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SANITARY CONDITION OF PROTECTIVE FOREST PLANTATIONS IN THE KARSHI STEPPE

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Abstract:

The article is very relevant in the work, the sanitary component of forest plantations and the degree of their damage by stem pests have been established. For these purposes, 21 plots with a trial plot were allocated to the nama, the selection of trial plots was made on the basis of a preliminary reconnaissance survey of plantings. They carried out a continuous inventory of trees by rows and species. In general, on the irrigated and rainfed lands of the Karshi steppe, on a separate site, protective forest plantations grow satisfactorily, have a good sanitary condition and high protective properties with timely agrotechnical and silvicultural maintenance in the form of soil loosening, watering and thinning.

Keywords: main, head, protective, careful, thinning, trunk, pennsilvan, alternated, cooperative, forest pathological.

1.INTRODUCTION.

Along with irrigated lands in the valley and on the fan of the Kashkadarya river in the Karshi steppe, there are large tracts of land suitable for growing cotton and other agricultural crops. Here, after the construction of the Karshi main canal, protective forest plantations were created on agricultural fields, along irrigation systems and along highways. Of these, the most mature, seasoned in the sense of agricultural technology and of the greatest interest for study, are irrigated crops located in agricultural fields along the Karshi steppe.

In this regard, we have investigated existing plantings with a total area of over 150 hectares and laid 21 test plots in them. On the test plots, in addition to measuring taxation indicators, a thorough examination of every fifth tree was carried out, that is, 20% of the trees from their total number, and sometimes all trees with a small area. The trunk and branches of all types of trees were examined, and at the same time the rows of poplars, squat elm, white acacia and other more common tree species were examined especially carefully

2. THE MAIN PART.

Trial area 1 was laid in the Bachofen poplar field protection zone on the territory of the Karshi fog. Here in the spring of 2005, a poplar was planted with two-year-old seedlings according to a 3x1 m scheme. In the first 3-4 years, agrotechnical care was carried out for 3-row strips, which consisted of watering and loosening. Poplar safety is good - 91%; at the age of 18 years, the height of the trees ranges from 12 to 16 m (Table 5.1). The results of the survey showed that up to 20% of trees are infected with the urban barbel and the odorous woodworm. Of these, 10% (15 trees) are weakly infested, and 6% (8 trees) on average. Dry-topped and shrunken ones make up no more than 4% (Table 1.2). In our opinion, poplar infection with barbel was due to the lack of timely thinning in the strip. In this area, the strip has a very dense structure, the crowns of trees are closed in rows and between rows.

Trial area 2 is also located in the protective zones of the cooperative farm "Uzbekiston Mustakilligi". On this site in the spring of 2002, 4-row forest strips of Bolle poplar were laid. At the age of 17, individual poplar specimens reached a height of 17.5 m, a diameter of 20 cm. The safety is high - 96% (Table 1.1) For the first 4-5 years, the plantings underwent regular agrotechnical care. Then, at the age of 7 years, the lower lateral branches were removed from the poplars, including those that were withered, diseased and damaged, and at the age of 12 years, the plantation was thinned. At the same time, up to 20% of lagging specimens were removed, as well as those damaged and infected with pests. Thinning according to the same system with the removal of up to 7% of trees was repeated after 4 years. At the time of the survey, poplar plantations in this area are in good condition, there are no dry tops

and no pest infestation (Table 1.2). Apparently, with satisfactory agrotechnical care of poplars at a young age and silvicultural care in subsequent years, they grow rapidly and become resistant to pests and diseases.

Test plot 3 was laid in a 4-row forest belt of black pyramidal poplar. Here in the fall of 2000, along the edges of the cotton fields, planting was carried out along the cut furrows. Annual seedlings were planted manually according to the scheme 2.5x1.0 m. Agrotechnical care of the plants was carried out in the first two or three years, which consisted in loosening the soil around the trunk and watering as needed. At the age of 20, the safety of poplar was 65%, the average height was 14.7 cm, and the diameter at breast height was 14.3 cm (Table 1.1). The low preservation of crops is explained by the fact that at a young age, the lateral branches of poplars were infected with glass, and at the time of examination, up to 36% were infected with urban barbel and woodworm. Of these: shrunken and dry-topped ones make up 20% (Table 1.2). To improve the general sanitary condition of forest belts, it is required to carry out sanitary felling with the removal of infected poplar specimens.

Trial plots 4 and 5 were laid in the same place, on a neighboring cotton field in 4-row forest belts. The outer rows are represented by white mulberry, the inner two rows are elm. The average height of the elm at the age of 17 is 7.5 m, the trunk diameter is 9.3 cm. In the mulberry, annual branches with leaves were cut down annually to feed silkworm caterpillars. In this regard, the height of the trunk does not exceed 2.5-3.0 m, the diameter of the trunk is 11 cm (Table 1.1).

In general, the general condition of the plantings is satisfactory. Agrotechnical maintenance of the strips was carried out in the first 3-4 years after planting. Currently, soil loosening in the strips is not carried out, and watering is carried out 2-3 times per summer, simultaneously with watering cotton fields. Other agrotechnical and silvicultural activities were not carried out for the plantations. Forest pathological examination showed that among the elm trees there are dry-topped, stunted specimens with weak crowns. Out of 100 trees on the trial plot: 60 healthy, without signs of weakening, 23 weakened with single drying out branches, 7 moderately weakened, 5 dry-topped, 5 drying out and dead wood of the past and current years. Among the dying out, and especially in the dead wood, there are numerous sapwood inlets. On the territory of the cooperative farm "Beruni" there are three-row forest strips of Pennsylvanian ash, where a trial plot 6 was laid. These plantings were planted in the spring of 2014 under a plow with planting 2.5 m between rows and 1-1.5 m between plants. Loosening of the soil was carried out in the first 3-4 years, and irrigation in furrows up to 5 years 4-6 times during the growing season. The strip is watered during the cotton watering period. In addition to agrotechnical care, the lower lateral branches of the trees were removed to a height of 1.5-2 m.The general condition of the strip is satisfactory, the safety is 85%, trees at the age of 25 years have a height of 11 to 15 m, a trunk diameter of 25.3 cm (table. one). About 13% of trees are infected with urban barbel, of which: to a weak degree - 3%, in an average - 8% and withered - 2%. Ash is infested with stem pests much less than poplar (Table 1.2). In addition, as noted above, the lower lateral branches were removed from the trees, which, in our opinion, creates unfavorable conditions for the reproduction of pests, due to the blowing and openwork of the forest belt.

Test plots 7 and 8 were laid in 9 row strips of white acacia and gleditsia in the area of the Talimarjan reservoir, Nishan district. The trees were planted in the spring of 2011 with two-year-old seedlings after autumn plowing of the soil with a plow to a depth of 27-30 cm

Table 1

Growth and preservation of forest shelter belts.

№№ п.п.	Breed	Age, years	Saveness,%	Nm	Dcm	Qty surveyed tree
1.	Bachofen's poplar	18	91,3	15,2	14,9	150
2.	Poplar Bolle	17	96,0	17,5	20,0	120
3.	Poplar black pyramidal	20	65,0	14,7	14,3	98
4.	Squat elm	17	87,3	7,5	9,3	100
5.	White mulberry	17	87,0	2,5	11,0	50
6.	Ash tree of Pennsylvania	25	85,1	13,4	25,3	163
7.	White acacia	28	83,5	16,7	19,1	150
8.	Gleditsia vulgaris	28	51,4	10,3	11,8	150
9.	Loch narrow-leaved	29	90,0	7,0	10,3	80

Table 2
Infestation of forest shelter belts stem pests

№	Breed	Number of infected trees		Including: infected						Pest type
				Weak		Medium		dry		
		ps.	%	ps.	%	ps.	%	ps.	%	
1.	Bachofen's poplar	30	20	15	10	8	6	7	4	City mustache, odorous woodworm
2.	Poplar Bolle	-	-	-	-	-	-	-	-	-
3.	Poplar black pyramidal	35	36	5	6	10	10	20	20	City mustache, odorous woodworm
4.	Squat elm	40	40	23	23	7	7	10	10	Sapwood
5.	White mulberry	10	20	5	10	5	10	-	-	Namangan barbel
6.	Ash tree of Pennsylvania	21	13	4	3	15	8	2	2	City mustache
7.	White acacia	38	25	24	15	7	5	7	5	City mustache
8.	Gleditsia vulgaris	90	60	15	10	30	20	45	30	City mustache
9.	Loch narrow-leaved	-	-	-	-	-	-	-	-	-

Initially, on half of the total area of about 2.5 hectares, together with acacia, gledichia was also planted. Acacia and Gleditsia alternated in clean rows in a 3x1 pattern. However, in subsequent years, gleditsia fell behind in growth and fell under the canopy of acacia. During this period, at the age of 7 years, in order to improve the condition of the plantations, reconstruction was carried out with the removal of gledichia in half of the area. In the other half, where no felling was carried out, almost all Gledichia trees have a twisted trunk, dry-topped and there are withered specimens. The general condition of the acacia is satisfactory; at the age of 28, the trees have a height of 15 to 17 m, a diameter of 18-20 cm, the preservation rate is 84% (Table 1.1).

An individual enumeration of trees inhabited and exhausted by stem pests in plantations showed that there are more freshly settled and freshly dried trees among gleditsia, compared with acacia. In the area where no felling has been carried out on the trunks of acacia, there are single passages of pests (Table 1.2) and the number of infected trees is up to 25%. On the site where the plantation was reconstructed, there are no single passages on the trunks of the acacia, the sanitary condition is good. A significant difference here may be the absence of dried specimens of gleditsia, which could serve as the cause of the emergence of foci of stem pests. The presence of such dried up trees could create conditions for the formation of foci of pests in young and older stands.

Test plot 9 was laid in the south of the Karshi steppe in the stands of narrow-leaved oak. Two-year old suckers were planted in spring 2009, after the construction of the working part of the Karshi Canal. A two-row planting of a sucker is placed on a cotton field in the form of an auxiliary strip according to a 2x2 m scheme. Loosening of the soil around the trunk was carried out in the first 2-3 years, and irrigation along furrows from the second year after planting 2-3 times during the growing season. The general condition of the strip is good, the preservation is 90%, trees at the age of 29 have a height of 6 to 11 m (Table 1).

A detailed examination of the foci of stem pests showed that the sanitary condition of the strip from the sucker is very good. Dried or infected trees were not found at the time of the survey. At the age of 25 years, an inventory was carried out in the strips and at the same time sanitary felling with the removal of dried out side branches. Apparently, these silvicultural activities had a positive effect on increasing the sustainability of plantings. Subsequent test plots were laid in protective plantings along the canals and shallow irrigation ditches of the Karshi main canal system. From 2007 to 2018, basically, various tree species were planted along the spreaders: black pyramidal poplar, Bolle and balsamic poplar, squat elm (elm), white acacia, mulberry, narrow-leaved oak and others. Initially, fruit trees were also used in planting, but they did not give a positive result due to an increase in the groundwater level. Apricot, apple, plum and cherry began to dry out due to the secondary colonization of the soil. Below are descriptions of the state of some protective plantations along the canals in the Karshi steppe.

Test plot 10 was laid in single-row plantings of black pyramidal poplar and narrow-leaved oak tree. Two-year-old poplar seedlings were planted along the dam of the Karshi Main Canal at a distance of 70-90 cm from the wet slope. Poplar safety is 65.5%; at the age of 15 years, the height of the trees is from 8 to 11 m, the trunk diameter is from 10 to 13 cm (Table 3). The surviving poplar trees are infected with stem pests, woodworms up to 50%, some trees began to dry up (Table 1.4). Such a low preservation of poplars, poor growth and unsatisfactory condition are explained not only by the lack of nutrients in the soil for plants, but also by the lack of moisture. As you know, gravel

and other building materials are used to strengthen the dam, often planting on the dam is covered with silt when cleaning the canals, mechanical loosening of the soil and watering is practically impossible.

Where **test plot 11** was laid, a survey of a single-row strip and narrow-leaved oak was carried out. The strip of sucker is practically a continuation of the strip of poplar. The lack of agrotechnical care and the action of other unfavorable factors (mechanical damage when cleaning the canals with an excavator, etc.) had a negative impact on the growth of trees. Loch at the age of 15 has an average height of 5.5 m, survival rate is 43% (Table 3). However, compared to the poplar, the oak tree has a slight pest infestation. In the poplar, dried trees as a result of damage by the city barbel and woodworm make up 15%, in the oak tree only 8%. Apparently, the death of trees from stem pests, in addition to agrotechnical, silvicultural measures and other external factors, also depends on the biological characteristics of the woody plants themselves (Table 1.4).

Test plot 12 was laid along the main canal in the single-row forest belts of the Bolle poplar. In the spring of 2017, on a dry slope at a distance of 1 m and from the foot of the dam, a planting was carried out along cut furrows. Agrotechnical care of plants was carried out in the first three years and it consisted of manual loosening of the soil around the trunk. Taking into account the close occurrence of groundwater, watering of trees was not carried out. At the age of 9 years, the dried lower lateral branches were removed from the trees. The condition of the poplar is good, the preservation is high - 93%, the height of trees at the age of 22 is 16-18 m. When trees are placed 5 m in a row, their crowns are not closed due to the columnar shape. Pest infestation, violation of stability, withered and dry-topped poplar trees were not found. The forest growing conditions for poplars are very favorable, since the moisture for the trees is sufficient due to the close location of groundwater and seepage waters from the canal.

The trial plot 13 is laid in the planting of a squat elm along the distributor from the main main canal. On this site, on the left side of the canal, at a distance of 3 m from the sole, there are 4 rows of elm trees. At the beginning of early spring 2010, after winter plowing, shallow furrows were cut, then two-year-old seedlings were planted manually according to the 2.5x1 m scheme.Plants were taken care of 2-3 years after planting regularly, since the aisles were used to grow vegetables and melons ... The condition of the elm is satisfactory, the crowns of the trees are closed, at the age of 7, the height of the trees ranges from 3 to 10 m, the preservation is 85%. However, due to the close placement of planting places in a row (after 1 m), among the plantings there is a significant number of specimens that are stunted in growth (15-20%), some plants are underdeveloped and have begun to dry tops, there are also trees infected with sapwood (Table 1.4,) Apparently, in order to increase the ameliorative role of plantations, it is necessary to thin out with the removal of withered and lagging trees.

On the right bank of the canal, there are old-growth stands of stocky elm, where a trial plot of 14 is laid. The plantings of the elm consist of five rows, as in the previous section, located 2.5-3 m from the canal.

The results of the survey showed that among the trees there are many withered and dry-topped specimens; at the age of 30, the height of the elm is about 10 m, the trunk diameter is 18.3 cm. The unsatisfactory condition of the elm is also explained by the fact that the groundwater is deep (from 3.5 to 5 m). Loosening, watering and silvicultural maintenance of plantations is not carried out (Table 3,).

To reduce the stock of stem pests, to reduce the threat of further drying out of plantations and to increase their meliorative role, selective sanitary felling should be carried out in this area.

In the Karshi steppe, in the system of the Karshi main canal, stands along an inter-farm irrigation ditch in a concrete lining were studied. Here, in the plantings of white acacia and mulberry, test plots 15 and 16 were laid. Mulberry is located in the extreme rows on both sides of the strip, acacia 2 rows in the middle: Sh – Ak – Ak – Sh, planting was carried out in 2004 by a forest planting machine LPA-1, according to the 3x1 m scheme. Plant care was carried out in the first 3-4 years, which consisted in loosening the soil with a cultivator and watering along the furrows. The condition of the trees is good, at the age of 14 years, the height of the acacia is from 8 to 10 m, the mulberry tree is from 2.5-4 m. The crowns of trees are well developed, the dry top is insignificant. The analyzes carried out in laboratory conditions of sections of model trees, as well as a thorough examination of trees in the strip, showed that the infestation by pests is insignificant. At the age of 9 years, thinning was carried out in the forest belts. Dry, dying, damaged and oppressed plants were cut down. The lateral branches of the remaining trees were removed to a height of up to 1.5 meters. These forestry activities contributed, in our opinion, not only to the intensive growth of trees in height, but also to the improvement of the sanitary state of plantings in general (Table 4). In mulberries, annual branches with leaves were cut down annually. In this regard, the height of the trunk is 3.5 m on average.

The next five test plots were laid along the highway of the Kashkadarya region (Table 5). It has now been proven that one of the most important elements of environmental protection in the design and construction of highways is the creation of green spaces from gas-resistant and durable wood species.

Table 3
Growth and safety of protective plantings along the sprinklers

№	Breed	Age, years	Save ness,%	Nm	Dcm	Number of trees surveyed
1.	Poplar black feast	15	65,5	8,7	11,3	60
2.	Midalny	15	43,0	5,5	7,5	50
3.	Loch narrow-leaved	22	92,5	17,5	19,5	55
4.	Poplar Bolle	7	85,3	6,3	7,1	250
5.	Elm	30	61,3	10,3	18,3	350
6.	Elm	14	95,0	9,5	10,3	120
7.	White acacia	14	90,3	3,5	9,5	100

Table 4
Infestation of protective plantings along the irrigation area with pests

№	Breed	Number of infected trees		Weak		Medium		dry		Pest type
		ps.	%	ps.	%	ps.	%	ps.	%	
1.	Poplar black pyramidal	30	50	12	20	9	15	9	15	Smelly woodworm
2.	Loch narrow-leaved	15	30	6	12	6	12	3	6	Urban barbel
3.	Poplar Bolle	not detected								
4.	Elm	40	16	20	8	10	4	10	4	Karagachev sapwood
5.	Elm	120	35	46	15	37	10	37	10	Urban barbel
6.	White acacia	60	50	20	17	20	17	20	16	Urban barbel
7.	White mulberry	45	45	15	15	15	15	15	15	Urban barbel

Test plot 17 was laid along the Kasan-Muborek road in the north of the Karshi steppe. On this site, on both sides of the road, 4-row strips of squat elm are planted. Saplings were planted in the spring of 2009 on an area of about 3 hectares. Placement of seats 4x1.5 m. Agricultural fields adjoin the strips from the outside, where cotton and other crops are sown annually. The condition of the elm tree in this area is satisfactory, although the planting is not regularly watered. At the age of 20, the height of the trees is from 10 to 12 m, the diameter at the height of the chest is about 10 cm (Table 5). In the first and second rows, closer to the road, a rather high number of stem pests of the city barbel was found, over 30% (Table 1.6). Dry tops and withered trees in these two rows account for about 17.5% of the infected, moderately infected - 11.8%. It is known that tree species are capable of absorbing many types of chemical compounds that negatively affect their growth and condition.

In this regard, with the wrong selection and placement of tree species along the roads, their resistance to pests is sharply reduced. Thus, during afforestation of the Nishan-Karshi highway, single-row strips were used on both sides of the road from balsam poplar **(trial plot 18)**. In the first years after planting the poplar, having good growth, at the age of four years, the height of the trees ranged from 3 to 5 m.Then, the poplars were affected by scutes over 40%, at the age of 8 years the height of the trees does not exceed 6 m, the preservation rate is 42.9 % (Table 5.5). Some trees are subject to felling, about 20% of trees are dry-topped, some of them are withered (Table 1.6). On another section of the Nishan-Talimarjan road, strips of white acacia were planted on both sides of the road bed (trial plot 19). Placement of seats 4x2 m. Planting was carried out with two-year-old seedlings in the spring of 2008. The distance of the strip from the road bed is 4-6 m.In the first years after planting, the plantings were cared for in the form of irrigation (2-3 times per growing season) and loosening, and at the age of 6-7 years, lateral branches were cut to a height of 1.5 -2 m. The general condition of acacia is satisfactory, pest infestation is insignificant - 6.9%.

3.CONCLUSION.

Forest plantations located along the main highways contribute to the improvement of the operation of the vehicles themselves, protect the road from overheating in the hot summer period and create a kind of microclimate.

Thus, the study of the sanitary state of the existing protective plantings and their growth in the Karshi steppe showed that under these conditions, tree planting in forest belts, along irrigation ditches and highways began to be created on a large scale after the construction of the Karshi main canal. In the assortment of species, poplar, elm, acacia and partially ash, mulberry and elm were used. Fruit breeds were planted in a limited area. They did not give a positive result due to their weak growth in saline lands and fragility. With appropriate agrotechnology at a young age

and silvicultural care after the closure of the crowns of trees, forest plantations have a good annual growth in height (from 1 to 1.5 m) and trunk diameter (0.5-1 cm), high safety (up to 95%) and a small percentage (5-10%) of pest infestation. However, if agrotechnical, and especially silvicultural care is not followed, among the existing adult protective zones, there is a loss of trees up to 30%, pest infestation up to 40% and weak growth. The greatest infection was noted in the plantations of poplars and elm stock, in white acacia, narrow-leaved oak, the degree of pest infestation is 8-15%, that is, under the same conditions, some tree species are infected with stem pests more, others less. Among the pests, the most common are the urban barbel, woodworm and sapwood. These pests are more common in middle-aged thickened stands with high density (0.8-1.0), where thinning is not carried out according to the periods of their growth. Even the removal of dried out lateral branches, a one-time thinning of the protective strips reduces the percentage of pest infestation to 10% by increasing the illumination in the butt part of the trunk and warming up in places of their settlement in the hot summer period.

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