

**VEGETABLE RESEARCH
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**Vegetable Production
Series**



TOMATILLO PRODUCTION IN CALIFORNIA

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Tomatillo or husk tomato (*Physalis ixocarpa* Broy. Ex Hornem.) is a member of the Solanaceae family. The spherical fruit are green or purple and are surrounded by an enlarged calyx or "husk." As a fruit matures, it fills the husk and can split it open at harvest. Tomatillos are the key ingredients used in making fresh and cooked green salsas in a wide variety of Latin American dishes.

PRODUCTION AREAS AND SEASONS

Tomatillos are produced in small acreage plots in many parts of the state. Production areas include southern California (San Bernardino County), the central coast (Monterey, San Benito, Santa Cruz, and San Luis Obispo Counties), and the Central Valley (Fresno, San Joaquin, and Tulare Counties).

Nearly all fields in the southern parts of the state receive transplants in January or February for harvest from late April through June. In the central coast, planting runs from March to June and harvest runs from July to November. Planting in the Central Valley begins in Fresno County in February (under plastic tunnels) and proceeds northward over the next four months for harvest from late May to November.

TOMATILLO ACREAGE AND VALUE

Year	Acreage	Average yield (tons/acre)	Gross value/acre
1997	161	1.92	\$5,134
1996	184	3.51	\$1,632
1995	138	3.35	\$1,989

Source: California Agricultural Statistics 1997 (Sacramento: California Department of Food and Agriculture, 1999).

CLIMATIC REQUIREMENTS

Tomatillo is a warm-season crop, sensitive to freezing temperatures at any growth stage. Optimum growth occurs at temperatures above 65°F (18.3°C) and growth is poor below 61°F (16.1°C). High temperatures during flowering, however, result in poor fruit set.

VARIETIES AND PLANTING TECHNIQUES

All tomatillos grown in California are open-pollinated varieties. Common varieties grown include 'Rendidora,'

'De Milpa,' 'Toma Verde,' and 'Purple.' In addition, some growers save their own seed or purchase "criolla" varieties (land race varieties) from Mexico. 'Rendidora' is a large-fruited type that gives high yields. Other varieties have smaller fruit and lower yields. Some varieties have various amounts of purpling on the fruit and calyx.

Nearly all fields are transplanted. Growers utilize plants produced in greenhouses or they produce plants in the field in transplant beds for subsequent replanting. Tomatillos are typically grown on beds 30 to 66 inches (about 0.76 to 1.68 m) wide with one or two rows of plants per bed. In-row plant spacing ranges from 16 to 24 inches (about 41 to 61 cm).

SOILS

Many soil types are used for tomatillo production. Sandy soils are preferred for the earliest plantings because they warm more rapidly in the spring. Heavier soils can be quite productive, provided they are well drained and carefully irrigated.

IRRIGATION

Tomatillo growers use a variety of irrigation systems: drip, sprinkler, and furrow. Drip irrigation is probably the predominant form of irrigation due to its efficiency and flexibility. Many drip systems employ lines buried 2 to 10 inches (5 to 25 cm) deep, typically with one drip line per bed. Growers do not generally favor sprinkler irrigation because it can aggravate problems with fruit rot, especially later in the season when the fruit touch the ground. The irrigation requirement is determined by weather-based reference evapotranspiration (ET_o) estimates and the crop's growth stage. Irrigation frequency can vary from once or twice a week early in the season to daily at peak periods during hot weather when the crop canopy has covered the bed tops.

FERTILIZATION

Tomatillos require moderate fertilization. A preplant phosphorus (P) application of 40 to 80 pounds per acre (44.8 to 89.6 kg/ha) of P₂O₅ is common; the higher rates generally are used on early spring plantings or in alkaline soils. Although most California soils have adequate potassium (K), soils should be fertilized with K if ammonium acetate

extractable K is less than 120 ppm; appropriate seasonal rates vary from 50 to 150 pounds per acre (56 to 168 kg/ha) of K₂O, depending on the soil test value.

Regardless of irrigation technique, most P is applied preplant, usually in a banded application. Where drip irrigation is used, nitrogen (N) and K (if needed) are usually applied in numerous small fertigations throughout the season. In conventionally irrigated fields, N and K are applied preplant and in one or more sidedressings; late-season water-run applications are also common. Seasonal N fertilization typically ranges from 100 to 150 pounds per acre (112 to 168 kg/ha).

INTEGRATED PEST MANAGEMENT

Contact the UC IPM World Wide Web site at <http://www.ipm.ucdavis.edu> or your local county Farm Advisor for current pest management information on tomatillo.

Weed management. Control of annual and perennial weeds is a serious challenge in tomatillo production. Few selective herbicides are registered for use on tomatillo and care must be taken to evaluate the species of weeds present in the field to determine if the available herbicides can be useful. Preplant fumigation with Vapam can greatly reduce initial weed infestations. Preirrigation, cultivation, throwing soil to the base of the plant to smother young weeds, preemergent flaming, and hand-hoeing are techniques used to achieve adequate control of weeds. By using transplants, you can give the crop a head start on weeds. Black plastic mulches can provide weed control as well as improved crop growth.

Insect identification and management. There are few insects that cause damage to tomatillo. Potato aphid (*Macrosiphum euphorbiae*) can occasionally build to damaging levels. Greenhouse whitefly (*Trialeurodes vaporariorum*) has occasionally been a minor pest. Tomato fruitworm (*Heliothis virescens*) can damage foliage as well as fruit. Leafminer (*Liriomyza trifolii*) can occasionally build to population levels sufficient to damage plants. Adults and larvae of the three-lined potato beetle (*Lema trilineata*) can build up large populations and can cause significant damage to tomatillo foliage.

Disease and nematode identification and management. Powdery mildew (*Sphaerotheca fusca*) has recently been found on tomatillo in California, and severe outbreaks have occurred late in the season. This disease can cause early plant decline and shorten the production season. Viruses pose a serious threat to tomatillo production and can cause severe stunting, reduced production, and in some cases fruit deformity. The major aphid-vector

viruses are cucumber mosaic virus (CMV), alfalfa mosaic virus (AMV), and potato virus Y (PVY). Beet western yellows virus (BWYV) is spread specifically by the green peach aphid (*Myzus persicae*) and tobacco mosaic virus (TMV) can be seedborne or spread by people handling infected plants. To date in California, most losses from virus diseases have been in areas adjacent to infected host plants and with active vectors present. In Mexico, virus disease is a serious production problem; these diseases could pose a threat to California tomatillo production as well if good sanitation and virus-free seed are not used.

HARVESTING AND HANDLING

Tomatillos are harvested when the fruit fills in the calyx. The majority of the California tomatillo crop is harvested for the fresh market, while the majority of canned tomatillos are imported from Mexico. Green (less-mature) fruit contain more acid and are less sweet than fully mature yellow-green fruit, and so are superior in flavor.

Fresh market fields are harvested five to seven times at 7-to-14-day intervals. All tomatillos are harvested by hand, usually into buckets which are then dumped into bulk bins or trailers for transit to a packing facility. Smaller growers may pack directly into boxes in the field. The standard unit of sale is a crate or carton holding approximately 40 pounds (18.16 kg) of fruit. At present, the fruit are not sized for packing, so extra large, large, and medium fruit are placed in the same box for shipment to market. The fruit may be repacked into 10-pound (4.54 kg) cartons.

POSTHARVEST HANDLING

To improve their postharvest shelf life and quality, tomatillos should be cooled by forced-air or room cooling after packing but before shipment. A key to tomatillo quality is the freshness and appearance of the calyx. To maintain a green calyx, store fruit at 41° to 45°F (5° to 7.2°C). At higher temperatures the calyx will dry out, but fruit quality will still be acceptable. Tomatillos are sensitive to chilling injury if stored below 45°F (7.2°C) for longer than two weeks. Chilling injury takes the form of fruit surface pitting and elevated levels of decay. Typical transit and storage conditions are 45° to 55°F (7.2° to 12.8°C) with high relative humidity (90 to 95%). Yellowing of tomatillos is hastened by exposure to ethylene, so storage with ethylene-producing fruit is not recommended. With proper storage conditions, you can expect a shelf life of 2 to 3 weeks. Cartons are palletized and then shipped, primarily by truck, to terminal markets or wholesale receivers across the United States and Canada.

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