WEED CONTROL IN ORCHIDS

Charles A. Conover
Assistant Ornamental Horticulturist

In orchid culture where plants are grown for years in the same pot, weed control can be a serious problem. There are some growers who would dispute this statement, however, I would know that these growers were lucky enough to escape having Oxalis corniculata or Dicliptera vahliana in their greenhouses. Oxalis and Dicliptera are troublesome pests because they are rhizomatous perennials and their seed pods snap open and propel seeds for several feet. Other weeds causing serious problems for the orchid grower include algae, mosses, and ferns. Many other weed species can be a problem, but these are the most troublesome.

Hand weeding is, and probably will continue to be, one of the main methods of weed control. However, with weeds that produce rhizomes, hand weeding is entirely unsatisfactory since parts of the rhizomes may be left in the pot to sprout again. Hand weeding may also result in removal of sections of the medium and can cause injury to roots. In addition, hand weeding cannot control seed germination and in a short time pots may be reinfested with a large number of weed species. Algae and mosses are particularly hard to remove from pots and can be quite unsightly. Thick growth of moss and algae may also restrict aeration of the medium and can cause a reduction in growth.

In recent years a large number of selective herbicides have been developed for control of weeds in various crops. A selective herbicide is a material that will selectively kill weeds without causing injury to the crop being grown. With such a wide selection of materials available, it was only a matter of time until research workers tried some on orchids for control of troublesome weeds. In preliminary experiments at the University of Hawaii by Akamine and Nakasome, six herbicides at different rates were used on Cattleya, Vanda and Dendrobiums for weed control. Of these six materials only monuron gave effective weed control (up to 12 months control) without causing injury to plants. This preliminary work led to further experiments with monuron. In an experiment with Cattleya and Brassocattleya 4, 6 and 8 mgm of monuron was applied to 4-7 inch pots. Complete kills of Oxalis occurred in 4 weeks and pots remained clean of weeds for 8 months. Various media were used in this work and similar results occurred in each. All treated plants and their blossoms seemed normal during and after the test and toxicity symptoms did not appear. Many additional experiments were established to determine toxicity of monuron on Vandas, Dendrobiums and Cattleyas. These experiments indicated that levels of monuron of 20 mgm/6 inch pot or less caused no toxicity or reduction in growth when applied once a year. In work where two applications of monuron at rates of 20 mgm/6 inch pot were made within 5 months of each other, leaves turned yellow, but newly emerged leaves were normal. However, in an experiment in a large nursery, monuron at 5 mgm/pot was applied to 2,000 orchids of various genera and excellent weed control was obtained; a second application after 4 months caused no toxicity.

More recent work by Murashige, Sheehan and Kamemoto indicated that simazine is a safer material than monuron for use in orchids for weed control. Their work also shows that weed control with simazine is as good, or better than, monuron. Test plants used included Vandas, Cattleyas and Dendrobiums. An initial experiment showed that simazine levels of 0 to 10,000 ppm did not injure mature Vandas and Cattleyas when sprayed on the medium surface. Excellent weed

control was obtained with the 10,000 ppm level of simazine in these experiments. Further work was carried on with Cattleyas and Dendrobiums (Table 1). Both monuron and simazine proved to be excellent herbicides and effectively controlled broadleaved weeds, algae, mosses and ferns at the 4,000 and 8,000 ppm levels. In this experiment plants were dipped in herbicide solutions. The 8,000 ppm rate of monuron injured Cattleyas, while the 10,000 ppm rate of simazine injured Dendrobium seedlings on hapuu logs. Dr. Sheehan, University of Florida, Gainesville, has conducted another experiment using simazine as a herbicide on pots of Phalaenopsis and Phaius. Rates range from 0 to 10,000 ppm simazine. Weed control has been excellent at the higher rates and no toxicity has been noted at any herbicide level.

TABLE 1. Eradication of algae and moss in potted cattleyas (Treatment applied February 23, 1962).

Herbicide	Concentration	Degree of Eradication		
		3/21/62	5/16/62	1/17/63
Monuron	800 ppm	slight	moderate	good
"	4000 ppm	moderate	excellent	good
"	8000 ppm	very good	excellent	excellent
Simazine	800 ppm	moderate	moderate	slight
"	4000 ppm	moderate	very good	good
"	8000 ppm	moderate	excellent	excellent
Bioquin 1	500 ppm	slight	none	none
"	1000 ppm	moderate	none	none
Copper A	2 lb/100 gal	slight	none	none
"	4 lb/100 gal	slight	none	none
Tribasic Copper Sulfate	2 lb/100 gal	slight	none	none
" " "	4 lb/100 gal	slight	none	none
None	----	none	none	none

General recommendations on monuron and simazine indicate that 4,000 ppm monuron and 5,000 ppm simazine will give adequate weed control without causing injury to mature plants. The 5,000 ppm rate of simazine can be obtained by making a solution of 1/2 oz. or 2 1/2 level tablespoons of 80 per cent wettable simazine in a gallon of water. I would be at fault if I did not bring to your attention the fact that neither of these materials have label clearance for orchids, and therefore, this recommendation can only be made on a trial basis. I might add, however, that the manufacturer might not seek label clearance because of the high cost involved.

Herbicide breakdown of simazine has been the object of intensive research by the Agricultural Research Service of the U.S.D.A. Their work has shown that Aspergillus fumigatus, one of the universal soil fungi utilizes carbon in simazine as a nutrient. The metabolic activity causes the herbicide to degrade, or change chemically into nontoxic products. Several other soil micro-organisms -- fungi, bacteria and actinomycetes -- are also capable of degrading simazine. Therefore, there should be little if any danger of simazine accumulating in the media and building up to toxic levels.

Literature Cited

1. Akamine, K. A. and H. Y. Nakasome. 1954. Control of weeds in orchid culture with special reference to the effect of CMU on Oxalis corniculata L. Na Pua Okika O Hawaii Nei. 4 (1): 3-10.

2. Kaufman, D. D., P. C. Kearney and T. J. Sheets. 1964. Pesticide breakdown. Agricultural Research. March. p. 10.

3. Murashige T., T. J. Sheehan and H. Kamemoto. 1963. Controlling weeds in orchids with herbicides. American Orchid Society 32: 521-525.

* * * * *

To simplify information in Florida Flower Grower, it is sometimes necessary to use trade names of products, equipment, and firms. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.