

STUDIES ON THE PHENOLOGY OF *COTONEASTER HORIZONTALIS* SPECIE, IN THE CONDITIONS OF "TUDOR NECULAI" NURSERY, IASI REGION

STUDII FENOLOGICE ASUPRA SPECIEI *COTONEASTER HORIZONTALIS* ÎN CONDIȚIILE PEPINIEREI „TUDOR NECULAI” IAȘI

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Abstract. *From the multitude of dendrological species, Cotoneaster genus, with all the species included, is particularly important in garden design, especially that the conditions of our country are generally favorable and very favorable for the growth of these species. The purpose of the paper is to highlight the ornamental potential of the most popular specie of Cotoneaster genus, respectively Cotoneaster horizontalis that was studied in the conditions of "Tudor Neculai" nursery, Iasi region. During the growing season there were made observations and determinations concerning shoots annual growth rate, the growth rhythm of leaves and the number of flowers on the stems.*

Key words: *shoots, leaves, flowers.*

Rezumat. *În cadrul multitudinii de specii dendrologice, speciile genului Cotoneaster au importanță deosebită în amenajarea spațiilor verzi și mai ales în condițiile de la noi din țară care sunt în general favorabile și foarte favorabile pentru aceste specii. Scopul lucrării este de a pune în evidență potențialul ornamental al celei mai cunoscute specii, Cotoneaster horizontalis, care se întâlnește în cadrul pepinierii „Tudor Neculai” Iași. Pe parcursul perioadei de vegetație s-au efectuat observații și determinări privind ritmul de creștere a lujerilor anuali, ritmul de creștere a frunzelor și numărul de flori pe lujeri.*

Cuvinte cheie: *lujeri, frunze, flori.*

INTRODUCTION

One of the basic components of the green spaces which provide the aesthetic aspect of the cities, is represented by the landscape arrangements (Zaharia and Dumitras, 2003).

Within the numberless dendrological species of the ornamental shrubs, the species of the *Cotoneaster* class are given a special importance when arranging the green spaces, while the environmental conditions of our county are generally favourable and very favorable for this species (Iliescu, 2002).

The need to diversify the class becomes a priority, taking into consideration the diversity of the biological material, especially, the results obtained at international level (Donita et al., 2004).

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The literature in the field reveals that, within this type, various species and varieties with unknown ornamental value have been discovered. As the ornamental importance diversity is known, it was suggested that, for the *Cotoneaster* class, phenological studies should be carried out, for the whole shrub, meaning: stalk, leaves and flowers (Bernardis, 2011; Mihail, 2005).

MATERIAL AND METHOD

The investigations regarding the *Cotoneaster horizontalis* species, were carried out within the "Tudor Neculai" nursery of Iași.

The nursery is located in the unincorporated area of Iași, on an area pertaining to Miroslava, being designated to produce the dendrological and floricultural seeding material, in order to decorate and beautify the green spaces from the city of Iași.

The nursery possesses a rich type of *Cotoneaster* species, among which we mention:

1. Procumbent species with persistent leaves:

- Cotoneaster dammeri* Schneid.,
- Cotoneaster microphyllus* Wall. Ex Lindl.

2. Prostrate plants with caducous leaves:

- Cotoneaster horizontalis* Decne.

3. Medium-size erected species, with caducous leaves:

- Cotoneaster dielsianus* Pritz.,
- Cotoneaster divaricatus* Rehd. et Wils.

4. High-size species with caducous leaves:

- Cotoneaster bullata* Bois.,
- Cotoneaster multiflorus* Bge.

5. High-size species, with semi-persistent leaves

- Cotoneaster salicifolius* Franch.,
- Cotoneaster franchetii* Bois.

The analyses have been carried out at *Cotoneaster horizontalis* Decne, with the purpose of highlighting the ornamental potential of the most popular species, *Cotoneaster horizontalis*, which can be found in the dendrological nursery "Tudor Neculai" of Iași.

These analyses were performed during 2012-2013 and there have been carried out determinations which regarded: the stalks' growing rhythm, leaves' growing rhythm and the number of flowers in the stalks.

RESULTS AND DISCUSSIONS

Following the determinations carried out at the annual stalks in 2012, it can be stated that the minimum value of the stalks' length was 0,7 mm, while the maximum one was 13,3 cm.

In 2013, the minimum value was 1cm, while the maximum one was 12,5 cm. (table 1, fig. 1).

Regarding the results that obtained for the leaves, we could say that, in 2012, the minimum value was 0,2 mm, while the maximum value was 2,2 cm; in 2012, the minimum value was 0,5 mm, while the maximum value was 2,5 mm (table 2, fig. 2).

Table 1

Annual stalks growing rhythm in 2012-2013

Date on which the analyses was carried out	Growths (cm)	
	2012	2013
25 march	0,7	-
30 march	2	1
10 april	3,7	2,5
15 april	4,4	3
20 april	5,6	3,9
25 april	6,7	5,5
30 april	7,7	7
10 may	10	8,2
15 may	11,8	10,4
20 may	13,3	12,5

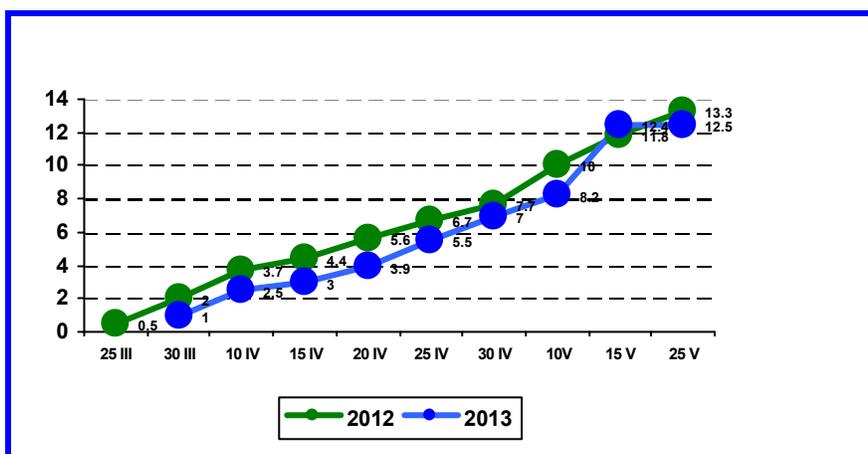


Fig. 1 - The annual stalks growing rhythm in 2012-2013

Table 2

The leaves growing rhythm in 2012-2013

Date on which the analyses was carried out	Growths (cm)	
	2012	2013
25 march	-	0,5
30 march	0,2	1
10 april	0,8	1,2
15 april	1,1	1,3
20 april	1,1	1,3
25 april	1,3	1,3
30 april	1,3	1,3
10 may	2	1,4
15 may	2	2
20 mai	2,2	2,5

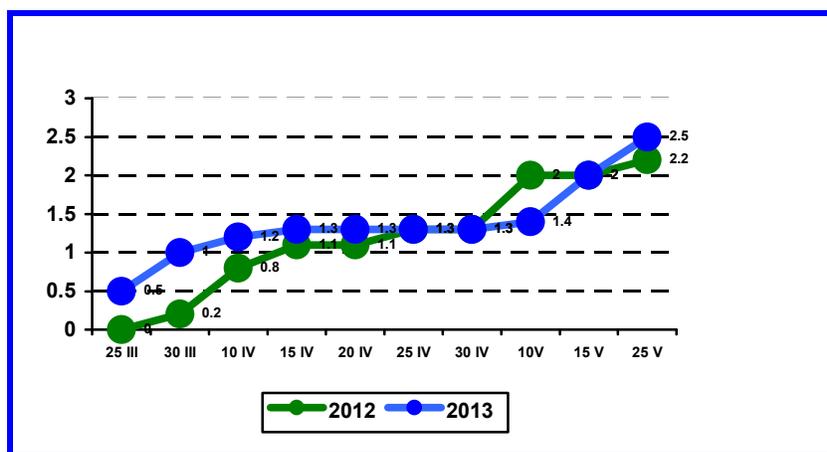


Fig. 2 - The leaves growing rhythm in 2012-2013

Following the researches carried out for the *Cotoneaster horizontalis* species, regarding the number of flowers (fig. 3) performed on 10 stalks, it was revealed that in 2012, on the stalk 1, a minimum number of 10 flowers was registered, while on the stalk 10, a maximum number of 42 flowers was registered.

In 2013, the species had a lower number of flowers, compared to 2012, and registered a number of 6 flowers on the stalk 1 and 36 flowers on the stalk 10 (table 4, fig. 4):

Table 4

Number of flowers on 10 stalks, in 2012-2013

Number of stalks	Number of flowers	
	2012	2013
1	10	6
2	13	8
3	14	14
4	15	15
5	20	22
6	28	26
7	32	28
8	36	31
9	38	34
10	42	36

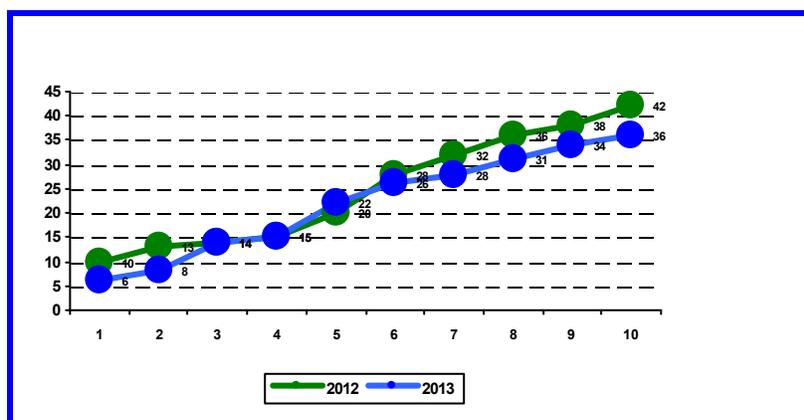


Fig. 4 - Number of flowers on 10 stalks, in 2012-2013

The analyses of the leaves

Following the researches carried out in 2012, the *Cotoneaster horizontalis* species started to come into leaf in the 3rd decade of the March. At the first measurement performed on 25th March, the leaves were 0,2 mm. Due to the cold temperature and precipitations, the same value was registered also on 30th March.

At the measurement performed on 10th April, the leaves had the value of 0,8 mm, after which, on 15th April, their size was to 1,1 cm, period in which stagnation was registered, until 20th April. From 20th April until 25th April, a growth was registered, up to 1,3 cm, which was maintained until 30th April. At the measurement performed on 10th May, it was noticed that the leaves' size was 2 cm, value which was maintained until 15th May, after which, at the last measurement the leaves were 2,2 cm.

In 2013, the species started to come into leaf 10 days later. This way, at the first measurement, performed on 25th March, the leaves were 0,5 cm, after which, on 30th March, their size was 1 cm. At the measurement performed on 10th April, the leaves were 1,2 cm, after which, on 15th April until 30th April, no growth was registered.

Starting from 30th April, until 20th May, the leaves grew as follows: on 10th May, they were 1,4 cm, on 15th May they were 2 cm, while on 20th May, and they were 2,2 cm.

The analysis of the annual stalks

In 2012, the *Cotoneaster horizontalis* species entered into vegetation in the 2nd decade of March.

From their first apparition, until the second measurement, performed on 30th March, the stalks have grown up to 0,7 mm.

From 25th March, until the second measurement performed on 30th March, the stalks have grown up to 2 cm.

At the following measurement performed on 10th April, it was revealed that the stalks have grown up to 3,7 cm. In April, the measurements were performed every ten days: on 10th April-4,4 cm, 20th April-6,7 cm, 30th April-7,7 cm.

At the performance of the last measurements, in May, it was revealed a reduced growth, as a consequence of the first inflorescence.

This way, on 10th May, the stalks reached the size of 10 cm, on 15th May – at 11,8 cm, and at the final measurement, the stalks were 13,3 cm.

Following the analyses performed in 2013, it was revealed that the species came into vegetation in the 2nd decade of March, but 12 days later.

At the first measurement, performed on 30th April, the stalks were 1 cm. But at the last measurement, performed on 10th April, the stalks have grown up to 1,5 cm. In that month, the measurements were performed more often and this way it was revealed that the stalks had the following values: 15th April- 3cm; 20 april- 3,9 cm.

From 20th April until 25th May, the stalks had a more punctuated growth, meaning: from 25th April- 5,5 cm, at 30th April-7cm, 10th May- 8,2 cm, on 15th May- 10,4 cm, while at the last measurement, the stalks had a growth of 12,5 cm.

CONCLUSIONS

1. The pedoclimatic conditions provided by the dendrological nursery, are adequate for a positive growth and development of the biological material which was studied, and may allow to highlight the ornamental value of the species.

2. Comparing the apparition and the dynamics of the stalks' development, it was observed that there are no major differences during the two vegetation periods, in which the analyses were performed.

3. After the phenological analysis, performed on the leaves of *Cotoneaster horizontalis* species, it resulted that there were no major modifications of the initial sizes of the leaves, the average was preserved between 2,2 cm for 2012, and 2,5 cm for 2013.

4. Regarding the number of flowers, due to the favourable environmental conditions and to the maintenance works which were applied; a relatively good number was observed, situated within the maximum biological values of this plant, the number of lowers providing a special ornamental value.

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