

Results in the valuation of some balcony plants in Hungary

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Summary: Three varieties of different species of annual bedding and balcony plants were examined in balcony boxes in three different places (Budapest, Solymár-Kerekhegy, Tázlár) in order to determine their tolerance to different climate conditions. The experiment proved that *Celosia argentea* L. var. *plumosa* 'Savaria' and *Dichondra repens* J. R. Forst. et G. Forst 'Silver Falls' tolerate well the Hungarian extremely dry, hot and changing climate. *Nemesia* Vent. 'Blue Bird' developed and flowered well only in cooler and protected conditions; therefore, this species can be offered to a more balanced climate as the western areas of Hungary and the mountains.

Key words: balcony plants, climate tolerance, ornamental effect

Introduction

In recent years, the establishment of friendly environment in the working and living places is becoming increasingly important. The increase of green surfaces helps psychically in this ambition. The monotony of green surfaces can be broken with colourful annuals planted in beds, balcony boxes or hanging baskets (Nagy, 1991).

After World War II., the species assortment began to grow rapidly as from all parts of the World new varieties arrived to Europe for further growing. Today, balconies and terraces became important resting places, where people can enjoy the nature without travelling (Frietsche, 1983). The larger surface is covered by plants around a building, the better people feel during their work or rest. Flowering plants in balcony boxes are useful in this respect (Larson, 1992).

In the last years, 30–32 million annual plants were grown in Hungary, 20–22 million of them are planted in private gardens (Schmidt, 2002). Many species are available in the commerce. Besides the traditional hybrids (*Petunia*, *Verbena*) new ones appear such as *Cuphea ignea*, *Bidens ferulifolia* or *Bacopa monieri*. (Szántó et al., 2003). For the experts and even for the private persons the wide assortment of species and varieties in the designing and the execution is very important (Schmidt, 2003).

For balcony decoration, only those species or varieties can be used, which can survive the extreme climate conditions and give attractive ornamental effect (Encke & Shiler, 1975). In Hungary, there is no breeding of balcony plants, the new varieties are imported from abroad. Plugs arrive mainly from Germany (Herneth, 2000; Anonymous, 2004ab).

In Hungary, Dr. Zoltán Kováts deals with the breeding of annual bedding plants, his varieties are available already in Europe. They are planted in many towns and villages in Hungary and also abroad. They are listed in the Hungarian National list of Varieties (OMMI, 2004).

The new varieties of balcony plants produced under the Atlantic climate have to be tested under continental climate conditions as the Hungarian weather is extreme and dry (Fekete & Tilly-Mándy, 2002)

The most common method for the evaluation of plants is the registration of shoot length, shoot number, flower size and number, the duration of flowering. The change of these parameters shows well whether the plant is in good condition or not. The main problems used to be bad fertilizing and irrigation (Armitage, 1994; Gugenhan, 1985; Mátyási, 2000).

The good soil mixture has a great role in the success of growing balcony plants. The structure of it is stabile, does not contain insects, fungi (sterile) or poisoning agents and has good buffer capacity (Gugenhan, 1985). The mixture has to contain appropriate amount of fertilizers but the elements can be washed easily out of the soil with irrigation (Ganslmeier, 1980). Therefore, it is worth to use long lasting fertilizers as base elements such as Osmocote (Anonymous, 2002).

The culture conditions of plug production are generally well known. For example the PanAmerican Seed Corporation gives detailed description of plug growth method to the ordered plant variety (Anonymous, 2003). But there is very limited knowledge about the plants after plantation. Our aim was to examine the newly bred annuals as balcony plants and to determine their development in hanging baskets or balcony boxes.

Material and method

Examined taxa were as follows: *Celosia argentea* L. var. *plumosa* 'Savaria', *Dichondra repens* J. R. Forst. et G. Forst 'Silver Falls', *Nemesia* Vent. 'Blue Bird'. Official latin names were determined from the works of *Walter Erhardt et al.* (2002) and *Griffiths* (1997).

All the plants of the examined varieties were grown in our greenhouse of Buda Arboretum of the Corvinus University Budapest. Seeds of the varieties were sown in Teku cell trays into Stender propagation mixture for seeds. Seedlings were transplanted into cubic round pots of 2.5 and 9 cm diameter, respectively. Growing mixture was 80% Novobalt sour turf, 20% clay originated from the garden of the greenhouse, pH was adjusted to 6–6.5 with the use of Futor (lime with carbonic acid). The basic fertilizer was 6 g/l Osmocote Exact standard 3–4 month length. We did not apply leaf fertilizer during growth.

In the end of May, plants were transplanted into terracotta (brown) balcony boxes made of artificial material, the size was 80×18×18 cm. Nine different varieties of plants were planted to each balcony box, the soil mixture was the same as during plug production. The only change was the adding of 8 g/l Osmocote Park Flower bed of 5–6 month duration. With the use of this dose, no more fertilization was necessary during summer. Balcony boxes were irrigated by an automatic irrigation system.

The varieties were planted into the balcony boxes on 20th May. After one week acclimatization and rooting they were placed to three examination places.

- the Western side of the roof of K building, BCU, Buda Arboretum, Budapest,
 - in Solymár-Kerekhegy (Buda Hills), north-western situation and
 - in Tázlár (Great Hungarian Plain) in eastern situation.
- The Buda location has typical city-climate: hot and dry air from spring till autumn with strong wind.

The climate of Kerekhegy is cool, balanced, with high humidity. The garden was protected from strong wind, surrounded by forest. In Tázlár the climate is typical continental: from spring to autumn hot, dry and the weather is changing. The plants were regularly sprayed against pests and diseases. From 21 June till 29 September plants were measured fortnightly: the number of open and shed flowers, height and/or hanging of stems, illnesses and insects were detected.

Results and discussion

Celosia argentea L. var. *plumosa* 'Savaria'.

The species is native to the tropical areas (*Erhardt et al.*, 2002; *Griffiths*, 1997) and is well known as a bedding plant. The variety 'Savaria' has light green leaves and red flowers (*Figure 1*). During the 10–11 weeks plug production it needs balanced high temperature. It flowers when ready for planting out. This strong variety needs a 9 cm pot size.



Figure 1 *Celosia argentea* L. var. *plumosa* 'Savaria' in balcony box, Tázlár (2003)

'Savaria' grew better in balcony boxes than in beds. As in beds the parameters were 25–30 cm height and 35–40 cm width, in balcony boxes it reached the 35–40 cm height and 30–35 cm width in Tázlár. In Kerekhegy, we measured higher than 40 cm height in August (*Figure 2*). Effected by the strong wind in Budapest, all the examined plants were beaten down in the balcony boxes. From all the leaf bases 10–12 lateral flowers developed and resulted in rather decorative

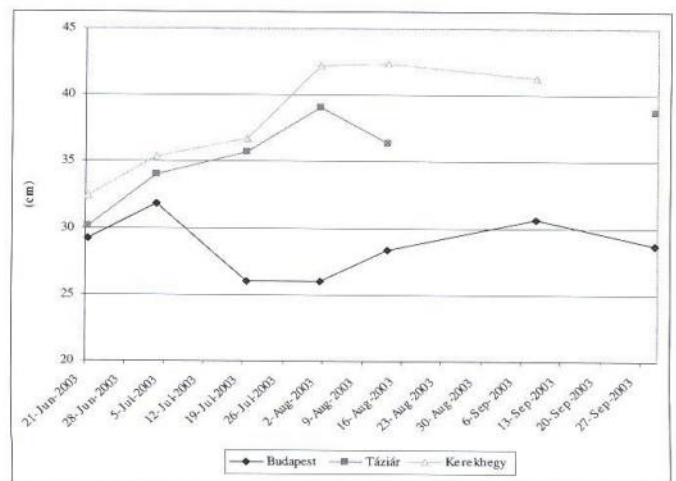


Figure 2 The height of *Celosia argentea* L. var. *plumosa* 'Savaria' (2003)



Figure 3 *Celosia argentea* var. *plumosa* 'Savaria' in Budapest (2003)

and bizarre form (Figure 3). Due to the beating down the height was reduced (Figure 2) and the width stabilized from August (Figure 4). In Kerekhegy and in Tázlár, growth was continuous, 5–6 lateral flowers appeared on the plants.

At all three sites, *Tetranichus urticae* infection was observed, in Tázlár *Helicoverpa armigera* appeared during the hot summer of 2003.

This variety is a decorative plant with long life, and can be offered to beds and balcony boxes too.

***Dichondra repens* J. R. Forst. et G. Forst 'Silver Falls'**

The species is native to the subtropical eastern side of the USA (Erhardt et al., 2002). The variety 'Silver Falls' is a structured plant with grey, intensively hairy leaves (Figure 5). The optimal temperature for germination is 23–24 °C. 2–3 pieces of cotyledon stage plantlets can be planted into one 9 cm pot. Even the very young plant produces long, rooting shoots. The plug is ready after 12–14 week growth, when the shoots are hanging long from the pots.

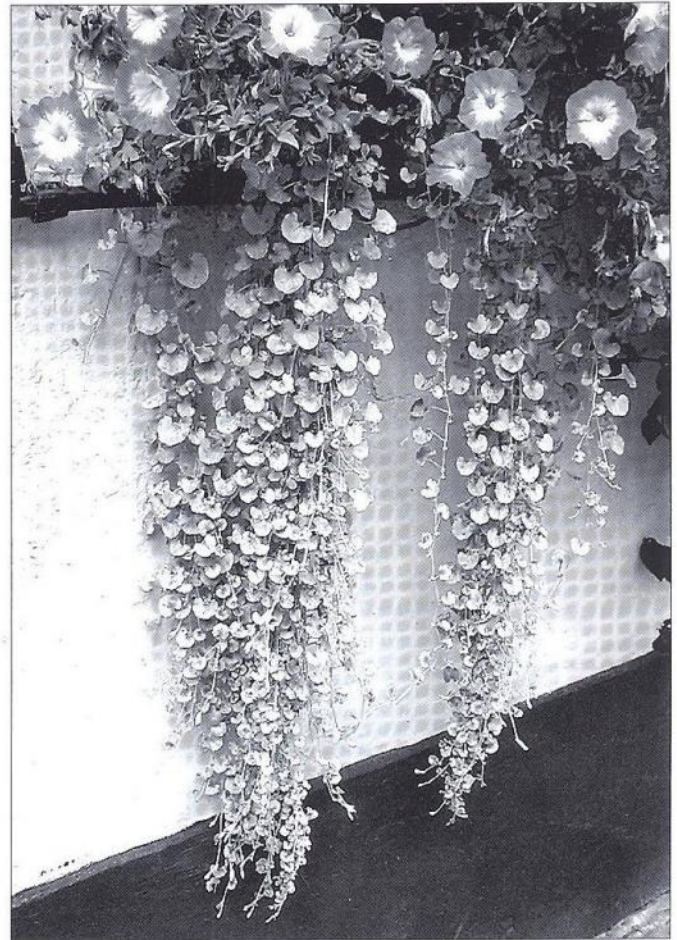


Figure 5 *Dichondra repens* J.R. Forst. et G. Forst 'Silver Falls' (2003)

In the beginning of the experiment, the growth was vertical, later appeared the hanging shoots developing a symmetrical circle form (Figure 5). The average height of the plants was 5–8 cm, the length of hanging shoots was 100 cm in Budapest, 80 cm in Kerekhegy and more than 120 cm in Tázlár (Figures 6, 7 and 8).

The variety 'Silver Falls' flowered all the summer but the small flowers did not have an ornamental effect. The long

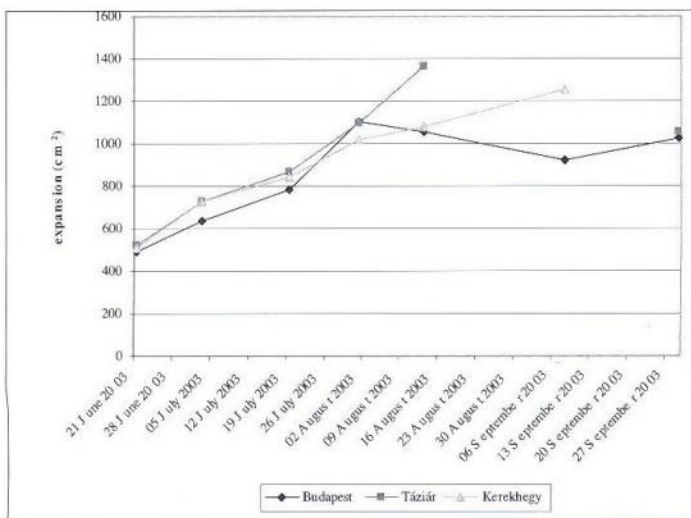


Figure 4 The expansion of *Celosia argentea* L. var. *plumosa* 'Savaria' (2003)

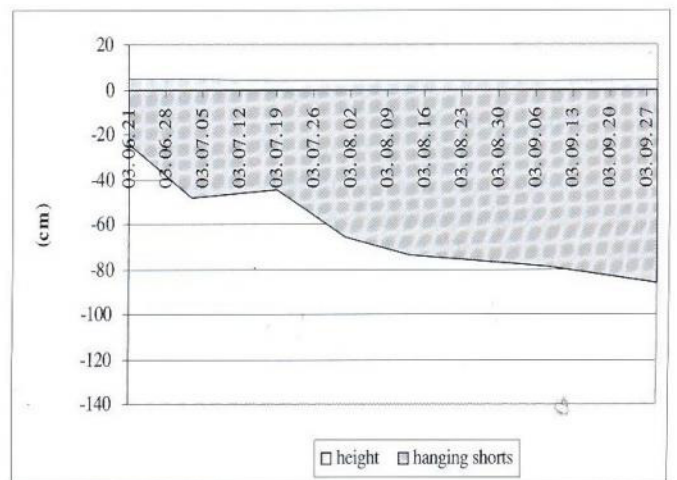


Figure 6 The height and hanging shoots of *Dichondra repens* J.R. Forst. et G. Forst 'Silver Falls' in Budapest (2003)

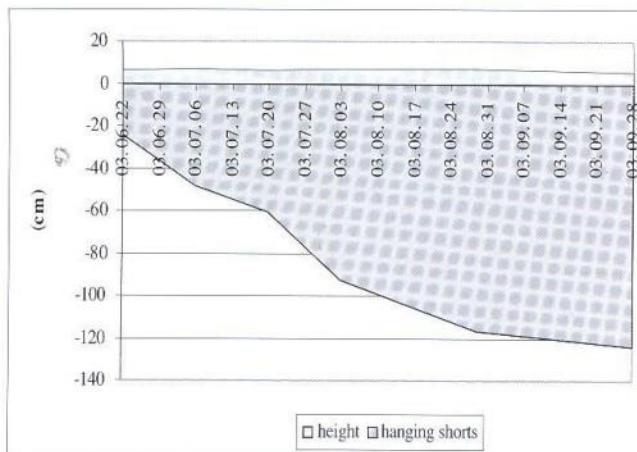


Figure 7 The height and hanging shoots of *Dichondra repens* J.R. Forst. et G. Forst 'Silver Falls' in Tázlár (2003)

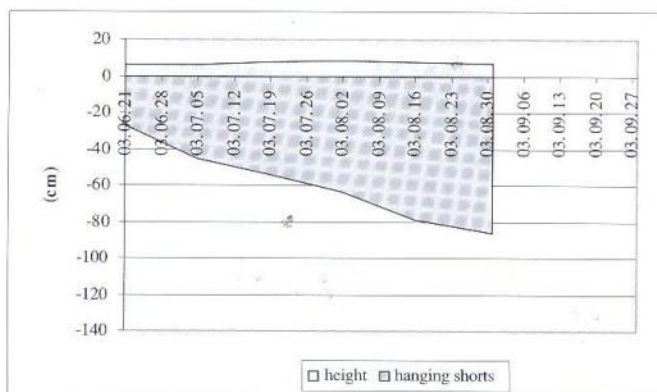


Figure 8 The height and hanging shoots of *Dichondra repens* J.R. Forst. et G. Forst 'Silver Falls' in Kerekhegy (2003)

hanging silver shoots and leaves had a long lasting ornamental view, leaves did not fall. Illness or insects were not observed during the vegetation stage. In the cool and rainy autumn fungi (*Capnodium*, *Apiosporium* and *Meliola* species) appeared on the hairy leaves. The shoots are suitable for use as cut green.

The variety is an excellent balcony plant, can be well associated with all the other species.

Nemesia Vent 'Blue Bird'

The species is native to South-Africa. The hybrids flower in lilac, blue and white colour (Figure 9), the base of petals is lighter or darker. This variety has light blue colour with lighter base. Flowers appear on the top of the shoots.

The variety 'Blue Bird' was propagated by cuttings. One rooted cutting was planted into a 9 cm pot and grown under 17–18 °C temperature. We reached the bushy form by cutting back twice. The duration of plug production is 12–13 weeks, it is flowering when ready.

In the beginning of the experiment shoots grew upwards, later began to hang (Figures 10–12). In Budapest, the height and length of hanging shoots were almost similar, 20 cm.



Figure 9 *Nemesia* Vent. 'Blue Bird' in Kerekhegy, Solymár (2003)

We measured the highest plants in Kerekhegy, the variety developed many shoots. In Tázlár the growth was poor, plants developed only few shoots, mainly upwards.

Till the beginning of August the variety flowered increasingly rich, during the hot August a decreasing period was observed in flowering ability. From September, due to the cooler mornings, plants began to flower again. In Tázlár, the plants flowered more poorly (approximately half) than at the other examined two places (Figure 13).

There was no mentionable insect infection during the summer. In Tázlár, a fungus appeared on the leaves which destroyed the half of the leaves within a short time.

The colour of the variety was long lasting but flowering stops in the hot August. It is better to combine it with other well flowering species.

Acknowledgement

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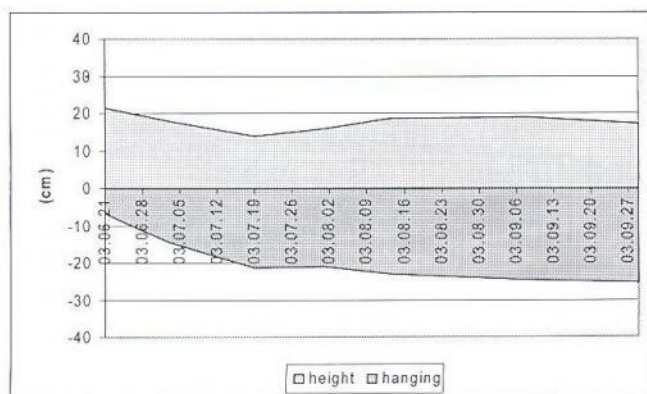


Figure 10 The height and hanging shoots of *Nemesia Vent 'Blue Bird'* in Budapest (2003)

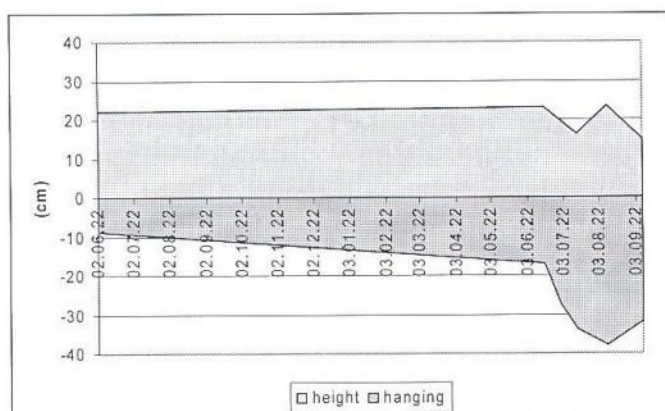


Figure 11 The height and hanging shoots of *Nemesia Vent 'Blue Bird'* in Tázlár (2003)

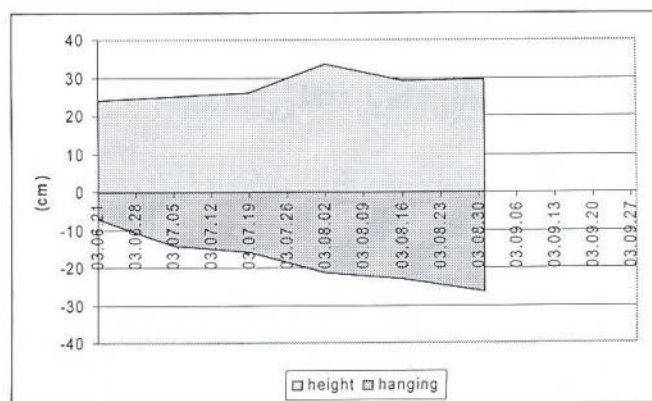


Figure 12 The height and hanging shoots of *Nemesia Vent 'Blue Bird'* in Kerekegy (2003)

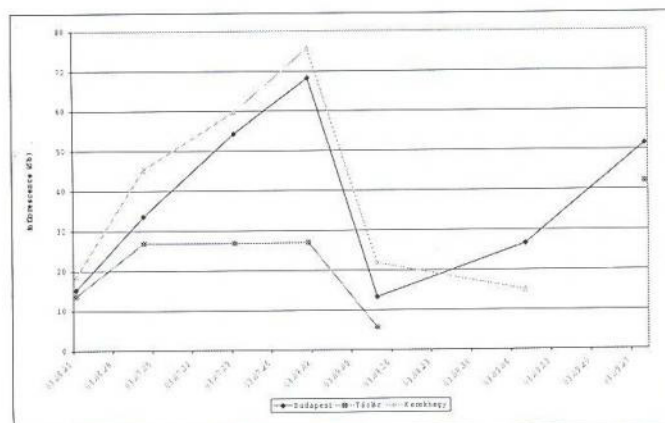


Figure 13 The flowering method of *Nemesia Vent 'Blue Bird'* (2003)

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