

TECHNICAL SHEET

Intensification system by cereal/legume association in the same plot (Sorghum and cowpea)

Presentation of the sorghum

A monocotyledonous plant species of the Poaceae family, sorghum is an annual herbaceous plant of about 3 meters high. It is native to Africa and is cultivated for its grains also called sorghum. African sorghum varieties are characterized by a large size, which makes them susceptible to lodging, with spaced leaves that do not favor the development of cryptogamic diseases (Diawaara, 2003). A particularity of African sorghum is their high sensitivity to photoperiod (Diawaara, 2003). Thus, the length of their cycle varies with the sowing date (Diawaara, 2003). The same sorghum variety can have a cycle of 90 to 170 days depending on the sowing date (VAKSMANN et al., 1996 cited by Diawaara, 2003).

Sorghum (which, incidentally, is one of the only important agricultural species to have its origins in the African continent) ranks 5th among the world's food grains in terms of annual production quantities, coming after maize, rice, wheat, and barley (Van Damme, 2013).

But the thing is, sorghum is in many intertropical regions and especially in Africa, a primary crop in family farming in semi-arid and sub-humid areas where it plays a role as a subsistence food crop (Van Damme, 2013).

Its hardiness, moderate water requirements, and drought resistance of the local varieties used are essential qualities for farmers with modest technical and financial means (Van Damme, 2013). Its uses for human food are diverse (flours, semolinas, porridges...but also 'beer' and other (non)alcoholic drinks) (Van Damme, 2013).

Indeed, sorghum is the basis for popular fermented drinks, such as dolo or tô, in some tropical countries (Van Damme, 2013).

Alternative food uses are diversifying: use in baking, rolled products, new flour and drinks, etc. (Van Damme, 2013). Considered a gluten-free grain, sorghum also has nutritional benefits for those with intolerance to these proteins (Van Damme, 2013).

According to Chantereau and *al.* (2013), there are several types of sorghum: the bicolor species, wild sorghum, forage sorghum, etc.

Sorghum seed

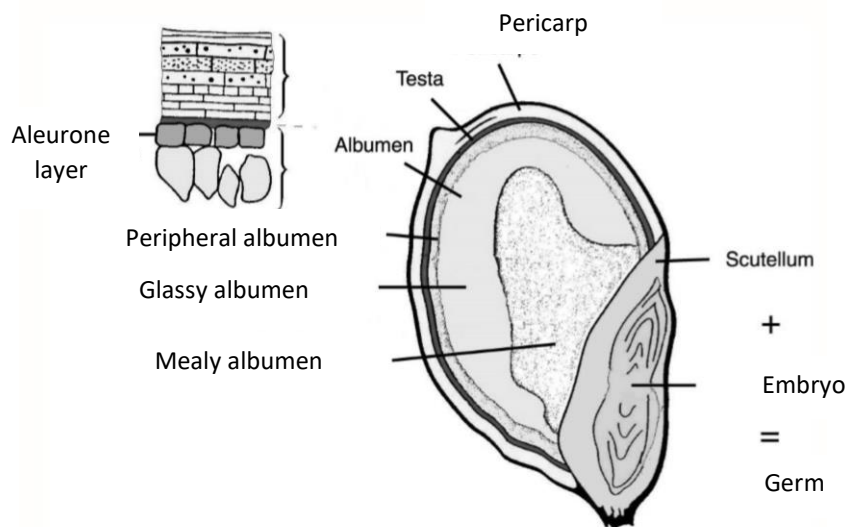


Figure 1: schematic section of a sorghum seed (source: Miche, 1980 cited by Chantereau and *al.*, 2013)

Presentation of cowpea

Cowpea has the scientific name *Vigna unguiculata* and is a member of the Fabaceae family and the genus *Vigna*. Cowpea (*Vigna unguiculata* L. Walp.) is a seed legume, an important household food staple in sub-Saharan Africa, particularly in the arid savanna regions of West Africa (Omoigui et al, 2017). (Omoigui et al, 2017). It plays an important role in human nutrition, food security and income generation for farmers and food vendors in the region. The seed is rich in protein ($\geq 25\%$), carbohydrates, vitamins as well as minerals, and complements the diet mainly consisting of cereals in countries where cowpea is a major food crop (Omoigui et al, 2017). Cowpea is a high-energy food whose consumption constitutes an important source of: i) nutrients: proteins, carbohydrates, lipids and fiber; ii) vitamins: B1, B2, B6, B9, C; iii) minerals: manganese, potassium, copper, sodium, calcium, iron, phosphorus, magnesium, zinc; iiiii) and pigments: niacin, pantothenic acid (Agossou et al, 2018). In addition to the seed, the green juvenile leaves and immature pods are consumed as a vegetable by the people; the tops (biomass) of the plants provide important nutritious fodder for ruminants, especially during the dry season (Omoigui et al, 2017). The dual use of cowpea is explained by the fact that it can produce an appreciable amount of seeds and haulms.

For good cowpea production, it requires: i) light, well-drained soils, moderately rich in organic matter, slightly acidic (pH: 6-7); ii) rainfall: 500 to 1200 mm of water per year well distributed over the vegetative cycle; iii) temperature: 28 to 30°C during the cropping season allows the species to express its performance (Agossou et al, 2018).

Cowpea seed

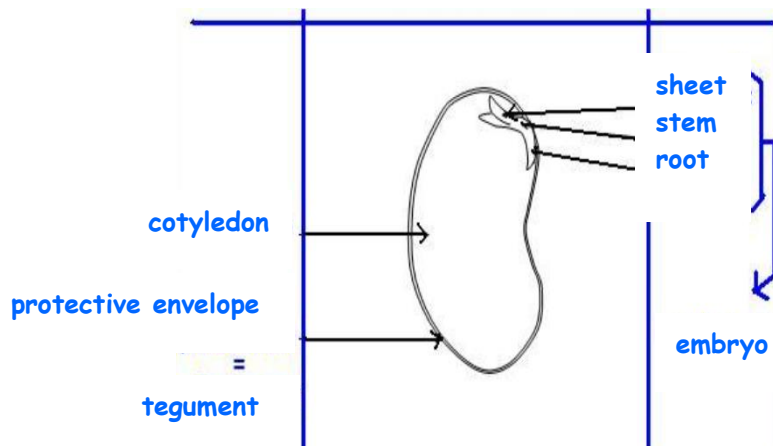


Figure 2 : structure of a cowpea grain (source : <https://www.vivelessvt.com/college/la-colonisation-dun-milieu-par-les-vegetaux/> ; SVT 6^{ème} lesson, 2021)

Characteristics of the technology

Sowing of sorghum and cowpea in the same plot with a spacing between the lines of 0.9 to 1m; Provision of grain and fodder (sorghum stem and cowpea tops).

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