Southern Pea Production

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.

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

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 P₂O₅ and K₂O are recommended (Table 2).

Table 2. Phosphorus and potassium requirements for
southern pea.

<table>
<thead>
<tr>
<th>Phosphorus Requirements (lbs P₂O₅/Acre)</th>
<th>When test shows</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>40</th>
<th>&gt;65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add lbs. P₂O₅</td>
<td>80</td>
<td>70</td>
<td>55</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potassium Requirements (lbs K₂O/Acre)</th>
<th>When test shows</th>
<th>0</th>
<th>75</th>
<th>125</th>
<th>200</th>
<th>&gt;250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add lbs. K₂O</td>
<td>80</td>
<td>70</td>
<td>55</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Nitrogen** - On soils of moderate to low fertility apply 20-50
lbs./A N preplant incorporated along with recommended P₂O₅
and K₂O 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. Seedling 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 ear-
ly 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 condi-
tions 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 discol-
oration of the developing seeds. Armyworms, especially
fall, beet, and yellow-striped 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 en-
sure 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 specified 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.