



COWPEA RESEARCH AT NaSARRI

Cowpea is an annual legume that is grown as a source of food and animal feed in the arid and semi-arid regions of sub-Saharan Africa. While Cowpea can be used at all stages of growth as a vegetable crop, the seed or grain is the most important part of the cowpea plant for human consumption

The seeds are harvested and dried for storage and consumption at alter time, either after cooking whole or after being milled like a flour product and used in various recipes.

The grain is a major source of dietary protein that nutritionally complements low-protein cereal and tuber crop staples. The grain contains about 23-32 protein, are rich in minerals (calcium, iron and phosphorus) and several vitamins (mainly thiamine, riboflavin, niacin) and is among plants that have one of the highest contents of folic acid and Vitamin B necessary during pregnancy to prevent birth defects in the brain and spine.

Immature green pods are used in the same way as snap beans often being mixed with other foods. Green cowpea seeds (fresh) are boiled as a fresh vegetable or may be canned or frozen. In many parts of Africa and Asia, in addition to the seeds, the fresh or dried leaves are also consumed as a side dish or as part of stew and provide significant nutritional value. In addition to human consumption, cowpea leaves and stems (stover) are also an important source of high quality hay for livestock feed.

Cowpea fodder plays a particularly critical role in feeding animals during dry seasons in many parts of the world. The plant tolerates drought, performs well in a wide variety of soils, and improves soil fertility through nitrogen fixation and also through decaying residues. It replenishes low fertility soils when the roots are left to decay and also grows and covers the ground quickly preventing soil erosion.

Varieties:

Several improved cowpea varieties released from NaSARRI include, SECOW 1T (this is brown seeded). SECOW 2W (white seeded), SECOW 3B (black seeded) SECOW 4W (white seeded) and SECOW 5T (brown seeded).

Soil requirements and seedbed preparation:

Cowpea requires well-drained, sandy loam to clay loam soils. Heavy clays tend to encourage vegetative growth at the expense of grain production. It adapts to a wide range of pH, but prefers

slightly acid to slightly alkaline soils (pH range 6-7). It has little tolerance of salinity preference is for lighter soils that allow good rooting.

For proper germination, a fine seedbed prepared by two ploughings followed by harrowing is needed; this promotes proper root growth that enables plants to get moisture from the soil. Where the soils are more fragile and prone to erosion, minimum or zero tillage is recommended.

Planting and spacing:

Planting should be done when there is sufficient moisture in the soil to allow germination. Cowpea can be grown in flatbeds or on ridges, depending on the field conditions. Planting is normally done using dibble method (where planting holes are made in the soil with a pointed tool such as a hand hoe) Three seeds per hole should be sown at a depth of 3 to 5 cm. A seed rate 20-24 kg/ha is recommended.

Field management.

Thinning

Thin to 2 plants per hole leaving healthier plants. Thinning should be done during or after first weeding at least three weeks after planting.

Weed control

Cowpea is not a strong competitor with weeds, especially at the early stage of growth; therefore fields should be kept free of weeds throughout the growing season. Weeding can be done either by using tractors, oxen or hand hoes.

1st weeding: 3 weeks after planting

2nd weeding: 3 weeks after 1st weeding

3rd weeding: This can be done only if necessary

Fertilizer application

Cowpea will not require nitrogen fertilizers since it can fix its own nitrogen. However, for optimum nitrogen fixation, seed should be inoculated with appropriate Rhizobium species. For good cowpea production, phosphorus and potash fertilization are required, notably in the poor soils. A combination of phosphorus (30-40kg/ha p₂O₅) and potassium (25-30kg/ha K₂O) is sufficient to ensure good growth of the cowpea crop. The fertilizers should be incorporated in the soil before planting.

Diseases

Cowpea is attacked by several fungal , bacterial and viral diseases. The diseases affect different parts of the crop at different stages of growth. The major diseases of cowpea in Uganda are; powdery mildew, cowpea scab, brown rusts, bacterial blight, cercospora leaf spot viral disease (caused by several viruses such as cowpea aphid borne mosaic virus.

Fungal diseases can be controlled through treatment of seeds with fungicides such as macozeb (80g/kg of seeds) followed by 2-3 foliar sprays of macozeb at 2.5/liter or teaspoon in 2 liters applied at 10-14 days intervals. Viral diseases can be controlled through use of resistant varieties such as SECOW 3B, SEOW 4W, SECOW 5T. A combined use of insecticides to control virus vectors and use of less susceptible varieties gives higher cowpea yields.

Harvesting.

Harvesting of Cowpea should be done when the pods are fully mature and dry(when pods have changed to straw color). Harvesting of Cowpea I is preferably done by hand picking of pods and for determinate varieties, a single picking may be sufficient while for indeterminate varieties , dry pods can be picked 2-3 times. Pods should be harvested when conditions are cool preferably in the morning and evening hours to minimize losses due to shattering.

Drying and Threshing:

The harvested pods should be spread on a tarpaulin or clean floor/platform and sun dried for about 3-4 days before threshing. Threshing is commonly done manually by heaping pods and beating them gently with sticks and great care should be taken to avoid damaging the grains.

Different varieties should be threshed on different days to avoid mixing up of varieties. After threshing, immature grains, chaff and other debris should be removed through winnowing. Winnowing is done against the air drift so that the inert materials, such as chaff and broken seeds are blown away by the wind and the grains are collected in a clean container/bag.

Storage:

Dry the seed/grains thoroughly to a moisture content of less than 13% before storage. Store grains in sacks / bags and place them in a dry, clean, well ventilated and rodent –proof store on raised benches/platforms.

Storage pest control:

Stored cowpea grain/seed is highly susceptible to attack by bruchids, collasobruchusspp. Severe infestation can lead to total grain loss in storage if no control measures are taken. The cowpea weevil is a field to store pest ie adult beetles lay eggs on pods (in the field) or directly on seeds if pods are open or during storage. After hatching, the larvae burrow through the seed coats and

developed within seeds and eat up the cotyledon, thereby causing extensive damage. Later adults emerge from holes made by the larvae. The holes make it easy to recognize infested seeds.

The Bruchids can be controlled through:

- 1) Regular drying of cowpea grain /seed in hot sun for about 4 hours for 3-4 days per month, this kills the larvae and adults.
- 2) Store dry grain using airtight containers such as metal drums, triple layer bags, plastic jars, and bottles. The airtight containers cut off oxygen supply for adult bruchids after which they suffocate and die. Examples of triple layer bags commonly used on the market are the Purdue improved crop storage (PICS) bags.
- 3) Cowpea grain can also be protected from bruchids by mixing grains with equal quantities of sieved sand and wood ash. This helps to expel the air between seeds and also emerging bruchids are physically unable to push their way out of the seed and therefore will die without mating.
- 4) Cowpea grain can also be protected by mixing with tephrosia leaf powder at a rate of 0.1% (w/w).
- 5) Mix grains with insecticides e.g 1kg Malathion dust/1000 kgs of threshed cowpea grains or pirimiphos methyl (marketed as actellic dust) applied at 500g dust per 1000 kgs of threshed grain.
- 6) Cowpea seed can be also fumigated using aluminum phosphide tablets at the rate of 2 tablets per 100 kgs of seed to kill larvae and adult weevils. Wrap the tablets in a piece of cloth or tissue paper before placing it inside the container. Do not store cowpea treated with aluminum phosphide in a living room or animal house due to its toxicity. Aluminum phosphide is marketed as phostoxin, cyclotoxin, forcetoxin, pretex, gastixin or quickphos.