

Sorghum (*Sorghum bicolor*) belongs to the Poaceae family. In Kenya, it is grown in Western, Eastern, Northern Rift valley and some parts of Central province and it is cultivated majorly for its seeds, although it can also be done for fodder.

Seeds/grains can be boiled like rice, cracked like oats for porridge, malted like barley for beer, baked like wheat, popped like popcorn for snacks, among others

Sorghum has the ability to regrow after harvesting and this reduces the cost of land preparation and replanting.

VARIETIES GROWN IN KENYA

The varieties are characterized majorly by seed colour and taste.

They include the following;

Variety	Grain Colour	Maturity (Months)
Gadam	Grey	3.5
Seredo	Brown	3.5
Serena	Brown	3
Mtama 1	White	3-3.5
Mtama 2	White	3.5
E 1291	Brown	7
E 6518	Brown	8
IS76	White	3
BJ28	Brown	7

ECOLOGICAL REQUIREMENTS

Sorghum is relatively drought resistant and therefore does well even in drier areas. The crop rolls up its leaves thus decreasing the transpiration rate, which is a survival tactic.

- *Soil*– although sorghum can produce reasonably on infertile soils, for best results, the crop requires a fairly fertile soil which is well drained.
- *Rainfall*- an annual rainfall of 400-650mm is adequate for optimal production of sorghum. The crop can however withstand drier conditions and still remain green at relatively low moisture levels. It is resistant to waterlogging.
- *Altitude*– the crop grows well in areas below 1500m ASL. Poor yields are achieved in areas of higher altitudes and the crop is also prone to attack by pests, e.g. shoot flies
- *Temperature*– warm temperatures of between 15-35 degrees centigrade are fit for the growth and development of this crop. Colder conditions may extend the maturity period of the crop.

PLANTING

Propagation is by seeds.

Land should be prepared earlier and planting done at the onset of the rains. Late planting can lead to reduced yields.

Seeds are broadcasted or sown directly into furrows on the well prepared seedbed. A row spacing of 45-60cm and plant-to-plant spacing of 12-20cm is suitable, especially if the conditions are favourable. In drier conditions, a wider spacing is adopted.

The crop can be planted as a pure stand or intercropped with other crops like maize, beans, and cowpeas, among others.

Germination occurs within 5-7 days after sowing.

PESTS & DISEASES MANAGEMENT

Pests

- *Cutworms*– these are black or brown in colour and cut off young plants at or slightly below the soil level. Attacked plants die.

Dress seeds with SHIELD 600FS 3ml/kg

DRENCH soil with PROFILE 440EC 60ml/20l or PENTAGON 50EC 20ml/20l

- *Chafer grubs*– they are whitish caterpillars found in the soil which feed on the roots and may kill young seedlings.

Dress seeds with SHIELD 600FS 3ml/kg

Drench soil with RANGER 480SL 60ml/20l or PROFILE 440EC 60ml/20l or LOYALTY 700WDG 10g/20l

- *Sorghum shoot fly*– the larva enters the funnel of the crop and moves down to feed on the young shoot killing the growing point and the youngest leaf which turns brownish and withers this damage is commonly referred to as ‘dead heart’. Tillers can also be attacked.

Spray KINGCODE ELITE 50EC 10ml/20l or PENTAGON 50E 10ml/20l or LEXUS 247SC 8ml/20l

- *Stem borer*– the larvae feed on the funnels before tunneling down to feed on the developing tissues. The young plants are more susceptible to attack by stem borers. Others bore holes straight into the centre of the stem. Feeding causes stunted growth and production of sterile or poorly developed ear heads. In severe cases, the plant dies.

Spray KINGCODE ELITE 50EC 10ml/20l or PROFILE 440EC 30ml/20l or LEXUS 247SC 8ml/20l

- *Termites*– these cause serious damages during the dry periods, whereby they attack the plant by hollowing out its root system and filling it with soil. Attacked plants can be pulled up by hand easily because the roots are damaged.

Drench EMERALD 200SL 20ml/20l or LOYALTY 700WDG 10g/20l at the base while ensuring that the soil is wet.

- *Armyworm*– this is a seriously destructive pest which causes serious damages to mostly the young plants by eating away the leaves.

Spray SINOPHATE 750SP 40g/20l or KINGCODE ELITE 50EC 10ml/20l or LOYALTY 700WDG 10g/20l

- *African bollworm*– the caterpillar appears on the ear heads especially when grains are in milk ripe stage and feeds on the seeds, damaging them. It also feeds on the whorls and can cause very serious damages if not controlled in time.

Spray LEXUS 247SC 8ml/20l or KINGCODE ELITE 50EC 10ml/20l or BACIGUARD 16WD 15g/20l

- *Sorghum aphids*– they suck sap on the ear heads or on the undersides of the leaves and produce honeydew which encourages formation of sooty mold. Infested plants become stunted, leaves dry up and yield is considerably reduced.

Spray KINGCODE ELITE 50EC 10ml/20l or LEXUS 247SC 8ml/20l or PENTAGON 50EC 10ml/20l

Spray JAMBO CLEAN 100ml/20l to clean the sooty mold

- *Sorghum midge*– the larvae feed on the developing seeds causing them to shrink and flatten. Damaged panicles have small, transparent midge pupae attached to the tips of the damaged spikelets.

Spray LOYALTY 700WDG 5g/20l or EMERALD 200SL 10ml/20l

- *Head bugs*– the adults and nymphs feed on the developing kernels as panicles emerge by sucking sap from them. Kernels shrivel, become small and discoloured, especially if attacked in early development stages.

Spray EMERALD 200SL 10ml/20l or LOYALTY 700WDG 5g/20l or PRESENTO 200SP 5g/20l

- *Birds*- the major destructive species is the Quelea Quelea birds. Others include weaver birds, bishop's birds, etc. these birds feed on the seeds causing heavy yield losses.

Solution; scare them away and attack their nests

Diseases

- *Damping off*– infection causes rotting of seeds before they emerge as well as seedlings after emergence from the soil.

Drench soil with PYRAMID 700WP 100g/20l

Spray crop with CHANCETYL ELITE 800WDG 50g/20l

- *Leaf blight*– small reddish purple or yellow-brown spots develop on the leaves of the infected plants. In severe cases, these spots coalesce, covering the entire leaf. This makes the leaf appear to be burnt.

Spray GEARLOCK TURBO 250WP 25g/20l or FORTRESS GOLD 720WP 40g/20l or TOWER 720WP 50g/20l

- *Loose kernel smut*– infection leads to formation of thin pointed galls, which burst out releasing dark brown spores. These spores are wind blown away leaving long dark pointed, curved structures in the central part of the gall. Infected plant get stunted and numerous side branches may develop. Spores are usually carried on the seed.

Solution; Treat/drench soil with PYRAMID 700WP 100g/20l

Spray crop with OPTIMIZER 10ml/20l to boost immunity.

- *Covered kernel smut*-all kernels are destroyed and replaced with cone shaped galls. These galls break releasing spores which contaminate the other kernels.

Solution; Treat/drench soil with PYRAMID 700WP 100g/20l

Spray crop with OPTIMIZER 10ml/20l to boost immunity.

- *Head smut*- large dark brown smut galls emerge in the place of the panicle. Initially, the galls are covered by a whitish layer but later breaks open releasing spores, which become soil borne and initiate systemic infection of seedlings in the subsequent seasons.

Solution; Treat/drench soil with PYRAMID 700WP 100g/20l

Spray crop with OPTIMIZER 10ml/20l to boost immunity.

- *Top downy mildew*– the infected plants develop thick, stiff, twisted, pale green leaves with bumpy surfaces. The plants do not produce heads in severe cases of infection.

Spray GEARLOCK TURBO 250WP 25g/20l or FORTRESS GOLD 720WP 40g/20l or

- *Rust*– this appears on the leaves as small raised pustules which rupture releasing reddish brown spores. These occur on both sides of the leaf.

Spray DUCASSE 250EW 20ml/20l or MILESTONE 250SC 10ml/20l or RANSOM 600WP 15g/20l

NUTRITION & NUTRITIONAL DEFICIENCY

In order to achieve maximum production, the crop should be supplied with enough nutrients. The amount of fertilizer to be applied to the crop however depends on the fertility of the soil.

Application of both basal and foliar fertilizers is recommended.

Basal fertilizers (DAP, CAN, NPK, etc.) should be mixed with HUMIPower at all times of application at the ratio 50:1.

Foliar fertilizers like OPTIMIZER, LAVENDER, among others are sprayed to the crops in order to supply both macro and micro elements required by the plants for their growth and development. Timely application of fertilizer should be observed.

Deficiencies

- *Potassium deficiency*– leaves develop marginal chlorosis then necrosis starting with the older ones to the young ones. Stunted growth occurs in severe cases of deficiency.

Correction; spray DIMIPHITE 30ml/20l or GREENPHITE 60ml/20l or LEGENDARY 20ml/20l

- *Nitrogen deficiency*– the growth rate is highly reduced and leaves turn yellow, starting with the older ones. Plants become stunted as deficiency continues.

Correction; spray LAVENDER 20ml/20l or GATIT SUPER GROWTH 50g/20l

- *Phosphorous deficiency*– plants turn dark green and leaves show reddish purple discolouration starting with the older to the young leaves. Stunted growth occurs.

Correction; spray DIMIPHITE 30ml/20l or GREENPHITE 80ml/20l or LAVENDER 20ml/20l

- *Zinc deficiency*– leaves develop broad bands of yellow coloration which later turn pale brown or grey. Symptoms start with young leaves and progress towards the older ones.

Correction; Spray ZINC GOLD 10ml/20l

WEEDING

Sorghum field should be kept weed free especially during the early growth stages. This is in order to minimize competition for nutrients, moisture and space, by the weeds.

The following herbicides are used to control weeds in sorghum field;

- CLAMPDOWN 480SL 200ml/20l- this is used before planting to kill all kinds of weeds.
- AGROMINE 860SL 150ml/20l – it is a selective herbicide which kills broadleaved weeds and is applied when crop is about 30cm high.
- HURRICANE 200SL 200ml/20l- this kills all types of weeds and is applied at later growth stages, usually sprayed between the sorghum rows.

NOTE; whenever doing any foliar spray, the product (insecticide, fungicide, foliar feed or herbicide) should be mixed with INTEGRA 3ml/20l. This is a sticker, spreader and penetrant, which improves the effectiveness of the product.

MATURITY, HARVESTING & STORAGE

Sorghum is ready for harvesting 3-4months after sowing, depending on the variety and ecological factors. This is when the grains are hard and do not produce milk when crushed.

The heads are cut off with a knife or sickle and sun dried. Alternatively, the entire plant can be cut and the heads removed later.

For large scale farming, combine harvesters are used.

If the crop is meant for seed production, harvesting should be done at maturity stage while that meant for fodder should be cut when still green and fresh.

Seeds are obtained through threshing the dry heads, winnowing and may be seed-dressed for a longer shelf life. They are stored in treated gunny or PICS on pallets, not directly on the floor.