

KEYS

TO PROFITABLE PRODUCTION

KEYS TO PROFITABLE OKRA PRODUCTION FOR FOOD AND SEED

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Okra is grown in Texas for both the fresh and processing market. About 4.5 million pounds of okra were harvested during the 1978-79 marketing season. Most of that was processed for the frozen food market. Commercial okra production in Texas is confined mostly to about 400 to 800 acres in the lower Rio Grande Valley. Some okra reaches markets from truck garden production in other areas of the state.

Okra is especially high in vitamins A and C and in calcium. It is a close relative of cotton, requiring warm growing conditions. Three okra varieties are particularly suitable for Texas production.

Varieties

Clemson Spineless. This variety produces market size pods approximately 55 days from emergence. Its leaves are serrated and the plant reaches a height of approximately 4 to 6 feet. Pods are a rich green color, spineless, angular, ridged and approximately 6 inches long. This is the leading variety for fresh market use, although it also is used for processing.

Dwarf Green Long Pod. This plant produces market size pods approximately 50 days from emergence. Its leaves are serrated and the plant reaches a height of approximately 3 feet. Pods are bright green in color, spineless, ribbed, slender and about 7 inches long. This variety is raised primarily for the fresh market.

Emerald. Emerald okra produces market size pods approximately 55 days from emergence. The plant attains a height of approximately 6 to 7 feet. Pods are dark green in color, spineless, round, thick

walled, of high quality and approximately 8 to 10 inches in length. They are used for processing because of their color retention and resistance to breakdown in soups. Yields generally are higher than those of the Clemson Spineless and Dwarf Green Long Pod.

Soil and Climatic Conditions

Okra grows in a wide range of well-drained soils and tolerates variations in soil pH. It does not tolerate wet, poorly aerated soils. A sandy loam soil with a pH range of 6 to 7 is considered ideal, although acceptable yields are possible on soils with a pH of 8.

Plant growth and quality are best where the average temperature ranges from 75° to 85° F.

Land Preparation

Chiseling, plowing, disking, harrowing and land planing to maintain a proper slope for irrigation and drainage are important preparations for okra production. Although the plant develops a tap root, a great mass of branch roots grows in the top 8 to 10 inches of soil.

Fertilizing

A high-yielding okra crop uses approximately the following amounts (in pounds) of nutrients per acre of soil:

	Nitrogen	P ₂ O ₅	K ₂ O	CaO
Pods	13	5	38	10
Stems/leaves	8	5	24	36
Total	21	10	62	46

Apply adequate fertilizer to insure that these amounts are available at the proper growth stage.

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A soil test helps determine the total amount of nutrients needed for crop production. The soil nitrogen level should test medium or higher at planting and throughout the harvest period. Excessive nitrogen applications can cause overly vegetative plants that produce few pods. Divide the total amount of nitrogen needed into at least three applications: preplant, first week of harvest and 75 to 80 days from emergence. Yield studies indicate that the greatest need for nutrients occurs during the fourth, fifth and sixth week of harvest. The fourth week of harvest starts 85 days from emergence, so apply nitrogen 75 to 80 days after emergence to assure availability by the eighty-fifth day.

Seed Characteristics and Planting

Germination time for okra seed ranges over a period of approximately 12 days because of variations in constituents and thickness of the seed coat. Okra seed, which are viable but resist germination, are termed "hard seed." The percentage of hard seed in each seed lot must be indicated on the seed tag. Avoid seed lots containing more than 20 percent hard seed. One pound of seed contains approximately 8,000 seeds (500 per ounce).

Seeds planted at a depth of $\frac{1}{2}$ inch require about 12 days to emerge at a soil temperature of 77° F. and approximately 6 days at 104° F. Space plants of dwarf and semi-dwarf varieties 8 inches apart (not over two plants per foot for 38-inch rows). This produces a plant population of 20,634 plants per acre. The same spacing for 40-inch rows gives a plant population of 19,602 plants per acre. For normal size varieties use about 8 pounds of seed per acre if the crop is to be hand weeded. This provides seed spacing of approximately five seeds per foot in 40-inch rows. Plants can then be thinned to 8 to 12 inches at the first weeding. Planting to stand to reduce cost of hand labor requires accurate knowledge of the germination percentage of the seed lot and the seed count per pound, as well as favorable soil temperature and moisture at planting time.

Prepare beds according to irrigation practices in the production area. Normally sow seed in the center of the bed; however, sow seed on the side of the bed when the soil or irrigation water is saline. Soil temperature, moisture content and type of irrigation and herbicide determine planting depth. Plant seed 1 to $1\frac{1}{2}$ inches in moist, preirrigated soil or $\frac{1}{2}$ to $\frac{3}{4}$ inch in dry soil and then irrigate.

Irrigation

An adequate water supply is essential for maximum okra yields. Commercial okra production is recommended only where irrigation water is available. Use alternate furrow irrigation during the harvest

period to allow continued harvest operations. Furrow irrigation is preferable, although sprinkler irrigation is acceptable if the water is low in salts and the soil type is suitable.

Weed Control

A combination of mechanical cultivation and chemical herbicides often is used for weed control in okra. On small plots, mechanical control may be the most practical, especially if adequate herbicide application equipment is not available.

Chemical weed control is achieved through preplant applications of Treflan® at 1 to 2 pints ($\frac{1}{2}$ to 1 pound) per acre. Incorporate Treflan® into the soil to a depth of at least 1 inch as soon as possible after application.

Use only shallow cultivation after herbicide application. Deep cultivation reduces herbicide effectiveness. Apply Treflan® and disk into the soil before bedding the field for planting.

Harvesting and Handling

Demand in the fresh produce market is for okra pods 3 to 4 inches in length, although some pods up to 6 inches and more are marketable. Pods usually are harvested by hand. Harvest during the morning hours to maintain highest quality and to make snapping easier. Small pods usually snap from the plant more easily than large ones. Remove large, over-mature pods from the plant to maintain productivity. Research on mechanical harvest of okra is promising, but a suitable machine and variety combination is not available.

Pods mature rapidly. To pack them uniformly without grading, it is necessary to pick them daily; however, most growers prefer to harvest every other day. It is advisable to grade and pack fresh market okra into uniform packages based on the following grades:

- Below 3 inches in length
- Three to 4 inches in length
- Above 4 inches in length

Handle okra as little as possible to prevent bruising. Try to market the okra immediately after harvest, preferably within 36 hours. Pack according to customer demand and precool to remove field heat and prolong tenderness. Ship under refrigeration. Yields of 3,000 to 8,000 pounds of marketable pods per acre can be produced depending upon soil type, growing conditions and variety. Yields of 12,000 pounds or more have been recorded under ideal management and growing conditions.

Insects and Diseases

Insects and disease generally are not a serious problem with okra; although damage can result from the following insects:

Insect	Control
Aphids	Malathion
Corn earworm	Carbaryl(Sevin®) Phosdrin®
Leaf miner	Parathion
Spider mite	Phosdrin®
Stinkbug	Carbaryl(Sevin®) Phosdrin®

Root knot nematodes are the most damaging disease occurring on okra. Whenever possible avoid land that is infested with root knot. Preplant treatment with chemical nematicides is effective for controlling root knot nematodes.

Fusarium wilt is a soilborne fungus disease of okra that causes infected plants to wilt rapidly with death occurring 2 to 3 days after first visual symptoms. They are characterized by a brown ring in the water-conducting tissue around the stem of the plant. Follow 6- to 10-year rotation to prevent build up in the soil.

Cotton root rot is caused by a soilborne fungus that attacks the root system. Affected plants die rapidly much like Fusarium wilt except the brown ring on the stem is not present. Use long rotation to reduce loss. Deep plowing also provides some relief. Do not grow okra in rotation with cotton. If possible, grow okra in rotation with sorghum and small grain.

Verticillium wilt affected plants react similarly to those affected by Fusarium wilt. For control follow a long rotation or avoid growing in infested soil.

There are several blossom and foliage diseases of okra, but no control measures are recommended except to improve air circulation around the plant. No compounds currently are cleared by the EPA for this use.

To prevent excessive chemical cost and unnecessary destruction of beneficial insects, follow Extension recommendations and chemical manufacturer's labels for applying all pesticides.

Quarantine Regulations

Okra is closely related to cotton and is subject to infestation by many of the same insects, particularly the pink bollworm. Some states and areas are quarantined against the entry of crops susceptible to this insect.

Texas okra may be shipped anywhere in Texas without restriction. However, other states allow entrance of okra only during certain months or with proper fumigation. Contact your local county Extension agent for more information about okra shipping.

Seed Contract

Most okra seed is produced under a written contract with seed companies. The companies generally require specific cultural practices. Many companies have field representatives who make regular visits to growers advising them on different aspects of seed production. However, the production guidelines in this publication may be used in the absence of recommendations from a specific seed company.

The seed company contract is beneficial to the grower and the company since the contract provides a written record of commitment between both parties. It is advisable, however, to sign the contract before planting the crop. Address the following issues in the contract:

- Price the grower is to receive
- Where the crop is to be delivered
- Who supplies the harvesting equipment
- Who pays for harvesting the crop
- Date of payment to grower
- Seed germination clause stating the minimum acceptable germination
- Noxious weed or other weed seed limitations

The last two items often are not considered by the grower until the seed crop has been delivered to the prescribed destination. The federal government, as well as individual seed companies, has rigid requirements on seed germination and weed seed content. Usually the grower is not paid until the seed crop meets certain germination and weed seed content requirements.

Yield

Most okra crops produce from 1,000 to 3,000 pounds of milled seed per acre. A reasonable average yield is 1,600 pounds per acre.

Specific Production Practices

Okra grown for seed is planted in the same way as market okra. In this case, plant population is more important as it affects harvesting procedures. Rows should average three to four plants per foot. Wider plant spacing allows the stalks to become so large they are difficult to machine cut in the windrowing or combining operations. Extremely thick stands result in excessively tall plants.

Okra for seed occupies land for a longer time, so "lay-by" herbicides, such as Treflan®, are recommended to control weeds.

Harvesting

The seed is mature when the pod is approximately 35 days old. Pods with mature seed should be dry at harvest with the moisture content of the seed approximately 14 percent or less. Seeds with higher moisture content may "heat" during bulk storage.

Okra bears pods over a long period and may continue to have green stalks, leaves and pods well into the cool weather of fall. Excess nitrogen and frequent irrigation increase vegetative growth and delay plant maturity. Ideally, allow the plants to dry "standing" in the field so they may be combined directly. However, if the plants remain too green,

windrow and combine after they have dried. Combining in the windrow requires a "pick-up" attachment or feeding by hand.

The cylinder of the combine should turn approximately 400 to 500 revolutions per minute to reduce mechanical damage. High speed cylinders crack and chip the seed, producing a heavy "clean-out" or low germinating seed.

Deliver harvested seed to the seed company as soon as possible. Always *retain a representative sample* of the seed being delivered and stay in close contact with a seed company representative.

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