

Hexaflurate is a highly selective herbicide, killing only Cactaceae. A single application of 4 kg/ha gives excellent control of *Harrisia* for 4 or more years, with only minimal temporary injury to other plants. It is thus tempting to speculate that hexaflurate is a selective inhibitor or poison of enzymes involved in crassulacean acid metabolism (CAM) or CAM regulation, although this explanation appears insufficient to explain all aspects of hexaflurate toxicity.

Hexaflurate is a very useful herbicide for control of *Harrisia*, especially from the landholders' point of view. The herbicide is root absorbed; this makes the method of application unimportant as long as ground coverage is even. Aerial application, with the attendant savings in time and labour, is practicable. Furthermore, because of the physical properties of this herbicide, aerial application through a canopy over uncleared land is theoretically possible. Trials to test this possibility are in progress. Results are promising, although it is still too early for definite conclusions to be drawn.

#### COMPARISON OF COSTS OF ALTERNATIVE METHODS OF CONTROLLING HARRISIA CACTUS

Trevor R. Armstrong  
Department of Lands, Queensland

The initial objective of the *Harrisia* Cactus Eradication Scheme in Queensland was eradication of *Harrisia* cacti (*Eriocereus* spp.) as some people feared that these plants could spread as extensively as the prickly pears (*Opuntia* spp.). Research into control methods has resulted in the progressive development of effective, cacti-selective, versatile, long-term and cheaper techniques.

At present, the most effective chemical available for control of *Harrisia* cacti is hexaflurate. Cultivation is also effective, but requires a minimum of three ploughings. Biological control, if effective, would be most useful but research is still at an early stage and is not far enough advanced to assess its full potential.

Irrespective of method of application, the effectiveness of hexaflurate is about 90% or slightly greater.

Cost of aerial spraying or boom spraying with 4 kg of hexaflurate per hectare in total volumes of water of 30 litres and 100 litres respectively ranges from \$66 to \$80. For spot spraying of small patches and isolated plants with 500 g of hexaflurate in 640 litres of water, costs depend on the density of the patches. In practice, they usually range from \$15 to \$30 per hectare.

For aerial spraying, no extra costs need to be added for clearing of standing timber. For boom spraying and ploughing, mechanical clearing of the woody plants is required, so \$8 (pulling and burning) to \$30/ha (pushing and stacking) should be added for those techniques. Whether these costs are chargeable to control of the weed depends upon whether the landholder considers that clearing itself is justified by increased returns or elects to rebate benefits gained as part compensation to the Scheme. In such situations, only scattered infested patches are likely to need boom spraying and the total cost of chemicals per hectare for the whole area is likely to be reduced.

For spot spraying, some extra costs may be incurred in clearing access tracks; additionally, missed and seedling cactus in perimeter areas will need retreatment with hexaflurate. Spot spraying is labour-intensive and costs increase with cactus density until it becomes economical to switch to boom or aerial spraying treatment of inside infestations.

The choice of alternative techniques is related to the likely use of the land by the property manager. If future cropping is envisaged, ploughing has advantages, although, in the Collinsville district, unreliable rainfall, lack of suitable sorghum varieties, high incidence of midge infestation and the presence of feral pigs rarely allow grain to yield profitable returns. Development of cleared country with sown pastures is desirable but can hinder follow-up cactus control by making regrowth difficult to find.

The Queensland Department of Lands is spending more than \$500 000 a year in treating *Harrisia* on 68 000 ha of the 3 000 000 ha of cactus-infested properties in the Collinsville region. Individual holdings that attempt to comply with lease conditions rather than face punitive provisions of the Lands Acts are also spending up to \$60 000 a year. As the maximum loss in productivity in the Collinsville area is the full market value of the land (currently about \$10/ha), graziers are understandably reluctant to clear infested country, especially during the current depressed condition of the beef market.