

# UREA HERBICIDE BREAKDOWN IS SLOW

*under field conditions*

C. A. SHADBOLT • F. L. WHITING

The use of certain herbicides for weed control is often restricted because of their persistence in the soil and the detrimental effect on subsequent crops. This is particularly true of short-season vegetables where a second crop may follow in from three to four months. In southern California tests two of the urea herbicides, neburon and monuron, were found to disappear relatively slowly. From 4 to 5 months were required for monuron and 8 to 9 months for neburon to fall to the 50 per cent disappearance levels.

These experiments were set up at Riverside to determine the rate of breakdown of monuron and neburon in a Ramona sandy loam soil under an intensive cropping regime. Each material was applied at 2, 4 and 8 pound rates to large plots on October 7, 1960. Four replications were used. The chemicals were immediately incorporated to approximately 6 inches into the soil with a double disk. All cultivations following applications were made with a disk or roto-tiller. An effort was made to keep such cultivations shallow and to move as little soil as possible.

## Cropped three times

The field was cropped three times after the experiment was set up: at the time of application; 5½ months later; and 9 months later. Soil samples were taken at

the time of each planting from the 0 to 6 inch depth and were chemically analyzed for residual herbicide. The crops planted at the first date included cabbage, spinach, beets, radish and lettuce. At the second date, radish, lettuce, snap beans, and spinach were planted. At both dates, emergence of all crops was normal, but within a few weeks, all plants were dead in the treated areas.

Up to the time of the last planting, in July 1961, the field had been furrow irrigated at weekly intervals for about 4 months. The land lay fallow and without irrigation between croppings. From the time of application of the chemicals, there was a total of 3.2 inches of rainfall, with nearly half of it occurring during November, 1960.

## Third planting

The third planting, consisting of sweet corn and onions, was made on July 10, 1961. By this time, the breakdown of the chemicals had progressed to a point where both crops survived in some of the plots. At one month after planting, the corn on the 2-pound neburon plot showed no reduction in vigor as compared with the control plots. At 4 pounds, the crop was severely stunted, and 8 pounds resulted in complete eradication of all vegetation.

Monuron plots with 2 pounds per acre

showed normal plant growth. Plants on the 4-pound plot were slightly stunted, and the 8-pound rate resulted in moderate stunting. Although the onions at this time were too small to be critically evaluated, it was evident that they were more severely injured than the corn. All rates of neburon resulted essentially in complete loss of the crop. The two higher rates of monuron resulted in a very severe stunting and loss of stand.

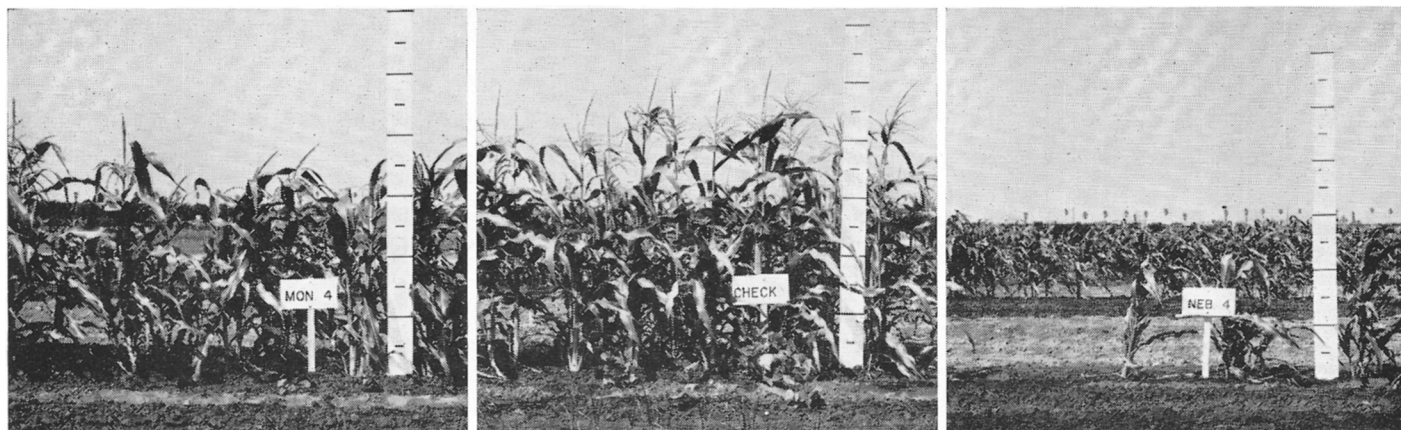
## Responses

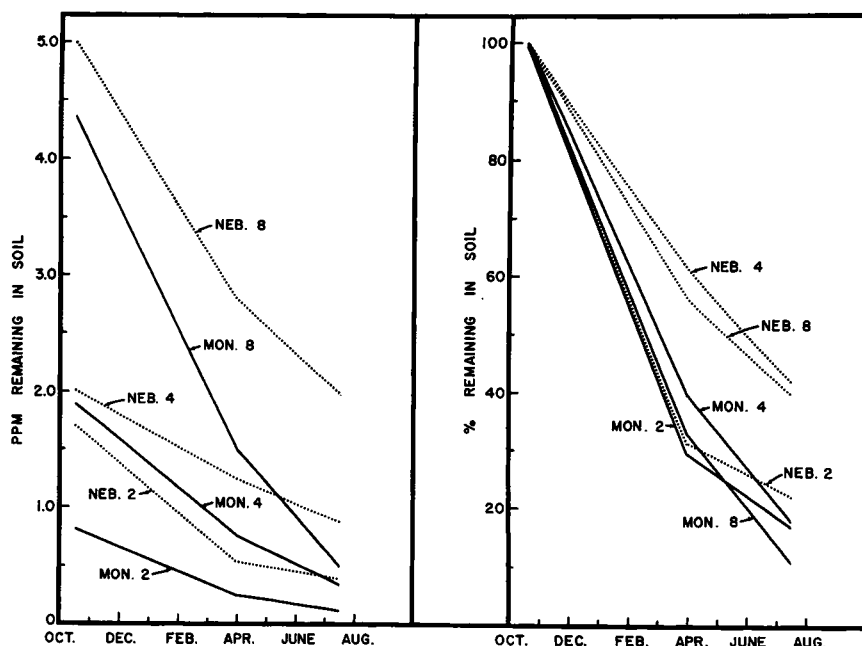
Responses of sweet corn to the chemicals, which had been applied about 9 months before planting, indicated that monuron disappeared more rapidly than neburon. This trend was also borne out by the chemical assay of the two herbicides in the soil. At 5½ months after application, from 30 to 40 per cent of the initial monuron remained in the soil. At the same time, with the exception of the 2-pound rate, from 55 to 60 per cent of the neburon remained. At the end of 9

*C. A. Shadbolt is Assistant Olericulturist, University of California, Riverside, and F. L. Whiting is Laboratory Technician in Vegetable Crops, University of California, Riverside.*

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Effects on sweet corn of monuron, left, and neburon, right, applied at 4 pounds per acre nine months before planting—as compared with check plot.





Levels of monuron and neburon and rate of disappearance from soil in 0 to 6-inch depth through period of 9 months.

months, only 10 to 18 per cent of the monuron remained, while about 40 per cent of the neburon was still present in the soil. Results indicated that neburon disappeared from the soil more rapidly when applied at two pounds than at higher rates. The amount of neburon found in the initial soil sample, taken shortly after application (at the 2-pound rate), was considerably higher than expected, however, as compared with levels found in soil treated with higher rates. Because the rate of breakdown is based on these initial rates, this could account for an apparent acceleration of disappearance.

## Conclusions

This experiment will be carried on for at least another year, involving from 2 to 3 additional cropping sequences. It can be concluded, however, that under the abnormally dry season experienced in southern California during the winter of 1960-61—and under cropping and furrow irrigation for 4 months of the 9-month interval—both neburon and monuron disappeared relatively slowly. Fifty per cent of the monuron disappeared in from 4 to 5 months, whereas it required 8 to 9 months for neburon to reach the same level.

It must be remembered that this experiment differs in one important respect from a normal herbicide application to a growing crop. Although a 2-pound application of either material would be a rate normally used for weed control, this

is usually applied to the surface of the soil. In most cases it would remain on the surface for a considerable length of time rather than be incorporated immediately as was done in this experiment. It is possible that the breakdown pattern under such conditions may be somewhat changed. The results of this study would therefore apply particularly after the soil has been disturbed and incorporation of the herbicide into the soil has been accomplished.

## Peppers add vitamins, flavor to

### NEW TOMATO JUICE COCKTAIL

Mixing 5 per cent red bell pepper juice into regular tomato cocktail offers processors a new flavor possibility as well as significantly increasing both vitamin A and C content of the canned juice.

Red non-pungent peppers are sweeter, more acid and possess flavors quite different from those of green bell peppers sold in the vegetable markets. Ripe bell peppers contain as high as 250 milligrams per 100 grams fresh weight of ascorbic acid (Vitamin C) and large amounts of beta carotene (pro-vitamin A).

To take advantage of the flavor characteristics and high vitamin content, freshly-harvested ripe bell peppers were blended in various combinations with ripe tomatoes. The peppers were washed

and cored (uncored peppers can be used in plant operations), then macerated together with the tomatoes in a "Spike" stainless steel hammer-mill, passed through a juice extractor with a 0.33 inch screen, and the air removed in a centrifugal vacuum deaerator. Then 0.6 per cent by weight of sodium chloride was added to the mixture.

If the pH of the raw juice is above 4.5, it is desirable to add 0.1 per cent citric acid by weight or an equivalent amount of lemon juice. The mixture was heated in a stainless steel steam-jacketed kettle to 200°F. It was then transferred to No. 2½ cans and processed in a rotary cooker at 212°F for 10 minutes, followed by cooling to 110°F in a rotary water-cooler for 7 minutes. The use of enameled cans is suggested.

Preliminary tests in the laboratory indicated that when only 2 per cent by weight of peppers was added there was no distinct difference in flavor of the juice. Five per cent peppers seemed to be the most desirable concentration. Ten per cent gave the juice a pronounced and sometimes undesirable pepper flavor. Chemical analyses showed that the 5 per cent pepper blend contained 57 per cent more ascorbic acid and 22 per cent more beta carotene than ordinary tomato juice processed using the same materials and methods.

#### Increased Vitamin Content Shown in Analyses of Tomato Juice and Cocktail Blend

	Per- cent total acids as citric	pH	°Brix 20°C	Brix acid ratio	Ascor- bic acid (Mg per 100 grams)	Beta caro- tene*
Tomato juice . . . .	0.44	4.0	5.3	12.1	16.6	0.53
Cocktail blend . . . .	0.45	4.0	5.6	12.4	26.1	0.65
(95% tomato and 5% red bell pepper)						

\* 1 mg beta carotene = 1,667 International Units Vitamin A.

In a consumer survey of 95 families, 70 per cent liked the 5 per cent bell pepper blend very much, 17 per cent were indifferent, and 13 per cent disliked the flavor. In another survey of 252 individuals in 112 families, 56 per cent stated they would buy the pepper blended juice should it become available on the market.

—M. Yamaguchi, Associate Olericulturist, University of California, Davis; B. S. Luh, Assistant Food Technologist, University of California, Davis; S. Leonard, Food Technologist, University of California, Davis; and M. Simone, Associate Specialist in Food Science and Technology, University of California, Davis.