PROSPECTS FOR THE USE OF SOME PLANT LIGNEOUS TO THE CONTAINER

PERSPECTIVELE UTILIZĂRII UNOR PLANTE LEMNOASE LA CONTAINER

MITRĂ M.[1], MITREA I.[1], BOTU I.[1]
e-mail: mitramarian@yahoo.com

Abstract. *In the last two decades have appeared widely in our country, fruit and dendrological plants on the container. These species are used for decorative effects, fruit and even research. Research carried out along 10 years have proposed to establish the most effective types of containers, mixtures of nutrients and different types of fruit and dendrological plants. The variants with plastic containers of 90 liters capacity and nutrient composed of 1/3 peat, 1/3 sand and 1/3 ground celery with 3-4 kg barbel have achieved the highest growth and highest number of fruits at the studied plants. (Juglans regia cv. Student, Corylus avelana cv. Vâlcea 22, Prunus domestica cv. Stanley şi Tuleu gras, Prunus cerasifera cv. Red Castle. Growth differences were recorded in all species where the containers were buried in the soil (SSTx- = 53 cm^2 and crown volume = 6,2 m^2) comparative with the aboveground container (SSTx- = 17,1 cm^2 and crown volume = 0,83 m^2) where the plants grew much less.For the fruit plants was found that fruit yield were from 0.5 to 7.6 kg / plant for containers buried in the soil. Benefits of plants fruit and dendrological grown in 90 liters containers and buried in the soil are superior to those grown in aboveground containers, also through increasing the quantities of fruit and the strength gives for the root systems during the winter frost (-12^{0}C, -20^{0}C) and even in summer (40^{0}C). Multiannual plants grown in containers are successfully used in yards, gardens and even on street alignments.*
Key words: containers, woody plants, growing, bearing.

Rezumat. *În ultimele două decenii şi-au făcut apariţia pe scară largă, în România, unele plante pomicole la container. Scopul acestora este de a le cultiva în grădini, terase sau pentru conservarea resurselor genetice. Cercetările efectuate de-a lungul a 10 ani şi-au propus să stabilească cele mai eficiente tipuri de containere, de amestecuri nutritive şi a unor feluri de plante pomicole. Containerele de plastic cu capacitatea de 90 L şi amestecul nutritiv format din 1/3 turbă, 1/3 nisip şi 1/3 pământ de ţelină cu 3-4 kg mraniţă au realizat cele mai mari creşteri şi cele mai multe fructe la plantele studiate, Juglans regia cv. Student, Corylus avelana cv. Vâlcea 22, Prunus domestica cv. Stanley, Tuleu gras şi Prunus cerasifera cv. Red castle. Diferenţe mari de creştere s-au înregistrat la toate speciile, în cazul în care containerele au fost îngropate în sol – Suprafaţa Secţiunii Trunchiului (SST), (SST_x= 53 cm^2 şi volumul coroanei = 6,2 m^3), comparativ cu containerele supraterane (SST_x = 17,1 cm^2 şi volumul coroanei = 0,83 m^3), în care plantele au crescut mult mai puţin. La plantele pomicole s-a constatat că se obţin producţii de fructe de 0,5 la 7,6 kg/plantă, în cazul containerelor îngropate în sol. Avantajele oferite de*

[1] University of Craiova, Romania

plantele pomicole cultivate în containere de 90 L şi îngropate în sol sunt superioare faţă de cele cultivate în containere neîngropate, atât prin creşterile şi cantităţile de fructe realizate, cât şi prin rezistenţa pe care o conferă sistemelor radiculare în cazul gerurilor din iarnă (-12; -20^{0}C) şi chiar în vară (+40^{0}C). Plantele lemnoase cultivate la containere se folosesc cu succes în curţi, grădini familiale şi chiar pe aliniamente stradale.
Cuvinte cheie: containere, plante lemnoase, creştere, fructificare.

INTRODUCTION

Ornamental plant growing in containers made of wood (crates, boxes, tub, etc.) or clay (pottery, amphorae, vessels of different shapes) dates back to ancient times. Many paintings, frescoes, archeological artifacts are found throughout the ancient sites.

This type of ornamental plant cultivation has spread to this day remains the precursor of modern culture and plant in container in urban centers today (Dartigues et Lemaire, 1989; Stanica et al., 2002).

Introduction of exotic plants, including those fruit plants in temperate areas (citrus, fig, pomegranate, etc. Have given a new perspective to use plants in container. Gardens Palace of Versailles, built by Le Nôtre, after 1861 became among the most representative of the culture of exotic fruit and ornamental plants in container. Around the same time make their appearance on paths in parks, sidewalks in court, many containers with grown plants.

From the great palaces and museums of the world (Louvre, Vatican, Schönbrun, Leipzig, etc.) The cultivation of plants in container is ubiquitous in urban life, and in recent years even under field conditions, the purpose of research (gene banks, hybrid cultures etc.) (Bunt, 1984, Wright and Nemiera, 1987, Costea, 2001).

Through our research at the University of Craiova (SCDP Vâlcea) we proposed to establish the behavior of plants grown in containers of plastic fruit with capacity of 90 L.

MATERIAL AND METHOD

The research was conducted on the following species: *Juglans regia cv. Student, Corylus avelana cv. Valcea 22, Prunus domestica cv. Stanley* and *Tuleu gras*, *Prunus cerasifera cv. Red castle, Malus domestica cv. Wijcik*.

In this paper we refer to results obtained in plastic containers with a capacity of 90 L and nutrient mixture consisting of 1/3 peat, 1/3 sand and 1/3 of fallow land and 3-4 kg manure.

Each year the container was fertilized with 25 g NH_4NO_3/container.

Containers with plants were used in two ways:

- containers buried in the soil (60-70 cm);
- containers maintained above ground (on film or concrete), with protection in solariums during winter.

Irrigation was performed every three days (containers above ground) and every six-seven days in the underground. Observations and measurements were made on trunk sectional area, crown volume, fruit production, ornamental appearance etc.

Some observations were processed by statistical methods (standard deviation and variance analysis), the experience using a number of five plants, each representing a repetition, a total of 5 repetitions.

RESULTS AND DISCUSSIONS

Culture of fruit and ornamental plants in containers of 90 L was found to be dependent on plant genotype and the use of containers. The way the plants growth for a period of 10 years was distinguished by the characteristic features: trunk sectional area (SST) and crown volume (table 1 and 2).

Trunk section area (SST) has differentiated as value between genotypes. This ranged from 32.1 cm^2 (*Corylus avelana* cv. *Vâlcea 22*) and 63.6 cm^2 (*Juglans regia* cv. *Student*, fig. 1) at the plants grown in containers buried in the soil. At the containers above ground trunk sectional area values (SST) ranged from 7.1 cm^2 and 40.7 cm^2.

Medium trunk sectional area (SST) in all plants grown in containers buried (50.9 cm^2) were higher than those of ground containers (13.7 cm^2), with a probability of transgression of P.005 = 6,8 cm^2.

Coefficients of variation (s%) of trunk sectional area (SST) ranged between 14.9% (*Malus domestica* cv. *Wijcik*.) (fig. 2) and 20.4% (*Juglans regia* cv. *Student*) for buried containers and between 14, 2% (*Corylus avelana* cv. *Vâlcea 22*) and 20.2% (*Prunus domestica* cv. *Tuleu gras)* (fig.3), standing in groups with average variability (10-20%).

Table 1

Trunk section area at plants grown in plastic containers of 90 L (age 10 years)

No.	Species	Containers buried		Containers above ground		R = $\frac{SSTCî}{SSTCs}$
		SST (cm^2)	s%	SST (cm^2)	s%	
1.	*Juglans regia cv. Student*	63,6	20,4	12,5	19,6	5,09
2.	*Corylus avelana cv. Vâlcea 22*	32,1	16,2	8,7	14,2	3,69
3.	*Prunus domestica cv. Stanley*	50,2	17,1	15,2	19,4	3,30
4.	*Prunus domestica cv. Tuleu gras*	53,2	18,9	12,5	20,2	4,25
5.	*Prunus cerasifera cv. Red castle*	52,8	16,4	15,2	18,2	3,47
6.	*Malus domestica cv. Wijcik*	53,6	14,9	18,2	16,4	2,94
Average		50,9		13,7	-	3,71

SST Cî = Trunk section area at buried containers
SST Cs = Trunk section area at above ground containers
P.005 = 6,8 cm^2

Trunk sectional area ratio values (SST) of the same genotype grown in buried and unburied container varies between 2.94 and 5.09, for those buried.

Values recorded at crown volume (table 2) show an average of 5.53 m^3 at plants in buried containers comparative to 0.67 m^3 (with P.005 = 0.75 m^3).

Fig. 1 - *Juglans regia cv. Student* at above ground containers

Fig.2 - *Malus domestica cv. Wijcik* at above ground containers

Fig. 3 - *Prunus domestica cv. Tuleu gras* at buried containers

Fig. 4 - *Prunus domestica cv. Stanley* at above ground containers

Table 2

Crown volume at plants grown in plastic containers of 90 L (age 10 years)

No.	Species	Containers buried		Containers above ground		R = $\frac{V.cor.\hat{i}}{V.cor.s}$
		Crown volume (m^3)	s%	Crown volume (m^3)	s%	
1.	*Juglans regia cv. Student*	5,5	19,5	0,40	20,4	13,7
2.	*Corylus avelana cv. Vâlcea 22*	3,7	18,5	0,39	16,6	9,5
3.	*Prunus domestica cv. Stanley*	6,9	18,5	0,76	19,6	9,1
4.	*Prunus domestica cv. Tuleu gras*	7,2	20,1	0,92	20,8	7,8
5.	*Prunus cerasifera cv. Red castle*	7,5	16,5	0,96	19,1	7,8
6.	*Malus domestica cv. Wijcik*	2,4	10,2	0,63	11,4	3,8
Average		5,53	-	0,67	-	8,6

V.cor.î = Crown volume at buried containers
V.cor.s = Crown volume at above ground containers
P.005 = 0,75 cm^2

Table 3

Fruit production at some plants grown in containers of 90 L (average 3 years)

No.	Species	Fruit production kg/pl		Fruit production t/ha *	
		Containers buried	Containers above ground	Containers buried	Containers above ground
1.	*Prunus domestica* cv. *Stanley*	4,3	0,8	7,1	1,3
2.	*Prunus domestica* cv. *Tuleu gras*	3,7	0,7	6,1	1,1
3.	*Malus domestica* cv. *Wijcik*	7,6	3,9	12,6	6,5
4.	*Corylus avelana* cv. *Vâlcea 22*	0,5	0,3	0,8	0,5
5.	*Prunus cerasifera* cv. *Red castle*	0,6	0,3	1,0	0,5
Average		3,3	1,2	5,5	2,0

* - Fruit production calculated for 1660 plants / ha

All plants in buried containers their crowns and heights were higher than those in unburied containers and this phenomenon is because the temperature and humidity in the container is very close to that of surrounding soil and the holes in the container allow to some roots have direct contact with the ground.

The crown volume of the plants in buried containers ranged from 7.5 m^3 (*Prunus cerasifera* cv. *Red Castle*) and 2.4 m^3 (*Malus domestica* cv. *Wijcik*), and for the plants in the unburied containers between 0.39 m3 (*Corylus avelana* cv. *Vâlcea 22*) and 0.96 m3 (*Prunus cerasifera* cv. *Red castle*).

Ratio between crown volumes from the same plant, ranged from 3.8 (*Malus domestica* cv. *Wijcik*) and 13.7 (*Juglans regia* cv. Student).

For a total of five varieties there was recorded the fruit production (table 3).

Plants grown in buried containers achieved an average production of fruit (3.3 kg/plant) comparative with those in containers above ground (1.2 kg/plant).

The most productive proved to be: *Malus domestica* cv. Wijcik (7.6 kg / plant), *Prunus domestica* cv. *Stanley* (4.3 kg / plant) (fig. 4) and *Prunus domestica* cv. *Tuleu gras* (3.7 kg / plant).

For a culture with 1660 plants/ha, buried containers, fruit yields are higher, *Malus domestica* cv. Wijcik (12.6 t / ha), *Prunus domestica* cv. *Stanley* (7.1 t / ha) and *Prunus domestica* cv. *Tuleu gras* (6.1 t / ha).

Variety of hazel *Vâlcea 22* and plum variety *Red Castle* have made very high productions (0.8 to 1.0 t / ha).

For the plants grown in containers above ground one variety, *Malus domestica* cv. *Wijcik* made a high production (6.5 t/ha), the rest of genotypes have produced between 0.5 and 1.3 t/ha.

CONCLUSIONS

Cultivation of the fruit plants/ornamental plants in container 90 L with burial in soil is advantageous to the ornamental and scientific production (gene banks).

Plants grown in containers without soil burial, need protection from low temperatures in winter, but can be used in different locations.

Between plants grown in the two systems shows differences of vigor and fruition in favor of container buried in the soil.

REFERENCES

1. **Bunt A. C., 1984** – *Physical proprieties of mixtures of peats and minerals of different particle size and bulk density of potting substrates*. Acta Horticulturae, nr. 150. SISH.
2. **Costea G., 2001** – *Cercetări privind influența substraturilor şi soluțiilor nutritive în cultura containerizată a unor specii de arbuşti ornamentali*. Teză doctorat, USAMV Bucureşti;
3. **Lemaire F., Dartigues A., 1989** – *Culture en pots et conteneurs – Principes agronomiques et application*, INRA, PHM Revue Horticole Limoge, France.
4. **Stănică Fl. et al., 2002 –** *Înmulțirea plantelor horticole lemnoase* Edit. Ceres, Bucureşti.
5. **Wright O.R., Niemera X.A., 1987** – *Nutrition of container – grown woody nursery crops*. Hort. Rev. 9., p. 75-101.