

Nutritious underutilized species



Fonio
(*Digitaria exilis*)

Botanical framework

Family: Poaceae

Subfamily: Panicoideae

Genus: *Digitaria*

Scientific name: *Digitaria exilis*

Common names

Fonio, white fonio, hungry rice, hungry millet, hungry koos, fundi millet, petit mil, findo findi, acha, fonyo, fundenyo, afio, fini, fundi, ipoga, foundé, foni, pende, kpendo, founié, pounié.

Brief introduction to the species

Fonio is a highly palatable cereal that is drought tolerant. It is often consumed in West Africa before most crops are ready to harvest because it is one of the world's fastest maturing cereals. It is believed to be one of the oldest cereals in West Africa, where it is indigenous. In some parts of Africa, like in regions of Mali, Burkina Faso, Guinea and Nigeria, it is a major part of the diet and in some places in Guinea it is even considered the staple.

Main use and benefits

How is it generally consumed?

Fonio is a fast maturing rate crop; this allows it to help humans during "hungry times" by being a very secure food. It is one of the most nutritious of all grains. It has medicinal properties as well; it is given to lactating women and diabetic people. Also, it does not contain any glutenin or gliadin proteins, which makes it suitable for people with gluten intolerance.

Fonio is a cereal and can be made into porridge and couscous. It can be ground into flour and mixed with others to bake bread. It can be popped like popcorn and brewed in beer, or just eaten as the popped product. It is one of the best tasting cereals in the world and has been greatly preferred to common rice by some who have done comparisons of dishes made with each.

What are neglected and underutilized species?

The term 'NUS' – standing for neglected and underutilized species – refers to a category of non-commodity cultivated and wild species, which are part of a large agrobiodiversity portfolio today falling into disuse for a variety of agronomic, genetic, economic, social and cultural factors. NUS are traditionally grown by farmers in their centres of diversity, where they support nutrition security and other livelihood goals of local communities while contributing to meet their socio-cultural needs and traditional uses. Until recently these species have been largely ignored by research and development, becoming less competitive than well established major crops and losing gradually their diversity and associated traditional knowledge.

Nutritional value

What is its nutritional value?

From Lake Chad to the savannah regions of Senegal and Guinea, fonio is an important food source for some 4 million people across West Africa. Fonio is one of the most nutritious of all grains. It is rich in important essential amino acids that are not found in wheat, rice, maize, or sorghum—such as methionine, leucine, valine and cystine, which help synthesize protein. In gross nutritional composition, fonio differs little from wheat.

The husked grain of white fonio has been shown to contain 8% protein, and in black fonio, 11.8% protein. The difference lies in the amino acids it contains. In the white fonio analysis, for example, the protein contained 7.3% methionine plus cysteine. The amino acid profile compared to that of whole-egg protein showed that except for the low score of 46% for lysine, the other scores were high including 127% for leucine and 189% for methionine.

Fonio also has low sugar content and low glycemic index which ensures less fluctuations in blood glucose

and insulin levels, providing beneficial protection against diabetes. It is also rich in iron, with 8.5 mg per serving, meeting at least half of the daily requirement.

Growing and harvesting

How easy is it to grow? How is it harvested?

Fonio is tolerant to soil stress and seasonal droughts. It is able to be grown on poor, shallow, sandy, or rocky soils, where other cereals cannot grow. It thrives in rainy seasons only if the soil has good drainage, but will grow in very poor, sandy, or ironstone soils. Its seeds are rarely sown in rows but scattered about on soil and lightly covered with tools or branches.

The seed germinates within a week after planting. Adult plants grow to about 50cm tall, while flowers show about 6 to 8 weeks after emergence. The grain is ready to harvest between 60 and 120 days after emergence. The plants are usually harvested with a knife or a sickle, tied into sheaves, dried and stored under cover.

Productivity

How much will it produce?

Good yields are typically 600-800 kg/ha, but have reached over 1,000 kg/ha. However, poor yields can only yield 150-200 kg/ha and are obtained with poor weeding. Farmers may recollect seeds after harvesting, but the seed loses its viability after two years.

The reason its yield may be so low is that it has such a tiny grain, and it takes a lot of them to weigh any appreciable amount. 1000 grains weigh about 44 g. It also shatters at maturity and if it is not harvested in time 10-30% of grains can be lost. The harvesting technique is also quite inefficient.

Preserving and processing

Can it be preserved, keeping its value?

The seed stores well, but more research needs to be done on post-harvest deterioration, storage, and preservation.



The grain is also difficult to process. Because it is so small, it is difficult to remove from the chaff.

Traditionally fonio sheaves are threshed by beating or trampling, and the grains are dehulled in holes (made in the soil) or in a mortar, a difficult and time-consuming process.

Threshing and husking machines are now created and are being tested. With the traditional husking methods, some sand remains with the grain which is partially removed by a long process of cleaning in water before cooking.

A women's group in southern Mali has produced precooked fonio cleaned grains in order to raise consumption. It is pre-packaged in 1kg plastic bags, ready for use with no pounding or cleaning necessary.

Other uses

What else can be done with it?

Because of its high methionine content, it is used to feed ruminant livestock like cattle, sheep, goats, and others, which can efficiently digest it. The crop can also be grown for hay and used to build houses or walls and can be burned to provide heat for cooking or ash for potash.

Culture

Are there any specific taboos, specific cultural adaptations, historical perspective?

Although it is referred to as 'hungry rice' in English, this is actually a term made by Europeans who misunderstood the original use for the crop. While it is good for those in hunger because of its growth rate, it was actually grown because the locals liked the taste, and it was reserved for royalty and special occasions. Some still use it in ancestor worship and see it as a sacred crop. West Africans say "the best way to judge a woman's stamina – essential in a good wife – is to watch her preparing fonio." Preparing it is a painstaking task, which is why its cultivation is disappearing. Fortunately, a fonio husking machine was invented in the 1990s, which makes the process much easier.

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PHOTOS:

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