Weeds Controlled with Cyanamid

new method for treating winter leafy vegetable crops with calcium cyanamid controlled weeds at moderate cost in tests

Garland E. May and William A. Harvey

Control of annual weeds—79% in 1957 and 81% in 1956—was achieved in winter crops of spinach and mustard greens by a new method of incorporating calcium cyanamid into the soil.

The weed-killing action of calcium cyanamid—when sufficiently and properly distributed through soil with adequate available moisture—was applied in an exploratory plot in Stanislaus County to test a new method of incorporating the chemical into the soil.

In December 1955, cyanamid was applied to an experimental plot of spinach in 18″ bands—in beds 36″ center-to-center—at the rate of 2,000 pounds per acre so 1,000 pounds per acre were actually applied. The cyanamid was worked into the top 2½″–3″ of soil with a power hoe.

No weed counts were taken on the 1955 plot, but the method of applying the cyanamid showed such promise that the work was continued.

In December 1956, cyanamid was applied in two 6″ bands—per 36″ bed—at the rate of 1,800 pounds, using 600 pounds of material per acre. A power hoe mulcher was used that year to incorporate the cyanamid in the top 2½″–3″ of soil. Weed counts made in four replications showed a range of from 25 to 44 weeds in the checks and from none to 10 weeds in the treated plots; an 81% control.

In 1957, the experiment was repeated but the calcium cyanamid actually applied was reduced from 600 pounds—used in 1956—to 535 pounds per acre. Weed counts made when the spinach was ¾″ high showed 79% of the weeds controlled. Spinach yield samples at cutting time showed an increase of 23% for the treated over the untreated plots.

Before the cyanamid was applied, the field was prepared—the beds in good tilth—for planting. The cyanamid was applied in 6″ bands over the anticipated seed rows and immediately incorporated into the soil. The application and the mulching units were mounted on the same tractor, making the treatment a single cultural operation.

The mulcher was set to a depth of 2″–3″ because at a greater depth the dilution of cyanamid with the soil reduces the effectiveness of calcium cyanamid for weed control.

Adequate soil moisture—supplied by irrigation or rain—is required within two days after application to activate the cyanamid and permit its breakdown products to reach maximum toxic quantities necessary for weed control. Therefore, if the field is not dry at the time of application, irrigation or rain must follow within two days. If the soil is dry at the time of treatment, water can be applied—by irrigation or rain—at any time after the cyanamid is applied. Low soil moisture conditions for a prolonged period after application cause such a slow breakdown of the cyanamid that the breakdown products could not reach the necessary toxic quantities. Free movement of cyanamid and its breakdown products in the soil solution is necessary for contact and kill of a maximum number of weed seeds.

Care must be taken to avoid further disturbances of the soil—such as in breaking a soil crust at planting time—because movement of untreated soil into

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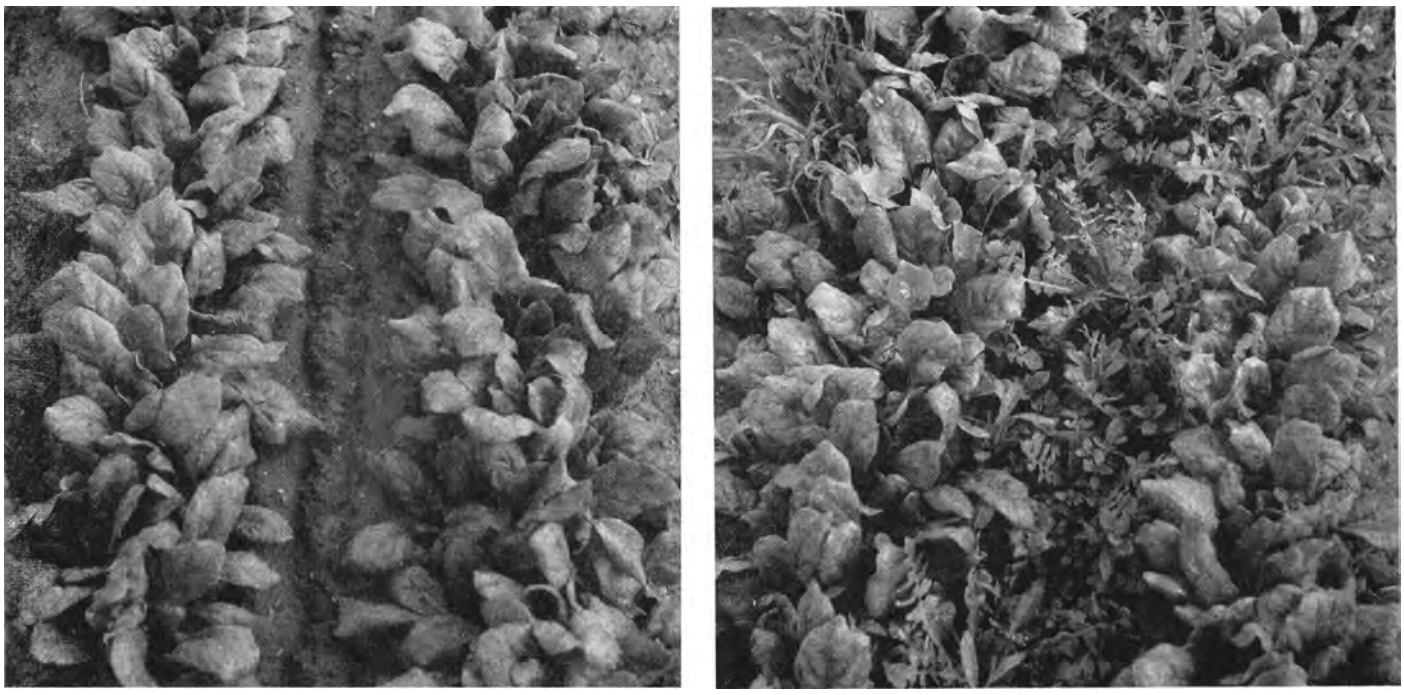
***Left*—Weed control of grasses, fiddleneck, and chickweed with 535 pounds of calcium cyanamid per acre. *Right*—Check rows in the same plot.**



Use of IBA was definitely beneficial in rooting plum cuttings in each of the three instances where untreated controls were included. The photograph on page 14 shows typical root systems which developed from the cuttings of the varieties used in the 1957–58 tests.

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TREE SHAKING

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Fruit removal was found to be affected primarily by four variables: *1*, the frequency of the shake; *2*, the stroke; *3*, the force required to remove the fruit divided by the weight of the fruit—F/W—and, *4*, by the number of limber fruit bearing hangers in any given tree.

The upper graph on page 3 shows the relationship of stroke and frequency with fruit removal. At low frequencies there is a large difference in the percent removed by use of the various strokes. However, at higher frequencies the difference is small. The relationship represents the average removal that could be expected, but any particular tree or group of trees might vary from this as a result in the effect of F/W and the number of limber fruit bearing hangers.

No attempt has been made to isolate the effect of F/W or the number of limber hangers. However, F/W, which is the number of g's—unit weight—acceleration required, is of importance because fruit removal by shaking is the result of accelerating the limb away from the fruit. With regard to the limb characteristics, it was found that the percent of fruit removed was less on trees having several limber hangers than on rigid type trees with few hangers.

Tree damage tests indicate that limb breakage increases with increasing stroke. However, minimum damage occurred within a frequency range of 700–900 cpm. The damage may be greater when using a higher or lower frequency. All combinations of frequencies and strokes are possibly acceptable to growers, although the long stroke with a low frequency causes the tree tops to whip which increases limb breakage particularly on old brittle trees.

A number of years observations are needed before final judgment on possible root damage caused by shaking can be made. However, visual observations made in these studies indicate that boom shakers may cause less tree damage than cable shakers.

Further studies are planned to evaluate the effect of the position of the clamp on the limb, and the F/W on fruit removal and power required.

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CYANAMID

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the treated area introduces a new source of weed infestation.

In moist, sandy loam soils, planting was started 8–10 days after treatment, but in heavier soils a waiting period of two weeks after irrigation or rainfall was found necessary.

The observations made at the test plots were verified in commercial field treatments.

The amount of cyanamid applied varies with the distance between beds and the width of band treated. A rate of 1,500 to 2,000 pounds per acre is required but the amount actually applied depends on the treated portion of the field. If two 6″ bands of cyanamid are applied to 36″ beds only one third of the soil is treated. Therefore, between 500 and 666 pounds applied meet the required rate of 1,500 to 2,000 pounds per acre.

Because cyanamid contains 21% nitrogen, the cost of the treatment—$25–$30 per acre for material—was divided equally between nitrogen fertilizer and weed control.

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Calcium cyanamid applicator and mulcher units mounted on same tractor used in treatment for weed control.

CDEC

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Crop injury was rated in terms of stand reduction and stunting of growth. Stand reduction at the 18-day rating was based on the unthinned stand. The rating at maturity was based on the stand left after hand thinning. Normal field thinning eliminated any evidence of stand reduction caused by CDEC.

Crop Injury from Treatment with CDEC

Variety	Stand reduction		Stunting	
	18-day	Mature	18-day	Mature
Red leaf	None	None	None	None
Salad bowl	None	None	2%–5%	None
Butter lettuce	5%	None	5%	None
Romaine	None	None	2%–5%	None
Endive	None	None	None	None

Stunting consisted of a slight curling and twisting of the leaf margins. This symptom appeared on only the first leaves and later leaves were normal. At maturity no differences between the treated and the untreated plants were observed.

Complete weed control was not obtained with CDEC at rates up to 10 pounds per acre, but the results—although from only one test in one area—warrant further trials with the herbicide as a method of selective weed control for pre-emergence treatment of lettuce.

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H. F. Arle, Field Crops Research Branch, USDA, Phoenix, Arizona, and W. D. Pew, Arizona Agricultural Experiment Station, reported the experiments conducted in Arizona.

The Fujiwara Brothers, ranchers in the Chino area, cooperated in the experiment with CDEC.

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