Cooperative
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Okra Production Update for Small Acreage Growers

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Introduction

Okra is a popular vegetable which originated from the hot climates of Africa. It is widely grown in southern parts of the United States as an annual vegetable crop. The leading okra producing states are Texas, Florida, Georgia and California. Supplies peak in July and August. Mexico exports okra year round, with peak exports to the United States from June to September.

In Arkansas, okra is grown in home gardens for personal use and for fresh market sales. The fresh market sales include local farmers' markets, roadside stands and local grocery stores. In Lee County and surrounding areas, okra is grown in larger fields and marketed through grocery chain outlets and superstore warehouses. Farmers sometimes grow okra under contracts for the soup and frozen food industry.

Small family farmers in Arkansas often grow okra as a cash crop which can be marketed over a 14- to 18-week period. Yields of 4 to 6 tons per acre are not uncommon when recommended production practices are followed. One drawback in commercial okra production is the need for a large labor force for harvest. It is estimated that picking one acre of okra requires 10 to 20 man hours. Packing, like harvesting, is performed on a custom piece-rate basis. Generally okra is harvested at least once a week. Using a pay scale of $7 per hour, the expense of one harvest approaches $140 plus the packaging. Not included in the estimate is the cost of coordinating and transporting workers to fields. In commercial okra production, wholesale buyers prefer a continuous supply for optimum marketing during the growing season.

Okra is easily grown because it tolerates environmental stress well and still produces a crop. For most cultivars, flowering begins 35 days after planting. Normally, flowers are self-pollinating or are pollinated by insects. Flowering is day length sensitive. Less than 11 hours promotes flowering in most cultivars. Under longer days, flowering buds tend to abort. However, 'Clemson Spineless' is one of many cultivars that is not photo period sensitive. Clemson Spineless has been widely accepted for growing in temperate regions where day length is long during the summer.

Table 1. Variety comparisons and yield estimates from trials at UAPB Agricultural Experiment Station.

Variety	Pod Shape	Days to Mature	Main Use	Other Comments	Average Yield 4wk/lb/A	Seed Cost /lb
Clemson Spineless	Star	55	Fresh Market	Good yields, spineless, bright green pods, good quality	3989	$4.90
Dwarf Long Pod	Star	49	Fresh Market	Deep cut leaves, dark green pods, short to medium height plant, heavy yield, itchy spines	3016	$4.85
Louisiana Green Velvet	Round	56	Freezing	For fresh markets, pods packed with seeds	3826	$4.30
Annie Oakley (Hybrid)	Star	53	Home Garden	Early okra, chilling tolerant, narrow dark green pods	3232	$100
North and South (Hybrid)	Star	48	Home-Fresh	Highest yields in trials, large stalk, extra effort required in picking, dark green pods	3275	$66
Cajun Delight (Hybrid)	Star	57	Home-Fresh	Good yields, dark green pods, moderate plant height	3599	$100
Green Best	Star	55	Fresh	Dark green pod, early okra, good yields	3991	$42
Emerade	Round	57	Canning	Semi-cut leaf, dark green pods, larger pods remain tender	3188	$7
Lee	Angular	48-58	Processing or Fresh	Deep bright green pods, semi-dwarf type	3099	$7.80
Jade	Regular	56	Processing or Fresh	Early, tender, dark green pods, few branches on stem	3988	$6.55

Varieties

Unlike other vegetables, new varieties of okra are seldom released, hence private and commercial breeders continue to improve existing varieties by developing new hybrids. The hybrids often produce higher yields, but the seed is more expensive than established varieties. Okra demonstration trials were conducted at the University of Arkansas at Pine Bluff Agricultural Experiment Station in 1999-2001. Table 1 shows the estimated yields from the trials and the growth characteristics of ten okra varieties. The comparisons may assist in variety selection and determining the potential economic benefit in growing a particular variety.

Soil

Okra grows best on well-drained sandy loam soils. Poorly drained soils may result in drowning (low oxygen) of the plants. Okra prefers slightly acidic soils with a pH between 5.8 and 6.5. On clay soils, seedlings have difficulty emerging, and transplanting is recommended. Okra is very sensitive to soils with a hard pan, and soil compaction can severely restrict plant growth.

Planting Dates

Okra is a hot weather crop. The optimum soil temperature for growth is 75 to 90°F, while the minimum soil temperature is 65°F. Damping off and seed decay are likely at soil temperatures below 70°F. Planting dates may vary with favorable soil temperature; however, planting time is generally April 10-15 in south Arkansas, April 15-21 in central Arkansas and May 5 in northern Arkansas. Planting can be made every four to six weeks to maintain a continuous supply of fresh produce.

Fertilization

Before planting, soil fertility should be tested and recommendations followed. Okra fertilizer recommendations generally call for 300 pounds per acre of a complete fertilizer like 10-20-10 incorporated before planting. When pods begin to form and again in three to five weeks the plants should be

sidedressed with 20 to 25 pounds of nitrogen per acre. Avoid over fertilization with nitrogen. High rates of nitrogen cause okra to produce excessive vegetative growth which can reduce yields. If soil tests indicate a high pH, lime is recommended and should be applied three to four months before the crop is seeded.

Spacing and Seeding

Recommended row spacing is 28 to 38 inches with 8 to 12 inches between plants. Seeds should be chemically treated to reduce "damping off" (seedling rot) and planted about 1 1/2 to 2 inches deep. A seeding rate of four to six seeds per foot is recommended. When okra is 3 inches tall, plants should be thinned to 8 to 12 inches between plants. Okra has 8,000 seeds per pound (500 per ounce), and 12 to 15 pounds of seeds are required to plant one acre. If a precision planter is used, 7 pounds per acre is recommended.

Okra has a thick seed coat and does not germinate easily. Germination may be enhanced by soaking for several (4 to 6) hours or overnight immediately before planting. The seed must be surface dried for mechanical planting.

Seedbed Preparation

Soil should be turned after harvest in fall and early spring. This practice will expose overwintering insects to killing frosts and bring weed seeds to the surface where they will germinate. The weed seedlings will be destroyed when disking the soil before planting, thus reducing chemical use and saving on labor input for weeding.

Transplanting

Growers interested in early fresh market sales may find it advantagious to transplant okra seedlings. If a greenhouse or a similar facility is available, okra seedlings can be grown. Seeds should be planted in 2-inch-deep pots or commercially available seedling trays four to five weeks ahead of planned transplanting. Plants should be thinned to one plant per pot or cell. Transplants should be placed in the field at the three to four leaf stage with 12 inches between plants. The use of plastic mulch and drip irrigation along with transplanting will speed plant growth in the spring and result in an earlier harvest when compared to conventional plantings.

Cultivation and Weed Control

Okra is harvested over a long period of time, so full-season weed control is usually required. A preplant application of Treflan or Dual is recommended for control of grasses. Both herbicides are labeled for use on okra in Arkansas. There are no herbicides labeled for broadleaf weed control in okra (MP44, *Recommended Chemicals for Weed and Brush Control*). Mechanical cultivation should be used as often as necessary to control broadleaf weed species. Care should be taken to cultivate as shallow as possible to avoid root damage to the okra. Producers may want to avoid fields with known heavy infestations of broadleaf weeds.

Insect Control

Severity of insect damage varies from year to year and is different at each stage of plant development. Aphids usually attack okra early in the season. Later, plants and pods may be attacked by stink bugs, cabbage loopers, corn earworms, European corn borers and the leaf-footed plant bug. See MP144, *Insecticide Recommendations for Arkansas*, and/or MP301, *Vegetable Insect Control Recommendations for Commercial Growers*, for recommended insecticides.

Disease Control

Southern stem blight, verticillium and fusarium wilts are some of the more serious diseases attacking okra. Root knot nematodes may also reduce yields. Crop rotation is one method to control many of the plant diseases. In rainy or wet seasons, rotting of blossoms and pods can be a problem when there are dense canopies. Removal of the lower leaves will allow better air circulation and reduce problems with blossom and pod rot.

Irrigation

Adequate soil moisture is necessary for optimum growth and yield. A regular irrigation schedule of 1.5 inches of water every 10 days is recommended for maximum yields. Conversely, over watering may drown plants or cause excessive growth. When using furrow irrigation during harvest, watering alternate rows is recommended. The dry furrow is used to walk in during harvest. Subsequent irrigation should be applied to the dry furrow.

Harvesting

Okra pods should be harvested while still tender, which is usually five to six days after flowering. Pods between 2.5 and 3.5 inches in length are preferred by most consumers. Okra should be harvested two to three times a week. Regular picking increases yield. Mature pods left on the plant will reduce flowering and fruit set. Pods may be cut from the plant with a knife or snapped off by hand. Pods with tips that will bend between the fingers without breaking are too tough for use as a fresh vegetable.

When harvested, okra pods rapidly lose moisture. This causes the loss of pod quality. It is recommended that harvesting be conducted in the cooler parts of the day, mornings or evenings, and the harvested okra be kept as cool as possible. Avoid leaving the harvested okra in the sun for long periods of time. Shaded storage areas will help maintain good pod quality. Harvested okra should be stored in ventilated containers. Pods kept in non-ventilated containers will lose color rapidly due to bleaching, and there can be a buildup of heat due to respiration of the okra.

Harvested okra should be handled carefully to avoid bruising. Bruised pods will turn black or brown within a few hours. Cotton gloves are recommended when harvesting and handling pods. In addition, okra plants and pods have small spines which can cause an allergic reaction. Handlers and pickers should wear long-sleeved shirts as well as gloves for skin protection.

Grading

Pods which are crooked, bent or have dark spots should be discarded before marketing. Most commercial buyers will purchase only the "fancy" or "choice" grade okra. Uniform standards (*Commercial Vegetable Production*, University of Georgia Cooperative Extension Service) for grading okra are:

- Fancy . . . Pods up to 3 1/2 inches long
- Choice . . . Pods 3 1/2 to 4 1/2 inches long
- Jumbo . . . Pods over 4 1/2 inches but still tender

Storage

Okra should be stored at 45 to 50°F with a relative humidity of 90 to 95 percent. At higher temperatures, the pods began to toughen, yellow and decay. Okra in good condition can be stored seven to ten days. Okra stored at temperatures below 45°F will develop chilling injury which is a pitting and discoloration of the pods. Ice should not be used to cool okra. Water from the melting ice will cause a spotting on the pods.

Packing

Okra is usually shipped in half or one bushel hampers or crates. A bushel holds 30 pounds of okra. Packing the okra in perforated bags and storing it in 5 to 10 percent carbon dioxide can increase shelf-life approximately one week.

Yield

Okra yield estimates range from 6,000 to 12,000 pounds per acre. At peak harvest times, one picking can yield 270 to 400 pounds per acre.

Production and Marketing Costs

Estimated okra pre-harvest cost (seed, fertilizer, pesticide, fuel, etc.) is approximately $150 per acre. The estimated harvest cost for one harvest is $147, not including other miscellaneous costs such as transportation and storage (Table 2). The yearly costs, as well as profits, vary depending on number of harvests per week and length of the harvest. There should be a consideration of the miscellaneous costs such as transportation, gas, electricity, water, repairs and depreciation of equipment and buildings. There are other labor costs for irrigation and weed control during the harvest. Labor costs from area to area may vary due to differences in harvesting, grading and packing cost on a piece-rate basis.

Table 2. Estimated costs of labor and packing for one harvest. Based on a harvest of 330 pounds per acre.

Item	Labor/Cost		Total
Picking[1]	@ 15 hrs x $7/hr	=	$105
Crates 22 (1/2 bu crates)	@ $1.25	=	$28
Grading	@ 2 hrs x $7/hr	=	$14
		Total	$147

[1] Harvest cost estimates were obtained from three okra producers in south Arkansas.

Marketing

Okra price in retail fresh markets is around $1 per pound. Wholesale prices vary from 20 cents to 70 cents per pound depending on time in the season. Prices are higher in the spring and fall when large quantities are not being produced. Locally, supplies peak in July and August.

The price of okra sold for canning is 8 to 12 cents per pound. Usually, a contract is made before planting to sell the harvest to a processor, and the crop is machine harvested.

References

Commercial Okra Production, Paul Colditz, Darbie Granberry and Charles Vavrina, Extension Horticulturists - Vegetable Crops, University of Georgia College of Agricultural and Environmental Sciences, Cooperative Extension Service, and Dr. Henry English, Director of Small Farms Project, University of Arkansas at Pine Bluff.

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