TABLE 1. EFFECTS OF SEVERAL PREPLANT SOIL-INCORPORATED HERBICIDES FOR WEED CONTROL IN CELERY*

Applied Sept. 27, 1963; harvested Jan. 15, 1964

| Herbicide | lb/A | Percentage of weed control† after | | | | Phytotoxicity to celery‡ | Yield lb/plot | Percentage of check |
|---|---|---|---|---|---|---|---|---|
| | | 15 days | 18 days | 35 days | 60 days | 35 days | | |
| Dacthal | 4 | 40 | 61 | 41 | 35 | 0.5 | 46.2 | 100 |
| Dacthal | 8 | 53 | 50 | 18 | 52 | 1.0 | 45.1 | 98 |
| Prometryne | 2 | 47 | 78 | 71 | 65 | 0.2 | 49.1 | 107 |
| Prometryne | 4 | 80 | 100 | 94 | 78 | 1.0 | 46.8 | 101 |
| Treflan | 2 | 80 | 94 | 94 | 74 | 2.2 | 48.2 | 104 |
| Treflan | 4 | 100 | 100 | 94 | 91 | 3.5 | 45.0 | 97 |
| Check | 0 | 0 | 0 | 0 | 0 | 0.8 | 46.2 | 100 |
| LSD.05 | | | | | | | NS | |

* Average of 4 replications (1 bed × 12½ ft long).

† Weeds present: Chenopodium murale, London rocket, nettle, chickweed, Malva sp., hairy nightshade.

‡ Phytotoxicity rating used was from 0–10: 0 = no effect and 10 = severely stunted or dead.

A. H. LANGE · R. A. BRENDLER · J. M. LYONS

Two new herbicides—prometryne and FW 925 (neither is registered for use on celery, so cannot be recommended)—have shown promise for weed control in transplanted celery, according to these preliminary tests in Ventura County.

*New chemicals show promise . . .*

# WEED CONTROL IN TRANSPLANTED CELERY

WEED CONTROL in transplanted celery is one of the largest production expenses for California growers. Each acre requires 30 to 60 man-hours of weeding by crews using short handled hoes. In addition to these high costs, hand-weeding is often hard on the celery. However, current, and possibly future, labor shortages may reduce the availability of "stoop" labor—thus focusing attention on the need for improved chemical weed control.

At present, the celery beds are kept wet for about two weeks after transplanting. Then they are allowed to become dry enough to hoe and cultivate. If this period is followed by unpredictable rain, delays due to labor shortages, or the pressure of other work, weeds become a real menace to the success of the crop.

Several years ago, research in Ventura County indicated that dicryl and neburon might have promise for weed control in celery. However, these chemicals have not been registered for use in celery. Several herbicides, including CIPC, IPC, CDAA, and CDEC, have not proven satisfactory under California conditions, therefore have not been recommended by the University of California. Presently, carrot oil is recommended for seed bed and direct seeded celery only. Since information was limited, a small screening program was set up in Ventura County celery fields to evaluate some of the more promising new herbicides.

In one of the early tests, prometryne, trifluralin (Treflan), and DCPA (Dacthal) were applied to bed surfaces and incorporated with a rotary tiller before transplanting celery. Although the weeds were not plentiful, there appeared to be excellent weed control with no toxicity to the celery (table 1). However, incorporation of these chemicals required equipment considered impractical at present in Ventura County. This factor, along with the rapid turnover in this vegetable crop, and the "unknowns" relative to herbicide residues, suggested that studies be directed toward early post-emergence applications of herbicides known to have short-lived soil residues.

Results of the first two post-emergence trials, comparing several herbicides, showed that solan and FW 925 (TOK E-25) caused less damage to the celery and more weed control than dicryl (tables 2 and 3).

The rates of prometryne in the first post-emergence test were too high; however, lower rates might be effective for weed control without damage to celery, as shown in tables 3 and 4. MCPB produced too much damage, and weed control was inadequate (table 3). Dicryl showed fair-to-good weed control (table 3) but somewhat marginal safety toward the crop (table 2). Follow-up tests with 1- and 2-lb-per-acre applications of prometryne proved to be safe with excellent weed control (table 4).

FW 925 at 2 lbs per acre controlled weeds effectively with no reduction in yield. (The weeds in these tests were mostly broadleaved.) Solan again provided good control except for hairy nightshade (*Solanum sarachoides*). Solan was a little more toxic than prometryne, although none of the treatments produced significant stunting or other symptoms (table 4). The yield data, however, pointed out that prometryne at 1 and FW 925 at 2 lbs per acre produced higher yields (statistically significant) than either solan rates or the combination of solan and FW 925. Prometryne also controlled more weeds than solan. Consequently, the follow-up trials included only prometryne and FW 925.

Three additional tests were conducted comparing rates of FW 925 and prometryne. A summary of these three tests showed both of these chemicals gave excellent weed control in transplanted celery (table 5). The 10- and 14-day ratings of weed control represent data averaged from three different experiments—suggesting the use of FW 925 at 2 lbs and prometryne at 1 lb per acre.

In these tests the weeds were not allowed to mature; so yield reduction attributable to weeds could not be determined. This may have no significance, since if weeds are present, they must be controlled.

*A. H. Lange is Associate Agriculturist, University of California, Davis; R. A. Brendler is Vegetable Crops Farm Advisor, Venture County; and J. M. Lyons is Lecturer and Associate Plant Physiologist, Department of Vegetable Crops, U. C., Riverside.*

Untreated celery test row showing heavy growth of London rocket and other broadleaved weeds in contrast to adjoining herbicide-treated rows.

TABLE 2, EFFECT OF SEVERAL POST-EMERGENCE HERBICIDES ON CELERY*
Applied Sept. 27, 1963; harvested Feb. 20, 1964 (weeds removed)

| Herbicide | lb/A | Phytotoxicity† rating after— 15 days | 35 days | Yield lbs/plot | % of check |
|---|---|---|---|---|---|
| Dicryl | 4 | 1.8 | 1.5 | 57.0 | 80 |
| Solan | 4 | 1.5 | 0.5 | 63.2 | 89 |
| FW 925 | 4 | 0.5 | 0.2 | 64.5 | 91 |
| FW 925 | 8 | 0.5 | 0.2 | 55.2 | 78 |
| Prometryne | 4 | 4.0 | 4.0 | 53.7 | 76 |
| Prometryne | 8 | 5.5 | 5.0 | 46.8 | 66 |
| MCPB | 4 | 2.5 | 2.2 | 47.2 | 66 |
| Check | 0 | 1.0 | 0.8 | 71.1 | 100 |
| LSD .05 | | | | 8.46 | |
| LSD .01 | | | | 11.55 | |

*Average of 4 replications (2 beds × 12½ ft long).
† Phytotoxicity rating used was from 0–10: 0 = no effect and 10 = severely stunted or dead.

TABLE 3, EFFECT OF SEVERAL POST-EMERGENCE HERBICIDES ON CONTROL OF BROADLEAVED WEEDS*
Applied Dec. 4, 1963

| Herbicide | lb/A | Average percentage weed control† after— 9 days: young weeds (2 to 4 leaf stage) | 9 days: old weeds (4-to-6 inches in ht.) | 30 days: old weeds (4-to-6 inches in ht.) | 60 days: all weeds present‡ |
|---|---|---|---|---|---|
| Dicryl | 4 | 84 | 36 | 74 | all living |
| Solan | 4 | 86 | 36 | 68 | nightshade |
| FW 925 | 4 | 96 | 80 | 68 | London rocket shepherd's purse |
| FW 925 | 8 | 100 | 84 | 74 | all weeds stunted or dead |
| Prometryne | 1 | 94 | 48 | 70 | cheeseweed |
| Prometryne | 4 | 94 | 68 | 100 | controlled |
| Prometryne | 8 | 96 | 54 | 100 | controlled |
| MCPB | 4 | 48 | 44 | 52 | all living |
| Check | 0 | 0 | 0 | 0 | all living |

*Average of 5 replications (1 bed × 10 ft long): 0–10 control rating: 0 = no control, 10 = complete weed control.
† The weed species were cheeseweed, nettle, chickweed, nightshade, shepherd's purse, groundsel, prickly lettuce, purslane, Brassica sp., London rocket.
‡ Predominant weeds growing in the plots.

TABLE 4, WEED CONTROL OF SEVERAL HERBICIDES IN CELERY*
Post-emergence to transplanted celery with weeds in the 2 or 4-to-6-leaf stages. Applied Jan. 4, 1964.

| Herbicide | lb/A | % weed control† after Test 4 11 days | Test 5 27 days | Phytotoxicity‡ 45 days | Yield lb/plot | Percentage of check |
|---|---|---|---|---|---|---|
| Prometryne | 1 | 96 | 98 | 1.0 | 57.3 | 109 |
| Prometryne | 2 | 100 | 100 | 1.2 | 55.2 | 106 |
| Solan | 1 | 87 | 85 | 2.4 | 47.5 | 90 |
| Solan | 2 | 90 | 93 | 2.2 | 49.7 | 95 |
| FW 925 | 2 | 84 | 91 | 0.2 | 56.8 | 108 |
| Solan + FW 925 | 1 + 1 | 95 | 95 | 2.0 | 52.0 | 99 |
| Check | 0 | 0 | 0 | 0.2 | 52.4 | 100 |

*Average of 5 replications (1 bed × 10 ft long).
† Weeds present were shepherd's purse, London rocket, cheeseweed, lambsquarter, nettle, and nightshade.
‡ Phytotoxicity based on a 0–10 rating: 0 = no effect, and 10 = badly stunted and dead.

TABLE 5, SUMMARY OF THREE TESTS COMPARING TWO HERBICIDES WITH AN UNTREATED CHECK PLOT*
Herbicides were applied March 20, 1964, in three locations on young transplanted celery in three different stages after transplanting. The weeds were in the 2-to-4-leaf stages. Two of the three plots were harvested in June, 1964

| Herbicide | lb/A | Weed control* after 10 days† | 14 days | Yield as a % of untreated check |
|---|---|---|---|---|
| FW 925 | ½ | 94 | 27‡ | 122 |
| FW 925 | 1 | 97 | 49‡ | 121 |
| FW 925 | 2 | 99 | 99‡ | 116 |
| FW 925 | 4 | 98 | .. | ... |
| Prometryne | ½ | 96 | 71§ | 100 |
| Prometryne | 1 | 99 | 96§ | 105 |
| Prometryne | 2 | 99 | 99§ | 96 |
| Check | 0 | 0 | 0‡§ | 100 |

*Average of 4 or 5 replications (1 bed × 10 ft long).
† Data from test 8.
‡ Data from test 6: yield in test 6 was 41.1 lbs/plot for check.
§ Data from test 7: yield in test 7 was 60.6 lbs/plot for the check.