THE INFLUENCE OF BLACK POPLARS WINTER CUTTINGS DIAMETER ON HIS ROOTFORMATION AND GROWTH OF CUTTING SEEDLINGS

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The data of influence of winter annual cuttings diameter of 5 hybrids of black poplars section on his root formation and growth of cutting plantlets in fresh sudubrava conditions are presented. Found that in the studied conditions, the highest rate of rooting of cuttings and height of one-year cutting plantlets are marked poplar of Toropogritskii and 'I-214'.

Poplar, hybrid forms, winter cuttings, cutting plantlets, fresh sudubrava, root formation, intensity of growth.

A poplars is the most fast-growing arboreal species of temperate climate. Its different species and forms rear in planting of the different setting, since olden times, especially for the speed-up receipt of arboreal raw material.

Wood of poplar is soft, easy and suitable for the different types of treatment. It is widely utilized in the paper, match, veneered production, building, energy and other industries of economy.

The Poplar genus (*Populus* L.), without the species of *Turanga* section, which by some authors selected in separate genus of Salix family, includes about 36 species [4]. Mainly it is trees of the first size, which are marked very intensive growth, especially early in life. Them the forest stands is able to accumulate plenty of wood already in age 10–20.

The productivity of poplar stands (middle change of stands to timber per hectare) makes in Italy, France and USA from 13,5 to 36,4 $м^3 \cdot га^{-1}$ in a 1 year [4]. The similar indexes of the productivity of the poplar forest plantations in the conditions of south of Ukraine also can be attained [5].

Among poplars, which are cultures with the purpose of production of arboreal raw material, and also for planting of greenery, with a melioration purpose and others like that species and forms of Black poplars section (*Aigeiros* Duby)

prevails. On the estimations of some researchers [11], over 90 % poplars, which are cultivated in the whole world, is presents species and hybrids exactly of this section. It is related to lightness of their hybridization between itself, and also with the representatives of other sections, by high adaptive ability for growth in moderate and subtropical areas, and also by lightness of vegetative reproduction.

Expedience of the use of different species and forms of poplars in a that or other region is set of their growing in testing cultures. Such works are conducted in a number of the European countries [9, 9, 10, 11], America [8], Russia [6, 7] and other countries, including Ukraine [1, 2, 3, 4, 5].

Purpose of researches – establishment of features of growth of five cultivars of poplar and optimum thickness of their cuttings for creation of forest plantations in the fresh sudubrava forest conditions of Kyiv Polissya.

Materials and method of researches. The experimental object was created on the educational-experimental nursery of department of reforestation and afforestation of National University of Live and Experimental Sciences of Ukraine in spring in 2013. Winter annual cuttings of five Euro-American cultivars were utillized: 'I-214' (P. x euramericana (Dode) Guinier cv. 'I-214'), 'Blanc du Poitou' (P. x euramericana (Dode) Guinier cv. 'blanc du Poitou'), 'Robusta' (P. x euramericana (Dode) Guinier cv. 'robusta'), 'Dorskamp' (P. x euramericana (Dode) Guinier cv. 'dorskamp') and poplar of Toropogritskii, which was selected by D.P. Toropogritskii on the Steppe branch of Ukraine Science-Experimental Institute of Forestry and Forest Amelioration (Tsurupinsk city, Kherson area) from seminal posterity of the 'I-214'cultivar and a poplar pyramidal (Italian) (*P. italica* (du Roi) Moench = *P. pyramidalis* Rozier) [1, 2].

One-year 25-cm cuttings of the adopted cultivars which after a diameter in an overhead cut parted on three groups: thin (0,5–0,8 mm) middle (0,9–1,5 mm) and thick (1,6–2,2 mm), were planted in fresh sandy clay soil apeak with abandonment above the surface of soil one bud. During of period of vegetation in planting 6 hand cares were conducted of soil with the delete of weeds and loosening of soil.

In autumn, after stopping of growth of cutting nursery transplants, after traditional methods, determination of percent of taking root and height of above-ground part was conducted.

Results of researches. Through an anomalous hot and dry weather the taking root of cuttings appeared low (tabl. 1), that specifies on expedience in hot droughty periods in such climate and soil terms to apply poured.

1. A taking root of winter cuttings of poplar is depending on their thickness

Cultivar of poplar	Taking root of cuttings, %			
	general	including:		
		thin	middle	thick
Toropogritskii	39,2±3,56	27,6±8,45	37,5±5,45	45,0±5,60
'I-214'	34,0±3,41	29,4±7,93	38,8±5,48	31,3±5,21
'Blanc du Poitou'	32,0±3,36	23,5±7,38	28,4±5,04	38,6±5,48
'Robusta'	23,6±3,02	10,0±4,80	25,0±4,87	29,1±5,14
'Dorskamp'	31,7±3,42	38,5±9,73	27,5±5,02	33,8±5,32

As evidently from the resulted information, a taking root appeared the greatest in the poplar of Toropogritskii (39,2 %) and 'I-214' (34,0 %), and the lowest – in 'Robusta' (23,6 %). After an exception to the cultivars of 'Dorskamp', and partly, 'I- 214', a tendency is traced to growth of indexes of taking root of cuttings with the increase of their diameter.

The greatest indexes of medium-high of nursery transplants (tabl. 2) appeared in to the 'I-214' (64,5cm), and also in the poplar of Toropogritskii and 'Dorskamp' (accordingly 58,3 and 57,6 cm). The least medium-high was mark 'Blanc du Poitou' plants– 44,0 cm.

2. A medium-height of one-year cutting plantlets of poplar is depending on the thickness of cuttings which they grew from

Cultivar of poplar	Medium-height of one-year cutting plantlets, cm			
	general	including:		
		from thin cuttings	from middle cuttings	from thick cuttings
Toropogritskii	57,6±3,07	52,5±7,46	60,3±6,00	56,4±3,57
'I-214'	64,5±3,57	78,7±11,18	64,0±5,26	59,3±4,98
'Blanc du Poitou'	44,0±2,15	41,9±6,12	48,6±4,69	42,0±1,96
'Robusta'	48,4±2,70	65,0±18,33	45,8±3,88	47,7±3,09
'Dorskamp'	58,3±3,96	34,5±5,25	54,4±5,37	70,2±6,31

General dependence between the thickness of cuttings and height of cutting plantlets is not observed. In to the 'Dorskamp' it is a line, in 'I-214' and 'Robusta' – reverse, and in the poplar of Toropogritskii and 'Blanc du Poitou' a most height appeared at the plantlets from middle thickness cuttings.

Low exactness of the got results, caused of considerable attrition of cuttings, does not allow to do final conclusions in relation to their optimum thickness, certain tendencies are traced although.

Taking into account the indexes of root formations of cuttings and height of annual cutting plantlets, that from them grew, and also features of purveyance of cuttings, plantations of the most presented cultivars it is expedient to create of middle thickness cuttings, with a diameter in an overhead cut from 0,8 to 1,5 cm.

Consequently, in the probed terms poplar of Toropogritskii and 'I-214' marked the greatest indexes of taking root of cuttings and height of one-year cutting plantlets. It is important to mark in this sense, that plantations of last cultivar have the greatest indexes of the productivity at growing in many countries of Europe [5, 8, 9] among other poplars, and the poplar of Toropogritskii is created on his basis [1].

Conclusions

1. From five probed forms of black poplars for growing in the conditions of fresh sudubrava of Kyiv Polissya the poplar of Toropogritskii and 'I-214' are most suitable.

2. Taking into account the indexes of root formations of cuttings and height of annual cutting plantlets, that from them grew, plantations of the most presented cultivars it is expedient to create of middle thickness cuttings, with a diameter in an overhead cut from 0,8 to 1,5 cm.

3. In the probed terms, for the increase of cuttings rootformations, it follows to apply poured in sultry and droughty periods. It will allow successfully to rear here and other probed cultivars.

Literature

1. Головчанский И.Н. Тополь Торопогрицкого – быстрорастущий гибрид

/ И.Н. Головчанский, А.И. Коваленко // Лесоводство и агролесомелиорация. – 1974. – Вып. 38. – С. 40–47.
2. Губа И.Т. Предварительные итоги сортоиспытания тополей в пойме Нижнего Днепра / И.Т. Губа // Лесоводство и агролесомелиорация. – 1975. – Вып. 42. – С. 61–63.
3. Патлай И.Н. Сортоведение быстрорастущих древесных пород на Украине / И.Н. Патлай, В.Н. Руденко // Лесоводство и агролесомелиорация. – 1990. – Вып. 81. – С. 3–7.
4. Редько Г.И. Биология и культура тополей / Г.И. Редько. – Ленинград: Изд-воЛенингр. ун-та, 1975. – 175 с.
5. Фучило Я.Д. Біологічні та технологічні основи плантаційного лісовирощування / Фучило Я.Д., Ониськів М.І., Сбитна М.В. – К.: ННЦ ІАЕ, 2006. – 394 с.
6. Царев А.П. Миниротационные плантации как средство раціонального природопользования / А.П. Царев, С.С. Мироненко // Лесохоз. инф. – 1995. – № 5. – С. 35–36.
7. Царев А.П. Сортоведение тополя / А.П. Царев. – Воронеж: Ворон. ун-т, 1985. – 152 с.
8. Bratovich R. Relaciyn juvenil-adulto de crecimientes en alturass, diametros y volumenes de clones provenientes de cruzamientos contrdados intr e interaspecificos de Populus sp. / R. Bratovich, R. Marlats, H. Mikelaites // Rev. Fac. agron. Univ. nac. LaPlata. – 1996. – 101, № 1. – P. 7–13.
9. Čfzek V. Vysledky ověřovani sortimentu topolu ve Slezske nĩĩini / V. Čfzek, I. Mařák, J. Mottl // Zpr. Les. Vyzk. – 1993. – 38, № 4. – S. 6–9.
10. Kohan S. Hodnotenie rozličnych klonov topolov v oblasti Latorice na Vэchodo-sloveskej nisine / S. Kohan // Zpr. Les. vyzk. – 1993. – 38, № 4. – S. 9–12.
11. Matyas C. Effect of age on selected wood quality traits of poplar clones / C. Matyas, I. Peszlen // Silvae genet. – 1997. – 46, № 2–3. – P. 64–72.
12. Ilsted B. Breeding strategy for poplar in Sweden / B. Ilsted // Norw. J. Agr. Sci. – 1994. – Suppl. n. 18. – P. 39–45.