

**SURVIVAL AND GROWTH OF 3-YEARS-OLD FOREST CULTURES OF
SCOTCH PINE ON OLD LANDS OF POLISSYA UNDER INFLUENCE OF
GROWTHFACTORS AND HYDROGELS©**

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Investigational influence of growthfactors and hydrogels on growth of forest cultures of pine-tree, created on old lands of Polissya. The optimum concentrations of the applied preparations are set for the increase of indexes of survival and growth of forest cultures of pine-tree.

Scotch pine, forest cultures, growthfactors, superabsorbents, old lands .

One of major tasks of domestic forestry there is providing of effective renewal of forest resources and increase of wooded of territory of the state to the optimum indexes. The decision of these tasks needs introduction of progressive technologies of creation of forest cultures on the basis of the last achievements of science, in particular by application on the different stages of plantation work biologically of active matters, hydrogels, superabsorbents and others like that [7, 8, 10].

Numerous researches are the last years conducted in relation to the study of influence biologically of active matters on the germination of seed and growth of seedlings of arboreal breeds [1, 2, 4, 5, 9, 11, 12]. Considerable attention is spared the study of influence biologically of active matters on survival seedlings and nursery transplants during creation of forest cultures and growing of decorative arboreal plants [1, 3, 6].

Successful introductions of the newest technologies can have an important value on the basis of application of regulators of growth of matters and absorbents of moisture at creation of forest cultures of Scotch pine.

A purpose of researches – is establishment of optimum concentrations of solutions of growthfactors and superabsorbents for the increase of efficiency of works from artificial reforestation and forestation of pinetries on old lands of Polissya.

Materials and research technique. The object of our researches was created in spring in 2011 in Graddy forest district of government enterprise „Kolky forestry” of Volynsk regional administration wood and game husbandry. Forest culture area – lands which went out from under the agricultural use. Till of soil consisted in cutting of furrows the plough of PKL-70. Chart of placing of planting places – 2,0×0,5 m. Culture is created by seating under the sword of Kolesova of one-year seedlings the rootages of which maintained before an exploding in solutions of regulators of growth of plants of different concentrations and in water solutions of superabsorbents.

Experience foresaw such variants of treatment of rootages of seedlings: a 12-sentinel soakage in solutions of agrostimulin with concentrations (2, 4 and 8 ml·l⁻¹) and 12-sentinel soakage is in solutions of charkor of the same concentrations. At the same time carried out treatment of root of seedlings water solutions of polymeric superabsorbents of teravet and akvasorb in concentrations 6, 7, 8 g·l⁻¹ and 5, 6, 7 g·l⁻¹ accordingly.

On a control variant the rootages of seedlings before seating processed a „bumpiness” from clay of look like sour cream consistency.

The concentrations of solutions of afore-mentioned preparations for experience were neat, leaning against literary sources [1, 2, 9], in which the results of influence of some growthfactors and superabsorbents are represented on survival and growth of forest cultures of Scotch pine in the fresh subor of the Kharkov and Chernigov areas.

After completion of vegetation period in every variant of experiments we measured the height of above-ground part, diameter of root-collar of nursery transplants and determined the indexes of survival cultures of Scotch pine.

Results of researches. As the first half of vegetation period of 2011 showed oneself hot and dry, on all of variants of experience the indexes of survival seedlings appeared low (tablas. 1).

**1. Survival of seedlings of Scotch pine in cultures, reared
with the use of growthfactors and superabsorbents
on old lands of Polissya**

Name of preparation	Concentration of solution	Survival on years %					
		2011		2012		2013	
		M±m	t _f	M±m	t _f	M±m	t _f
Control	-	48,3±3,08	-	43,8±3,05	-	39,6±3,01	-
	2	58,4±3,63	2,12	41,1±3,63	-0,57	39,5±3,60	-0,03
Charkor	4	50,3±3,65	0,41	40,2±3,58	-0,76	37,0±3,52	-0,56
	8	47,5±3,54	-0,17	40,5±3,48	-0,71	35,0±3,38	-1,02
	2	58,2±3,49	2,13	48,3±3,53	0,96	45,3±3,52	1,22
Agrostimulin	4	54,0±3,53	1,22	42,5±3,50	-0,27	39,0±3,46	-0,14
	8	69,3±3,25	4,69	55,4±3,51	2,51	52,5±3,52	2,77
	5	47,9±3,60	-0,19	39,7±3,52	-0,88	35,1±3,43	-1,00
Akvasorb	6	50,5±3,54	0,36	42,5±3,50	-0,27	39,5±3,47	-0,03
	7	57,9±3,53	2,04	51,8±3,57	1,70	48,2±3,57	1,84
	6	70,8±3,21	5,06	60,4±3,45	3,61	57,4±3,49	3,86
Teravet	7	57,7±3,49	2,02	50,7±3,54	1,49	47,3±3,53	1,65
	8	59,3±3,49	2,25	50,8±3,55	1,49	49,3±3,55	2,07

Treatment of rootages after the methods utilized all in experience positively influenced on survival cultures of Scotch pine after first-year of growing almost in all of cases. As evidently from tablas. 1, on the separate variants (agrostimulin in the concentration of 8 ml·l⁻¹) of survival cultures was on 43,5 % more high comparatively with control, and at application of teravet (6 g·l⁻¹) – on 46,7 %. At the end of the second and third vegetation periods looked after an analogical picture. In a variant from agrostimulin in the concentration of 8 ml·l⁻¹ of survival cultures was on 26,7 and 32,4 % more high comparatively with control, and in the variant of till of root of seedlings of teravet in the concentration of the 6 g·l⁻¹ exceeding after the second and third vegetation periods was 38,0 and 44,9 % accordingly.

**2. Biometrical indexes of nursery transplants of Scotch pine are in cultures,
reared with the use of growthfactors and superabsorbents
on old lands of Polissya**

Name of preparation	Concentration of solution	Biometrical indexes of nursery transplants				
		Diameter, mm		Height, sm		
		M±m	t _f	M±m	t _f	
2011 year						
Control	ml·l ⁻¹	-	3,7±0,08	-	11,4±0,37	-
Charkor		2	4,0±0,10	2,40	11,1±0,38	-0,53
		4	4,1±0,11	2,61	11,9±0,46	0,80
		8	4,5±0,09	6,05	13,3±0,40	3,40
Agrostimulin	g·l ⁻¹	2	3,8±0,08	0,68	10,2±0,32	-2,56
		4	4,2±0,11	3,74	11,3±0,37	-0,21
		8	4,0±0,07	2,55	10,7±0,30	-1,57
Akvasorb		5	3,8±0,09	0,82	10,7±0,40	-1,31
	6	3,6±0,08	-0,89	11,8±0,37	0,66	
	7	4,0±0,09	2,05	12,1±0,43	1,13	
Teravet		6	3,7±0,08	-0,17	12,5±0,35	2,06
		7	3,9±0,08	1,54	13,0±0,36	3,12
		8	3,6±0,09	-0,73	12,3±0,37	1,63
2012						
Control	ml·l ⁻¹	-	6,64±0,23	-	21,80±0,72	-
Charkor		2	7,00±0,27	0,99	21,17±0,91	-0,54
		4	7,06±0,28	1,15	22,86±0,91	0,91
		8	7,71±0,26	3,11	25,97±0,77	3,97
Agrostimulin	g·l ⁻¹	2	6,31±0,21	-1,03	20,12±0,77	-1,59
		4	6,56±0,26	-0,23	22,80±0,76	0,96
		8	5,72±0,14	-3,36	20,49±0,63	-1,37
Akvasorb		5	6,07±0,23	-1,75	21,67±0,90	-0,11
	6	6,40±0,31	-0,62	22,98±0,94	1,00	
	7	7,86±0,36	2,84	27,17±1,19	3,85	
Teravet		6	6,71±0,25	0,21	24,21±0,86	2,14
		7	7,00±0,27	1,03	24,87±0,92	2,63
		8	8,45±0,37	4,18	27,59±1,17	4,22
2013						
Control	ml·l ⁻¹	-	10,33±0,45	-	30,89±1,23	-
Charkor		2	11,28±0,61	1,27	31,29±1,59	0,20
		4	11,71±0,63	1,78	33,17±1,55	1,15
		8	13,18±0,53	4,12	38,86±1,30	4,46
Agrostimulin	g·l ⁻¹	2	10,88±0,51	0,81	32,03±1,38	0,62
		4	11,19±0,61	1,14	32,50±1,38	0,87
		8	9,00±0,32	-2,42	27,42±0,91	-2,26
Akvasorb		5	11,63±0,66	1,63	34,40±1,77	1,63
	6	11,94±0,72	1,90	36,82±2,01	2,52	
	7	14,48±0,82	4,46	43,32±2,28	4,79	
Teravet		6	12,20±0,55	2,65	38,76±1,69	3,76
		7	12,53±0,66	2,75	40,96±2,06	4,20
		8	15,24±0,70	5,89	47,41±2,25	6,43

After first-year of growing the greatest indexes of middle diameter of root-collar and medium-altitude of plants appeared at application of solution of charkor in the concentration of $8 \text{ ml} \cdot \text{l}^{-1}$. A diameter in this variant exceeded control indexes on 20,1 %, and height – on 16,2 %. After the second and third years of growing the greatest indexes of middle diameter of root-collar and medium-altitude of plants appeared at application of charkor in the concentration of $8 \text{ ml} \cdot \text{l}^{-1}$, akvasorb in the concentration of $7 \text{ g} \cdot \text{l}^{-1}$ and teravet – $8 \text{ g} \cdot \text{l}^{-1}$, here after the second year of growing the indexes of middle diameter of root-collar and medium-altitude of plants appeared higher than control indexes on 16,2; 18,4; 27,3 and 19,2; 24,6; 26,6%, and after the third year – on 27,6; 40,2; 47,5 and 25,8; 40,3; 53,5% accordingly.

Conclusions. Treatment of rootages after the methods utilized all in experience positively influenced on survival cultures of pine-tree of first-year almost in all of cases. On the separate variants (agrostimulin in the concentration of $8 \text{ ml} \cdot \text{l}^{-1}$ and teravet at $6 \text{ g} \cdot \text{l}^{-1}$) of survival was accordingly on 43,5 and 46,7 % more high comparatively with control. After the second and third years of growing there is the analogical exceeding – 26,7 and 38,0 and 32,4 and 44,9 % accordingly.

After first-year of growing on old lands most for certain meaningful influence on a diameter and height of nursery transplants entailed charkor in the concentration of $8 \text{ ml} \cdot \text{l}^{-1}$ – 20,1 and 16,2% accordingly ($t_f=6,05$ and $3,40$ accordingly). After the second and third years of growing the greatest indexes of middle diameter of root-collar and medium-altitude of plants appeared at application of charkor in the concentration of $8 \text{ ml} \cdot \text{l}^{-1}$, akvasorb in the concentration of $7 \text{ g} \cdot \text{l}^{-1}$ and teravet – $8 \text{ g} \cdot \text{l}^{-1}$, here after the second year of growing the indexes of middle diameter of root-collar and medium-altitude of plants appeared higher than control indexes on 16,2; 18,4; 27,3 and 19,2; 24,6; 26,6%, and after the third year – on 27,6; 40,2; 47,5 and 25,8; 40,3; 53,5% accordingly.

Taking into account the above-mentioned, it is possible to assert that the probed preparations and superabsorbents in the mentioned concentrations it is expedient to apply at creation of forest cultures on old lands of Polissya.

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