

MAIZE (*Zea mays* L.)
Family Poaceae (Gramineae)

By

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Origin

- Maize was domesticated in Southern Mexico around 4000BC.
- On arrival of European in America,maize had already spread from chile to Canada.
- Maize was first reported in west Africa in 1498 six years after Columbus discovered the west indies.
- Maize is grown in all countries in Africa from the coast through savannah regions to the semi- arid regions of west Africa

Cultivated varieties

- DMR-LSR-W
- DMR-ESR-W
- SUWAN 1-SR
- DMR-LSR-Y
- DMR ESR-Y

- OPEN POLLINATED VARIETIES
- TZL Comp4-DMR, TZL Comp3 x 4co
- AK 93DMR-LSR , AL 9322-DMR-SR

cultivated var contd.

- GREEN VARIETIES
- ART-98-STWI/OLOYIN :High carotene content, 14% crude Protein and medium maturity, 88-89 days.
- ART 98 SWIOB.
- ART 98 SW 20B etc.

Morphological description.

- Robust annual grass several meters tall.
- Roots system comprises of adventitious roots developing from lower nodes.
- Single root penetrates up to a dept of 2m.
- Stem (culm) is usually single and simple solid'
- Leaves alternate, simple leaf-sheath overlapping auricled at the top.

Morphology contd.

- Male and female inflorescences separate on the same plant'
- Male inflorescence(tassel) a terminal panicle up to 40 cm long.
- Female inflorescence a modified spike usually 1-3 per plant in leaf axis and about half way up to the stem.
- Fruit a caryopsis(grain) has a wedge shape with various colors viz white, yellow, red and purple to almost black. Up to 1000 together in an inflorescence(cob) enclosed by modified leaf up to 45x8cm.

Ecology

- Maize is adapted to a wide range of environment but essentially a crop of warm regions where moisture is adequate.
- The bulk of the crop is grown in tropical and subtropical regions.
- The crop requires an average daily temperature of at least 20⁰C for adequate growth and development.

Contd

- The optimum temperature for growth and development is 25-30°C.
- Temperature above 30°C reduces yield and frost is not tolerated.
- Maize requires abundant sunlight for optimum yield.
- Maize is a short-day plant.

contd

- Rainfall
- Maize is less drought resistant than sorghum, pearl millet and finger millet.
- In tropics, it does best with 600-900mm well distributed rainfall during the growing season.
- It is especially sensitive to drought and high temperatures around the time of flowering.

Soil requirements

- Maize perform well on well drained and well aerated soils containing adequate organic matter well supplied with nutrients.
- Maize can be grown on soil with PH5-8 but 5.5-7 is optimal.
- Maize does not tolerate water logging.
- Maize is sensitive to salinity

Propagation and planting

- Maize is propagated by seed mostly by direct growing.
- The 1000 grain weight is 150-300g.
- Sowing should be done early as soon as soil condition and temperature is favorable and rainfall is well established.
- Planting by hand requires 5-10 manday per hectare.

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- Seed is dropped in hole made with planting stick or hole.
- Planting may be done on hill or in rows on flatland or ridges.
- Ridging or heaping is usually done on heavy soil to improve drainage.
- The seed rate is 25kg /ha in sole cropping and 10-15kg/ha in intercropping.

contd

- When maize is sown in rows the spacing is usually 75-90cm between rows and 25-50cm within rows with 1-3 seeds per hole.
- This results in plant density of 40,000-80,000 plants/ha.
- Wide spacing result to more weed growth and increase erosion.
- The sowing dept is commonly 3-8cm depending on soil condition and temperature.

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- Maize can be grown as a sole crop or intercropping with other crops such as cowpea, pigeonpea, groundnut, yam, cassava sweet potato, pumpkin, melon or water melon.
- In southern Nigeria, two crops of maize are planted per year.

Management

- Maize is very sensitive to weed competition during the first 4-6 wks after emergence and weed control is very important.
- Weeding is mostly done by hand.
- Chemical weeding is gaining ground in tropical Africa because hand weeding is time consuming and expensive.
- Maize production in Africa is usually rain fed. Occasionally, it is grown in bunds under irrigation scheme.

Fertilizer application.

- Maize usually respond well to fertilizer.
- A maize yielding 2t grain per hectare removes 60kgN/ha, 10kgP and 70kg/ha k from the soil.
- Maize have a high demand for nitrogen which is often the limiting nutrient.
- High nitrogen levels should be applied in 2 doses; the first at 2-3wks after emergence and second by 2wks before flowering.

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- Maize is grown in rotation with groundnut, common bean, cowpea, cotton and tobacco'
- Rotation with soya bean is gaining popularity in northern Nigeria; it increases yield by providing nitrogen.

Diseases

Important fungi diseases of maize in tropical Africa are;

- Rots affecting female inflorescence(*Fusarium* spp)
- Stalk rot complex(*F. Monilifomes*)
- Downy mildew(*perenoscleospora sorghi*)
- Smut (*Ustilago maydis*)
- Rust (*Puccinia sorghi* and *puccinia polysora*)

Virus Diseases

- Maize streak virus(msv) restricted to Africa and can lead to 100%yield loss.transmitted
- By leaf hopper (Cicadulina spp.)
- Pest s
- Cutworms (Agrotis spp)
- Stem borer (Buseola fusca, sesemia calamitis)
- Cob borers(Mussidia nigrivenella)

Common storage

- Grain weevils (*Sitophilus* spp)
- Larger grain borer(*Prostephanus truncatus*)
- Parasitic witchweed (*Striga* spp)

Yield

- Maize has the highest yield potency among the cereal crops. The current average world yield of maize is 4.4t/ha
- Grain yield of over 20 tons are possible.
- Average grain yield in tropical Africa are about 1.25t/ha varying greatly from less than one ton from small holders to 6tons in commercial farms.

Handling

- The major post harvest problem of maize is reducing the moisture content of the grain to 12-15%, protection from insect and rodent as well as proper storage.
- A high grain moisture content combine with high ambient temperature can cause considerable damage making the product unsuitable for consumption by livestock and humans.

Uses

- As staple food
- As food for livestock and poultry
- Raw material for industrial products.

