until recently little attempt was made to control such weeds by either chemical or cultural means.

Seven experiments were conducted throughout the north west between 1971 and 1974. The weed populations studied were dominated by one or other of the following: *Datura* spp., *Echinochloa colonum* or *Eragrostis cilianensis*. The effect of weeds on yield of grain sorghum, the effectiveness of herbicide

and cultural methods of weed control and the effect of row spacing were measured.

WEED EFFECT

One complete crop loss was recorded with weed competition under conditions of severe moisture stress, but 30 to 70 per cent loss of yield was the general result. Sorghum yields were linearly reduced with increasing dry matter yield of weeds in each experiment. Weed type influenced the degree of crop loss. Grasses reduced yields more than *Datura* spp. for the same weed dry matter yield.

WEED CONTROL

Pre-emergent atrazine as a blanket spray was effective on all grasses and broad-leafed weeds encountered, at rates within and below the recommended ranges and resulted in sorghum yields equal to the hand-weeded controls. Post-emergent atrazine treatment did not always effectively control grasses.

Atrazine banded over the sorghum row at sowing, combined with one inter-row cultivation 5-6 weeks after sowing, was consistently as effective as a blanket spray.

Inter-row cultivation in the absence of herbicide increased sorghum yields compared with the weedy controls, and in one experiment produced a yield equal to that of the hand-weeded control, but in other experiments the yield was substantially less than the hand-weeded control.

ROW SPACING EFFECTS

Weeds produced more dry matter as inter-row spacing increased from 30 cm to 120 cm, and generally caused greater reductions in sorghum yield. In the weed-free situation, maximum yields were obtained in narrowly spaced rows on high-yielding sites (generally >2500 kg/ha) and in widely spaced rows on low yielding sites (<2500 kg/ha). Sorghum plants grown in widely spaced rows (90-120 cm) suffered less moisture stress, as determined by relative leaf turgidity, than those grown in narrowly spaced rows.

DISCUSSION

The effects of weed competition and practical weed control measures on sorghum yield were much greater than we expected from experience with weeds in wheat. Some factors we consider responsible are:

(1) lower plant density of grain sorghum relative to wheat, plus a higher incidence of weeds and thus a higher weed density to crop density ratio;