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Black-Eyed Pea Production for Eastern Colorado >>

by Jason Webb, Sally Jones-Diamond, Joel Schneekloth

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Black-eyed pea (*Vigna unguiculata* (L.) Walp.) is a type of cowpea that originated in Africa. It is an annual legume that is generally produced in semi-arid regions of the world, often serving, in some cultures, as a primary source of protein in human and animal diets. In Colorado, black-eyed pea can be grown either in dryland or irrigated cropping systems. It is approximately a 90 to 95 day crop that fits well with current rotation practices in eastern Colorado.

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Potential benefits of growing black-eyed pea in eastern Colorado

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- Black-eyed pea is a broadleaf legume option for grass-based dryland crop rotation systems. It is directly consumed as human food in the United States.
 - Black-eyed pea requires little fertilization, especially Nitrogen. See fertilization section below.
 - Its low water usage is ideal for limited irrigation systems with low water volume, shared wells or limited irrigation allocations.
 - Current equipment used for small grains or dry beans is suitable for production, and no significant machinery changes or upgrades are required to plant or harvest.
 - It is a drought resilient crop option for dryland cropping systems.
 - Black-eyed pea is adapted to a wide variety of soil conditions and can tolerate soil pH values up to 8.0.
 - It is more tolerant to salinity conditions compared to traditional dry beans grown in Colorado.
 - Black-eyed pea has a relatively high forage value.
 - Markets exist to buy seed and sell the crop.
 - No significant insect or diseases that affect black-eyed pea have been observed in Colorado at the time of publication.
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Potential problems for growing black-eyed pea in eastern Colorado

- Like dry beans, black-eyed pea leaves very little plant residue after harvest, making soil susceptible to erosion if a winter crop such as wheat or triticale is not planted immediately afterwards.
- There are a limited number of herbicides registered for use on black-eyed pea.
- Harvest damage, mainly in the form of splits, can occur if the combine is not properly set.
- Black-eyed pea crop yield can vary from year to year. In dryland yields can range from 300 to 1400 lb/acre and irrigated yield can range from 800 to 2800 lb/acre.
- When drilling seed, uniformity in planting depth is critical to avoid uneven stands which will cause harvest timing issues.
- Canopy closure does not always occur when planting in 30" rows, allowing sunlight through to facilitate weed germination and growth late into the season.
- Black-eyed peas are sensitive to mesotrione (and other HPPD) herbicide residues.

Rotation

Black-eyed pea is planted in late May through early to mid-June, usually into corn or wheat stubble from the prior year. It is typically harvested from mid-September to early October depending on growing conditions. Dryland black-eyed pea can replace fallow in a winter wheat-summer crop-fallow rotation. Usually, the summer crop used in this rotation after wheat is also a grass (corn, proso millet, and/or grain sorghum), and occasionally a broadleaf crop such as sunflower. Black-eyed pea harvest is early enough to allow for planting of wheat or another winter cereal after harvest if moisture allows in a dryland situation. Black-eyed pea can follow any grass crop as long as herbicide carryover is not an issue. Rotating irrigated black-eyed pea with sugar beet or dry bean may increase the risk of disease or insect infestation and subsequent damage for any of those crops.

Field Selection

Black-eyed pea is adapted to a wide variety of soils. Heavier clay soils with poor drainage, though productive, are not as suitable as well-drained soils. Black-eyed pea is not as sensitive to elevated pH and salinity as other alternative crops can be. They can be grown in any type of tillage system, however, when drilling into no-till wheat stubble sometimes seed hair-pinning can occur, resulting in poor stand establishment.

When following corn, herbicide rotation intervals are critical. Mesotrione and isoxaflutole residues can severely affect the health of the crop. The triazine family of herbicides is of lesser concern. Issues with atrazine carryover are usually limited to late herbicide application followed by little to no rainfall occurring afterwards. Most herbicide labels do not list black-eyed pea as a rotational crop; therefore, it is recommended that a grower perform a bioassay or a grow test in potted soil from the field. If performing a grow test, a grower should not only check for emergence, but allow the crop to grow for several weeks to ensure early plant development is not affected.

Variety Selection

The number of variety options for black-eyed pea is limited at this time. The primary varieties available for commercial planting are *California Blackeye 5 (CB5)* and *California Blackeye 46 (CB46)*, both developed by University of California, Riverside. Occasionally *California Blackeye 50 (CB50)* is also available for planting. These varieties typically flower about 40-45 days after emergence and are harvested in about 90-95 days. Typically, *CB5* produces a slightly larger seed than *CB46* or *CB50* regardless of being dryland or irrigated. *CB46* and *CB50* have better resistance to Fusarium wilt than *CB5*.

Planting Considerations

Black-eyed pea can be planted when soil temperatures reach 60°F. In eastern Colorado this is roughly near May 25th. Planting should be delayed if cold and wet weather is forecasted within the week following the anticipated planting date. Seeds typically emerge 3 to 5 days after planting and are somewhat resilient at pushing through slightly to moderately crusted soils. Planting after June 20th usually results in a late harvest making it difficult to plant a subsequent winter cereal crop timely.

Black-eyed pea can be planted with a conventional row crop planter at spacings of 30" or less or drilled at narrower row spacings such as 7.5 or 10". Black-eyed pea seeds usually range from 1,700 to 2,200 seeds per pound. Seeds are planted ¾ to 1" deep but can be planted up to 1.5" in sandy soil. Planting too deep or too shallow will result in an uneven and often unacceptable emergence. It will also have adverse effects on herbicide, desiccation, and harvest timing. Seeding rates for dryland fields are 50,000 to 60,000 seeds/acre while irrigated fields are planted around 115,000 seeds/acre.

Weed Control

Few herbicides are labeled for use in black-eyed pea (Table 1). The best approach to weed control in black-eyed pea is to plant into a clean field. A burndown herbicide application prior to planting may be necessary to achieve this. Good stand establishment will also help black-eyed pea compete with weeds that emerge. Pre-emergent herbicide applications are critical in maintaining a weed-free crop until canopy closure can occur. Post-emergent weed control is an option, but the risk of crop injury is increased.

Table 1. Herbicides labelled for use in black-eyed pea.

Active ingredient	Trade name example	Use timing	Rotation interval to wheat
Ethalfluralin	Sonalan	pre-emergent	next crop season
pendimethalin	Prowl H2O	pre-emergent	4 months (injury may still occur)
S-metolachlor	Dual II Magnum	pre-emergent	4.5 months
sulfentrazone	Spartan/Authority/Br oadaxe HC	pre-emergent	4 months

trifluralin	Treflan	pre-emergent	next crop season
halosulfuron	Permit/Sandea	pre or post emergent	2 months
bentazon	Basagran	post-emergent	any time
clethodim	Select Max	post-emergent	1 month
imazamox	Beyond Xtra/Raptor	post-emergent	0-3 months (Clearfield/non-Clearfield)
flumioxazin	Valor SX	burndown	2 months
glyphosate	Roundup products	burndown only	any time
carfentrazone	Aim	burndown/harvest aid	any time
saflufenacil	Sharpen	burndown/harvest aid	0-3 months
paraquat dichloride	Gramoxone	harvest aid	any time

Fertilization

Soil sampling is always recommended before planting any crop. Black-eyed pea responds to fertilization but overfertilization of nitrogen can delay bloom and crop maturity. In dryland, typically an application of 20 lb/acre of phosphorus and 10 lb/acre of nitrogen as a starter is sufficient. Under irrigation, an additional 30 to 40 lb/acre of nitrogen is usually supplemented through fertigation or side-dress prior to flowering. Efficacy of zinc and sulfur applications has not yet been determined. Additional research on optimal fertilization rates and timing of applications is being conducted.

Harvest Considerations

- For direct harvest, desiccation of the crop may be necessary beforehand. Desiccation or swathing should be done only when 80% of the leaves have turned yellow. The stems of black-eyed pea can take a long time to dry down. It is critical that desiccation or swathing not be done too early or harvest will ultimately be delayed due to too much moisture in the stems.
- Optimum seed moisture for harvest is 14%. Black-eyed pea seeds typically dry quickly in the field. When moisture levels are below 10%, the chance of damaging and splitting seeds is increased.
- Combine settings can vary greatly depending on the equipment manufacturer. It is important to use settings that do not damage the seed yet separate the chaff effectively. Typically, rotor/cylinder speeds are set as low as possible, and a slowdown kit may be required. Fan speeds are usually high. Concaves are opened similar to what they would be for corn or soybean.

- Black-eyed pea seeds are produced in the upper canopy of the crop making it easier to harvest whereas other legume crops generally produce their pods closer to ground.

Water Use

Black-eyed pea is a drought tolerant crop requiring less water to produce yield compared to corn, sorghum, winter wheat, millet, or dry bean. The primary time period of response to water with black-eyed pea is the reproductive growth stage when the flowering stem (peduncle) emerges to near-maturity. This is a 30-day period of growth. Excess water use by the crop does not increase yield over the maximum water use of approximately 15 to 16 inches of evapotranspiration (ET). Additional water use generally translates into more vegetative growth rather than grain yield. Yields of 1,000 lb/acre are achievable with approximately 8 inches of ET, or total water.

Marketing Black-Eyed Pea

Reliable markets exist today in eastern Colorado and western Nebraska and Kansas. The crop is typically grown under contract, similar to other dry beans. It is sold on a hundred-weight (cwt) basis. Seed production contracts are also sometimes available. Black-eyed pea is primarily used for human consumption. A large part of that consumption is on New Year's Day as they are purported to bring prosperity in the new year. Other research has shown health benefits of adding black-eyed pea to the human diet.

Additional Resources

- www.csucrops.org/bep
- <https://fsp.ucdavis.edu/seed-catalog/cowpea-varieties>
- <https://lubbock.tamu.edu/files/2015/02/Black-eyed-Pea-Production-TX-High-Plains-2004-2014.pdf>
- <https://www.extension.iastate.edu/alternativeag/cowpea>
- <https://www.usda.gov/media/blog/2017/12/27/ringing-new-year-traditionally-lucky-foods-and-their-facts>

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