VEGETABLE RESEARCH AND INFORMATION CENTER

Vegetable Production Series

TURNIP PRODUCTION IN CALIFORNIA

Vernon I. Shattuck, formerly with the Department of Plant Pathology, UC Riverside

Keith S. Mayberry, University of California Vegetable Crops Farm Advisor, Imperial County

PRODUCTION AREA AND SEASONS

The turnip (*Brassica campestris*) is grown on a limited commercial scale in California. About 400 acres are planted to the crop. The main production areas are in Kern and Imperial Counties, but there are small commercial plantings that serve local markets in other areas of the state. Turnips in the southern Central Valley are planted from September through February and harvested from November to March. Growers in the Imperial Valley plant turnip seed from October through December and harvest the roots from December to March. If sown too early or harvested too late, the turnips can suffer adverse effects from high temperatures.

CLIMATIC REQUIREMENTS

The turnip is a biennial cool-season crop that is grown commercially as an annual. Turnips grow best at temperatures ranging from 50° to 65°F (10° to 18.3°C), so they are cultivated in the Central Valley and the southern desert in the cooler fall and winter months. Turnip plants are frost hardy, but may suffer injury if subjected to extended periods below 30°F (–1.1°C). Extended periods of temperatures below 50°F (10°C) may cause some older varieties to bolt (produce a seed stalk). Bolted turnips develop a hard core and are unmarketable. High temperatures and unfavorable growing conditions may produce strong-flavored roots and reduce the root quality.

VARIETIES AND PLANTING TECHNIQUES

Certain turnips can be grown for their greens, but in California most turnips are grown for fresh market sale of the enlarged fleshy root. The principle varieties grown in the state are improved selections of Purple Top White Globe and Royal Crown. The roots have purple crowns, white bottoms, and white internal flesh. Some commercial growers supply restaurants or ethnic clientele with other varieties that differ in root color, shape, and flavor. Turnips are precision seeded in multiple rows on raised beds that range from 3 to 4 feet (0.9 to 1.2 m) wide, with rows 4 to 10 inches (10 to 25 cm) apart and plants in rows spaced 3 to 4 inches (7.5 to 10 cm) apart. Planting density is important because the root quality suffers when turnips are crowded. A grower will usually plant a series of small blocks of turnips in succession for multiple harvests to accommodate anticipated market demands.

SOILS

Turnips are well adapted for growth on a wide range of soils, but are typically cultivated on well-structured sandy loam soils. During wet harvests, the roots pick up less soil if they are grown in lighter soils. Turnips grow best on soils with a pH of 6.0 to 6.5, and are moderately sensitive to salinity.

IRRIGATION

For rapid plant growth and high-quality root production, turnips must have adequate soil moisture. Many growers use sprinkler irrigation to establish seedlings in the field, and then switch to furrow, sprinkler, or drip irrigation once the plants are established. You should maintain root zone moisture at or near field capacity to avoid stressing plants. Root growth is moderately sensitive to salinity: an ECe of 7 mmhos/cm will reduce yields by 50 percent.

FERTILIZATION

A total of 60 to 100 pounds of nitrogen per acre (67 to 112 kg/ha) is adequate for turnips grown in lighter-textured soils. The usual approach is to apply nitrogen preplant, with two additional sidedressings after roots begin to enlarge. Too much nitrogen encourages excessive foliage development and causes misshapen roots. Phosphorus and potassium application rates range from 120 to 200 pounds and 60 to 100 pounds per acre (134 to 224 and 67 to 112 kg/ha), respectively. Turnips

University of California • Division of Agriculture and Natural Resources
Publication 7241

are sensitive to boron deficiency. A slight boron deficiency can cause the physiological root disorder known as brown heart. Boron-deficient roots can look sound on the outside, but have brown discolored tissue inside. Irrigation waters in the Central and Imperial Valleys contain enough boron for turnips. In areas of California with low-boron irrigation water and frequent rainfall, growers should test the soil to determine whether they need to add boron to the fields.

INTEGRATED PEST MANAGEMENT

Weed Management. Perennial grasses including yellow and purple nutsedge and Bermudagrass, annual grasses, and various broadleaf weeds can occur in turnip fields. Brassicaceae (mustard family) weeds are hosts for turnip mosaic virus and insect pests, and so should be controlled in and around fields. Hand weeding and timely shallow cultivation will reduce weed pressure. You can rotate turnips with cover crops or green manure crops or use herbicides to control weeds. Herbicides play an important role in weed management in turnips.

Insect Identification and Management. Insect pests of turnip include aphids, maggots (seed corn and cabbage), and larvae of various lepidopterous pests. Cabbage, melon, green peach, and turnip aphids can attack plants at all stages of development. Aphids feed on plant foliage and are vectors for turnip mosaic virus. In the Central Valley, seed corn maggots infest turnip roots. In coastal areas, cabbage maggot larvae tunnel into and feed on the developing storage root, rendering the roots unmarketable. Silverleaf whitefly populations in turnip fields occasionally become high enough to wilt foliage. Turnip insect management is achieved through the timely use of cultural and chemical controls when warranted.

Disease Identification and Management. Powdery mildew disease, caused by the fungus *Erysiphe cruciferarum* Opiz ex L. Junell, first appears on leaves as white powdery spots consisting of fungal mycelium and conidia (spores). When infection is severe, the leaves' upper and lower surfaces may be covered with a white powdery growth. Leaves eventually turn yellow, shrivel, and fall from the plant. Severely infected plants may be stunted and reductions in yield can be substantial. Usually no chemical control of this disease is attempted when infection occurs late in plant development. When roots and leaves are bunched for market, however, control of this disease is important. Preventative fungicidal sprays are effective against this disease.

Plants infected with turnip mosaic virus (TuMV) may be stunted in growth and may have mottled and distorted leaves. When plants are infected early in development, yields are severely reduced. This virus is transmitted by many aphid species. Preventative measures include sound field sanitation and the elimination of weed hosts that may harbor the virus. By reducing aphid populations in and around turnip fields you may help to reduce the incidence of this virus, but spray programs commonly do not eliminate this disease completely from an infected area. The Purple Top White Globe cultivar is susceptible to TuMV. Some turnip cultivars from Japan are tolerant to the virus.

Crown rot caused by *Erwinia carotovora* attacks the root crown and the lower parts of turnip leaf stems and causes soft rot symptoms. This disease is most prevalent during damp periods and in fields where sprinkler irrigation is used. Optimal plant density, adequate spacing of sprinklers in fields to avoid local overirrigation, and irrigation timing that allows plant foliage to dry before evening help to minimize the incidence of crown rot.

HARVESTING AND HANDLING

Turnips are harvested 70 to 80 days after seeding, when the roots reach 2 to 3 inches (5 to 7.5 cm) in diameter. Roots are hand harvested and most are topped (leaves and crown are removed from the storage root). In some areas roots are commercially harvested along with leaves for bunching. Topped roots are mechanically washed, sized and packaged by hand, and air cooled. After sizing, the cull roots are fed to livestock. Turnips are commonly bagged in perforated transparent plastic bags of various sizes for the wholesale markets. Plastic bags keep the humidity high around roots so they will not lose moisture and shrivel. Turnips are washed before bunching and are handled carefully during the harvesting and packing operations to prevent breakage and crushing of the stems and leaves. Four to six roots of similar sizes are commonly bunched together. Bunched turnips are marketed quickly because they are susceptible to rapid moisture loss, which decreases quality. Topped roots are also moved quickly to market. However, turnip roots that have been topped will keep for several weeks at 32°F (0°C) and 90 to 95 percent relative humidity when root storage is warranted.

An average yield is 700 to 800 sacks per acre. Each sack contains 25 pounds (11.4 kg) of roots.

MARKETING

Most of the California turnip crop is produced for markets within the state. Some turnips are exported to neighboring states and others to distant U.S. markets including markets on the Atlantic Coast. The demand for California turnips varies from year to year. In spring and summer months, Oregon-grown turnips are imported to California to help satisfy market demands.

An electronic version of this publication is available on the
DANR Communication Services website at http: / / danrcs.ucdavis.edu.

Publication 7241

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in their original labeled containers in a locked cabinet or shed, away from foods or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Recommendations are based on the best information currently available, and treatments based on them should not leave residues exceeding the tolerance established for any particular chemical. Confine chemicals to the area being treated. THE GROWER IS LEGALLY RESPONSIBLE for residues on the grower's crops as well as for problems caused by drift from the grower's property to other properties or crops.

Consult your county agricultural commissioner for correct methods of disposing of leftover spray materials and empty containers. **Never burn pesticide containers.**

PHYTOTOXICITY: Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high. Injury may also result from excessive amounts or the wrong formulation or from mixing incompatible materials. Inert ingredients, such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.

76-pr-9 / 98-WJC

ISBN 978-1-60107-032-6