SOYA BEANS

Designed by:

cropmanagerApp

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Varieties

The most recommended Soya bean varieties for Uganda are Maksoy 1N and Maksoy 4M; these two Soybean varieties yield between 2000 - 2500Kg/ha.

The choice of variety depends on:

- It must fit in a growing season of 4 to 4 ½ months.
- It should give the highest yield for that particular area and season.
- It must be resistant to lodging especially where combine harvesters are used.
- It should have a longer period between physiological maturity (time when no more dry matter is added to seed) and pod shattering.
- High pod clearance to reduce losses when harvesting with a combine harvester.
- Resistance to diseases, especially Red Leaf Blotch.

Soil requirements

Soybean is a legume plant that grows well in tropics. Its highly adaptable and will grow in most soils, although they can have trouble in heavy clay. The best soil is loose, rich loam that is moist but well drained. The crop is also sensitive to soil acidity. Soybean requires reliable rainfall, particularly from flowering to pod maturity. It is a good crop to grow in rotation with maize, cotton and wheat.

Nitrogen and phosphorus are the critical nutrients in soils for soybean. These determine good root and stem development and pod formation however since it's a legume it has the ability to fix its nitrogen from the air to the soil.

Climatic conditions

The temperature ranging from 26.5 to 30 degrees Celsius is favorable for soybean growth. For proper germination minimum temperature is 15.5 degrees Celsius soil temperature, minimum temperature for effective growth is 10degrees Celsius, below which flowering might be delayed.

Fertilization

Since soybean is sensitive to soil acidity, check the soil pH (acidity or basicity) during the wet season. If necessary, apply lime at the recommended rate to bring the soil to a pH of 5.5 (CaCl2 scale).
Soybean grows well on residual fertilizer. However, a general recommendation is to apply a pre-plant application of 200 to 300 kg per ha of either a basal fertilizer (e.g. 7, 14, 7), Gypsum or Single Super Phosphate before planting, particularly where fertility is low. Soybean responds well to manure application. Soybeans do not need much nitrogen in the basal fertilizer, and they do not require nitrogen fertilizer top dressing, since they are able to obtain their nitrogen requirements from the soil air.

Planting

Soybean can be planted using a hand hoe or the mechanical planter.

However, the spacing varies, with hand hoes taking on a spacing of (50x25cm) with 3 seeds per hole.

For machine planted the spacing is (60x5cm) with 1 seed per hole.

A cheap way of providing nitrogen to soybean crop is by inoculating the seed with Bradyrhizobium japonicum.

Weed control

Weeding is recommended to be done 3weeks after planting followed by a second weeding 3weeks later.

Diseases

Bacterial diseases

Bacterial blight

Symptoms

- Small, angular, translucent, water soaked spots that start as yellow to light brown.
- As the spots age, their centers darken to a reddish brown.
- For severe cases, loss of leaves.

Management

- Use cultivars that are resistant to bacterial blight.
- Plant high quality, disease free seeds.

Bacterial Pustule

Symptoms

- Small, pale green spots with raised centers on leaves.
- As the disease progresses, small brown-colored pustules form in the middle of the spots and the spots turn yellow.

Management

- Use of cultivars that are resistant to bacterial pustule.
- Cultural practices include planting high quality, disease-free seed and using tillage practices that hasten rapid decomposition of crop residue.
- Cultivation when foliage is wet should be avoided to reduce disease spread.

Fungal diseases

Anthracnose

Symptoms

- When infected seeds are used damping off may occur.
- For mature plants, brown, irregularly shaped spots may occur on stems and pods.
- Premature defoliation may be visible.
- For infected pods, seeds may not be formed, or could be smaller or lesser in number.
- Formed seeds appear brown, moldy or shrieveled.

Management

- Crop rotation.
- Fungicide application.

Brown Spot

Symptoms

- Premature defoliation.
- Irregular small brown leaf spots on the upper and lower surface.
- Lesions slowly darken to blackish brown and often develop a yellow halo around the leaf spot.
- As plant matures infected leaves appear rusty

Management

- Fungicides in severe cases may be helpful, should be timed between beginning pod fill and initial seed formation.
- Plant high quality seeds.
- Rotate with non host crops like rice, sorghum, maize.

Leaf stain/Purple seed stain.

Symptoms

- Purple discoloration on the upper leaf surface sometimes mistaken for sunburn.
- Rapid necrosis
  of leaf tissue resulting in defoliation, starting in t he upper canopy.
- Lesions on petioles or stems are reddish purple a nd several millimeters in length.
- Purple seed stain is characterized by irregular light to dark purple blotches on the seed that ma y cover much or even all of the seed coat.

Management

- Planting high quality, disease free seeds, using tillage practices that hasten decomposition of crop residue.
- Growing the least susceptible cultivars that are adapted for the area.
- Crop rotation with non host crops like corn, cotton, rice, sorghum and timely harvest.
- Fungicides applied when weather conditions fav or disease may suppress disease severity.

Downy Mildew

Symptoms

- Downy mildew appears on the upper leaf surface of young leaves as pale green o r light yellow lesions.
- Older lesions may turn grayish brown to dark brown with yellow green margins.
- Severely infected leaves turn from yellow to brown and pre maturely drop.
- Infected plants remain stunted.
- With systemic infection, light green areas appear at the base of young leaves and spread along the vascular syste m infecting the entire plant.

Management

- Use of resistant cultivars.
- Fungicide seed treatment.
- Crop rotation with something other than soybea ns for a year and crop residue destruction.

Frogeye Leaf Spot

Symptoms

- Leaf spots are circular to angular in shape.
- Leaf symptoms begin as dark brown, watersoak ed spots and mature into lesions with tan or brown centers and a narrow reddish - brown to purple margin.
- Older lesions are translucent and have whitish centers containing black dots.
- Infected seeds may be gray to brown in color.

Management

- Cultural management practices consist of planting high quality.
- Diseasefree seed and implementing tillage practices that improve crop residue decomposition.

Soy bean Rust

Symptoms

- Lesions appear as small (25 mm), tan or reddish brown, angular spots on leaves.
- Leaves begin to turn yellow and defoliate.
- Further defoliation leads to fewer seeds.

Management

Apply Fungicides to avoid serve loss.

Charcoal Rot

Symptoms

- Leaves become chlorotic, then turn brown, but remain attach ed to the petiole giving the entire plant a dull gree nish yellow appearance.
- At early reproductive stages, a light gray to silver discoloration of the sub epidermal tissue develops on taproot and lower part of the ste m.
- Near maturity, the lower stem epidermal tissue is often shredded in appearance and ex hibits an ashy gray discoloration.

Management

- Fields with a history of severe charcoal rot should be rotated for 1 to 2 years with nonhost crops (cereals).
- Avoiding excessive seed- rates and maintaining adequate soil fertility t o maintain healthy, vigorous plants reduces l osses by this disease.

Other fungal diseases include: Stem cancer, Aerial Blight, pod & Stem blight, Target spot, Sudden death syndrome, Phytophthora root rot, Southern Blight.

Viral Diseases

Mosaic Disease

Symptoms

- Green yellow mosaic pattern is common.
- Yellow mosaic pattern is observed in advanced stages.
- Seed discoloration, brown or black.

Management

- Insecticides are not recommended as disease may further be spread.
- Used virus tested seeds.
- Plant virus resistant cultivars.

Vein Necrosis Virus

Symptoms

- Yellowing of veins.
- Severely affected leaves die off.
- Mild infections cause threadshaped vein clearing w hereas severe infections result in purple or dark brown lesions expanding to the majority of the leaf blade

Management

Cultural techniques as discussed elsewhere are highly recommended.

Other viral diseases include: Tobbaco Ring spot virus, Bean pod mottle virus

Harvesting

Soybean should be harvested as soon as the plants have dried. If harvesting is delayed, the pods may shatter with a consequential loss of yield.

- Hand harvesting. This method is suitable for small areas, or where a large labor force is readily available. The advantages of hand harvesting are that losses can be reduced to a minimum, soybeans of a high quality are produced, and the beans normally have a high viability. Therefore, hand harvesting is suitable for seed production. The usual system of hand harvesting is to allow laborers to cut or pull as much plant material as they are able to thresh in a day. For hand cutting, laborers require sickles or sharp hoes. A laborer should be able to cut and thresh at least 50 to 90 kg of clean beans per day.

- Mowing or cutting by hand and shelling. A variation is to use a mower to cut the plant material, and a mechanical winnower for the final cleaning. This method should enable an output of ± 150 kg (3 bags)/labor/day. This method enables harvesting to commence before the pods split, but allows sufficient moisture to be lost, thereby preventing mould developing in the established cocks or stacks.

- Swather plus combine. This method involves the use of a swather to cut and wind-row the crop before it is combined. A pick-up attachment (picker) is required to be fitted to the combine table.

- Combine harvesting. Large areas are usually reaped by combine harvester and losses are inevitable. The degree of loss depends on the efficiency of the machine and operator, the evenness of the land, the height of the pods off the ground, lodging, the moisture content of the beans, and weed control. Machines must cut very close to the ground, and losses must be minimized by cutting at the correct moisture content and paying attention to machine adjustments. The golden rule for combining is to “take it low and take it slow”. Soybean seed is delicate and can be easily damaged by the threshing mechanism which must be carefully adjusted and run slowly.