



OKRA PRODUCTION IN CALIFORNIA

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PRODUCTION AREAS

Although California has relatively little acreage in okra (*Abelmoschus esculentus* L.), it is an important cash crop for small-scale farmers. Riverside County has the most okra with 150 acres (60 ha), and other counties produce small amounts.

OKRA ACREAGE AND VALUE

Year	Acres	Average yield (tons/acre)	Gross value/acre
1994	218	11.5	\$8,247
1993	334	10.0	\$8,618
1992	178	7.9	\$3,082

Source: *California Agricultural Statistics 1994* (Sacramento: California Department of Food and Agriculture, 1995).

VARIETIES AND PLANTING

Most California commercial okra cultivars are green, ribbed, spineless types. Clemson Spineless, the standard open-pollinated variety, has been grown for over 40 years. It is still used because of low seed cost and wide adaptation. Its dark green pods are slightly grooved, and the plants are about 4 feet (1.2 m) tall. Clemson Spineless 80 is an open-pollinated selection from Clemson Spineless with shorter plants and greater uniformity. Annie Oakley F1 is a very prolific hybrid that produces bright green pods and nearly double the yield of standard varieties. Growers are reluctant to plant it because seed is much more expensive than open-pollinated varieties. Other varieties that have been grown or are under trial include Green Best F1, Penta-Green OP, Annie Oakley II, Emerald, Picacho, Velvet, and Lee.

Planting should begin after the last killing frost. The best time to plant the spring crop in the southern desert valleys is from the first of February to the end of March. The fall crop is planted from mid-June to mid-July. Soil temperature should be at least 60°F (16°C) for adequate germination. Studies show that it takes 17 days for plants to emerge at 68°F (20°C), 13 days at 77°F (25°C), and 7 days at 86°F (30°C).

Rows should be spaced from 26 to 40 inches (0.65–1 m) apart depending on the equipment. Seed should be

planted about 1.5 inches (3.7 cm) deep. About 10 pounds (4.5 kg) of seed should be planted per acre. (The seed requirement per acre can be substantially reduced by precision planting.) This amount of seed gives an approximate spacing of 5 seed per foot of row. When the plants reach a height of 3 inches (7.5 cm), they should be thinned to 6 to 9 inches (15–22.5 cm) apart. In some states, 4- to 6-week-old okra transplants are used to establish a stand. These plants have 3 to 4 true leaves at transplanting time and are spaced 9 inches apart.

SOILS

Okra will grow on many soil types. However, sandy soils prevail in the Coachella Valley, the major growing region. Sandy soils must be fertilized frequently as soluble nutrients leach readily from the crop root zone.

IRRIGATION

The crop may be planted in moist soil (mulch planting) or furrow-irrigated for the initial irrigation. If the soil has adequate moisture at planting, the young seedlings will grow to 3 to 5 inches (7.5–12.5 cm) before another irrigation is needed. Excessive irrigation in chilly weather tends to cool the soil and retard plant growth. As the plants mature, the crop should not be stressed for moisture if maximum yields are to be obtained. At harvest, irrigate alternate furrows (depressions between rows) to provide a dry place to walk during harvest. Subsequent irrigation should be applied to the dry furrow.

FERTILIZATION

Some growers apply 100 pounds per acre (112 kg/ha) of an ammoniated phosphate fertilizer (such as 11-52-0) containing both phosphorous (P) and nitrogen (N). This fertilizer is broadcast flat and listed into the beds. Others inject ammoniated phosphate (5-35-0) at 15 gallons per acre (168 l/ha) 4 inches (10 cm) below and 1 inch (2.5 cm) to the side of the seed rows. A preplant application of chicken manure may be substituted for chemical fertilizers. The manure should be applied 1 week or more prior to listing. The manure should be broadcast, then disced into the soil.

Growers sidedress an additional application of 40 to 60 pounds of N per acre (45–67 kg/ha) about 6 weeks after planting. Sources of N such as dry ammonium nitrate (34-0-0), AN-20 (liquid ammonium nitrate, 20-0-0), dry urea (46-0-0), UAN-32 (liquid urea–ammonium nitrate, 32-0-0), or aqua ammonia (21-0-0) may be used. Liquid fertilizer may be water-run (sidedressed). However, direct placement of fertilizer with a tractor-mounted applicator is more efficient as the fertilizer can be precisely placed in the crop root zone.

INTEGRATED PEST MANAGEMENT

Weed mangement. Early-season cultivation for weed control should be shallow so as not to injure young okra roots. A preplant herbicide should be worked into the soil. Which herbicide to use depends on which weeds predominate. Consult your Farm Advisor or licensed pest control advisor for advice as registered herbicides change often. Select fields free of nutsedge for optimum yields.

Insect identification and control. Cutworms, crickets, and earwigs attack okra during stand establishment. During the growing season, silverleaf whitefly and cotton aphids can be present in damaging numbers. Near harvest, cotton bollworms, corn earworms, silverleaf whitefly, tobacco budworm, beet armyworm, lygus, and stinkbugs can attack the crop. Consult your local Farm Advisor or a licensed pest control advisor with a specific pest problem. Chemicals that may be legally used to control these pests change frequently. Check the label of the material for current registration information before treating a field.

Disease identification and management. Damping off, caused by soil-borne fungi (*Pythium* and *Rhizoctonia*), may be controlled by a fungicidal seed treatment. Make sure all the plant residue from previous crops is decomposed as residues increase the incidence of damping off. *Fusarium* wilt (*Fusarium oxysporum* F. sp. *vasinfectum*) is a fungal disease that destroys okra. The water-transporting cells in the plant become clogged with fungi and the plants droop and wilt. Crop rotation is the best control. To avoid this disease, do not plant okra, eggplant, or tomatoes in the same field more than once every 4 years.

Other pests. Okra is very susceptible to root knot nematodes (*Meloidogyne* sp.), which reduce crop yields and cause secondary infection by fungi in the roots. Avoid soils infested with root knot nematodes.

HARVEST AND HANDLING

The immature pod (the edible part of the okra plant) is harvested when still tender. Harvesting is normally

done by hand. Okra is harvested every 2 to 3 days or more often under very warm conditions. The crop is ready for harvest about 4 to 6 days after flowering, when the pods reach 3 to 5 inches (7.5–12.5 cm) long. The first pods may be ready to harvest 2 months after planting. The crop will continue to bear for several months under ideal conditions, especially when over-mature pods are removed on a regular basis. Over-mature pods are more fibrous and lower in quality and value.

Okra that is 3 inches (7.5 cm) long or smaller is marketed as Extra Fancy; okra that is longer than 3 inches is sold as Fancy. Harvested okra is packed in 20-pound (9-kg) waxed cartons or wooden flats. The pods must be handled with care as they are subject to bruising. The bruises will turn black a few hours after rough handling. Harvesters should wear soft cotton gloves to help prevent pod damage. Okra should never be stored in large bins or hampers for any length of time. Because okra has a high respiration rate, the pods will bleach due to lack of proper ventilation and excess heating.

POSTHARVEST HANDLING

Okra, a very delicate vegetable, should be marketed immediately after harvesting. It should be stored at 45°F (7°C) and a relative humidity of 90 to 95 percent. At this temperature and humidity, shelf life is 7 to 10 days. At higher temperatures, the pods yellow, toughen, and start to decay. As little as 3 percent moisture loss causes okra to wilt.

Okra may be spray washed or placed in a large water tank for cleaning. Wash water may be chlorinated to 75 to 100 ppm of free chlorine. Excess water should be removed after packing. Never use top ice on okra cartons or baskets: the ice will cause water spots on the pods after 2 to 3 days. Okra is subject to chilling injury below 45°F (7°C). Damage will consist of surface pitting, pod discoloration, and excessive decay.

In general, okra has the same storage requirements as green beans, cucumber, eggplant, peppers, and squash. These products may be stored together without deleterious effect. Okra should not be stored with melons, bananas, apples, or other produce that give off ethylene gas.

MARKETING

Leading okra-producing states are Texas, Georgia, California, and Florida. Supplies peak in June, July, and August. California ships okra from June through October. Mexico exports okra year-round, but exports to the United States are highest from June to September.

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