RESEARCH ON THE DEPLOYMENT OF THE PHYSIOLOGICAL PROCESSES DURING THE GROWTH AND THE FRUITING OF THE *CUCURBITA PEPO* SPECIES

CERCETĂRI PRIVIND DESFĂȘURAREA UNOR PROCESE FIZIOLOGICE ÎN TIMPUL CREȘTERII ȘI FRUCTIFICĂRII SPECIEI *CUCURBITA PEPO*

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Abstract. *In this study it was evaluated the development of the physiological characterization of Cucurbita pepo plants during their growth and development, as well as on the mode of physiological adaptation of the plants to the photosynthesis. The research was conducted in the experimental field of the Department of Horticulture , in the USAMV , V. Adamachi farm. Chlorophyll and carotenoid pigments study emphasizes quantitative and qualitative presence of these pigments as a fundamental expression of plant adaptation to environmental conditions .Among the new culture were highlighted some differences, but overall, they have a special significance, showing that some photosynthetic activity cultivation are distinctly different. More interesting are the results that show that the pigment chlorophyll a levels was the highest at the top of plant (about 0.50 equivalent units) and what is particularly interesting in binding phenophase fruit. As was natural data show that levels of chlorophyll is smaller towards the base of the plant and fruit maturity phenophase (about 0.30 equivalent units).*
Key words: *C. pepo, phenophases, foliar pigments, chlorophyll a, an indicator sensitive.*

Rezumat. *În cadrul acestui studiu a fost evaluată caracterizarea fiziologică asupra evoluției plantelor de Cucurbita pepo pe parcursul creșterii și dezvoltării lor, ca și asupra modului de adaptare din punct de vedere fiziologic a plantelor la procesul de fotosinteză. Cercetările au fost efectuate în câmpul experimental al Disciplinei de Legumicultură, din cadrul USAMV IAȘI, la ferma V. Adamachi. Studiul pigmenților clorofilieni și carotenoizi pune în evidență prezența cantitativă și calitativă a acestor pigmenți, ca expresie fundamentală a adaptării plantelor la condițiile de mediu. Între cele nouă cultivare au fost puse în evidență unele diferențe, dar, în general, acestea nu au o semnificație deosebită, din care să rezulte că unele cultivare au o activitate fotosintetică în mod distinct diferit. Mai interesante sunt rezultatele care arată că pigmentul clorofilă a avut nivelele cele mai mari la vârful plantelor (circa 0,50 unități echivalente), și ceea ce este deosebit de interesant în fenofaza de legare a fructelor. Așa după cum era firesc datele arată că un nivel al clorofilei e mai mic spre baza plantei și în fenofaza de maturitate a fructelor (circa 0,30 unități echivalente).*
Cuvinte cheie: *C. pepo, fenofaze, pigmenţi foliari, clorofila a, indicator sensibil.*

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INTRODUCTION

The vegetable production is marked by a great diversity of species, cultivation practices and traditions of usage. The large biodiversity of vegetable species and their great movement across the globe have allowed many usages, besides food, such as phytotherapy, cosmetics, landscaping, etc.

The ornamental value of vegetables results from the morphological characteristics of the plants themselves: size, general habitus of plants, shape, appearance, size and color of the leaves, flowers and fruits.

The importance of cultivating vegetables with ornamental value originates from the constant need of man for finding beauty. Since forever, man has been attracted to nature. Vegetable plants with ornamental value can be considered today as an objective necessity of life. Many people find untold joy in the company of nature, beauty, either in their small living spaces or outside, in gardens or parks (Arthur et al., 1987). The vegetables with ornamental value, along with other decorative plants help fight air pollution, establishing equilibrium in living spaces. Cultivated by man in green spaces, these plants extend their utilitarian-social importance. The vegetation in parks, gardens, squares and roads visibly influences the microclimate of population centers. They clear the air of contemporary life, which, in the unprecedented development of industry, harms the environment (Lichtenthaler and Wellburn, 1983).

MATERIAL AND METHOD

The biological material for the ornamental pumpkin consisted in seed taken from a private person's collection in Iasi. For the physiological characterization there were used ornamental pumpkin seeds to new hybrids discussed in the study: verrucosa, Festival, Bicolor, Pear, Dinosaur Egg, Styriaca, Yugoslavian Finger, Warzen Orange, Small Warted, Custard Marrow. *The material used in the ornamental squash experiment consisted in the biological material of nine hybrids.*

The research was conducted between 2012-2013 in the experimental field of the Department of Horticulture, in the USAMV farm "Vasile Adamache".

The land is flat, with an average cambic chernozem leached soil, well supplied with nutrients and an average pH of about 6.5 -7.0.

Weather conditions varied a lot than the normal average temperate continental climate which characterizes the area; the temperatures and the rainfall were ranged between extremes, with high temperatures and excessive drought, which required mandatory extra provision of irrigation conditions.

The culture was established by direct sowing in the field on the 15th of May, for all nine hybrids, placed in nests in three times. The distance between rows was of 120-140 cm and 75-80 cm distance between plants in a row.

RESULTS AND DISCUSSIONS

Measurements were made at the three phenological points: blooming, linking fruit and fruit maturity.

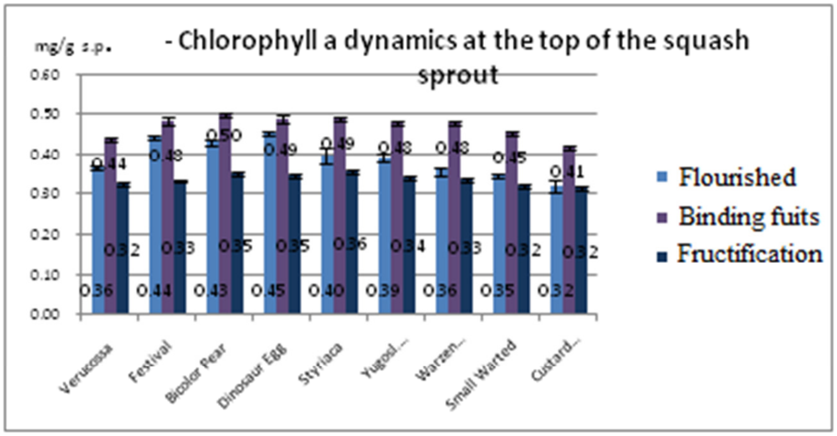

Fig.1 - Chlorophyll a dynamics at the top of the squash sprout

In the analyzed experiments the chlorophyll content on the top of the pumpkin sprouts ranged from 0.32 mg / g at *Verucossa* hybrid , *Small Warted* and *Custard Marrow* hybrids to 0.50 mg / g at *Bicolor Pear* hybrid. An increased content of chlorophyll a during the season, reaching a maximum during the binding phase of the fruit, after which there is a reduction as a result of the leaf senescence process (fig. 1).

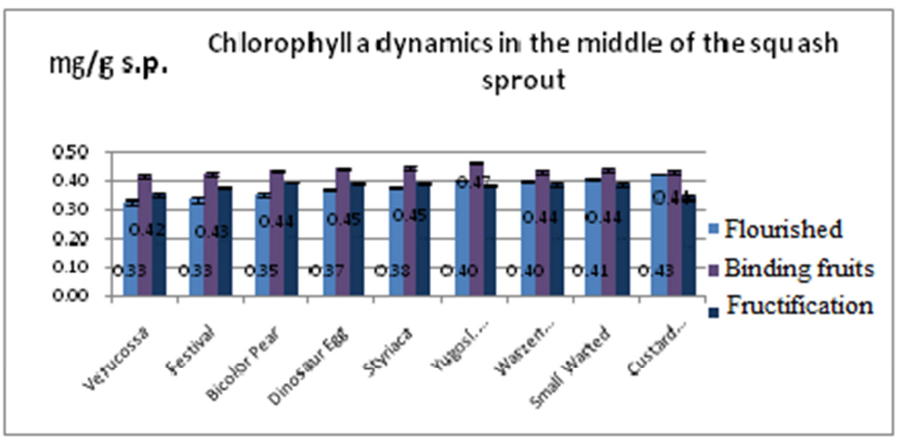

Fig. 2 – Chlorophyll a dynamics in the middle of the squash sprout

The results obtained in this experiment show that at mid-shoot leaves the greatest amount of chlorophyll pigments was recorded in the *Yugoslavian Finger* hybrid (0.47 mg / g), and the smallest amount of chlorophyll pigments showed the *Verucossa* hybrid (0.33 mg / g) (fig. 2).

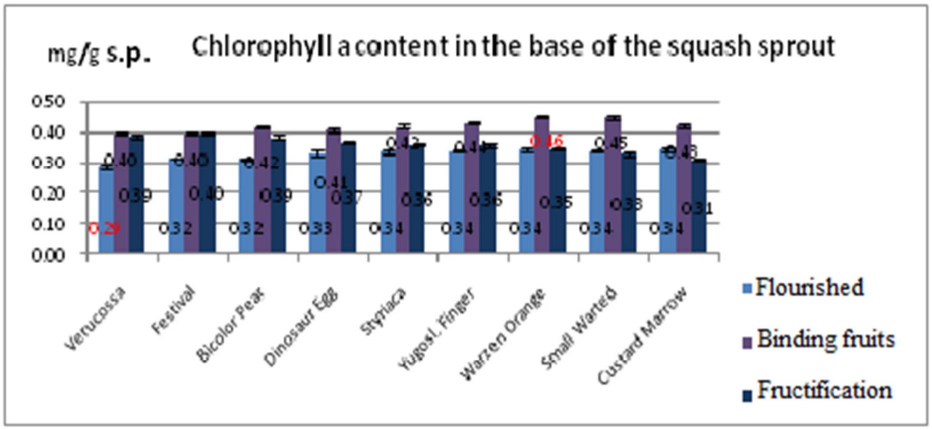

Fig. 3 – Chlorophyll a content in the base of the squash sprout

In figure 3 we can see that the most variable content of chlorophyll pigments was recorded for the *Warzen Orange* hybrid, having a value of 0.46 mg/g in the binding phase of the fruit, and the lowest content of assimilating pigments was registered for the *Veruccosa* hybrid, with a 0.29 mg / g (Reid et al. 1990; Fang et al. 1998; Northup et al. 1996).

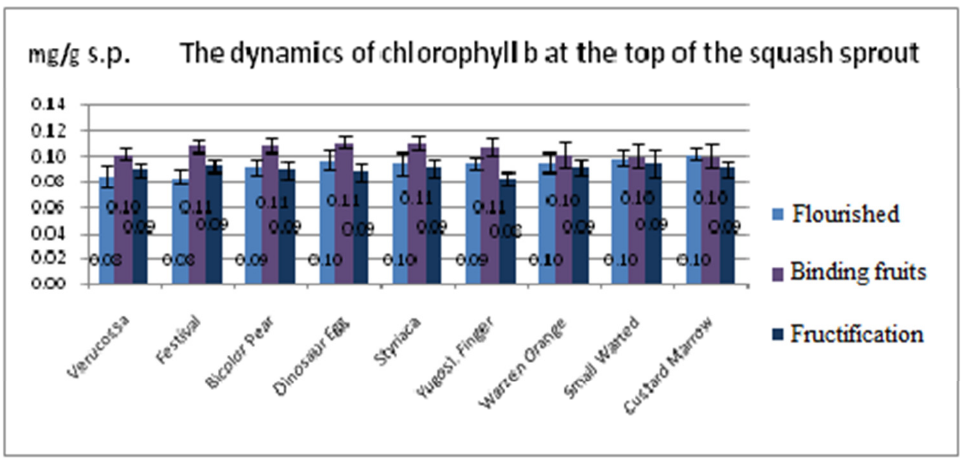

Fig. 4 – The dynamics of chlorophyll b at the top of the squash sprout

The chlorophyll b had a somehow similar evolution to the chlorophyll a, but its content is more uniform in the assortment, but the values are about five times smaller. The maximum amount was equivalent to about 0.12 units and the smallest had units of about 0.9 equivalent (fig. 4).

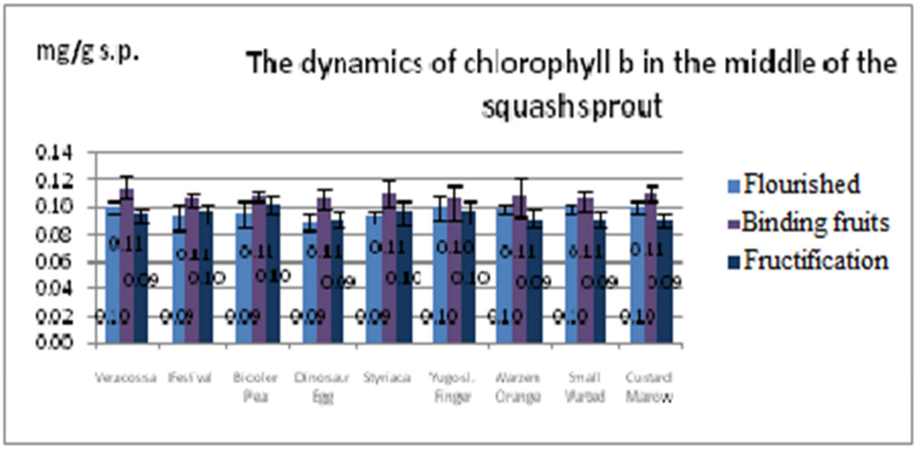

Fig. 5 – The dynamics of chlorophyll b in the middle of the squash sprout

The fact that this pigment has not undergone major changes during the growing season, indicates the optimal light conditions for the cultivation of the species in this area (fig. 5).

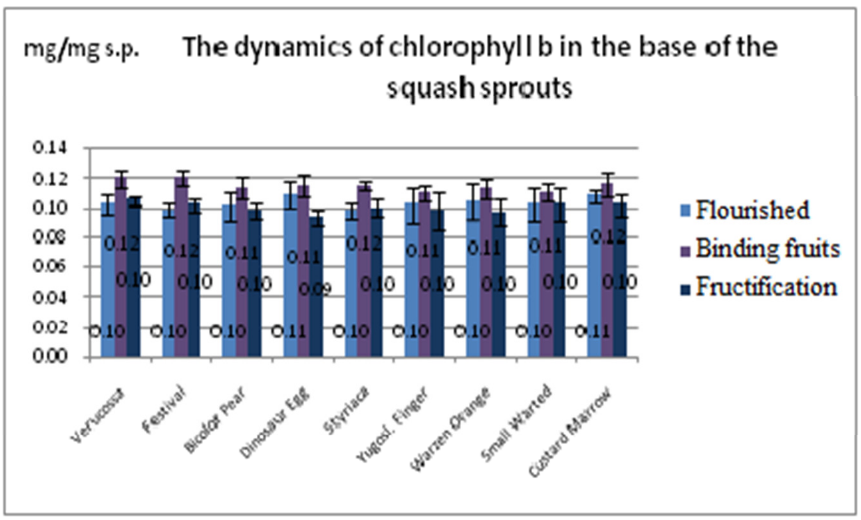

Fig. 6 – The dynamics of chlorophyll b in the base of the squash sprouts

In what concerns the influence of the leaf position, it is clear in this case a low dependency of the chlorophyll b content, on the leaf position on the sprout (fig. 6).

CONCLUSIONS

1. Squash plant phenology and physiology were generally similar in the assortment, although by the biochemical analysis were highlighted some differences;

2. The adaptability of plants to environmental conditions was evaluated by chlorophyll and carotenoid pigments study;

3. The higher content of the *chlorophyll a* was found in the middle of the squash sprout, in the *Yugoslavian Finger* (0,47 mg / g);

4. The *chlorophyll b* had a somehow similar evolution to the chlorophyll a, but its content is more uniform in the assortment.

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