SUMMARY

Key words: Araceae, *Zantedeschia*, cv. ‚Cameo', cv. ‚Picasso', cv. ‚Black Star', cv. ‚Black Eyed Beauty', gibberellic acid, thermal treatment, *Arum creticum, Arum italicum*

Plants belonging to the Araceae family are not very well-known by their scientific name, but we find them in all the environments that surround us: either potted plants in homes and offices, or used in floral art in the composition of bouquets and arrangements for different events, or as plants used in parks and gardens.

The hallmark of the Araceae family is the inflorescence consisting of spathe and spadix, floral structure being composed of a transformed leaf (spathe) and a protuberance which has the actual flowers called spadix. Although from the botanically point of view this is an inflorescence not a flower, because it contains a multitude of individual flowers, it functions as a single flower.

Despite the diversity of sizes, shapes, colors, textures, fragrances of the spathe and spadix, all being most often eccentric, the species belonging to the Araceae family have very showy leaves. In addition to the multitude of forms, the Araceae leaves are often embellished by the lobes and corrugations and by varied colors and textures.

The *Arum* L. and *Zantedeschia* Spreng. genera belong to the Araceae family, which includes about 2000 species, mostly subtropical and tropical, herbaceous or woody (Sîrbu, Paraschiv, 2005).

The *Arum* genus, officially named by Linnaeus in the Species Plantarum Treaty in 1753, currently consists of 40 species, most of them originating from the Mediterranean area.

The species of the *Arum* genus are excellent plants for decorating shaded places in gardens. It prefers moist, but well-drained soils. It is decorative by both dark green lanceolate leaves and by the "flowers" and red-orange fruits which attract attention (Van Dijk, 1997). Also, for over one thousand years, plants belonging to the Arum genus were used as a source of starch, food, as an alternative treatment for various diseases, but also for its aphrodisiac effects (Boyce, 1993).

Arum creticum, native from the rocky slopes of Crete, is a particular species, due to the yellow inflorescence and the slightly sweet fragrance.

Arum italicum, the most widespread species of the genus, is very decorative both in spring and fall when being cultivated in parks and gardens under trees and shrubs.

Zantedeschia genus consists of eight species distributed in two sections, *Zantedeschia* and *Aestivae*. The *Zantedeschia* section consists of *Z. aethiopica* and *Z. odorata*, and the *Aestivae* section (also found under the name of "colored callas") consists of *Z. albomaculata* (with two subspecies: *albomaculata* and *macrocarpa*), *Z. elliotiana, Z. jucunda, Z. pentlandii, Z. rehmannii* and *Z. valida* (Singh et al., 1996).

Since the days of ancient Rome, *Zantedeschia* (also known as Calla) was a valued flower frequently used in ceremonies. Often callas are used at weddings because they are the traditional symbols of Divinity, marital happiness and devotion. However, they are also used at funerals because they represent empathy and the purification of a passed soul. Calla is a sophisticated flower, suitable for any occasion involving major transitions and new beginnings (Bown, 1988).

Zantedeschia genre's popularity increased on the international flowers market due to its distinct and stylized inflorescence and because of the varied range of colors (from white, yellow, pink, green to purple, orange and black) (Janowska *et al*., 2012).

This PhD thesis entitled "AGROBIOLOGICAL STUDY OF CERTAIN SPECIES OF *ZANTEDESCHIA* SPRENG. AND *ARUM* L. IN DIFFERENT CULTURE CONDITIONS" is divided into two parts and eight chapters. The aim of the paper is to study the methods of cultivating *Zantedeschia* and *Arum* species in different culture systems (in the field, in the greenhouse and as pot plants) and to determine which of these three methods can be applied to ensure the best plants for cut flowers and foliage used in floral art, plants in pots or in the garden landscape. The influence of the gibberellic acid and of the thermal treatment to the underground organs was also studied (i.e. the emergence of the vegetation period of the plant and the appearance of floriferous stems, plant height and floral stem length, number of leaves per plant, number of flowers per plant).

For a better understanding of the studied species, **Chapter I - *Overview of Araceae* -** presents the origin of species belonging to the Araceae family, their characteristics (description of the underground organs, flowers and leaves) and their behavior in culture systems.

Chapter II - *General considerations regarding the cultivation of the studied species* - comprises an overall analysis of *Arum* and *Zantedeschia* genera, which includes the history and the description of the species, biology and ecological requirements, production of the propagating material, establishment and care culture, and pathogens and pests often encountered at the studied species.

For a proper understanding of the studied topic, for the organization of the experiments and interpretation of the observations and measurements, a synthesis of several specialized

scientific articles, theses, books and publications was made in **Chapter III** - ***The current state of research on species studied.***

Chapter IV - ***Aim, objectives and general research methodology*** - provides information about the purpose of this thesis, with the following objectives:

• study of the influence of culture system to the agro-biological characteristics of some *Zantedeschia* cultivars and *Arum* species;

• study of the influence of gibberellic acid and thermal treatments on the growth and development of *Zantedeschia* cultivars and *Arum* species;

• morphological, physiological and ornamental characterization of the studied cultivars and species (*Z.* ‚Picasso', *Z.* ‚Cameo', *Z.* ‚Black Eyed Beauty', *Z.* ‚Black Star', *Arum italicum*, *Arum creticum*) depending on the culture system adopted and the applied treatment option.

In order to achieve the established objectives and to obtain conclusive scientific results, the biological material used for creating the experimental variants was represented by an assortment of four *Zantedeschia* cultivars (’Picasso’, 'Cameo’, 'Black Eyed Beauty' ’Black Star' from the *Aestivae* section) and of two *Arum* species (*A. italicum* and *A. creticum*) (differentiated by the appearance of flowers and leaves, leaf maximum height and length of the floriferous stems.

The statistical analysis was performed using Microsoft Excel, the results being analysed with the limit differences (Săulescu, Săulescu, 1967).

Chapter V - ***The natural, organizational and institutional environment, conditions for the research*** - consists of the description of the natural conditions from the time of the experiments and the description of the organizational and institutional framework where they occurred.

Chapter VI - ***Results on the behavior of Zantedeschia cultivars in different culture conditions*** - summarizes data regarding the influence of the culture system, of the thermal and gibberellic acid (GA_3) treatments to the average number of flowers and leaves per plant, the size of the spathe, the length of flower stems, the maximum length of the leaves. The results related to phenological data and to the underground organs of species and cultivars taken in the study, are presented in the same chapter.

Chapter VII - ***Results on the behavior of Arum species in different culture conditions*** – presents the results obtained from experiments on *Arum italicum* and *Arum creticum* species, taking into account the same aspects as *Zantedeschia* described above.

Chapter VIII - ***Methods for preserving cut flowers and leaves of calla and arum*** - provides information on the influence of different treatments on preserving the studied species and their longevity. The preservation of leaves and flowers was made in water and in

commercial solution for cut flowers conservation, applying or not a pre-treatment with 100 ppm of gibberellic acid for 4 hours.

Based on the experiments the following conclusions were formulated. Regarding the *Zantedeschia* cultivars, they perform best in protected areas, grown both in greenhouse soil and in pots (higher number of inflorescences). In the experimental field, only certain varieties can be recommended, as they behave like annual plants, because they do not survive over the winter time. In order to ensure decoration in gardens during the summer time, they need to be planted in an area with moderate sun or semi-shade.

Regarding the two species of Arum, they showed good adaptability to soil and climatic conditions in the experimental field as well as plants grown in pots in protected areas. For a harmonious development, Arum needs to be planted in a shady or semi-shady area, the behavior being as a perennial with the resting period in summer.

The most eloquent longevity, both to flower and leaves of arum and calla was recorded by keeping them in water after the 4 hours treatment with GA_3 100 ppm. In addition, the leaves of *Arum italicum* responded well when keeping them in commercial solution after the GA_3 treatment.

This PhD thesis ends with the bibliography, which includes national and international titles, with reference to the theme explored.