



# Southern Pea Production

Lynn Brandenberger  
Extension Vegetable Specialist

James Shrefler  
Extension Vegetable Specialist

John Damicone  
Extension Plant Pathologist

Eric Rebek  
Extension Entomologist

## Production Requirements

Southern peas are known as “cowpeas,” “field peas,” “blackeyes,” “crowders,” “pinkeye-purple hulls” and several other names. Southern peas were brought to the Americas from Africa and are well adapted to low fertility soils and production during hot summer months. From a human nutrition standpoint, southern peas are a good source of protein (24 percent), and have higher levels of folate, vitamin A, potassium, and calcium than several other vegetables. They fit well into crop rotations, since they can be planted after spring vegetables are harvested. Being a legume, southern peas can fix nitrogen from the atmosphere when inoculated with the correct inoculum. Inoculants of bacteria are available commercially, and may be used to coat the seed before planting to ensure the bacteria are present in the soil. Yield will vary depending upon soil fertility and moisture supply. From a single harvest, green pod yields will range from 2,500 to 4,500 pounds per acre, while shelled green and dry pea yield will range from 1,200 to 2,000 pounds per acre. Multiple hand harvests can increase pod and green pea yields of vining types (indeterminate) by about 25 percent above the indicated single harvest yields.

**Table 1. Southern pea varieties.**

<i>Variety</i>	<i>Plant habit</i>	<i>Dry pod color</i>	<i>Seed type</i>	<i>Disease resistance</i>
Arkansas Blackeye # 1	Bush	Cream	Blackeye	Bacterial blight
California Blackeye # 5	Vining	Straw	Blackeye	Fusarium wilt, nematodes
Coronet	Bush	Purple	Pinkeye	None
Early Scarlet	Bush	Dark rust	Pinkeye	Bacterial blight, virus tolerant
Early Acre	Bush	Cream	Cream	
Ebony	Bush	Straw	Black	
Elite	Bush	Light straw	Cream	Fusarium wilt
Empire	Bush	Brown to tan	Pinkeye	
Envoy	Bush	Light brown	Red & White	
Epic	Bush	Tan	Brown crowder	
Excel	Bush	Purple	Pinkeye	
Mississippi Silver	Semi-vining	Light brown	Brown crowder	Fusarium wilt, nematodes
Pinkeye Purple Hull BVR	Vining	Purple	Pinkeye	Blackeye cowpea mosaic virus

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are also available on our website at:  
<http://osufacts.okstate.edu>

## Varieties

The preference of potential buyers must be considered in determining the varieties to grow. If the crop is to be grown for processing, the processor will designate the variety to be grown. Varieties differ in the following characteristics: (1) growth habits including vining, semi-vining and bush; (2) pod color at green shell stage — the color may vary from green to silvery to purple; (3) seed color — cream, buff, brown, red, black, spotted and speckled; (4) eye color — varies from no color to pinkish, maroon eye to black eye; (5) seed type — crowder, semi-crowder and non-crowder. A crowder pea is one in which the seeds are crowded in the pod, causing seed to be blunt on the ends.

Most of the varieties listed (Table 1) have a plant type and pod set location, which permits machine harvesting or easier hand harvest when compared to vining types. From planting to harvest ranges from 58 to 80 days, depending upon season and variety. For an updated list of recommended varieties check fact sheet HLA-6035, “Commercial Vegetable Varieties for Oklahoma.”

## Sites and Soils

Southern peas will grow on many soil types, but highest yields occur on well drained, slightly acidic sandy loams. High yields are possible on sandy soils if adequate moisture and fertility are provided. Soils known to be droughty will likely

produce poor yields unless irrigated. Although commercially acceptable yields are unlikely in non-irrigated fields, southern peas are more tolerant of drought and high temperatures than most other vegetable crops.

### Soil pH and Fertilizer

Neutral to slightly acid soils (pH 5.5 to 6.5) are preferred by southern peas. Soils with a pH above 7.5 and high in calcium should be avoided or chlorosis (iron deficiency) could occur, stunting plant growth and reducing yield. Apply lime if soil pH is below 5.5. Based on OSU soil test results, the following amounts of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O are recommended (Table 2).

**Table 2. Phosphorous and potassium requirements for southern pea.**

Phosphorous Requirements (lbs P <sub>2</sub> O <sub>5</sub> /Acre)					
When test shows	0	10	20	40	>65
Add lbs. P <sub>2</sub> O <sub>5</sub>	80	70	55	30	0
Potassium Requirements (lbs K <sub>2</sub> O/Acre)					
When test shows	0	75	125	200	>250
Add lbs. K <sub>2</sub> O	80	70	55	25	0

**Nitrogen** - On soils of moderate to low fertility apply 20-50 lbs./A N preplant incorporated along with recommended P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O prior to planting or band all fertilizer with the planter 3 inches to 4 inches below and 2 inches to 3 inches beside the seed row. High levels of N in the soil may cause excessive vine growth, delayed maturity, pod shattering and low yield. Southern peas show very little response to N fertilizer, so side dressing with N fertilizer is not advised and peas should not follow crops that add large amounts of N to the soil. The nitrate-N value provided by the OSU soil test report should be used to determine N fertilizer needs on a particular soil.

### Soil Preparation and Planting

Rework the soil just before planting to destroy any weeds and to develop a clod-free seed bed needed for mechanical harvesting. Make the earliest plantings in mid-May in central Oklahoma but make sure the soil temperature has been 70°F or above for several days prior to planting. Do not plant later than July 15. Southern peas can be planted in rows 20 to 42 inches apart depending upon variety and equipment to be used in planting, cultivation, and harvest. Vining and semi-vining varieties require wider spacing with in-row spacing of 1-2 seeds per row-foot. Bush varieties can be planted in closer spaced rows with 4-6 seeds per row-foot. Size of seed determines the weight of seed to plant per acre. Seeding rates vary from 15 pounds per acre for small seeded varieties to 30 pounds per acre for larger seeded types when planted in 36 inch rows. At a 20 inch row spacing, 30 and 55 pounds are required for small and large seeded varieties, respectively. Seeds can be planted one inch deep in heavy soils and 1 1/2 to 2 inches in light soils.

### Cultivation and Chemical Weed Control

The use of herbicides is becoming more important with mechanical harvesting and as plant populations rise. Cultivate just deep enough to control weeds. Consult the latest edition of the Extension Agents' Handbook (E-832) for chemical weed control information.

### Irrigation

Peas have some drought tolerance, but irrigation can double or triple yields in periods of severe droughts. This is especially true when water is applied during bloom and early pod development. Without irrigation, peas usually suffer during short drought periods; and, although they may produce a crop, the yield can be greatly reduced. Excessive rainfall or overhead irrigation at or a few days before bloom stage may delay fruit set and encourage excessive vine growth by interfering with pollination.

### Insects

If southern peas are planted early (mid-May) seedcorn maggots may be a problem. Since this insect is usually only a pest in cool, damp springs, peas planted at the normal time should not be attacked. Thrips often feed in the terminal buds of the crop. Although thrips damage can result in distorted growth, southern pea will grow out of thrips damage in most years. Aphids can be problematic in cool, dry weather, whereas spider mite populations often increase when it is hot and dry.

Peas planted on lighter soils and under dryland conditions can be attacked by lesser cornstalk borers. This insect bores into the stalk just above the soil line and hollows out the stem. Infested plants will lodge and easily break off in the wind. Late planted peas are more likely to have problems with lesser cornstalk borers.

As the pods form, a number of other insects can become pests. Green stink bug feeding will cause discoloration of the developing seeds. Armyworms, especially fall, beet, and yellowstriped armyworms, along with corn earworm will feed on pods during the summer. Cowpea curculio attacks southern peas throughout the state. This small weevil feeds on pods and lays eggs in the seeds; larvae then feed on the developing seeds in the pods.

### Diseases

Diseases can limit the production of southern peas when they become severe. *Rhizoctonia*, *Pythium*, and *Fusarium* species are soil-borne fungi that cause seed rot and seedling blight. Using a seed treatment fungicide and planting when the soil is warm will help control seedling disease and ensure an adequate plant stand. Virus diseases often appear, causing symptoms such as puckering and distortion of young leaves, mosaic color patterns in young leaves, and plant stunting. Planting high-quality seed and varieties with virus resistance reduce virus problems. Charcoal rot, Fusarium wilt, and root-knot nematode are the most common soilborne diseases of older plants. Charcoal rot causes plants to die quickly during periods of moisture stress. Lower stems are grey in color and have internal black flecking. Fusarium wilt causes lower leaves to yellow and fall from the plant before plants wilt and die. Fusarium wilt causes an internal, dark brown discoloration of lower stems. Root-knot nematode is



**Figure 1. Cowpea Aphid (*Aphis craccivora*).** Photo provided by Clemson University, USDA Cooperative Extension Slide Series at Bugwood.org



**Figure 2. Cowpea Curculio (*Chalcodermus aeneus*) on common bean.** Photo provided by Clemson University, USDA Cooperative Extension Slide Series at Bugwood.org



**Figure 3. Green Stink Bug (*Chinavia hilaris*).** Photo provided by Susan Ellis at Bugwood.org



**Figure 4. Yellowstriped Armyworm (*Spodoptera ornithogalli*) on cotton.** Photo provided by Russ Ottens, University of Georgia at Bugwood.org



**Figure 5. Twospotted Spider Mite (*Tetanychus urticae*) on corn.** Photo provided by Frank Peairs, Colorado State University at Bugwood.org



**Figure 6. Western Flower Thrips (*Frankliniella occidentalis*).** Photo provided by Jack T. Reed, Mississippi State University at Bugwood.org

often found together with Fusarium wilt and causes a stunted and deformed root system that has swellings (galls) along the roots that are distinct from nitrogen-fixing (*Rhizobium*) nodules that develop on normal roots. Control strategies for soilborne disease include crop rotation, irrigation to minimize moisture stress, and planting resistant varieties. Fungal leaf spots (*Cercospora*, *Ascochyta*, *Colletotrichum*) and bacterial blight are common foliar diseases. Foliar diseases generally cause brown, circular to angular spots on leaves, stems, and pods and may cause premature defoliation during when severe. Leaf spots caused by bacterial blight are typically surrounded by a prominent yellow border. Crop rotation, incorporation of crop residue into the soil to hasten its decomposition, and avoiding cultivation when plants are wet are general strategies to reduce foliar diseases. Bacterial blight is typically carried on seed so planting high quality seed from a disease-free field (if known) is beneficial. Some varieties are resistant to bacterial blight. Spray programs for diseases are not normally required for southern pea production in Oklahoma, but a listing of fungicides and bactericides registered for use on southern peas can be found in the most recent edition of the Extension Agents' Handbook (E-832).

## Harvesting

Peas are harvested in three different stages of maturity—green snaps, green shell and dry. Each stage requires a different harvester. The commercial snap bean harvesting machines can be used to harvest in the green snap or green shell stage. Bush and semi-vining varieties harvest best with the snap bean harvesters. For processing, in the green shell stage, peas are harvested by mobile viners (supplied by the processor) these machines shell and clean the peas for processing. Harvest time for the green shell stage is speci-

fied by the processor, and is usually when 35 percent to 40 percent of the pods are dry. For dry pea harvest, small grain combines are usually used to cut and thresh the peas. Peas are normally defoliated with a chemical defoliant (E-832) or occasionally windrowed to speed drying prior to threshing. Before selecting any harvester, consider row spacing, varieties and available markets for the peas. Multiple hand harvesting is still utilized by fresh market growers for both bush and vining types. Southern peas that have a vining growth habit can be harvested every five to seven days for three to four weeks, bush-types are normally a once-over harvest because of their concentrated flowering and fruit-set. Yields of 150 bushels/A are possible (22 to 25 lbs./bu).

## Handling and Marketing

Most southern peas in Oklahoma are produced under contract with a processor for canning, freezing or dry peas. Some fresh market peas are produced and these are hand harvested or harvested by machine and packed in baskets or crates for shipment to local markets. Shipment of fresh peas to distant markets must include proper refrigeration and relative humidity to maintain quality. Fresh peas have an approximate shelf life of six to eight days when stored at 40 F and 95 percent relative humidity. Dry peas are mechanically harvested and hauled bulk to processing stations where they are cleaned, graded, stored and fumigated prior to packaging and marketing. Southern peas are well adapted to U-pick marketing. The purple hull varieties are best suited to U-pick, since pods begin to turn purple when they are ready to harvest. A commercial pea sheller in conjunction with a U-pick operation may be a profitable investment.

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