SUCCULENTS FROM THE *EUPHORBIACEAE* FAMILY PRESENT IN THE GREENHOUSE COLLECTION OF THE BOTANICAL GARDEN "AL. BUIA" FROM CRAIOVA

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Abstract

Through the collections it owns, the "Alexandru Buia" Botanical Garden contributes to the protection and preservation of natural heritage. In the greenhouses of the Craiova Botanical Garden there is a rich collection of exotic species, of great scientific and decorative value, obtained over time from seeds or cuttings in the framework of the exchange of plant material between the Botanical Garden and other similar institutions in the country or abroad. Knowing these exotic plants in all aspects and disseminating information both to specialists and to the general public is one of the objectives of a university botanical garden. Succulents represent an interesting group of plants, cultivated in the greenhouses of the Craiova Botanical Garden, of which the species from the Euphorbiaceae family are presented in this communication.

***Key words**: Botanical Garden "Al. Buia", Craiova, succulent plants, Euphorbiaceae family.*

INTRODUCTION

The greenhouses of the Botanical Garden "Al. Buia" from Craiova contain a collection of plants grouped in three compartments, depending on the ecological conditions specific to their natural environment. Knowing these exotic plants in all aspects and disseminating information both to specialists and to the general public is one of the objectives of the Botanical Garden.

Information activities and ecological education, carried out with the help of the collections, have an important role in raising awareness among the public (especially the young generation) regarding the need to preserve and protect the environment, given that we are currently witnessing its continuous degradation and to the drastic decrease in the global rate of biodiversity.

The Succulent Plants section includes plants that attract with their bizarre appearance, determined by the presence of foliar and caulinar metamorphoses, induced by the need to adapt and survive in drought conditions. Among the species of succulent plants is the *Euphorbiaceae* family, which we have proposed to present in this communication.

MATERIALS AND METHODS

The species of succulents from the *Euphorbiaceae* family, present in the greenhouse collection of the Botanical Garden "Al. Buia", were verified or identified with the help of specialized literature. For each species, the updated scientific name is presented, according to the most recent taxonomic studies, the origin, life span and biological form, the conservation status (for the species that

are endangered in the natural habitats, being included in different degrees of endangerment) and various observations (propagation, uses etc.).

RESULTS AND DISCUSSIONS

The *Euphorbiaceae* family is represented in the compartment of succulent plants in the Craiova Botanical Garden greenhouses by species of the genus *Euphorbia*.

There are more than 2,000 species of *Euphorbia* in the world. They range widely in habit from trees and succulent perennials to small annual herbs. They all produce caustic milky sap. There are many herbaceous species, especially in temperate zones worldwide, but the genus is best known for its many succulent species, some of which appear very similar to cacti. Succulent *Euphorbia* species are most diverse in southern and eastern Africa and Madagascar, but they also occur in tropical Asia and the America (https://euphorbiaceae.org/pages/about_euphorbia.html).

From this family, species originating generally from Africa, but also from Madagascar, Central America and Mexico are present in the greenhouse (Table 1).

Table 1. Collection of succulent plants from the *Euphorbiaceae* family, "Al. Buia" Botanic Garden

Family EUPHORBIACEAE				
Species	**Geographical Distribution**	**LF**	**CS**	**Observations**
Euphorbia caput-medusae L.	Endemic to the Cape region of South Africa, from Namaqualand to Mossel Bay	Perennial, succulent subshrub	LC	Succulent ornamental plant. This succulent resembles the head of Medusa, with many serpent-like stems arising from a short, central caudex. *Euphorbia caput-medusae* was introduced to the Netherlands around 1700 and was one of the early plants described by Linnaeus (*Species Plantarum*, 1753). Known hazards: The milky sap (latex) is a skin and eye irritant (Prain D., 1916).
Euphorbia officinarum L. subsp. *echinus* (Hook. f. & Coss.) Vindt	S. Morocco to N. Mauritania	Perennial, succulent subshrub	-	Succulent ornamental plant. Known hazards: As with all other *Euphorbia* when a plant get damaged it exudes a thick white milky sap known as latex. This latex is poisonous and particularly dangerous for the eyes, skin and mucous membranes. Cultivated plants must be handled carefully. https://worldofsucculents.com/euphorbia
Euphorbia globosa (Haw.) Sims	South African endemic	Perennial, succulent subshrub	EN R	Succulent ornamental plant. These succulents can be grown from seed, but they can be difficult to germinate (or even find). They are usually propagated by cuttings. This can be tricky because of the exuding sap. Rooting hormone is recommended. They tend to grow problem-free, but there are a few pests and diseases.

				https://worldofsucculents.com/euphorbia
Euphorbia grandidens Haw.	Southern Africa	Perennial, succulent subshrub	LC	Succulent ornamental plant. The specific name *grandidens*, is taken from the Latin, meaning 'with big teeth'. Is used for traditional medicine. If correctly applied, the milky latex from the stem can be used medicinally as a laxative or for the treatment of ulcers. Though the plant has medicinal uses, it also has some physiological impacts. The plant is said to be irritant and may cause blindness when the milky latex comes in contact with the eyes. https://worldofsucculents.com/euphorbia
Euphorbia splendens Bojer ex Hook.	NW. & Central Madagascar	Perennial, succulent subshrub or shrub	-	Succulent ornamental plant.
Euphorbia obesa Hook. f.	South-central Cape Provinces of South Africa	Perennial, succulent	EN	Succulent ornamental plant. As in all *Euphorbia* species, the latex is toxic. In the wild it is endangered because of over-collection and poaching, combined with its slow growth, and the fact that the pod contains only 2 to 3 seeds. However, it is widely cultivated in botanical gardens.
Euphorbia ramipressa Croizat	Madagascar	Perennial, succulent shrub	-	Succulent ornamental plant.
Euphorbia submamillaris (A. Berger) A. Berger	South Africa	Perennial, succulent subshrub	-	Succulent ornamental plant. These succulents can be grown from seed, but they can be difficult to germinate (or even find). They are usually propagated by cuttings. This can be tricky because of the exuding sap. Rooting hormone is recommended. https://worldofsucculents.com/euphorbia
Euphorbia tirucalli L.	Africa	Perennial, succulent subshrub	LC	Succulent ornamental plant. Toxicology: The milky latex is extremely irritating to the skin and mucosa and is toxic. Skin contact causes severe irritation, redness and a burning sensation. If ingested, it can cause burns to the mouth, lips and tongue. Eye protection equipment and gloves are recommended for handling the plant. https://worldofsucculents.com/euphorbia
Euphorbia trigona Mill.	Central Africa	Perennial, succulent shrub or small tree	-	Succulent ornamental plant. These succulents can be grown from seed, but they can be difficult to germinate (or even find). They are usually propagated by cuttings. This can be tricky because of the exuding sap. Rooting hormone is recommended. https://worldofsucculents.com/euphorbia
Euphorbia tithymaloides L.	Tropical and subtropical	Perennial, succulent shrub	-	Succulent ornamental plant. The roots, stems, and leaves of the plant are known to be toxic. In Peru, the plant is known as

	North America and Central America			"cimora misha", "timora misha", or "planta magica". It is sometimes added to drinks made from mescaline - containing *Trichocereus* cacti, although *Euphorbia tithymaloides* has no known psychoactive properties (Anderson, 2001).
Euphorbia umbellata (Pax) Bruyns (syn. *Synadenium grantii* Hook. f.)	Africa	Perennial, succulent shrub	-	Succulent ornamental plant. Toxicity: produces a white milky poisonous sap called “latex”. This can be highly irritating to the skin, cause blindness, and be toxic when ingested. Medicinal uses: Despite the plant’s latex toxicity, it also has some medical benefits. It is specifically used to deal with internal parasites. Several drops of latex can be taken to deal with intestinal parasites and tapeworms. Some previous studies have also shown the use of latex in dealing with cardiac problems and excessive menstruation. Some people have also used latex to get rid of warts, sores. The diluted latex (18 drops/L of water) is commonly used in the south of Brazil to treat gastric disturbances. (https://succulentcity.com/euphorbia-umbellata/).

Note. LF - Life Form; CS (Conservation Status): LC - Least Concern, EN - Endangered, R – Rare (according to the Red List of South African Plants 2009, following IUCN Red List criteria).

Some of the *Euphorbia* species cultivated in the greenhouses of the Craiova Botanical Garden are endemic species, endangered in the natural habitats where they come from. Thus, *E. globosa*, South African endemic species, is considered Endangered – EN (Raimondo et al., 2009) and Rare – R (Hilton-Taylor, 1996).

Euphorbia caput-medusae L. is Endemic to the Cape region of South Africa, from Namaqualand to Mossel Bay. It has Least Concern (LC) status according to the Red List of South African Plants 2009, following IUCN Red List criteria (Hilton-Taylor, 1996).

On an International level there are ten species of *Euphorbia* on Appendix I, but *Euphorbia obesa*, and all other succulent species of *Euphorbia* are listed on Appendix II of CITES, i.e. the Convention on International Trade in *Endangered Species* of Wild Fauna and Flora. This means that each and every *Euphorbia obesa* plant or piece of a plant being carried over an international border requires a CITES Export Permit issued by the authority of the exporting country, and a CITES Import Permit issued by the authority of the importing country. Seed, flasked seedling cultures and pollen from artificially propagated plants are exempt and may be traded without a permit. Buyers are advised to make sure that the seller is a reputable, registered dealer and that an invoice is issued with the sale. (https://pza.sanbi.org/euphorbia-obesa).

Therefore, the protection of these endemic and endangered species *in situ*,

i.e. in their natural habitats, must be of high priority. In addition, *ex situ* conservation is necessary, which involves cultivation in botanical gardens, thus ensuring the maintenance of the species and possibly the repopulation of natural habitats if necessary.

Species of the genus *Euphorbia* are used all over the world in traditional medicine, but especially in the traditional Chinese medicine. Members of this taxa are promptly recognizable by their specialized inflorescences and latex. Recent studies have shown that there is a wide variety of chemical compounds present in *Euphorbia* sap, and some of them are toxic and potentially carcinogenic (Salehi B. et al., 2019).

CONCLUSIONS

In the greenhouse collection of the Botanical Garden "Al. Buia" from Craiova, the *Euphorbiaceae* family is represented by 12 species of succulent plants from the genus *Euphorbia*.

Succulent species of *Euphorbia* are cultivated for their ornamental value, but in their countries of origin many are also used in traditional medicine, although these plants produce a white, poisonous, milky sap called "latex". Several species are endangered in their natural habitats. For these, recommendations are made, such as cultivation in Botanical Gardens, as a safe measure to preserve some species, from where they can be returned to their natural habitats. Also, for Endangered species, it is also recommended to preserve germs in gene banks.

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