

COWPEA

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INTRODUCTION

In recent decades, there has been considerable confusion regarding the taxonomy of cowpea. The currently accepted classification is Vigna unguiculata (L.) Walp. although older references call it Vigna sinensis (L.). Further classification of varieties and groupings are based on seed size, shape, color, and texture as well as growth habit (prostrate, erect, or climbing). Other common names for this crop are southern pea, blackeye pea, lubia, niebe, coupe or frijole.

The cowpea and its relatives are among some of the most ancient food and crop plants known with some estimates citing its probable cultivation to Neolithic times. The origin of the crops is disputed but many believe it originated in Africa and was brought to North America in about 1700.

PLANT CHARACTERISTICS

In total, the crops classified as cowpeas are extremely variable; however, there are some qualities of this crop that are generally recognized. Structurally, most varieties are strongly taprooted, compared to other legumes such as Phaseolus, with many spreading lateral roots in the top 30 cm of soil. Because of this character, cowpea is thought to be more tolerant of water stress than legumes with a less dominant taproot. Roots have been found as deep as 240 cm as early as 8 weeks after seeding. The plant nodulate freely and fixes relatively high amounts of atmospheric nitrogen (N₂).

Cowpea seeds are relatively large (up to 12 mm long) although some types and varieties, especially wild types, may be quite small. The germination of seed is epigeal and rapid under warm (above 65° F) conditions. Under cool soil conditions, germination can be extremely slow and seeds may rot before emergence can occur. General seed vigor is not usually a problem for this species unless growing conditions or handling problems are severe. There are no unusual seed dormancy problems, although in wild types, seed coats can be relatively hard.

Seed shape, a major type characteristic, is correlated with seed development in the pod. When seeds have sufficient space within pods, the seeds tend to be kidney shaped, but when they become crowded, called "crowder" types, the seeds become progressively more globular. The seed coat can be either smooth or wrinkled and have various colors including white, cream, green, buff, red, brown, and black. Colors may also be speckled, mottled, and blotchy. Many are also referred to as "eyed" (blackeye, pinkeye purple hull, etc.) where the hilum is white and surrounded by some dark color such as black, pink, or light red.

The trifoliate leaves develop alternately. Commonly, the terminal leaflet is longer and larger than the lateral leaflet. There is a wide range in leaf size and shape and rarely is there any pubescence.

Flowers are formed in racemose or indeterminant inflorescences in the axils of leaves and are rarely terminal. Color of flowers ranges from white to purple. The species is generally day-neutral.

TYPES

There are a tremendous number of varieties of cowpeas but it is possible to group varieties by type. Although there may be differences in opinion, the following are common groupings:

1. Blackeye and purpleeye types. The immature pods shell easily because the hull (pod wall) is pliable and the seeds come out of the pod clean and free. The shelled peas are attractive, mild flavored and suitable for canning. The hilum is surrounded by black, pink, or light-red color.
2. Browneye types. Pods vary in color from green to lavender and have a wide range of lengths. The immature seeds, when cooked, are a medium to dark brown color, very tender, and have a delicate flavor.
3. Crowder types. Seeds are closely crowded in the pods and tend to be globular in shape.
4. Cream types. Seeds of these types are generally cream colored and have no noticeable "eye" (inconspicuous hilum).
5. Clay types. These are generally older varieties that are medium to dark brown in color and kidney shaped. They are no longer commonly grown.
6. White acre type. The peas are kidney shaped with a blunt end. This type is a semi-crowder, generally tan in color and somewhat small. Pods are quite stiff.

Some individuals may include other type groupings, but the above are the most common.

COMPOSITION

Cowpea seed is a nutritious component in the human diet, as well as a nutritious livestock feed, that is high in protein, low in fat and cholesterol, and high in carbohydrates.

Composition of cowpea seed (% dry matter):

Protein	-	22.75
Fat	-	1.30
Fiber	-	1.81
Carbohydrate	-	67.28
Water	-	8.70

USES

As a human food, the crop may be handled in a number of different ways.

1. Immature seeds - boiled as a fresh product or canned.
2. Immature snapped pods - may be handled in a manner similar to snapbeans and mixed with immature seeds (fresh or canned product).
3. Dry mature seed - suitable for boiling or canning.
4. Leaves may also be used as a food crop during the early stages of development. This is a common practice in some developing countries.

In many areas of the world, cowpea represents the only available high quality legume hay for livestock feed, and is used as a green or dry fodder. Its use as a legume hay has proved effective as far north as Minnesota where in vitro digestibility values and yield of certain varieties were comparable to alfalfa.

Other uses include:

1. Green manure crop
2. Rotation crop
3. Erosion control
4. Wildlife protection and feed.

CULTIVATION

The cowpea will produce satisfactory yields on a wide variety of soils and soil conditions but performs better on well-drained sandy loam or sandy soils. Because the plant is taprooted, seedbed preparation should insure that there are no barriers to root penetration into the subsoil such as hardpans. A soil pH of 6.0 - 6.5 is most desirable.

Fertility

Excessive nitrogen applications tend to promote vegetative growth, delay maturity, and suppress nitrogen fixation. The plant will perform well under low N conditions because it has a high capacity for N₂ fixation. In some cases, inoculation with cowpea Rhizobium is helpful although, in most situations, there is a lot of native bacteria in the soil that will effectively nodulate the plant. Consequently, N rates of about 30 pounds/acre should be sufficient.

Other fertility needs will be dictated by soil test results. In general, about 50-75 pounds/acre of phosphorous and potassium are recommended and other elements supplied only under soil deficiency conditions. Relatively little is known about micronutrients except Z_N, which has a proven link to nitrogen fixation.

Irrigation

Cowpeas are grown under both irrigated and non-irrigated regimes. The crop responds positively to irrigation but will produce under dryland conditions. This is one of the reasons that it is such an important crop in many underdeveloped parts of the world. If irrigation is used, expect more vegetative growth and some delay in maturity. Application rates should insure that the crop is not overwatered, especially in more northern latitudes as this will tend to keep soil and air temperatures down, suppressing the growth of this hot weather crop.

Diseases

Listed below are a number of diseases which are potential problems in the production of cowpeas. Local experts should be contacted for control recommendations.

1. Fusarium wilt
2. Bacterial canker
3. Southern stem blight
4. Cowpea mosaic virus
5. (approximately 6 other less prominent viruses)
6. Cercospora leaf spot
7. Rust
8. Powdery mildew

Insects

Insects that are problems will vary from location to location. Shown below are a list of some of the most serious pests. Consult local experts for control recommendations.

1. Mexican bean beetle
2. Bean leaf beetles
3. Cowpea curculio
4. Aphids
5. Green stink bug
6. Lesser cornstalk borer (and possibly other stalk borers)
7. Weevils (in storage)

Weeds

The principal herbicide available for weed control is trifluralin. It should be used carefully, particularly in cooler regions since cowpea is a hot season crop. Rates of application will vary with soil type with lower rates applied to sandy soils.

Planting

The planting technique will depend on the use of the crop. Traditionally, it is seeded in rows spaced 30-36 inches with seeds 2-4 inches apart if grown for seed or human consumption. In recent years, commercial plantings have used closer rows spaced 12-20 inches, and higher plant populations. For forage purposes, the crop can be seeded as above or broadcast. Seeds should not be planted until soil temperatures are consistently above 65° F and soil moisture is adequate for germination and growth. Seeds should be planted 1-1/2 inches deep with good seed-soil contact. If irrigation is used, the land should be pre-irrigated rather than irrigating after planting.

Varieties

There are a tremendous number of varieties and types, as discussed previously. A recent Clemson University publication (Ogle, W.L., W.Witcher, and O.W. Barnett. 1987. Descriptors for the southern pea of South Carolina. Clemson University Agricultural Experiment Station Bulletin 659. (Write to Dr. W.L. Ogle, Department of Horticulture, Clemson University, Clemson, S.E. 29631).) gives detailed

descriptions of a number of varieties and would be an excellent place to start. In addition, local extension specialists should be able to help identify seed sources.

FURTHER READING

The following is a selected list of references that provide a detailed overview of cowpeas. Research has been done with this crop for many years, mainly in India, Africa, and Latin America. Consequently, many specific reports exist, and this is not intended to be an exhaustive list.

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