

Weed control in processing tomatoes



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High yields in processing tomatoes depend on a great many factors, not the least of which is good weed control. Weeds compete severely with the tomato, primarily for water and light, and interfere with mechanical harvest. The arsenal of herbicides available for annual weed control in tomatoes is relatively large compared to those for other vegetable crops. However, because tomatoes are planted over a large range of soil types and weather conditions, it is difficult to make accurate general recommendations.

If some fields are to be planted early, the safest herbicide available should be used to control early spring weeds with the minimum setback to the young germinating tomato. Diphenamid (Enide) is often the candidate for the winter weeds. However, diphenamid is somewhat short-lived, particularly in the heavier soils of the Sacramento Valley, and the addition of a lay-by type of herbicide, such as trifluralin (Treflan) will often be useful to control late spring and summer weeds.

If planting is delayed until soils warm up somewhat, when pigweed and

lambsquarters are the main weeds, followed by summer grasses, napropamide (Devrinol), or pebulate (Tillam), or both are usually the choice, particularly in the light soils of the San Joaquin Valley. Napropamide has also been outstanding in the Imperial Valley.

If the plantings are somewhat late, the diphenamid-trifluralin mixture (Trefmid) does an excellent job in most soils with little or no setback to young tomato plants.

Most tomato herbicides give adequate control of weeds, such as the pigweeds, lambsquarters, Russian thistle, purslane, and annual grasses, but are weak on weeds in the tomato family, such as the nightshades, groundcherries, and jimsonweed. For control of weeds in the thistle family, including sowthistle, prickly lettuce, groundsel, and pineapple weed, napropamide is somewhat more effective than diphenamid and trifluralin.

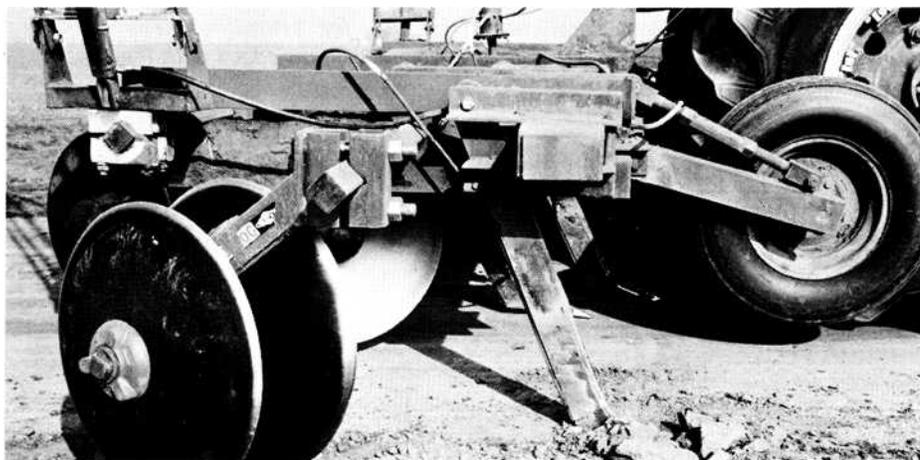
The answer is harder to find when weeds in the tomato family are the main problem. California scientists have been working on this problem for years, and recently the Processing Tomato Advisory

Board elected to support increased research on selectively controlling weed species of the tomato-potato family (Solanaceae) in processing-tomato crops. Field and greenhouse experiments have been conducted throughout the state. Several of the new herbicides, applied preemergence, preplant incorporated, or postemergence, have shown more safety on the weeds than on tomatoes. One new herbicide, RH 6201, has shown a degree of selectivity in a limited number of trials.

In a number of trials, pebulate, one of the older, registered herbicides, has selectively controlled nightshade species, including the most widespread—hairy nightshade. Although extensively used in tomatoes, pebulate has not always been as effective or as safe in all soil types as have some of the newer herbicides, and it often has a narrow margin of safety. It generally controls nightshade at 4 to 6 pounds per acre, shallow incorporated and followed by sprinkler irrigation. But, at 6 to 8 pounds, it occasionally injures tomatoes in some light sandy soils or under other marginal growing conditions. In some trials, pebulate, applied to dry soils at 6 pounds per acre and sprinkled in, has given selective control of hairy nightshade in VF 65 tomatoes. Additional studies are under way to find the maximum selectivity of this herbicide for tomatoes.

Another older herbicide used widely for weed control in soybeans and tomatoes in other areas is chloramben (Amiben). Applied preplant and incorporated it has not been effective. However, when applied after direct seeding and sprinkled in, it has given outstanding nightshade control.

Unfortunately, when chloramben is used at planting time, the margin of safety in many soils is not adequate. A



Fumigation shank with border discs for big-bed application technique.

three- to four-week delay allows the herbicide to dissipate sufficiently so that a satisfactory tomato stand is established with initial nightshade control.

Often planting schedules do not allow this delay before spring planting. Workers in Monterey, San Benito, Yolo, and Ventura counties found that the phytotoxicity of chloramben to tomatoes was reduced, without the loss of nightshade control, by spraying a small area over the seed hill or seed line with activated carbon. Although this approach is promising and inexpensive, it has not been helpful where herbicides are incorporated before bed planting or under furrow irrigation. Further, it has not always been effective in light sandy soils.

Chloramben plus surfactant has also shown promise as a postemergence application, killing several weed species, including hairy nightshade, without excessive damage to young tomatoes. More work under a wide range of environmental conditions is planned.

Another approach coming out of the increased research has been the deep-injection giant-bed work. The technique

includes a large bed listed over a 20- to 24-inch injection of 1,3-D fumigants (Telone and DD) or methyl bromide gel. The single shank per bed delivers a high rate (on a broadcast basis), concentrating the kill in the center of the large high bed, which is knocked off just before planting, leaving the clean heart of the bed on the surface, where the seed row of tomatoes or other crops can be planted. This technique requires more money per acre but offers fewer phytotoxicity problems, control of nematodes and other pests, and control of nutsedge in addition to nightshade and most other weed species. Hard-seeded weed species, such as some pigweeds, filaree, and cheeseweed, may not be controlled with this technique, although some pigweed control has been obtained at the higher rates tested in two field experiments at the Kearney Horticultural Field Station.

Such factors as soil temperature and moisture will have to be carefully evaluated to obtain the most effective movement and activity of the fumigants. The 1,3-D fumigants have broad registrations, but methyl bromide gel currently

has greater restrictions. A great deal of additional work with the many soil types in which tomatoes and other row crops are grown is necessary before this new use of fumigants can solve resistant weed problems.

Many of these approaches to controlling resistant weed species in processing tomatoes are promising. Perhaps one method or a combination will stop the increase of botanically related weeds in tomato fields, with nutsedge control as a bonus.

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In a 1976 trial, the fungicide dichlofluanid gave the best control of Botrytis cinerea in strawberries.

Fungicide controls Botrytis in strawberry

Albert O. Paulus ■ Victor Voth ■ Jerry Nelson ■ Howard Bowen

Botrytis fruit rot, commonly known as gray mold rot, is the major fruit rot of southern California strawberries. It is caused by the fungus, *Botrytis cinerea*, which thrives in wet conditions and cool temperatures. Because tolerance to benomyl by this fungus has been noted in the past several years, trials were initiated to test several other fungicides, alone and in combination with benomyl against *B. cinerea*.

1976 trial

The 1976 trial, using Tioga and Tufts strawberries, was conducted at the University of California South Coast Field Station near Santa Ana. Polyethylene mulch was used in all plots. Plots consisted of 12 strawberry plants and were replicated four times. Fungicide spray applications were made with a 2-gallon Hudson CO₂ sprayer at 30 psi.

Sprays were applied on March 4, 15, and 26 and on April 2, 12, and 22. Yield and counts of rotted fruit were taken on April 14, 20, 24, and May 4 for both Tufts and Tioga. An additional pick

and counts of rotted fruit were made for Tioga on May 12. The table gives the results.

Dichlofluanid gave the highest yields and provided the best control of Botrytis fruit rot in both varieties. Benomyl was not significantly different from the controls in its effect on yield or fruit rot. Further, *Botrytis* isolates collected from the benomyl plot grew well on culture media containing 400 ppm benomyl, indicating tolerance to this fungicide.

EFFECT OF VARIOUS FUNGICIDE TREATMENTS ON STRAWBERRY YIELD AND BOTRYTIS FRUIT ROT CONTROL, 1976

Treatment*	Yield (tons per acre) ^{†‡}		Number of rot-affected fruit [†]	
	Tioga	Tufts	Tioga	Tufts
Euparen (dichlofluanid) 50W, 2 lb	22.40 a	13.66 a	317 a	14 a
Benlate (benomyl) 50W, 8 oz, plus Thylate (thiram) 65W, 2 lb	16.68 b	10.97 c	396 ab	47 b
Thylate 65W, 2 lb	15.00 b	11.87 b	436 bc	28 ab
Benlate 50W, 8 oz	12.32 c	10.97 c	545 c	80 c
Control (no treatment)	10.75 c	10.30 c	558 c	89 c

* Fungicide rates are per 100 gallons of water, and the fungicidal mixtures were applied at 200 gallons per acre.

[†] Significant at 5 percent level.

[‡] Yield data represent production up to test picking dates, not to end of season.

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