

EFFECT OF PRE-EMERGENCE 2,4-D AND DICAMBA ON SUNFLOWERS

S.R. Walker and D.W. Lack
Department of Primary Industries, Biloela Qld. 4715

Abstract. The use of herbicides such as 2,4-D and dicamba in reduced tillage and seedbed salvage situations is increasing in central Queensland. However, there is little information on the tolerance of summer crops to the soil residues of 2,4-D and dicamba under local conditions. As both herbicides undergo microbial breakdown, soil moisture status is an important factor in determining safe plant-back periods. The effect of differences in soil moisture at the time of application of these herbicides was studied in trials at Biloela in central Queensland.

In one pot trial, 2,4-D was applied at 0.5 and 2.0 kg a.i./ha and dicamba at 0.14 and 0.56 kg a.i./ha to either moist or dry clay loam soil, 14 or 7 days prior to planting or immediately after planting sunflowers. Soil in the pots was maintained either moist or dry from spraying to planting. Ten seeds of sunflowers cv. Hysun 33, were sown in each pot which was then watered with overhead misting nozzles. Fourteen days after planting, plant numbers, shoot height and weight, and root weight were recorded.

In two field trials, 2,4-D was applied at 0.5 and 1.0 kg/ha to either moist or dry clay loam soil at different times ranging from 21 days pre-planting to two days post-planting. The moist plots were watered the day before spraying with soaker hoses, sprayed and then allowed to dry. All plots were spray irrigated seven days before planting. Emergence, seedling shoot heights and weight, height at flowering and yield were measured.

In the pot trial, seedling growth was not affected by residues from the low rate of either herbicide at any time of application. Residues from the high rate of either herbicide adversely affected seedling growth, with dicamba having a greater effect than 2,4-D. When applied to dry soil, the residual activity did not alter with time. However, in moist soil the residual activity of both herbicides decreased rapidly with no reduction in seedling growth from 2,4-D applied 14 days pre-planting. The root weights followed the same trends. Similar results were found for a pre-planting application for 2,4-D on wheat in southern Queensland (1).

In both field trials, 2,4-D had no effect on emergence, seedling weight, height, or yield for any time of application. In one trial which received rain two weeks after planting, leaf distortion appeared in plots treated with the high rate of 2,4-D applied close to planting, but the affected plants soon recovered. There were no leaf distortions in the other trial which received rain four weeks after planting.

Results from the pot trials indicate that 2,4-D and dicamba are degraded rapidly in moist soil, but on dry soil maximum effectiveness is maintained for at least 14 days even under hot conditions. In the field, soil moisture at spraying does not appear an important factor in determining safe plant-back periods. When 2,4-D at 1.0 kg/ha or less is applied before the planting rain, it is sufficiently degraded to safely plant sunflowers. When applied after planting rain, the effect on the crop seems to be related to timing of rain following planting. Similar results were obtained in pot and field trials with sorghum.

REFERENCES

1. Marley, J.M and Robinson, G.R. 1984. No-tillage Crop Production in Northern N.S.W., Proc. Project Team Meeting, pp. 36-38.