



***Eleusine coracana* (L.) Gaertn.**

Gramineae

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Home

Synonyms

E. africana K.-O'Byrne; *E. indica* (L.) Gaertn. subsp. *africana* (K.-O'Byrne) S.M. Phillips

Common names

African finger millet, goose grass, osgras (Afrikaans), uphoko (Zulu), mpogo (Pedi), majolothi (Ndebele), mufhoho (Venda), vogel gierst (Dutch), tailabon (Arabic), petit mil, eleusine cultivée (French), Fingerhirse (German), wimbi (Swahili), ulezi (Swahili), dagussa (Amharic/Sodo), tokuso (Amharic), barankiya (Oromo), ragi (India), mugimbi (Kikuya), mawere, lipoko, usanje, khakwe, mulimbi, lupodo, malesi, mawe (Malawi), koddo (Nepal), ceyut (Bari), mbege (Tanzania), bulo (Uganda), kambale, lupoko, majolothi, mawale, amale, bule (Zambia), rapoko, zviyo, njera, rukweza, mazovole, poho (Zimbabwe).

Photo

Taxonomy

Chloridoideae; Chlorideae. There are about 9 species occurring in tropical and subtropical parts of the world.

Origin and geographic distribution

E. coracana is found in warm temperate regions of the world from Africa to Japan and also in Australia. It is present in archaeological records of early African agriculture in Ethiopia that date back 5000 years, and it probably originated somewhere in the area that today is Uganda (National Research Council 1996). It is an important staple crop in many parts of Africa and has been cultivated in eastern and southern Africa since the beginning of the iron age. Before maize was introduced it was the staple crop of the southern African region. It was introduced into India some 3000 years ago.

Description

A tufted annual grass that grows to a height of 210-620 mm tall. The leaf blades are shiny, strongly keeled and difficult to break and are 220-500 mm long and 6-10 mm wide. The leaves and culms are typically green in colour. It has an exceptionally strong root system and it is difficult to pull out of the ground by hand (Van Wyk & Van Oudtshoorn 1999). The culms and the leaf sheaths are prominently flattened. The ligule is a fringed membrane. Inflorescence consists of spike-like main branches that are open or contracted and are digitate or sub-digitate. The spikelets are 5-8 mm long and 3-4 mm wide. The spikelets do not disarticulate (break apart at the joints) at maturity. The grains are globose. There are two subspecies of African finger millet, the wild form (*E. coracana* subsp. *africana*) and a cultivated form derived from it (*E. coracana* subsp. *coracana*). Wild African finger millet (*E. coracana* subsp. *africana*) is similar to Indian goose grass (*E. indica*) and may be confused with it, but the latter has smaller spikelets and oblong, not rounded, grains. The grains of *Eleusine* are unusual in that the outer layer (pericarp) is not fused and can be easily removed from the seed coat (testa) below (Van Wyk & Gericke 2000).

Use

Archaeological excavations show that improved forms of finger millet were once the staple grain diet of southern Africa. In India it is still an important grain today. In east Africa, where it is cultivated as a cereal, five races are distinguished on the inflorescence morphology (Gibbs-Russell *et al.* 1989). It is the principal cereal grain of Uganda and is planted on more than 0.4 million hectares there. It has been successfully grown in the United States as far north as Davis, California, but with considerable problems of photoperiod sensitivity (National Research Council 1996).

It is a versatile grain that can be used in many different types of food. It is eaten

by grinding the grains up for porridge or, as in Indonesia, eaten as a vegetable. Sometimes it is ground into flour and used for bread or various other baked products. The sprouted seeds are a nutritious and easily digested food that is recommended for infants and the elderly (National Research Council 1996). The grain may be left to germinate to make malt, which is very popular in southern Africa due to the sweetness of the malt (Van Wyk & Gericke 2000). Its ability to convert starch to sugar is surpassed only by barley (National Research Council 1996). In Ethiopia a powerful distilled liquor called arake is made from finger millet.

In India finger millet is widely enjoyed as a popped grain.

Finger millet straw makes good fodder and contains up to 61% total digestible nutrients (National Research Council 1996).

It is used in traditional medicine as an internal remedy for leprosy or liver disease (Van Wyk & Gericke 2000).

Parts of the plant (the leaves and culms) are used to plait bracelets (Gibbs-Russell *et al.* 1989).

Chemicals can be obtained from the plant, namely hydrocyanic acid.

E. coracana is probably the most important weed in cultivated lands in southern Africa due to its exceptionally strong root system that makes it difficult to control mechanically. It is also a weed in many other parts of the world, namely North America, where it is listed as a weed. In Africa, the wild form (*E. coracana* subsp. *africana*) is considered to be a weed where the cultivated form (*E. coracana* subsp. *coracana*) is grown and is especially problematic since they are so similar in appearance.

Cytology

Chromosome base number, $x = 9$. *E. coracana* subspecies *coracana* is a tetraploid that derives from the wild diploid subspecies *africana* (National Research Council 1996).

Leaf blade anatomy

C₄ photosynthetic pathway.

Toxicity

Not toxic.

Ecology

The wild form is found in areas with rainfall as low as 300 mm per annum in South Africa, but the cultivated form more commonly requires 500-1000 mm of rainfall per year. This should be well-distributed throughout the growing season and with an absence of prolonged droughts (National Research Council 1996). The altitude limits of the species are unknown, but most of the cultivated finger millet in the world is found from 500-2400 m elevation (National Research Council 1996). It tolerates cool climates, but thrives under hot conditions and can grow where temperatures are as high as 35°C (National Research Council 1996). *E. coracana* appears to be photoperiod sensitive, the optimum photoperiod being 12 hours, which is considered to be relatively short.

Drought tolerance

It tolerates dry spells in the early stages of growth and then grows rapidly.

Tolerance to flooding

It will not tolerate flooding.

Soil requirements

It can be grown in any soil type as long as the rainfall is higher than 800 mm per annum (Van Wyk & Gericke 2000). Cultivated crops of *E. coracana* are frequently produced on reddish-brown lateritic soils with good drainage but reasonable water holding capacity (National Research Council 1996). It has greater ability to utilize rock phosphate than other cereals do (Flack *et al.* 1987).

Propagation and planting

E. coracana is much hardier and less susceptible to pests and diseases than other grain crops.

Growth and development

From germination cultivated plants take 2.5-6 months to mature. In southern Africa the wild form flowers any time from October to May.

Diseases and pests

Suffers little from diseases and insects. However, it is subject to bird predators, most notably the quelea. A fungal disease called "blast" can devastate whole fields of finger millet. The seeds can be stored for years without insect damage, which makes them perfect for famine-prone areas (National Research Council 1996).

Performance

The cultivated form is considered to be a highly productive crop (National Research Council 1996). Yields vary tremendously from 600-5000 kilograms per hectare and are not affected much by bird damage. However, yield per unit labour is considered to be more important in rural areas and also that there is at least some yield during times of drought (Van Wyk & Gericke 2000). Cereal from this species is considered to be more nutritious than any other major cereal species. It has high levels of methionine, an amino acid which is lacking in the diets of poor people who live on starchy foods such as cassava and plantain (National Research Council 1996). This may be the major reason why people of central Africa are so physically healthy despite a limited diet.

Palatability

The straw is used as low-quality roughage in India and Uganda.

Nutritive value

Finger millet has variable nutritive value; protein contents ranging from 6–14% have been reported, fat 1–1.4%, iron 5mg per 100g and food energy 323–350 Kc. These are the more frequently given levels but in some samples they are much higher. For the essential amino acids, the most noteworthy is methionine which is reported to be 3%, an exceptional figure for a cereal grain (National Research Council 1996).

Main attributes

It can be stored as grain for long periods without insecticides. The seeds are small, they dry out quickly, and insects cannot live inside them. This is important in humid Uganda where maize is difficult to store. Called a "famine" crop because it could be stored for lean years. Used as a first crop in new land in Kenya and Tanzania.

Ability to compete with weeds

Poor. It is mostly hand weeded to remove *Eleusine indica* and *E. africana* in Uganda. These are hard to distinguish from finger millet in the young stage.

Main disadvantages

It has a low yield capacity and requires much labour at all stages for seed-bed preparation, weeding, bird scaring, harvesting and threshing.

Links

[Feed information](#)

References

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