ABSTRACT

Key words: morphology, leaf pigments, chemical fertilizers, ornamental cabbage, ornamental zucchini, landscaping, gardens and parks, interior design.

The present PhD study has as theme the use and promotion of vegetable species *C.pepo* L *andB.o.*var.*acephala* D.C. in landscaping design.

The research undertaken within the PhD study entitled "Agrobiological study of some vegetable species with the aim to be used in the landscape desgin" were done at the University of Agricultural Studies and Veterinary Medicine Iasi during 2010-2013, using the infrastructures of the Vegetable – growing chair, the Center of Horticultural Research of USAMV Iasi, as well as the research laboratories of the Agricultural Faculty in Tuscia, Italy.

The aim of the research is to evaluate the possibilities of usingornamental vegetable species *C. Pepo* L. And *B.o. var. acephala* D.C., promoting them in landscaping design, using them in the natural scenery.

To reach this aim, several other key points were addressed: the agrobiological study of the evaluated species, the landscaping importance of the two plants, which are cultivated either very little either not at all in our country.

The international state-of-the-art research shows multiple uses of the species.

The two species answer the market's request for ornamental vegetable plant, being easily used in landscaping design.

The recommendations of the specific literature are varied, but they do have the necessary amount of information to give growers the „courage" to cultivate and successfully promote these species in Iaşicounty for use in gardens, parks and interior design even.

Therefore, the suggested aim is necessary and relevant for an original overview of the culture of vegetable species with ornamental value (*C. pepo* L., *B.o. var. acephala*).

The following **objectives** were established:

1. *Evaluation of main morphological characters of C. Pepo* L. *and B.o. var. acephala* D.C. *– evaluating the possibilities of plant growing and development and their adaptability to culture conditions;*

2. *Evaluating the main physiological characters: the dynamics of phenol-phases, the analysis of photosynthetic pigments (chlorophyll a and chlorophyll b, carotenoids), as well as analysis of the influence of chemical fertilisers on the ornamental cabbage culture;*

3. *Study of the ornamental value – use in gardens and parks.*

The two species were studied over a three years period, during which morphological and physiological characters, as well as ornamental value were studied.

The hybrids that were used for this study are:

- For ornamental zucchini: *Verrucosa, Festival, Bicolor-Pear, Dinosaur Egg, Styriaca, Yugoslavian Finger, Warzen Orange, Small Warted, Custard Marrow;*
- For ornamental cabbage: *Red Peacock, White Peacock, Coral Queen, Coral Prince, Crane Bicolor, Crane Pink, Crane Red, Glamour Red.*

Zucchini can be cultivated in unprotected field as well as in greenhouses (small surfaces) for obtaining an earlier product. It requires level grounds, with a slight Southern exposure, rich in humus, middle to light soils, with irrigation. The natural and technical-organisatorical framework was favorable for the culture of the studied ornamental vegetable plants.

The zucchini culture was established by direct seeding in the experimental field on the 15th of May for all the nine hybrids, in three repetitions; the experimental material was donated by an individual in Iași county.

The distance between rows was of 120-140 cm while the distance between plants/row was of 75-80 cm.

The ornamental cabbage culture was established by planting material produced in planting containers, in a substrate of peat, decomposed manure and earth.

The used seed was produced in the United Kingdom, by the company Nicky's Nursery Ltd.

At planting, the seedlings were 45-50 days old. The seeds were planted on the 15th of March, while the transfer of the young plants in open field was done on the 10th of May, for all 8 hybrids, in subdivided lots, in three repetitions.

The distance between rows was of 75-80 cm and the distance between plants within the row was of 50 cm.

The PhD thesis has six chapters, structures in two parts.

Part I –Present state-of-the-art knowledge on the culture of ornamental zucchini (*Cucurbita pepo* L.) and ornamental cabbage (*Brassica oleracea* var. *acephala* D.C.).

This is composed of two chapters

- Chapter I. Scientific base of ornamental zucchini and ornamental cabbage cultures.
- Chapter II. Culture technologies of studied species.

Part II – Personal studies and research with four chapters:

- Chapter III. Aim, objectives, material and research method
- Chapter IV. Evaluating the culture favourability of ornamental zucchini and cabbage
- Chapter V. Use of ornamental vegetable species with decorative purpose
- Chapter VI. Conclusions

Bibliography comprised 120 titles of research articles of national and international origin.

The first part of the thesis is formed of two chapters and general information regarding the present state-of-the-art knowledge of the studied theme. These two parts were based on studies from speciality manuals and treatises, scientific journals, articles, books, PhD theses, as well as recent virtual information (Sciencedirect, Springerlink, CabDirect, Pubs.Aic.Ca, ScienceSocieties).

The first chapter of the thesis is composed of the scientific databases of ornamental zucchini and cabbage, developing issues like the history and the evolution of these cultures, the importance of vegetable plants as well as ornamental ones, the origin and botanical characteristics.

The second chapter presents the technological actors for the two studied species. For improving the cultural technology as to obtain a richer yield, maximum produce and superior quality

The second part of the thesis is composed of four chapters, representing approximately 70% of the total and is the author's contribution on the research theme.

The third chapter presents the aim and research objectives, material and working method, as well as the environmental, organisatoric and institutional conditions.

The aim of the research is to promovate and to perform the possibilities of usingornamental vegetable species *C. Pepo* L. and *B.o. var. acephala* D.C and to use them in landscaping design, where the following objectives were established:

- *evaluation of main morphological characters of the species we study;*
- *evaluating the main physiological characters;*
- *study of the ornamental value – use in gardens and parks.*

The fourth chapter is composed of the actual results of the research. The fourth chapter is composed of the actual results of the research on morphological, phenological and physiological characterization of varieties under study, and treatment of ornamental cabbage varieties with ammonium nitrate. The study was based on the study of the effect of ammonium nitrate on growth and fertilization during the five hybrid quality of ornamental cabbage, grown in the greenhouse. In particular the studied was based on the effects of growth of the hybrids on the total amount of nitrogen present in the leaf, weight of the leaf and the production of biomass and the amount of chlorophyll and carotenoid of ornamental cabbage leaves.

The fifth chapter is structured in two sub-chapters. The first sub-chapter presents the results of the main features of the decorative squash and ornamental cabbage. There were identified ornamental shapes characterized by color, shape and appearance of ornamental cabbage leaves and for the ornamental squash forms by plant habitus (size, shape, color and appearance of the fruit). The second chapter has focused on their revaluation in landscaping related to private and public spaces. It was proposed to promote and later use ornamental cabbage varieties and ornamental squash in three private gardens in Iasi city, two facilities for public spaces in Iasi and one in Galaţi. To be implemented, vegetable varieties with ornamental value were based on actual study of major morphological, phenological and physiological characters.

Results concerning the morphological and physiological characterisation of ornamental vegetable species

♫ Morphological studies on ornamental squash revealed a great diversity of assortment, shapes, varieties and hybrids.

♫ Morphological structure revealed that this diversity is due to plant vigor, number of shoots and in particular their shape, appearance and color of the fruit.

♫ The ratio of male flowers and female flowers varied widely depending on the cultivar and growing conditions, a number of female flowers from 2.7 at Styriaca hybrids and Yugoslavian Finger to 17, 3 at Warzen Orange hybrid.

♫ Fruit size was measured by diameter and mass, where the diameter ranged from 6.2 cm to Warzen Orange hybrid to 9 cm at Small Warted hybrid and fruit weight in the assortment has grown from 120, 67 g to Veruccosa hybrid up to 530.00 g to Bicolor-Pear hybrid.

♫ Fruit shape is extremely varied and gives ornamental value unexpected: globular, flattened, elliptical, discoid, cordiforme or pear, turkish-turban or bent-neck.

♫ The color is very varied; it was found that there monocolor fruit (yellow, green, orange), bicolor (yellow-green, yellow-green, yellow-green) and tricolor (orange-green-yellow).

♫ Morphological characterization was evidenced by biological and eco-physiological characteristics of species of ornamental cabbage, due to the size, shape, color and appearance of the leaves.

♫ Plant height was influenced by both, the hybrid and the density of the culture, where it went from 29.27 cm at Coral Prince hybrid to 50.14 cm Crane Pink hybrid and the number of leaf was adversely influenced by ornamental cabbage hybrids.

♫ The size of the leaf was assessed by rosette diameter, leaf length and ground vegetation. The rosette diameter increased from 17.28 cm at Red Crane hybrid to 25.87 cm at Coral Prince hybrid, while the length of the leaf ranged from 12.10 cm at Crane Pink hybrid to 17.60 cm at White Peacock hybrid. Regarding vegetative mass, it has achieved dynamic growth of 591.6 g at Pink Crane hybrid up to 800.6 g at Glamour Red hybrid.

♫ The dynamics of foliar pigment content during ontogenetic development was analyzed depending on the age of the leaves, the phenophase and the hybrid.

♫ The treatments applied were determined the increase and decreaseof chlorophyll, compared with the control. Following the treatment with ammonium nitrate, significantly negative values were recorded at White Peacock hybrid with a concentration of 0.5 mM (NH4NO3) and Coral Prince hybrid with a concentration of 2.5 mM (NH4NO3), where the difference from the control was 93% for the White Peacock hybrid, namely 92% for the Coral Prince hybrid.

♫ The differences compared with the control in the total chlorophyll were both positive and negative. There were significant differences at Coral Prince hybrid, decreasing the total amount of chlorophyll, compared to the control (91.8%), while to Coral Queen hybrid, the treatment increased the total amount of chlorophyll, difference compared to the control being distinctly significant (109.3%).

The effect of chemical fertilizers on the ornamental cabbage culture (factor A – variety and factor B – treatment)

♫Regarding the influence of factor A on the growth and development indices, differences in all of the 5 studied species were registered. White Peacock variety was the highest (34, 6 cm), as well as the variety with the widest (30,7 cm) and the longest (29,8 cm) leaf.

♫The mass of the fresh leaf and stem (g) shows differences at all 5 analysed species. The highest average value for all three morphological aspects is registered in *White Peacock*variety (94,4 g, 78,4 g, respectively 16 g).

♫Factor B determines a variation amplitude in all 5 studied varieties. The use of nitrogen led to a decrease of plant height up to 15,2 cm at*White Peacock*variety, registering very significant negative differences compared to the control sample.

♫The nitrogen dose influenced the plant mass, the leaf and fresh stem mass. Differences were found in all studied hybrids. N1 variant registered the highest average value for two aspects(mass of the plant and of the fresh stem). In the case of the mass of the fresh leaf, variant N4 had the highest average value.

♫The fertilisation had a differential influence on the studied characters. There is a positive correlation between the used nitrogen dose and the growing index.

♫The interaction between the factors slightly influenced, in a positive and negative manner, the plants' height and width, the leaves' number, fresh and dry plant's mass, fresh and dry leaf's mass, fresh and dry stem's mass and leaves' nitrogen content.