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TECHNOLOGY FOR CREATING FOREST PLANTATIONS FROM POPLARS IN THE GREEN ZONE OF ASTANA

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Annotation

The detailed technology of creation of forest plantations from the fast-growing wood species of poplar and care work in the green zone of Astana are given in this article. It is presented information about the state of poplar forest species which are satisfactory for all types of poplar, except for the "Kazakhstani" poplar, which has a good condition. The average bonitet of the main forest-forming species makes up 3.7 which indicates the optimality of the forest location for the natural and climatic conditions of the area and on newly created poplar plantations an area of 0.5 ha in "Akkol" nursery. An inventory of forest poplar plantations was carried out in the allotted samples.

One of the agrotechnical methods of accelerated cultivation is the process of cuttings of poplar before planting growth stimulators with zircon, cornevine, heteroauxin, epine, and krezatsinom with different soaking time. To increase the rooted cuttings, biomicrofertilizers "Extrasol" and growth stimulator "Karpansil" were used. Studies have established that the average bonitet of the main forest-forming species is 3.7, which is optimal for the natural and climatic conditions of the forest site of the enterprise. The poppy plantations of the poplar of the pyramidal and the Kazakh poplar are affected by a thick-walled sawfly, and the seed plantations of the Kazakh poplar are poplar, aspen leaf and spinal fly. Most (63.8%) of the preserved forest poplar cultures are in good condition and only 8.8% of plantings were in unsatisfactory condition.

According to the results of studies of the state of forest cultures on permanent test plots, the agrotechnics of the establishment are given: soil preparation, planting,

agrotechnical care, irrigation, growth stimulators, and technologies and methods of soil cultivation and types of forest cultures

Key words: reforestation, forest plantations, uterine plantations, undiscovered crops, poplar forest, biomicrofertilizers, growth stimulator, cuttings, age of cuttings, completeness

Introduction

It is adopted the concept of transition to sustainable development and it is developed an environmental code of legal norms in the sphere of ecologization in Kazakhstan. In this regard, the attitude towards green construction changes radically [1].

An important problem of forestry production is the improvement of the condition and increase of forest productivity in order to meet the needs of the national economy in high-quality timber and other useful forest resources. One of the ways to solve it is the creation and cultivation of plantation forest species. With their proper creation, plantations grow more productive than in natural forests, the reforestation period after logging is reduced. When creating artificial plantations, it becomes possible to use selection seed and planting materials.

The city of Astana is located in the dry steppe zone of the Eurasian continent. This determined the severity and low suitability of natural conditions for the creation and maintenance of green spaces, which are greatly complicated by town planning. In the composition of plantations, it is necessary to introduce more resistant species of trees and shrubs in accordance with the biological and ecological conditions of the environment. The creation of plant groups in the form of large tracts will ensure the preservation of the conditions of the forest environment [2,3].

To protect the new capital in the treeless area of Kazakhstan from unfavorable climatic factors and create the necessary conditions for organizing active recreation of the population in 1997, the creation of a green zone around the city was started.

The purpose of the Sanitary and Protective Green Zone in Astana is to reduce the negative impact of wind loads on urban areas, improve the microclimate and architectural landscape landscaping of suburbs, reduce CO2 emissions, increase the carbon deposition of plantations and create recreational facilities for urban residents in the natural environment [4, 5.6].

In combination with other forestry measures, the reproduction of forests should be aimed at improving the efficiency of forestry production on

the basis of the achievement of science and technology [7,8,9,10].

To increase the forest cover of Kazakhstan, it is necessary to find ways to meet the demand of the national economy of low-forest areas in wood as soon as possible and possibly fully. In the implementation of these tasks an important role can be played by the introduction into culture of fast-growing tree species, the most promising of which are various types of poplars [11].

It is planned to use the fast-growing poplar pyramidal rocks, which are fragile, as the main forest-forming species in artificial reforestation and afforestation. Particular attention is paid to the increase in the area of poplar plantations [12].

Materials and methods

The main condition for obtaining successful plantations from poplars is the right choice of areas for their cultivation, as well as the selection of species and varieties that are optimal in specific climatic conditions.

The quality of the forest crops created depends on many factors, one of which is soil preparation. Soil cultivation is the most important link for obtaining in the future a high planting habitability.

The soil preparation system, including the depth of plowing, depends on the mechanical composition of the soils and the degree of its containment (the number of densely intertwined roots and rhizomes of plants in the soil).

In the conditions of creation of the sanitary-protective green zone of Astana city the enterprise according to the Working projects used 2-year early steam, at which the continuous tillage of the soil (agroscheme 1) and rocking processing (agroscheme 1a) was carried out.

Agroscheme 1

With continuous processing of steam, all types of work were carried out in the following order:

-cutting of furrows and breakdown of the whole area, according to quarterly columns with the designation of interquarter roads as well as non-cultivated areas, if such exist;

- 2-fold disking of soil with disc harrows BDT-7 on K-700A tractors;

- dump plowing to a depth of 23-25 cm, depending on the height of the humus layer according to the project plows PLN-7-35 on K-700A tractors or PAN-5-35 on T-150 tractors;

- soil discarding after plowing by BDT-7 harrow on K-700 tractors;

- 3-fold cultivation with simultaneous harrowing cultivators KPSH-on K-700A tractors or KPSH-5 cultivators on T-150 tractors. The gap between cultivations is 20-25 days;

- designation of the direction of the wings and slicing of furrows along the boundary of the wings;

- without plowing in the wings to a depth of 30-35 cm plows PLN-7-35 on K-700A tractors or PAN-5-35 on T-150 tractors with removed dumps. (All these types of work are carried out in the first year of sinking);

- 2-fold snow retention;

- early spring harrowing;

- 3-fold cultivation of soil during the spring-summer period, the gap between cultivations is 20-25 days;

- planting plowing to a depth of 45-50 cm plow PJAS-1.4 on K-701 tractors (this treatment of the soil ends the work in the 2nd year of sinking);

- 2-fold snow retention;

- spring cultivation with simultaneous harrowing before planting of forest species

Agroscheme 1a

In the case of a rocking steam treatment, all types of work were carried out in the following order:

-cutting of furrows and breakdown of the whole area, after which all quarters are divided into wings and interclusal spaces (moisture stores) and further all work is carried out in the wings;

- 2-fold disking;

- dump plowing;

- 3-fold cultivation of the soil with simultaneous harrowing;

- mowing of vegetation in interclusal spaces until the seeds ripen;

- snow retention. This method is performed not in the wings but in the intercooled spaces with a small amount of snow.

One-year-old rooted cuttings seedlings, grown from winter stem cuttings, which are harvested in "uterine" plantations are the best planting material. According to laboratory studies of Polish and Swedish scientists, cuttings kept during winter in trenches, cellars, on ice or in snow reduce the survival rate by 10-15%. In the future, they have a smaller energy of growth. Admissible shrinkage of shoots without loss of quality should not exceed 2-3% of their weight in a freshly prepared form. Cuttings with a diameter of the top cut 0.8-1.5 cm and a length of 25-30 cm, harvested from the middle part of the shoot have the largest survivability. Before planting, they were soaked in aqueous solutions of physiologically active substances for 24 hours of different concentrations: Zircon, Kornevin, Heteroauxin, Epine and Krezacin. Cuttings soaked in water served as the control.

In order to increase the rooting of rooted cuttings, it is necessary to use biomicrofertilizers: Extrasol; growth promoter: Karpansil.

When planting, cervical root should be buried to 12-15 cm into the soil. In arid conditions, a good effect on the increase in plant survival and plant growth is provided by cutting seedlings on a stump of 5-10 cm high immediately after planting. On the stump one is left, the most powerful shoot.

The timing and technique of planting are determined by the characteristics of the areas on which the plantation is divided, as well as the type of planting material used. On unsealed parts of the soil, the best time to plant cuttings and rooted cuttings is early spring. On the early and long flooded areas, autumn shoots of rooted seedlings are carried out. Cuttings are planted by forest planting machines in plow furrows. Large-scale rooted cuttings seedlings are planted in furrows or in pits with a depth of 40 cm to 2 m.

Results

The density of poplar cultures is determined, first of all, by their purpose and biological characteristics of cultivated varieties. When growing trees that go to the billet of small-sized assortments with a short felling age, they take a dense arrangement of plants - 2.5 × 2.5 or 3 × 3 m.

Planting of forest crops is carried out at the optimal time for 12-15 days, by seedlings and rooted one-year-old cuttings. The assortment of planted species is determined by the Working Project.

In the first and second year after planting, work is under way to

supplement forest cultures. The range of planting material included tree and shrub species according to the scheme of planting according to the Working Project.

The viability and durability of the plantings depends on the regularity of the care work aimed at moisture accumulation and moisture conservation.

In undisguised forest cultures, the enterprise carries out mechanized care in the inter-rows, intercluster spaces and manual care in the ranks.

The same measures are being taken to irrigate undisputed forest cultures, where the main species is the common pine, the birch pendant, as well as the unclosed forest species from the rooted poplar and willow cuttings.

In poplar cultures, work is underway to form a stem.

The Forest Inventory has recorded and evaluated the quality of forest species according to the Indicators for the Assessment of Closed and Unexplored Forest Crops (evaluation of the success of closed and unclosed forest species is made according to the indicators given in Table 9 of Annex 1 to this Forest Inventory Rules in the State Forest Fund of the Republic of Kazakhstan). Table 1 shows the indicators of the state of forest poplar species in the green zone of Astana.

Table 1 - Indicators of the state of forest poplar species according to forest inventory data

Species	Condition of preserved forest species (area, ha)			Total
	good	satisfactory	unsatisfactory	
Poplar white	70.5	119.4	55.2	245.1
Poplar hybrid	56.7	-	-	56.7
Poplar “ Kazakhstani”	397.6	106.7	17.0	521.3
Total, ha	524.8	226.1	72.2	823.1
Percentage distribution, %	63.8	27.4	8.8	100.0

The average bonitet of the main forest-forming species is 3.7, which is optimal for the natural and climatic conditions of the forest area of the enterprise.

The main pest of nurseries is the Gallic thick-walled sawfly, which affects the willow uterine plantations. Poplar and aspen leaf hopping affecting the uterine poplar plantations of the pyramidal and Kazakhstani poplar.

On the seed plantation, the main pests also settle on the poplar of Kazakhstan - a poplar, aspen leaf and a Spanish fly.

There are two forest nurseries for cultivation of planting material in RSE

"Zhasyl Aimak": a typical nursery "Ak Kaiyn" with the rights of a forest area with a total area of 110 hectares and a nursery "Damsa" in the Shortandy forest area of 66 hectares.

The cuttings branch of the nursery is laid on an area of 3.006 ha, where 4 species of tree and shrub species are located - Kyzyl-Tan poplar, pyramidal poplar, Kazakhstani poplar and white willow. In 2008, cuttings of white poplar, tamarix exquisite and juniper Cossack were planted in the greenhouse.

To increase the vitality of the cuttings and to enhance growth, cuttings before planting were soaked in a solution of sodium humate. For the development of a powerful root system, the cuttings were irrigated using rootstocks.

Discussion

The uterine branch of the nursery "Ak kaiyn" is 4.71 ha, where 4 species of poplars and 1 species of willow grow. The genus of poplars occupies 4.45 hectares, willow white – 0.26 hectares. Total 8.886 trees grow on the uterine plantation.

In the uterine branch, mechanized processing between rows of trees, manual weeding and watering was performed throughout the growing season. Chemical processing of uterine plantations was also carried out (Figure 1).

Figure 1 – Kazakhstani poplar in the uterine branch of the “Ak kaiyn” nursery

Table 2 shows the characteristics of the types of poplar forest crops to be designed. From the data of Table 2, it can be seen that poplar planting is carried out in three types of forest species: RTK-2, RTK-4, RTK-8. Planting a common, associated tree species or shrub. Mixing in rows, placing 4×1 m or 4×0.75 m

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Table 2 - Brief characteristics of the types of forest species being designed

Types of forest cultures	Category of forest fund	Method of soil cultivation	Scheme of mixing forest cultures	Distance between rows and in rows	Number of plants per 1 hectare, pcs.
PTK-2	non-forest lands	belt of trees 24× 12 м	CWS - MTS - MTS - MTS - MTS - CWS	4 × 1 м	MTS – 1005 pcs. CWS – 670 pcs.
PTK-4	non-forest lands	belt of trees 24× 12 м	S - CWS - MTS - MTS - CWS - S	MTS, CWS 4 × 1м S 4 × 0,75 м	MTS – 556 pcs. CWS - 556 pcs. S - 742 pcs.
PTK-8	non-forest lands	belt of trees 20×20 м	S - CWS - MTS - MTS - S	MTS, CWS 4 × 1м S 4 × 0,75 м	MTS, CWS - 750 pcs. S - 667 pcs.
Notes 1 MTS - the main tree species - ГП; 2 CWS - concomitant wood species СП; 3 S - shrubby species. К					

The age of cuttings was developed by Kazakh National Scientific Research Institute of Forestry and Agromelioration and the Kazakh forest management enterprise and approved by the order of the Ministry of Forestry of the KAZ SSR of 05.10.78 № 150. For poplar, the age of cuttings and the distribution of age classes by age groups are given in Table 3.

Table 3 - The age of felling and the distribution of age classes by age groups for poplar plantations

Prevailing culture	Established felling ages, years			Distribution by age group (numerator - age classes, denominator - age, years)			
	Past Fores	Present	Length of	young	middle-aged	ripening	ripe and overripe

	t Inventory	Forest Inventory	age class	I class	II class	total	including those included in the calculation		total	Including overriped
Category SFF (State Forest Fund) – green zones										
Poplar	51	51	10	1 1-10	2 11-20	3-4 21-40	4 31-40	5 41-50	6-7 51-70	8 and higher 71 and higher

The distribution of areas and reserves covered by forest lands by age classes in plantations of tree species is not homogeneous. The presence of all age groups among natural and artificial plantations is very important for the rational management of forestry (Table 4).

Table 4 – Distribution of forest areas and reserves by age classes (area, ha, stock, thousand m^3)

Prevailing species	Distribution by age group (numerator - area, ha; denominator - stock, thousand m^3)											Average age
	1	2	3	4	5	6	7	8	9	10	total	
Poplar Balsamic	-	-	-	8.9 0.35	-	-	-	-	-	-	8.9 0.35	44
Poplar white	-	8,9 0.35	-	2,0 0,10	0.5 0.06	0,3 0,04	-	-	4,6 0.73	-	14,2 1.10	40

On productivity in plantations of coniferous species, stands of 2-3 classes of bonitet dominate, in soft-leaved-3-4 classes of bonitet, for hardwoods - 4-5 classes of bonitet. The average bonitet of the main forest-forming species is 3.7, which is optimal for the natural and climatic conditions of the forest area of the enterprise. The average class of poplar bonitet is 5.0; the plantations are mainly of low productivity.

Table 5 shows the average taxation indicators of poplar according to the forest inventory (2008).

Prevailing species	Forest Inventory Year	Average taxation indicators				
		age, years	Bonitet class	completeness	stock on 1 ha of forest covered land, m^3	average increment per 1 ha of forest covered land, m^3
Poplar Balsamic	2008	40	5.0	0.30	39	0.7
Poplar white	2008	44	5.0	0.66	77	0.7

Insufficient amount of preliminary renewal under the canopy of ripe and ripening plantings of soft-leaved species is of no significance, since the main felling is not carried out and most softwood cuttings are successfully renewed with the subsequent coppice or root crop. Plantations of hard-leaf and other tree species are represented by introducers and their restoration or replacement will be carried out artificially. In plantations of shrubby species, natural regeneration does not play a special role, since they are either subject to reconstruction or will be referred to the undergrowth.

Table 6 shows the characteristics of the undergrowth under the canopy of ripening and mature stands in available poplar stands.

Table 6 - Characteristics of the undergrowth under the canopy of ripening and mature stands of the main forest-forming species (area, hectare)

Prevailing species	Group of forest types (index)	Area of ripening and ripe plantations	there is underwood				Prospects of natural overgrowth			
			of all species, area	% of the area	valuable species, area	% of the area	provided with growth, area	% from area	Non provided with growth, area	% from area

Poplar white	PF	5.4	3.4	62.0	-	-	-	-	5.4	100
Notes - PF – poplar forest										

Distribution of plantations at the age of thinning by type in the context of completeness groups (Table 7). It is seen from the table that in the plantations with the predominant species from the poplar it is projected increment thinning. These plantations are with a completeness of 0.9-1.0.

Table 7 - Distribution of plantations at the age of thinning and assigned to cuttings in the context of completeness groups (area, ha)

Prevailing species	Type of thinning	Distribution by completeness numerator - in the age of thinning; denominator - assigned to thinning				
		0.3-0.5	0.6-0.7	0.8	0.9-1.0	total
Poplar white	Increment thinning	–	–	–	1 1	1 1

Conclusion

When selective sanitary felling is carried out, removal of dying trees is carried out.

Protective measures with the use of chemical and biological preparations are carried out under the condition of mass reproduction of pests, epiphytoty of diseases and the threat of death of plantations. Pesticides for the control of pests and diseases of green plantations should be applied in accordance with the Directory of Pesticides (insecticide) approved for use on the territory of the Republic of Kazakhstan and compliance with technological and sanitary regulations.

With a low number of pests and a small degree of spread of the disease, the mechanical removal of clutches and spider nests of insects, sanitary pruning of the crown is carried out. Activities include sampling patients and tree stem pests, windswept cleaning and windbreaks.

Biological methods include measures to attract birds that feed on insects, by hanging starling boxes. In the deciduous plantations, 5-7 pcs. / ha cilia, colony and birdhouse are hung, in coniferous - 3-4 pieces / ha [13].

Thus, the technology for creating forest plantations includes the following activities:

Site selection. This section of the forest plantation should be as smooth as possible and suitable for irrigation. First of all, it is necessary to choose a fertile, non-saline or slightly saline,

light or medium-mechanical soil. Particular attention should be paid to the water sources used for irrigation, since without irrigation it is impossible to create high-performance forest plantations.

Soil preparation. Forest plantations are created on well-cultivated soil. First, it will be started with watering to ensure a one-time watering of the soil. After planning, depending on the texture of the soil, the presence of grass cover and weeds, the soil is treated according to the system of black steam or spring sowing with mandatory rising of steam in autumn and deep plowing. The whole summer season in the nursery are carried out in accordance with the used soil preparation system.

Planting seedlings. Work on planting should be carried out in autumn after the fall of leaves or early spring, when the buds are not yet awake. The most suitable planting materials are annual seedlings. Their root system is well developed at this age, reaching a height of 1.5 m, landing is carried out in pre-prepared pit size of 60x60 cm. Yamaha diggers KYA-100 or KRK-60 are used to prepare pits on the basis of MTZ-80 tractor. The productivity of these diggers is 80-100 and 45-90 yards per hour.

Seedlings are planted manually in prepared pits. We must try to plant deeper, so that the root neck of plants is 20-25 cm below the surface of the soil. In this case, planted seedlings are well supplied with moisture and additional nutrients. Thus, in the first years of growth the seedlings form a root system that covers all layers of the rhizosphere, at this depth more nutrients pass and soil process pass more intensively. In addition, deep-set seedlings are resistant to strong winds.

After planting, the seedlings will be subjected to the adaptation process, so it should be borne in mind that during the first growing season, growth will be slow. In the second and subsequent years, the growth of seedlings is increasing.

The productivity of plantation forests is directly related to the location of the fields. Their location should correspond to the soil and climatic conditions of the area. In arid conditions, the growth of trees can decrease on dense plantations. Dense plantation crops can be created in irrigated areas, where it is possible to carry out caring work on young trees and receive small-scale commercial timber.

When creating plantation forests for energy purposes, a 3 x 1.5 m plan is recommended, 2222 pieces of plants are needed per hectare. A row spacing of 3 m allows the use of a cultivator with a tractor for cultivating the soil.

After planting, irrigation canals are created at a distance of 20-25 cm from planted plants. Then the seedlings are watered, moisture promotes soil

compaction and close closeness of the plant root system.

Care of plantation crops. Poplar and willow mainly create a root system in the upper surface of the soil and show a high energy of growth due to a sufficient amount of moisture, nutrients and air in the soil. If the soil surface is very compact and covered with herbaceous vegetation, then the energy of growth decreases. Therefore, care should be carried out carefully, which should be focused on soil preparation, application of fertilizers, irrigation and the formation of the tree trunk.

Soil preparation or agrotechnical care should be carried out from planting to ripeness of the forest.

Cultivators KRN-2,8 and KUN-4 are used for loosening the rows, on which an additional soil tiller may be installed on the frame side to create irrigation irrigation canals. If there are dense weeds on the surface of the soil, it is necessary to process the inter-row between the disk harrows BDT-3 and BDN-3. All cultivators and harrows are hung on the tractor MTZ-80, etc.

After machining the rows at a distance of 30-40 cm from the rows for plant protection are handled manually.

During the first two years after planting, soil cultivation is carried out at least 3-4 times. In the autumn of the first year, an inventory should be made, and in the spring of the second year, if necessary, you need to supplement the 2-year-old seedlings. In the third and fourth years, the number of annual care activities can be reduced by 2 times.

During the first two years, the plantation should be watered at least 4-5 times during the growing season. In subsequent years, watering can be reduced to 2-3. Irrigation regime is 1 hectare - 500-600 m3.

During the first 3-4 years after planting, watering is carried out on temporarily created irrigation ditches. After the completion of the care work in the inter-row, irrigation grooves are made with the plow PL-1 on the basis of the tractor DT-75 T.

Poplar and willow plantations consume large amounts of nutrients from the soil, so organic and mineral fertilizers should be used.

When using phosphorus and nitrogen fertilizers (90 kg / ha and 120 kg / ha of active substance) and using nitrogen fertilizers 2 times in the same amounts during 2 growing seasons, poplar and willow are characterized by high growth rates. When using organic fertilizer (20 tons per 1 hectare), you can get good results.

The growth of seedlings is greatly influenced by the liquid complex of organomineral fertilizers using the bio-fertilizer "Ecstasol" and the growth stimulator "Karpansil" when soaking the plant roots for 30 and 60 minutes.

To obtain high-yielding wood in a short period of time, it is necessary to carry out caring work, starting from the first year of plant life. In the initial

period with a rare location in these rocks, lateral branches develop very intensively; therefore, pruning branches is necessary to form the main trunk.

These works must be performed in early spring. In the first year after planting, the most developed branches are left, and the rest are cut off. Sprouts from trunks are cut from 3-4 years of age. Every 3-4 years, it is necessary to clean the bottom of the trunk for better formation. To prevent fungal diseases, the pruning sites are treated with a garden solution.

After 10-12 years on the plantation, half of the trees are cut; the poles obtained are used as small-value wood for biofuel. These fellings lead in the future to the increasing of the nutrient medium and biomass for biofuel production. In plantation crops, subject to agrotechnical requirements at the age of 20, 600 to 650 m3 of biofuel raw material can be obtained from each hectare of plantation

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АСТАНА ҚАЛАСЫНЫҢ ЖАСЫЛ АЙМАҒЫНДА ТЕРЕК ОРМАН ПЛАНТАЦИЯЛАРЫН ҚҰРУ ТЕХНОЛОГИЯЛАРЫ

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Түйін

Мақалада жылдам өсетін терек ағаштарының түрлеріне және Астана жасыл аймағында орман екпелерін құрудың күтім жұмыстарына, толық технологиясын ұсынады. Орманда өсетін түрлерінен теректің барлығының жағдайы қанағаттанарлық, тек «Қазақстан» теректері жақсы дамығаны туралы мәліметтер берілген.

Негізгі орман құраушы түрлердің орташа бонитеті - 3,7, бұл орманның климаттық жағдайлары мен Аққөл көшетжайында 0,5 га жаңадан құрылған терек плантациялары үшін орманның оңтайлы орналасуын көрсетеді.Таңдалған үлгілер бойынша орман теректеріне инвентаризация жүргізілді.

Теректерді қалемшелеу үрдісімен отырғызу жұмыстарының алдында , өсу стимуляторларымен циркон, корневин, гетероауксин, эпин және крезацинмен әр түрлі уақытта суға салып қою жылдам өсірудің агротехникалық әдістерінің бірі болып табылады. Қалемше тамырлары өсуі үшін "Экстрасол" биомикротыңайтқыштар мен «Карпансил» өсу стимуляторы қолданылады. Зерттеулер көрсеткендей, негізгі ормандарды құраушы түрлердің орташа бонитеті 3,7 құрайды, бұл орман учаске кәсіпорынының табиғи-климаттық жағдайлары үшін оңтайлы болып табылады. Пирамидалды және "Қазақстан" терек плантацияларына қалың қабырғалы егеуіштер, ал қазақ теректерінің тұқымдық плантацияларына терек, көктеректің жапырақтарын жегіштер, омыртқалы шыбындар әсер етеді. Сақталған орман теректерінің көпшілігі (63,8%) жақсы жағдайда, ал екпелердің тек 8,8% қанағаттанарлықсыз жағдайда болды.

Зерттеу нәтижелері бойынша, тұрақты сынақ алаңдарында орман екпелеріне агротехникалық іс-шаралар жүргізілді: топырақты дайындау, отырғызу, агротехникалық күтім шаралары, өсіру стимуляторлары, тағы топырақ өңдеудің технологиялары мен әдістері және орман екпелерінің түрлері.

Кілттік сөздер: орманды қалпына келтіру, орман плантациялары, аналық плантациялар, бөрікбастары түйіспеген екпелер, теректілер, биомикротыңайтқыштар.

ТЕХНОЛОГИЯ СОЗДАНИЯ ЛЕСНЫХ ПЛАНТАЦИЙ ТОПОЛЯ В ЗЕЛЕНОЙ ЗОНЕ Г.АСТАНЫ

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Резюме

В данной статье приведена подробная технология создания лесных насаждений из быстрорастущих пород дерева тополя и работы по уходу в зеленой зоне Астаны. Представлена информация о состоянии лесных видов тополя, которые являются удовлетворительными для всех видов тополя, кроме «Казахстанского» тополя, который находится в хорошем состоянии. Средний бонитет основных лесообразующих пород составляет 3,7, что свидетельствует об оптимальности расположения леса для природно-климатических условий района и на вновь созданных плантациях тополя площадью 0,5 га в питомнике

«Акколь». Инвентаризация лесных тополей проводилась по отобранным образцам.

Одним из агротехнических приемов ускоренного выращивания является процесс черенкования тополя перед посадкой стимуляторов роста с цирконом, корневином, гетероауксином, эпином и крезацином с различным временем замачивания. Для увеличения корневых черенков использовали биомикро удобрения «Экстрасол» и стимулятор роста «Карпансил». Исследованиями установлено, что средний бонитет основных лесообразующих пород составляет 3,7, что является оптимальным для природно-климатических условий лесного участка предприятия. На плантации тополя пирамидального и казахского тополя влияет толстостенный пилильщик, а на плантациях семян казахского тополя - тополь, осиновый лист и муха позвоночная. Большинство (63,8%) сохранившихся лесных тополей находятся в хорошем состоянии, и только 8,8% насаждений находились в неудовлетворительном состоянии.

По результатам исследований состояния лесных культур на постоянных опытных участках приведены агротехника учреждения: подготовка почвы, посадка, агротехнический уход, полив, стимуляторы роста, а также технологии и методы обработки почвы и виды лесных культур.

Ключевые слова: лесовосстановление, лесные плантации, маточные плантации, несомкнувшиеся культуры, тополевники, биомикроудобрения.