

Geographical origins of eragrostis tef

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Introduction The purpose of this report is to analyze and illustrate the geographical origins of eragrostis tef along with details of its global dispersion. The common name of the crop in Ethiopia is tef. It was chosen for its cultural significance and its importance. **Background** In Ethiopia, about 4.9 million acres of land is devoted to its production every year. From 2003-2005 production statistics indicated that tef accounted for about 29% of the land and 20% of the gross grain production of all major cereal cultivation in the country (National Research Council).

Eragrostis tef belongs to the grassfamilyPoaceae, and is species of Eragrostis. It contains about 350 species and tef is the only cultivated cereal (Seyfu). Its name tef is originated from the Amharic word yate-tef-ah, which means, "lost". Since the grains are so small they are easily misplaced (Kloman). It is the world's smallestfoodgrain and is as small as a grain of sand. It also has quite similar traits to other grains such as quinoa and millet. Tef grows anywhere from 30 to 120 cm in height, with slim stems and long, narrow, smooth leaves.

It is a loose or compact panicle. The really small grains are 1.5 mm long, and there are about 2,700 seeds in a gram (Seyfu). The plant uses a Carbon 4 photosynthesis, which uses light efficiently while having low moisture demands. This gives the plant the ability to stand high heat and bright lighting therefore able to harvest in any unpredictable or difficult climate. Also the plant's resistance to diseases, pests, and heavy soils and its inexpensive costs to raise and very quick to produce give it special appeal (Tadele).

Tef tends to thrive under growing condition from elevations that range from sea-level to as high as 2800 meters, and in various temperatures, soil, terrains and rainfall conditions (not where there is too much rainfall though) (Seyfu). Varieties of Tef * Magna (white) tef - This type is grown in the cooler seasons and is slow maturing. It is superior for grain due to its higher demand in the market. But it is blander in taste compared to the darker types (Seyfu). * Sergegna (mix of white and brown), kay (red), and tiquir (black) tef - This type is superior for fodder and is faster maturing.

The darker the color the richer in flavor and nutrients (Seyfu). * Abolse tef - An improved strain being tested and studied currently in Ethiopia. It has shown good results in early studies based upon its yield and baking quality. There is no record of this new strain being distributed as of yet (Kloman). Due to its properties to survive and grow through harsh climates, Ethiopian farmers grow tef for either two purposes as a staple or as a standby product. When planted as a staple, they grow it as their primary component in their trade or business.

So it is normally planted late and harvested well into the dry season. But as a standby, the farmers wait till their main crop such as maize or wheat shows signs of failing. They then plant a faster maturing tef such as the red or brown tef as a backup source of food in case of disaster. What also makes tef very attractive is that it is a grain that contains no gluten, at least none of the type found in wheat (Ingram). For this reason people with severe allergies to wheat gluten or health enthusiasts are buying tef these days.

Due to the seeds small size it makes it difficult to plant and prepare the fields. It is difficult to get an even distribution of seeds and also the wind or

rain can bury the seeding before it has spouted. Then separating, inspecting and grinding such tiny seeds is very strenuous and time consuming. History Tef is common all over Ethiopia and its major varieties were found only in that part of the world. Among with numerous other crops, the precise date and location for the domestication of tef is unspecified.

But, there is no uncertainty that it is actually an ageless crop, where domestication took place. It has been documented by some historians such as Ponti that tef has long been cultivated in Ethiopia for its grain from some time between 4000 BC and 1000 BC (Engels); Shaw disputed that tef must have been domesticated before the introduction of wheat and barley to Ethiopia or else the tef, would have never been cultivated. The use of tef was quite crucial for the Abyssinians, since the amount of tef seed required to plant were hundreds of times smaller than that of wheat (Ingram).

This productive potential and minimal time and seed requirements have protected them from hunger when their food supply was under attack from numerous invaders in the past. It was reported by Unger in 1866 that tef seeds were also found in the Egyptian Pyramid of Dashur in 3359 BC (National Research Council). Dried tef straws were suggested to have been used in the making of mud bricks used in the Pyramid of Dashur as well (Seyfu). The closest wild relative to tef is generally considered to be *eragrostis pilosa* this species is recorded as an annual growing weed from Eritrea and Northern regions of Ethiopia (Ingram).

Vavilov has recognized Ethiopia as the center of origin and variety of tef (National Research Council). Due to the fact that several widespread and non-widespread species of eragrostis, some of which are considered the wild

relatives of tef, are found in Ethiopia. Since the genetic diversity for tef does not exist anywhere else in the world except in Ethiopia, confirms that tef originated and was domesticated in Ethiopia. Production Areas of Ethiopia The regions of Shewa, Gojam, Gonder, Wello and Welega are the major tef-production areas (Seyfu). As can be seen in fig. these regions are concentrated in the central highland areas of Ethiopia. These areas suffer from waterlogging and these other parts of the country suffer from low moisture stress (Seyfu). The water logged soils of these regions seem to be a unique environment for agriculture since there isn't any other grain that can be grown in this environment. Tef is grown in almost all regions of the country for home consumption since it is the preferred grain. Local markets are also able to charge the highest price compared with other cereals, which is why farmers use it as their cash crop. There is going to be a map here)

Global Spread James Bruce (1730-1794) was a travel writer and a traveller of Scottish descent. He travelled through Abyssinia (present day Ethiopia) in search of the foundation of the Nile River; his discoveries were published in his 1768 book "Discover the Source of The Nile". In his journeys he mentions of a grain called tef that was grounded and used in their diet as much, if not more than wheat. It is also said that Bruce had taken some grain back with him to a Botanic Garden in Florence, Italy.

This led to the publication in 1775 of the first botanical description of the plant, which made tef known worldwide. But it would be The Royal Botanic Gardens, (Kew Gardens) located in the United Kingdom that would've been responsible for the distribution of tef seeds to various other botanic gardens in India and the colonies. In 1887, was the first issue of seeds and it was to

India, Australia, and South Africa. The trials were set in the elevated portions of these countries and all places where maize and wheat cannot be cultivated. These trials were successful.

Which led to the introduction of tef to other parts of the world such as: * Zimbabwe, Mozambique, Kenya, Uganda, Tanzania by Skyes in 1911 * USA, Malawi, Zaire, Sri Lanka, New Zealand, and Argentina by Burt Davy in 1916 The most effective trial was in the northern region of South Africa (National Research Council) . It was reported that the crop was very rapid in growth and was maturing in seven or eight weeks from the time of planting. When it normally matures between 80 - 160 days. Favorable Growing Conditions Sunlight - The length of sunlight should be between 11- 13 hours.

Rainfall - The average annual rainfall in tef-growing areas is 1, 000 mm, but the range is from 300 to 2, 500 mm. Tef is able to resist moderate drought, but there should be three good rain days. Altitude - It can be grown from near sea level to altitudes over 3, 000 m. Most is cultivated between 1, 100 and 2, 950 m. Temperature - While tef has some frost tolerance, it will not survive a prolonged freeze. But it can tolerate temperatures as high as 50°C (Ogadan regions of Ethiopia) Soil Type - Tefs' tolerance of soil types seems to be very wide. It performs well even on the black cotton soils that are notoriously hostile to crops and farmers.

Patterns of Consumption Human Consumption Tef is a cereal grain that is usually grounded to flour that is mainly used for injera that is a popular fermented sour pancake, porridge and baked goods. Is often used in North America as a thickener for soups and stews. Alcoholic beverages are also made from tef such as tela and katikala. Due to its high mineral content, it

has also been used in mixtures with chickpea soybeans and other grains for baby foods. Cattle Feed Tef straw is used as animal feed, especially during the dry season. Farmers feed tef straw preferentially to lactating cows and working oxen (Tadele).

Farmers prefer tef straw to the straw of any other cereal because of its sweetness (which is appealing to the cattle), high nutritive value, high yield, rapid growth, drought resistance and ability to smother weeds. In South Africa various productive types have been selected for hay production. It has since been exploited in the USA. It has increasingly become abundant, and is growing in dozens of states. It is also predominately cultivated in Australia for these purposes as well. Ornamentals There has been a growing interest in Europe, the United States, and Japan to grow tef for its visually appealing features (Tadele).

Since it stands straight, dense and has a orderly feature, often has multi-colored leaves and it's open fluffy panicles, tef can be extremely eye-catching. Erosion Control The non-weedy features of tef give it the ability to serve as a good temporary ground cover. South Africans are now using tef as a " nurse crop" that quickly covers the ground and fosters the establishment of permanent grasses planted along with it (Seyfu). It is already being used in mixtures to protect opencast mine workings, stream banks, and other erodible sites in South Africa. Construction

In Ethiopia, tef straw is the preferred binding material for walls, bricks, and household containers made of clay. Overall Impact Tef has increased in popularity in so many countries that the Ethiopian government has to instill routine bans of exporting this grain. During the lean season where the

production of tef is minimal the exportation of the crop will increase prices for it inside the country. With this scarcity in effect tef growers outside of Ethiopia has increased tremendously. Currently there are many tef providers in the USA for human consumption and forage for livestock.

Another influence in popularity is the shift in consumer's nutritional habits. There has been an increase in vegetarians (teff is high in protein) and the increased awareness of gluten allergies (teff is a good alternative for wheat). Also the rise in Ethiopian immigrants and the related rise in the popularity of Ethiopian food have increased demand for this staple crop. It's not just Ethiopian migrants, it is everyone; Ethiopian food is becoming more mainstream. There are teff fields in the states of Oregon, Kansas, Idaho, Montana, Washington, Minnesota, Oklahoma, Pennsylvania, South Dakota, Nebraska, and Virginia.

The US Agriculture Department and other institutions are in support of the cultivation of teff. Currently there are government grants offered to farmers in Kansas to cultivate teff on their farms (Kloman). Also the University of South Dakota and Cornell University have pushed for farmers in their states to start the cultivation of crop as well, for scientific research (Kloman). Other US institutions have been quite successful in their trials: * University of Nevada - They leaped at opportunity to begin a project to grow teff in 2002. In 2008 they produced 800,000 pounds of teff and in 2009 produced a million pounds (Kloman).

The production was so successful that the university was approached by retailers from Ethiopia with a deal to buy as much as four million pounds. * Idaho - The Teff Co. is America's largest producer of teff; it has been in <https://assignbuster.com/geographical-origins-of-eragrostis-teff/>

business for 25 years (Kloman). Wayne Carlson, who lived and worked in Ethiopia in the 70's as biologist, started The Teff Co. When he returned to the US he found that the climate and geologic region of Idaho was similar to that of Ethiopia's prosperous regions where tef is grown. As the East African population of the US started to grow significantly Carlson realized an investment opportunity.

The Boston Globe reported in 2004 that he grows about two million pounds of tef grain annually (Kloman). Dun & Bradstreet Inc. (business information company) estimated its annual sales to be \$1. 2 million (Kloman). Carlson reports this is still not enough to meet the demand. * To express just how competitive the industry has become. Carlson has recently pleaded guilty in April of 2012 for harassing a rival tef grower, Tesfa Drar, of Teff Farms in Minnesota regarding the production and distribution of their grains (Wax). Carlson was sentenced to a year's probation. Nutritional Value

Tef grains are nutritionally similar to wheat; but are actually more nutritious. The reasons for this may be due to the fact that since the seeds are so small they have a greater proportion of fiber (the nutrients are concentrated on the outside of the seed) and are almost always produced as whole grain flour. Tef is rich in energy (353-367 kcal per 100 g) and its fat content averages to about 2. 3 percent (Seyfu). The grain reportedly contains 11% protein, which higher than that in maize or oats. The tef cultivated in the US though have been showing an even higher protein level of 14% on a consistent basis (Seyfu).

These specific proteins should be highly digestible because it is high in the main protein fractions that are most digestible. Overall, it has an excellent

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balance of amino acids. Teff is higher than wheat in a dozen amino acids, especially the essential lysine, and slightly higher in such nutrients as potassium, zinc and aluminum. The mineral content is also good, iron and calcium are especially notable. The absence of anemia (iron deficiency) in Ethiopia where tef consumption is present is presumably due to the grain's good iron content.

The amount of calcium is equivalent to that of half a cup of spinach (Seyfu). It's also an excellent source of vitamin C, which is not commonly found in grains. Resistant starches are a newly revealed type of nutritional fiber that is either not digested or partially digested until it reaches the large intestine, where bacteria uses it for energy (Hopman). This is beneficial for blood-sugar management, which would be ideal for those suffering from diabetes. It is also beneficial for weight control and colon health. About 20-40% of the carbohydrates in tef are resistant starches (Hopman).

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