

## AMARANTHUS PLANT – BETWEEN MYTH AND USAGE

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### Abstract

*Plant species from Amaranthus genus are extremely important from many points of view: from an historical point of view, they were mentioned in ancient cultures such as Inca or Ancient Greece; from a nutritional point of view, they have many usages as food sources or drinks in many cultures from all around the globe; from a cultural point of view, they have been an inspiration source for numerous poets; from an economic point of view, some are used as natural pigments. The present article shortly presents the mythology associated with Amaranthus genus, the usages of its different species as well as the inventory of plates present in INCDS Herbarium from Bucharest.*

**Key words:** herbarium, amaranth, usage, incas, nutritional richness

### INTRODUCTION

*Amaranthus Genus* belongs to the *Caryophyllales* Order, *Amaranthaceae* Family, *Amaranthoideae* Subfamily. Approximately 60 species are recognized. "Amaranth" derives from Greek *ἀμάραντος* (*amárantos*), "unfading", with the Greek word for "flower", *ἄνθος* (*ánthos*), factoring into the word's development as *amaranth*. *Amarant* is an archaic variant. The species was planted from ancient times in Mexico, Peru and Guatemala, where it is still present. The cultivation potential was proven by its presence in the U.S., India, China or Nepal. Furthermore, Marx named it the „crop of the future” in a *Science* article (Marx, 1977).

### MATERIAL AND METHOD

The study material is composed of articles and websites that mention the history and usage of *Amaranthus* species, together with the exemplars (90) presents in the Herbarium from *Marin Drăcea* National Institute for Forest Research and Development (INCDS) in Bucharest. This Herbarium, realized by the renowned botanist Alexandru Beldie (Vasile et al., 2017), contains approximately 40.000 plants.

## RESULTS AND DISCUSSION

The species from this genus that are present in the Alexandru Beldie Herbarium are the following (Fig. 1):

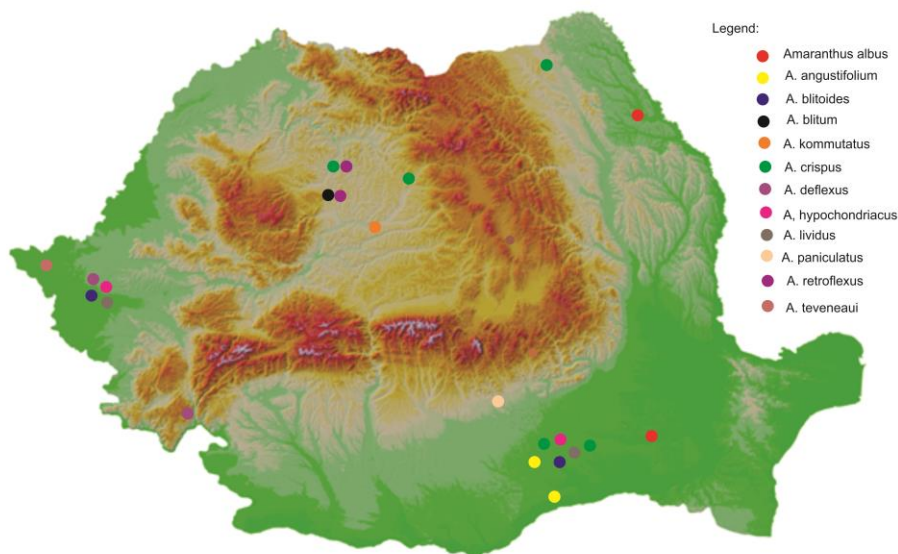


Fig. 1. Harvesting place for plants from *Amaranthus* genus in Romania

***Amaranthus albus* L.** (Fig. 2), gathered in 1936 in Ialomița County by C.C. Georgescu, in 1942 in Vlașca by I. Murariu, in 1938 in Cucuteni-Iași by M. Ravarut, in 1942 in Chișinău by C.C. Georgescu, in 1936 in Cojocna (Basarabia) by A. Arvat and in 1937 in Durostor by Badea.

***Amaranthus angustifolius* Lam.** (Fig. 3), gathered in 1941 in Ilfov County by I. Morariu, in 1944 in Ghimpați, in 1942 in Băneasa (Vlașca), in 1941 on Take Ionescu Street from Bucharest by the same I. Morariu.

***Amaranthus blitoides* S. Wats.** Was gathered in 1941 in Ilfov County by G. Bujoreanu and in 1946 in Torontal (Timisoara) by the same botanist.

***Amaranthus blitum* L.** was gathered in 1882 in Turda by Wolff and by I. Morariu in 1937, 1941, 1942, 1947 in Băneasa, Lehliu, and Bucharest and in 1942 at Torontal by G. Bujoreanu.

***Amaranthus caudatus* L.** was gathered in 1892 in Kania (Polonia) by Dr. Hartmann

***Amaranthus commutatus* Kom.** was gathered in 1916 in Targu Mures Park by E.J. Nyarady.

*Amaranthus crispus* L. (Fig. 4), was gathered in 1964 in Suceava County and in 1964 at Prundu Bârgăului by V. Grapini, in 1945 in Cluj County by E. Gheisa, in 1942 at Mizil, in 1941 in Bucharest and in 1942 at Buftea by I. Morariu.

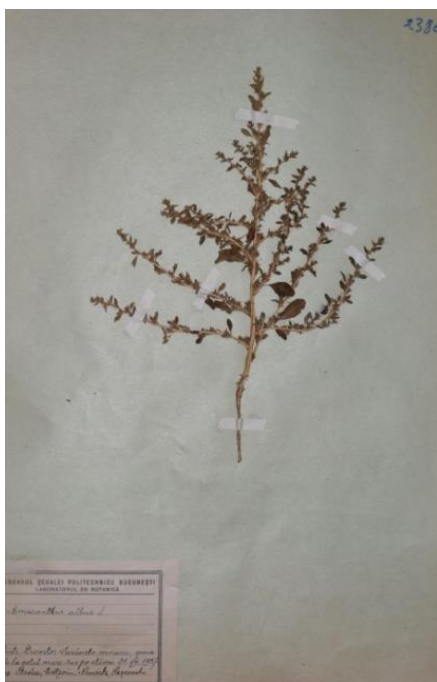


Fig. 2. *Amaranthus albus*



Fig. 3. *Amaranthus angustifolium*

*Amaranthus deflexus* L. was gathered in 1928 at Turnu Severin by E.J. Nyarady, in 1939, 1942 and 1943 in Bucharest by I. Murariu, in 1943 at Torontal by G. Bujoreanu.

*Amaranthus hybridus* L. was gathered by I. Morariu in 1942 from Bucharest and Chitila, in 1837 in Venice by Rigo and in 1884 at Casinalbo (Italy) by Fiori and Gibelli.

*Amaranthus hypochondriacus* L. was gathered in 1937 at Lehliu by Haralamb and in 1943 at Torontal by G. Bujoreanu.

*Amaranthus cruentus* L. was gathered in 1946 in Bucharest by I. Morariu and in 1908 and 1918 by Mihai Haret in Herăstrău and Valea Călugărească.

*Amaranthus quitensis* Kunth. was gathered in 1926 in Miguele (Spain) by Thellung.

*Amaranthus retroflexus* L. (Fig. 5), was gathered between 1918 and 1946 in numerous locations from Romania (Bucharest, Chitila, Valea Călugărească, Turda, Cluj, Timișoara) by I. Murariu, Mihai Haret, G. Bujoreanu, E.J. Nyarady, S. Pașcovschi.

*Amaranthus graecizans* Desf. was gathered in 1887 at Turda by Wolff and in 1886 at Lendan (Spain) by A. Gotz.

In Romania, different species of *Amaranthus* were found in: Băneasa, București, Buftea, Chitila, Cluj, Ghimpați, Iași, Lehliu, Mizil, Târgu Mureș, Timișoara, Turda, Turnu Severin, Valea Călugărească, Vatra Dornei etc.

### Mythology

Amaranth has a strong presence in myths, poems and fiction from all around the globe and from different time periods. Below are rendered some of the most notable and memorable mentions.

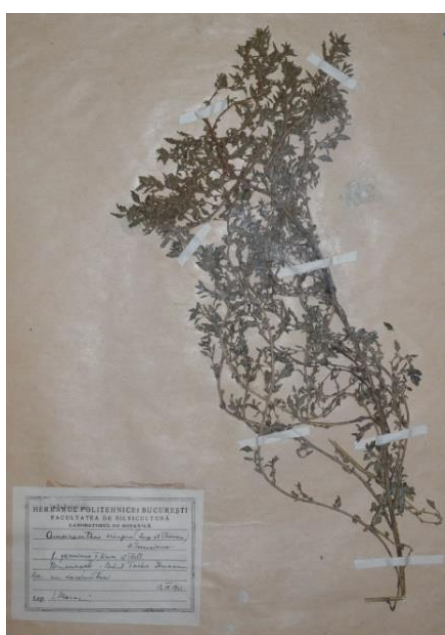


Fig. 4. *Amaranthus crispus*



Fig. 5. *Amaranthus retroflexus*

The species had an important role in the Aztec culture under the name *huauhtli* (Coe, 1994), being an important food source as well as worship material. Statues of the Huitzilopochtli deity were built by combining honey and amaranth and then eaten. A whole month of festivities known as Panquetzaliztli (7 December to 26 December) was dedicated for worshipping this deity and the amaranth plant. Christian Spaniards were responsible for outlawing the grain and destroying all the statues and amaranth fields (<http://www.ancientgrains.com/amaranth-history-and-origin/>).

In other Mesoamerican cultures, the plant was used as food source and considered the grain of the future due to its high nutritional qualities. For example, the grains were used in order to prepare *alegría* ("joy"), a popular drink that also contained honey and chocolate. The Incas also used it for its

nutritive qualities and the plant is still used in the Andes today, being known under the name of *kiwicha*.

The plant has an interesting history also in Europe, namely in Greece, where it is associated with an ancient Greek myth. The stories claims that *Amaranthus*, a hunter and son of King Euboea was very loved by Artemis, but managed to insult Poseidon, so he drowned due to the god's wrath. Artemis transformed him in her sacred plant, the amaranth flower, which became a symbol of immortality and healing.

Numerous poets and authors praised the flower's beauty and divine immortality. Among them, were Aesop, John Milton (*Paradise Lost*), Samuel Taylor Coleridge (*Work without Hope*) or Joachim du Bellay (*A Vow to Heavenly Venus*).

### Usage

The plant has many usages and essential properties. The first of them is represented by its nutritional richness. The grain is an important source of protein, minerals (105 % DV), fibers, magnesium (40 % DV), iron (29 % DV) and selenium (20 % DV). The fiber and minerals content are even higher than other cereals, together with a higher concentration of folic acid (102 µg/100 g in amaranth vs. 40 µg/100 g in wheat). Amaranth does not contain gluten (Lamacchia et al., 2014), (Penagini et al., 2013), (Gallagher et al., 2012), so it is used in gluten-free products (Rahaie et al., 2014). An important quantity of vitamins (A and C), calcium and folate can be found in its leaves, especially if they are cooked and also polyphenols, saponins, tannins, and oxalates which are reduced in content and effect by cooking (Hotz, Gibson, 2007). As such, the leaves are part of the cuisine of numerous countries in Eastern Asia (especially *Amaranthus cruentus*, *Amaranthus blitum*, *Amaranthus dubius*, and *Amaranthus tricolor*) (Costea, 2003). In India, the plant is even used in preparing different kinds of curries (*hulee*, *palya*, *majjigay-hulee* etc.), while in China it is used in soups. The name range from country to country: *bayam* (Indonesia, Malaysia), *kalunay* (Philippines), *chaulai* (Uttar Pradesh, Bihar – India), *chua* (Uttarakhand), *harive* (Karnataka – India), *cheera* (Kerala), *mulaikkira* (Tamil Nadu), *shravani math* (Maharashtra), *khada saga* (Orissa), *rau dền* (Vietnam).

The nutritional attributes are also valued in Africa, where the plant is used in improving nutrition, in fostering rural development or supporting land care. Mainly used in preparing dishes, the name of the plant is yet again variable: *doodo* or *litoto* in Kenya (Goode, 1989), *lengalenga* or *bítekuteku* in Congo or *shokoin* Yoruba (Enema, 1994).

The plant is presented in other cuisines from around the globe. For example, in Greece, the green amaranth (*A. viridis*) is used for preparing the popular βλήτα, *vlita* or *vleeta* (a kind of salad served with fish). The green

amaranth is also cooked in Brazil, while in Mexico the plant is mixed with rice, chocolate or honey and considered a popular snack (Fig. 7).

Other species that are edible are *A. blitoides*. (by the Zuni people, Stevenson, 1915), *A. blitum* (Greece and Lebanon), *A. caudatus* (India and South America), *A. hybridus* (used by Native Americans as food source and medicine and still popular in present day in Mexican food markets, Fig. 6), *A. retroflexus* (Native Americans, Mexico, India - Kerala state where it is used in preparing the famous *thoran* dish – Fig. 8).



Fig. 6. Skull shapes made of amaranth and honey made for Day of the Dead in Mexico (<https://en.wikipedia.org/wiki/Amaranth>)



Fig. 7. Traditional Mexican candy with amaranth



Fig. 8. Southern Kerala-style traditional *thoran* made with *cheera* (*A. retroflexus*) leaves ([https://en.wikipedia.org/wiki/Amaranthus\\_retroflexus](https://en.wikipedia.org/wiki/Amaranthus_retroflexus))

The *Amaranthus* genus does not contain poisonous species. However, the leaves are known to contain oxalic acid and even nitrates (if it has grown on rich nitrate soils), so it is recommended that the boiling water should be discarded.

Other usages of the plant can be found in the Hopi culture, where it was used as red dye. Today, the “amaranth” synthetic dye is similar to the natural amaranth color and used in North America (Red No.2) and the European Union (E123). Other species are purely ornamental, such as *Amaranthus caudatus* (love-lies-bleeding) or *Amaranthus hypochondriacus* (prince's feather). In Victorian times, *A. caudatus* was used in transmitting the meaning of hopelessness or a hopeless love.

## CONCLUSIONS

Amaranth has a strong presence in myths, poems and fiction, such as the Aztec culture or Ancient Greece. The species is known even from ancient time for its nutritional richness and numerous usages as food source and traditional drinks in East Asia, Africa, Europe or South and North America. Furthermore, she has been used as natural die and was mentioned in the works of many renowned poets from Greece, England etc.

From amongst the 60 species present in the world, the INCDS Bucharest Herbarium holds 17 species. The most exemplars belong to *A. retroflexus* (27 exemplars), *A. lividus* (9 exemplars), *A. crispus* (8 exemplars), *A. deflexus* (8 exemplars) and *A. albus* (6 exemplars).

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