

## *Eragrostis tef* (Teff): A Rising Global Crop

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Small millets can be grown even in poor soil and climatic conditions. They have short growing season and can be very well fitted into multiple cropping systems both under irrigated as well as dry farming conditions. They can provide nutritious grain and fodder in a short span of time. Their long storability under ordinary conditions has made them "famine reserves". This aspect is very important as Indian agriculture suffers from vagaries of monsoon. The most important minor millets cultivated in India are finger millet (ragi), proso millet, barnyard millet, italian millet, kodo millet, little millet and teff.

*Eragrostis tef* is a self-pollinated tetraploid annual cereal grass. Teff is a C4 plant which allows it to more efficiently fix carbon in drought and high temperatures, and is an intermediate between a tropical and temperate grass. The word 'teff' comes from the Ethiopian word 'teffa', which means 'lost' because of its minute grain size, which have a diameter smaller than 1 mm. Teff is a fine-stemmed, tufted grass with large crowns and many tillers. Its roots are shallow, but develop a massive fibrous rooting system. Teff (*Eragrostis tef* (Z.) Trotter) is a cereal crop (nutri-millet) belonging to Poaceae family, extensively cultivated in Ethiopia, where the crop is known to have originated. In Ethiopia, it is grown on 2.8 million hectares (24% of the total cultivated land) annually and contributes 17.57% of the gross grain production of all grain crops, with a national productivity of 15.75 q ha<sup>-1</sup>. Over 6.5 million farmers grow teff, which is a major staple food of Ethiopians (greater than 50 million) and contributes to the national food security.

It grows best with an annual rainfall of 750-850 mm (sufficient for minor millets to complete their life cycle) and with a temperature range of 25-35°C. The length of growing period ranges from 60 to 180 days with an optimum of 90 to 130 days. Teff is more like a grass, can be grown under a wide range of conditions, including situations not suitable for other cereals. It bears very tiny seeds which are highly nutritious, especially in protein content. The primary use of teff is for grinding into flour to make injera, the spongy fermented flat bread that is a staple food for most Ethiopians. This crop needs minimum tillage to cultivate, though productivity is less. A handful of teff is enough to sow a typical field, and it cooks quickly, using less fuel than other foods. Teff also thrives in both waterlogged soils and during droughts, making it a dependable staple wherever it's grown. Teff is an emerging annual cereal crop. Because of high nutritional quality and hardiness coupled with low water requirement, teff is preferred by the small farmers in rainfed environments. Teff is also a strategic crop with high potential to enhance commercialization of smallholder agriculture and improve food security in Ethiopia. Shorter duration of the crop makes it the most suitable crop for multiple cropping systems such as double and relay cropping. Compared to other cereals, teff has few insect pests and disease problems in the field. Therefore, it is a healthy, reliable and a low-risk crop. Grains can be stored for many years and fetches higher price as compared to other annual cereals. Teff is the most preferred cereal among better-off households due to nutritional value and cultural preference and it is nutritionally rich

with 9.4–13.3% protein (with an excellent balance in essential amino acids, glutamic and aspartic acids being the major), 73% starch present in whole kernel (stored endosperm section of the grain; 2.6–3.0 % ash and 2.0–3.1% lipid, with rich source of Fe, Ca, Zn, Mg than other cereal grains. Teff straw is preferred by the cattle over other cereal crop straw. Tef straw is also used for construction purpose, i.e. for reinforcing mud for plastering walls of houses and other household items.

#### **Taxonomical classification**

Kingdom: Plantae

Order: Poales

Family :Poaceae

Subfamily :Chloridoideae

Genus: *Eragrostis*

Species : *E. tef*



**Table 1: Nutritional and Microelement Composition of Teff Grain**

| Nutrients               | Amount |
|-------------------------|--------|
| Crude protein (g/100 g) | 11.0   |
| Crude fat (g/100 g)     | 2.5    |
| Moisture (g/100 g)      | 10.5   |
| Ash (g/100 g)           | 2.8    |
| Crude fibre (g/100 g)   | 3.0    |
| Carbohydrate (g/100 g)  | 70.2   |
| Calcium (mg/100 g)      | 165.2  |
| Copper (mg/100 g)       | 2.6    |
| Iron (mg/100 g)         | 15.7   |
| Magnesium (mg/100 g)    | 181.0  |
| Manganese (mg/100 g)    | 3.8    |
| Phosphorus (mg/100 g)   | 425.4  |
| Potassium               | 380    |
| Sodium (mg/100 g)       | 15.9   |
| Zinc (mg/100 g)         | 4.8    |

#### **Importance**

Apart from Ethiopia, India, Australia, and other European countries are the main areas where it is grown. Its gluten-free nature has made it popular among the researchers. Teff is not only gluten-free but also naturally has a higher content of macro and as well as micronutrients such as calcium, iron and zinc, which make it a very good alternative in gluten-free products.

It contains a good amount of protein including all the essential amino acids especially lysine, which is most often deficient in grains. One more characteristic of this cereal is its small size because of which teff can be made into whole-grain flour (bran and germ included), this enables very high fiber content in the cereal, and thus, it is useful to improve the hemoglobin level in the human body which can prevent malaria and incidences of anemia.

The qualitative value of teff as a gluten-free millet united with its nutritional value and health benefits has attracted global interest in its consumption compared to the other major cereal

crops. The crude protein, crude fiber, fat, and starch concentrations of teff grain are either similar or superior to those of maize, oat, sorghum, wheat and quinoa in general. Due to the many health benefits of this gluten-free product, the demand for teff grain has increased over the last decade globally.

Teff has a slightly grainy texture that adds a great crunch to any recipe. It has a unique nutty

flavour and cooks faster than other grains. This versatile nature of the grain means that it can be added to anything, from chapattis', dosas and breads to cookies and cakes. Hence the grain can be incorporated into any diet very easily. Basically, it's everything a superfood should be!

**“Millets were the first crop; Millets are the future crop”**

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