SORGHUM

Designed by:

Crop Manager Team

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Varieties

There mainly four types of sorghum grown worldwide: Grain sorghum, Forage sorghum, Biomass Sorghum and Sweet Sorghum. In Uganda there are close to 4 varieties introduced by NARO released for its various traits like drought resistance, pest and disease resistance some of these are: NAROSORG 1, NAROSORG 2, NARO SORG 3 and NAROSORG 4.

Soil requirements

Sorghum is mainly grown on low potential, shallow soils with high clay content, which usually are not suitable for the production of maize. Sorghum usually grows poorly on sandy soils, except where a heavy textured sub-soil is present. Sorghum is more tolerant of alkaline salts than other grain crops and can therefore be successfully cultivated on soils with a pH (KCl) between 5.5 and 8.5. Sorghum can better tolerate short periods of water logging compared with maize. Soils with a clay percentage of between 10 % and 30 % are optimal for sorghum production.

Climatic requirements

Sorghum is a warm-weather crop, which requires high temperatures for good germination and
growth. The minimum temperature for germination varies from 7 to 10 ºC. At a temperature of 15 ºC, 80 % of seed germinate within 10 to 12 days.

The best time to plant is when there is sufficient water in the soil and the soil temperature is 15 ºC or higher at a depth of 10 cm.
Temperature plays an important role in growth and development after germination. A temperature of 27 to 30 ºC is required for optimum growth and development. The temperature can, however be as low as 21 ºC, without a dramatic effect on growth and yield.
Exceptionally high temperatures cause a decrease in yield. Flower initiation and the development of flower primordial are delayed with increased day and night temperatures.

Plants with four to six mature leaves that are exposed to a cold treatment (temperatures less than 18 ºC) will form lateral shoots. However, in plants with or beyond the eight-leaf stage, apical dominance will prevent the formation of lateral shoots. Temperatures below freezing are detrimental to sorghum and may kill the plant. At an age of one to three weeks, plants may recover if exposed to a temperature of 5 ºC below the freezing point, but at 7 ºC below freezing, plants are killed. Plants older than three weeks are less tolerant to low temperatures and may be killed at 0 ºC.

Fertilization

Sorghum does not do well on sandy soils. Generally, little fertilizer is required or applied to small grain crops. However, they will respond to manure applications, and where the rainfall is favorable, sorghum, in particular, will respond well to a low application of basal fertilizer (100 to 300 kg of 7.14.7 per ha) followed with a top dressing of 100 to 200 kg per ha of 28 - 34% N fertilizer. Sorghum also favors a soil pH of 5.5 to 6.8 on a Calcium Chloride Scale.

Symptoms of deficiencies that may be observed in the field are as follows:

Nitrogen (N) deficiency – young plants are light green or yellow-green, at a more mature stage the older leaves start yellowing first with a characteristic inverted V-shape.

Phosphorus (P) deficiency – under wet, cool conditions leaves of young plants may turn dark green
with reddish-purple margins and tips.

Potassium (K) deficiency – a deficiency of K is initially noted as yellow or necrotic leaf margins beginning at the lower leaves and spreading to the upper leaves.

Planting

Sorghum can be sown in 50 to 100 cm rows. A seeding rate of 5 to 15 kg is recommended depending on variety and use.

Basal fertilizer is broadcast and incorporated by discing before planting can commence. The common practice of planting is broadcasting seed on a well ploughed land (with fine tilth) and covering lightly using a light harrow, roller, bush drag by cattle over the lands and covered to a depth of 2-3 cm.

Mechanical planting using seed drill can also be done but this will require high seed rates and will require more labor for thinning.

Weed control

Weed control during the first six to eight weeks after planting is crucial, as weeds compete vigorously with the crop for nutrients and water during this period.

The root parasite *Striga asiatia* (L.) Kuntze or witchweed (rooiblom) can damage the crop and mainly occurs under low input farming conditions. The parasitic plants are single stemmed with bright red flowers.
Most of the damage is done before the parasite emerges from the soil. The symptoms include leaf wilting, leaf rolling, and leaf scorching even though the soil may have sufficient water. The tiny seeds are disseminated by wind, water, and animals, and remain viable in the soil for 15-20 years.

Rotation with cotton, groundnut, cowpea and pigeon pea will reduce the incidence of S*triga*. Hand
pulling the plants before flowering may help.

Methods of weed control

Physical methods

Weeds can be removed mechanically, using hand labor or implements.

Cultural practices

Ploughing during winter or early spring is an effective method of controlling weeds.

Chemical methods

Chemicals formulated as liquids, granules or gasses can be applied to kill germinating or growing weeds, or seeds.

Control of nut-grass with pre-emergence herbicides is not effective when applied after emergence. It is important to cultivate fields before applying herbicides.

Wild sorghum in sorghum fields can only be controlled mechanically or by hand hoeing.

Disease Management

Sorghum diseases can best be managed by using cultural practices like:

- Using seeds treated with fungicide to prevent seed rots and seedling blights.
- Using tolerant/resistant grain sorghum products.
- Rotating to a different crop.
- Removing infested crop residue.
- Managing growing conditions throughout the growing season.

Downy Mildew

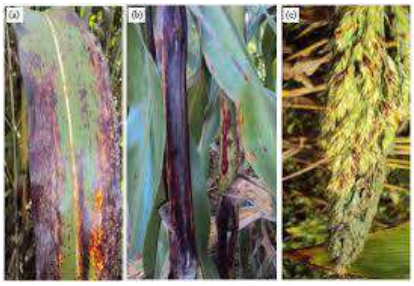
Symptoms

- Infected plants have thick, stiff, twisted, pale green leaves with bumpy surfaces.
- The leaves often turn downward and the plants produce many shoots or suckers, giving the plant a bunchy appearance.
- Infected plants produce a proliferation of leafy tissue instead of producing heads.

Management

- Fields should be adequately drained.
- Tolerant sorghum products should be used; although there are differences in susceptibility among grain sorghum products, these differences are not substantial.
- Rotation is not useful as the fungus infects many wild and cultivated grasses.

Anthracnose



Symptoms

- Infected stems cut lengthwise may show brick-red sections surrounding areas of the infected pith tissues, which may appear healthy and white in color

Management

- Sorghum products that are rated as “susceptible” should be avoided in fields with a history of anthracnose.
- Rotating to a crop that is unrelated to grain sorghum is highly recommended. Cotton should be planted for at least two years before planting grain sorghum; however, this practice will not eliminate the problem but can reduce disease severity.
- Good residue management should be adopted.

Maize Dwarf Mosaic

Symptoms

- Causes a distinctive leaf mottling (light-green blotchiness), plant stunting, and reduction in yield potential.
- Reddish discoloration and tissue death on leaves, sheaths, and peduncles.

Management

- Plant resistant hybrid varieties.
- Control johnson grass as soon as it emerges. Encourage your neighbors to control the weed too; johnson grass in the surrounding environment increases the risk of disease in your garden.
- Check plants carefully after an aphid infestation. Spray aphids with insecticidal soap spray as soon as they appear and repeat as needed. Large crops or severe infestations may require use of a systemic insecticide.

Head smut

Symptoms

- Large mass of dark-brown smut spores appear in place of the panicle.

Management

- Planting head smut susceptible products in the same field for several years can rapidly increase the percentage of infected plants.
- Planting products with compact heads should be avoided in those situations and fungicide seed treatments should be used.
- Promptly removing and burning head smut has been recommended in some cases as a method to prevent the spread of smut spores.

Harvesting

Harvesting is normally done when plants reach physiological maturity. Leaves will be turning yellowish and beginning to dry up naturally.