

is, especially in thorny or prickly plants and they can see that you care and are trying to help them, it is truly an indirect benefit to your business.

MODERATOR FRETZ: Thank you, Charley; your presentation is a first for this Society as far as I am aware of. I thought you did a good job of indicating the need for calibration of equipment used for application of herbicides. Our next speaker is Dr. Elton Smith who will talk about chemical weed control in lining-out beds.

CHEMICAL WEED CONTROL IN LINING-OUT BEDS

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INTRODUCTION

Weed control in lining-out beds has always been expensive, since weeds have been controlled for the most part by manual labor. With beds usually composed of small plants, weeds must be removed frequently to reduce the competition primarily for light, but for moisture and nutrients as well. Although, women and teen-agers have been used extensively for weeding the labor costs have steadily increased to well over the \$600/A/yr for weeding field stock as reported by Johnson in 1962 (1).

In recent years, pre-emergence herbicides have been used extensively by nurserymen in field stock but not in lining-out beds. Among the reasons for limited use in liner beds are: 1) fear of herbicide damage to small plants with a limited root system; 2) with large numbers of plants in a small area, concern that a mistake will eliminate a future crop; 3) often, lining-out beds contain numerous cultivars of plants and herbicide selection becomes more difficult; and 4) certain herbicides such as Treflan are not as effective in beds amended with peat or other organic materials.

Research workers have shown that herbicides can be safely used in lining-out beds (3, 4) with savings in labor of up to 70% (2). The objective of studies conducted in liner beds in commercial nurseries in Ohio for the past several years have been to determine those herbicides which will result in satisfactory weed control over an extended period of time with a minimum of plant injury.

MATERIALS AND METHODS

The studies during the growing seasons of 1972-1973 were conducted in Fox silt loam soils with a pH range of 6.2 to 6.7. The herbicides were applied with 4 gal pressure-type tank sprayers or with rotary spreaders within 10 days following planting in April and May. All plots were irrigated immediately following treatment.

The predominant annual weed species encountered in most studies was galinsoga [*Galinsoga parviflora*] which is somewhat resistant to many herbicides. Other prevalent weed species included foxtail, crabgrass, lambsquarters, purslane, pigweed, and ragweed. The plant materials were a mixture of deciduous shrubs which had been rooted the previous summer and autumn.

RESULTS AND DISCUSSION

In the 1972 study the principal objective was to control galinsoga and the results, summarized in Table 1, indicate that Lasso, Princep, and Princep combinations were the most effective herbicides. In this study the plant materials were deciduous shrubs, most of which were susceptible to Princep, and injury was prevalent as shown in Table 2.

Table 1. Galinsoga control in lining-out stock

| Treatment | Pounds a.i./A | % Galinsoga Control After 8 weeks |
|-------------------|------------------|--------------------------------------|
| Check | | 0 |
| Treflan | 2.0 | 50 |
| Dymid | 8.0 | 70 |
| Chloro IPC | 10.0 | 80 |
| Lasso | 2.5 | 90 |
| Princep | 1.0 | 100 |
| Princep + Lasso | 1.0 + 4.0 | 100 |
| Princep + Treflan | 1.0 + 2.0 | 100 |

Since Lasso is not registered for nursery crop use, broad spectrum application would be limited to using Chloro IPC or possibly Dymid, although the latter in subsequent trials has not consistently controlled galinsoga.

In 1973, trials were conducted to evaluate control of both annual grasses and broadleaf weeds with new herbicides including some labelled herbicides for comparison. The results after 7 weeks (Table 3) indicate that Lasso and a numbered compound from Amchem (A-820), alone and in combination, were the most effective materials in controlling a mixture of weeds.

Table 2. Phytotoxicity to lining-out stock

| Treatment | Pounds a i /A | Injury Rating* | | | |
|-------------------|------------------|--------------------------|----------------------|-------------------------|---------------------|
| | | Spreading cotoneaster | Chenault viburnum | Bronxensis forsythia | Snowmound spirea |
| Check | | 0 | 0 | 0 | 0 |
| Treflan | 2.0 | 0 | 0 | 0 | 10 |
| Dymid | 8.0 | 10 | 0 | 0 | 20 |
| Chloro IPC | 10.0 | 0 | 20 | 40 | 30 |
| Lasso | 2.5 | 10 | 10 | 10 | 30 |
| Princep | 1.0 | 10 | 10 | 40 | 70 |
| Princep + Lasso | 1.0+4.0 | 10 | 10 | 60 | 70 |
| Princep + Treflan | 1.0+2.0 | 0 | 10 | 30 | 90 |

* 0 = No injury, 100 = Complete death. Values above 30 are considered too injurious for use.

Table 3. Annual grass and broadleaf weed control in lining-out stock.

| Treatment | Pounds a.i./A | Percent Weed Control (7 Weeks) |
|------------------------|------------------|--------------------------------------|
| Check | | 0 |
| Lasso 4E | 2.0 | 70 |
| Lasso 4E | 3.0 | 90 |
| A-810 4E | 3.0 | 70 |
| A-820 + Dymid 4E + 80W | 3.0 + 5.0 | 70 |
| A-820 + Amiben 4E + 2E | 3.0 + 2.0 | 80 |
| A-820 4E | 4.0 | 80 |
| Treflan 4E | 1.0 | 80 |
| Dymid 80W | 8.0 | 60 |
| Amiben 2E | 2.0 | 50 |
| Betasan 3.6G | 12.5 | 50 |

There was no appreciable injury associated with the ornamentals which included: flowering almond, regels privet, winged euonymus, bronxensis forsythia, vanhoutte spirea, and compact American cranberrybush viburnum.

SUMMARY

Based on these and other studies, herbicides for use in controlling weeds in liner beds must be selected on the basis of weed species anticipated, ornamentals present and soil type. In general, the safest labelled herbicides include Treflan, Dacthal, Chloro IPC, and diphenamid. These herbicides control weeds for only a few weeks and must be applied more than once a season. Princep and its combinations can be used with certain crops and will remain effective for 2 to 3 months or longer. Lasso and

A-820 show promise but are not currently registered for nursery use.

LITERATURE CITED

1. Bingham, S.W. 1968. Economic evaluation for weed control in field-lined woody ornamental nursery crops. *Proc. Amer. Soc. Hort. Sci.* 92:704-712.
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3. Newman, R. and L. Binning. 1972. Weed control in nursery lining-out stock. *Proc. N.C.W.C.C.* Dec. 1972, pp. 61.
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MODERATOR FRETZ: We are still running behind time and all questions will have to be deferred until this evening's program. Our next speaker is William Bennett who will speak on herbicides and combinations in field liners.

HERBICIDES AND COMBINATIONS IN FIELD LINERS

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Chemical weed control programs for nursery crops have been adopted at an increasing rate over the past several years. Effective herbicides have been developed and tested and nursery operators have shown cost reductions for weed control when compared to mechanical methods. Injury to nursery crops has been negligible when recommended herbicides are used at the correct time and at suggested rates of application.

Field trials of many herbicides and combinations of two or more chemicals have been conducted in Massachusetts by the Cooperative Extension Service for several years. Growers and chemical companies have been very cooperative in making these possible. In designing various field trials several considerations were basic to the decision making process. These are as follows:

1. The first flush of weed growth following transplanting is probably the most important to control effectively.
2. Granular formulations are much more practical for the smaller grower or the treatment of smaller blocks of similar plant material.