Scientific Papers. Series B, Horticulture. Vol. LVII, 2013
Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN-L 2285-5653

WINTERING RESISTANCE OF ORNAMENTAL WOODY PLANTS IN CONTAINERIZED CULTURE

Ion ROȘCA

Botanical Garden (Institute) Academy of Sciences of Moldova,
18 Padurii Street, MD 2002, Chisinau, Republic of Moldova

Corresponding author email: roscasilva@yahoo.com

Abstract

*The target of the experience consists in establishing the level critical temperatures and the mode preservation during cold period of the year for the species and cultivars of conifers in containerized culture. Because of at the plants are fortified in container conditions, frequently occurs the phenomenon of spiraling root system, standing at the periphery of the substrate, endangered by frost and, proceeding from the need of protection during the winter, we suggest the following objectives: * the comparative comportment of the species and cultivars during the cold season, depending on the way of storage; * the species and cultivars resistance at low temperatures, depending on the ecological requirements of plants. For containerized culture of ornamental species and cultivars were established following conservation cold season: V_1 – protected plants displayed in greenhouse; V_2 – protected plants and exposed outdoor but covered with protective acrylic cloth; V_3 – plants unprotected and exposed outdoors throughout the cold period. As a result of the study it was found that the species and cultivars of conifers remarked the highest coefficient – 100% resistance at low temperatures, where all three variants of wintering (V_1, V_2, V_3), at the end of the cold period the plants were started in vegetation and there were no damages caused by the frost.*

Key words: *resistance wintering, containerized culture, preservation variants and cultivars.*

INTRODUCTION

Roots of the plants in the open field are protected from the soil mass and penetrates deeper, thus preserving it from the excess of high and reduced temperatures. At the fall of frost, the temperature sometimes decreases more than a few degrees below the critical point, except the portion from the soil surface. Different behaviors have the plants roots in containerized culture from the temperate and sub temperate zone, where the freezing point is not lethal, comparatively with the temperate-continental climate in the Republic of Moldova. In temperate zone, the aerial part of the majority of species possesses the ability of increasing their resistance to wintering, from the moment of reducing the duration of the day and the decreasing of fall temperatures. On the contrary, the containerized plant roots in local conditions have a reduced capacity for resistance to wintering or even are missing. At the plants grown in the cylindrical shape containers is often the phenomenon of spiraling of the roots, so the young roots are much more vulnerable to the injuries caused by the low temperatures. In that case, the container thickness of the wall performs the duties of the protector of roots to lethal temperatures. If the temperatures, fall below the critical point for some time, the roots, coming in contact with the interior surface of the container, freezes. In such cases, the roots regenerate from the remaining who survived inside the culture substrate and from the base of the plant. Therefore, if the temperature persists at or below the lethal point then the temperature of the culture substratum integral mass also reaches the lethal temperatures, thus completely destroying the root system. The degree of deterioration of the root system is difficult to determine until start the vegetation season and only when takes place the desiccation we can establish the full effect of the damage state (Rosca, 2003). From a technological point of view is recommended the transferring of suspicious moderately affected plants in greenhouses heated (Gouin, 1973; Rosca, 2003). More authors attest the

fact that root injuries is the major factor which limits the containerized culture in the northern countries and was established that *Taxus* x *media* 'Hatfieldi' young white roots freezes at the temperature of − 3°C, those secondary red-maroon at − 7°C and the mature stem from the base does not freeze until − 19°C (Mityga et al., 1971; Rosca, 2009).

MATERIALS AND METHODS

For containerized culture of ornamental coniferous species and cultivars such as: *Abies concolor* Lindl. et Gord., *Abies nordmanniana* (Stev.) Spach., *Juniperus communis* 'Meyer', *Picea glauca* 'Conica', *Picea pungens* f. *glauca* (Reg.) Beissn, *Taxus baccata* L., *Taxus* x *media* 'Hatfieldii', *Taxus* x *media* 'Wojtec', *Thuja occidentalis* 'Danica', *Thuja occidentalis* 'Fastigiata', *Thuja occidentalis* 'Holmstrup', *Thuja occidentalis* 'Smaragd', *Thuja orientalis* 'Aurea Nana' following variants of preservation for the cold period of year have been established: **V_1** − protected plants displayed in greenhouse; **V_2** − protected plants and exposed outdoor but covered with protective acrylic cloth; **V_3** −unprotected plants and exposed outdoors throughout the cold period. In the experience were involved by 20 units / cultivar for each variant of preservation and was carried out between 1.XI.2007-15.IV.2008. Meteorological data on the period XI.2007-IV.2008 were registered in Chisinau and taken from State Hydrometeorological Service (Table 1).

Table 1. Containerized plant resistance at low temperatures.

Species and cultivars	Number of plants exposed on 15.11.07., units $t^o = +11^oC;-4,9^oC$			Number of plants preserved on 15.04.08., units		
	Wintering variants					
	greenhouses	protected	unprotected	greenhouses	protected	unprotected
Abies concolor Lindl. et Gord.	20	20	20	20	20	20
Abies nordmanniana (Stev.) Spach.	20	20	20	20	20	20
Juniperus communis 'Meyer'.	20	20	20	20	20	20
Picea glauca 'Conica'	20	20	20	20	20	20
Picea pungens f. *glauca* (Reg.) Beissn.	20	20	20	20	20	20
Taxus baccata L.	20	20	20	20	20	20
Taxus x *media.* 'Hatfieldii'	20	20	20	20	20	20
Taxus x *media* 'Wojtec'	20	20	20	20	20	20
Thuja occidentalis 'Danica'	20	20	20	20	20	20
Thuja occidentalis 'Fastigiata'	20	20	20	20	20	20
Thuja occidentalis 'Holmstrup'	20	20	20	20	20	20
Thuja occidentalis 'Smaragd'	20	20	20	20	20	20
Thuja orientalis 'Aurea Nana'	20	20	20	20	20	20

RESULTS AND DISCUSSIONS

The plants experimented concerning the resistance to low temperatures, depending on the three types of wintering it consists of species and cultivars of conifers. The obtained results on wintering containerized conifer yield are shown in Figures 1-5, Table 1.

On the basis of investigations regarding the behavior of species and cultivars under the conditions of containerized culture, their resistance to low temperatures, depending on the mode of conservation, we obtained the following results:

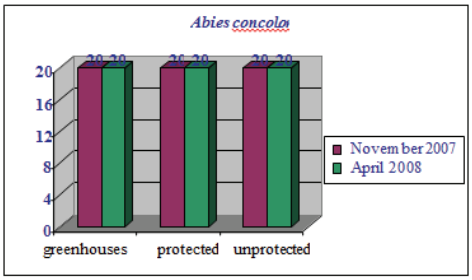


Figure 1. Number of plants preserved after wintering at the species Abies concolor Lindl. et Gord.

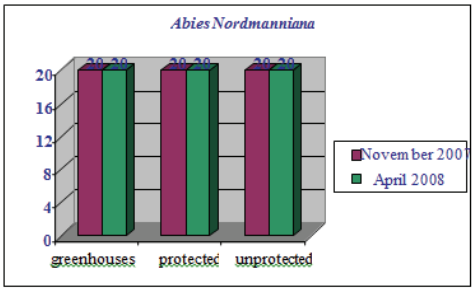


Figure 2. Number of plants preserved after wintering at the species Abies nordmanniana (Stev.) Spach.

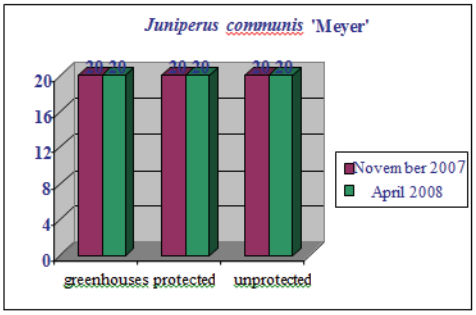
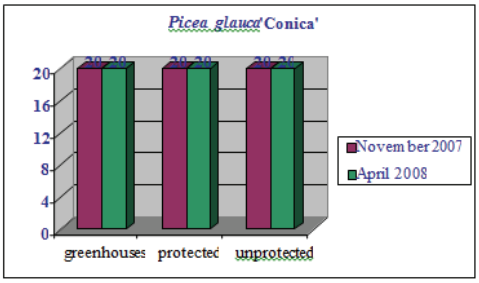


Figure 3. Number of plants preserved after wintering at the cultivar Juniperus communis



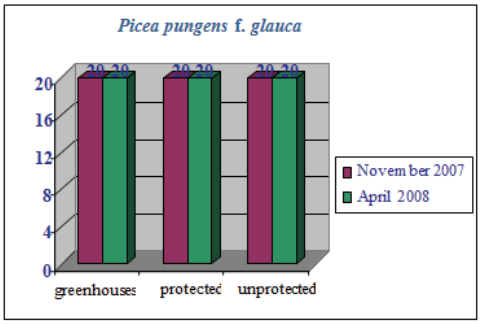


Figure 4. Number of plants preserved after wintering at the species Picea pungens f. glauca (Reg.) Beissn.

Figure 5. Outdoor wintering mode.

Figure 6. Plants coated with protective acrylic cloth.

Figure 7. Plants placed in the greenhouse for wintering.

CONCLUSIONS

As a result of the study it was established that the species and cultivars ***of conifers*** have remarked the highest ratio-**100%** of resistance at low temperatures, in all three types of wintering (**V_1**, **V_2**, **V_3**), which started at the end of the cold vegetation and there were does not injuries caused by the frost.

We recommend that the species and cultivars of ornamental woody plants in conditions of containerized culture must be maintained during the cold season of the year, with the *fast rhythm* of growing – in conditions of greenhouses – **V_1**, those with *slowrhythm* of growth, protected with acrylic cloth, and exposed outdoors – **V_2**.

REFERENCES

Gouin F.R., 1973. Winter protection of container plants. Proc. Int'l Plant Prop. Soc., 23, p. 255-258.

Mityga H.G., Lanphear F.O. 1971. Factors affecting the cold hardiness of *Taxus cuspidata* roots. Jour. Amer. Soc. Hort. Sci., 96, p. 83-87.

Rosca I., 2003. Caracteristicile recipientelor pentru culturile în containere. In: Tezele conf. tinerilor savanti ai Academiei de Stiinte a Moldovei. Chisinau, p. 77.

Rosca I., 2003. Cultura plantelor lemnoase în containere – tehnologie noua de crestere si dezvoltare. In: Buletinul A.S.M., ser. Stiinte Biologice, Chimice si Agricole. Chisinau, nr. 2 (291), p. 163-164.

Roshka I., 2009. Aspecte caracteristice rezistentei la temperaturi critice ale plantelor decorative cultivate în conditii de container. International Conference of Young Researches. November 5-6, Chisinau, Moldova. In: Scientific abstracts. p. 56.