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RESEARCH DIFFICULT THE AGROPHYTOCENOSIS CONDITIONS OF AN IRRIGATION OF THE SOUTHEAST OF KAZAKHSTAN

Results of field experiments are given in article difficult bean legume-grass mixtures in the conditions of an irrigation of a foothill zone of the southeast of the republic and perspective options for creation of cultural pastures are allocated.

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NEW METHODS, STANDARDS AND SCALES FOR GROWING PINE CULTURES IN THE BELT PINE FORESTS OF THE IRTYSH RIVER AREA (PRIIRTYSHYE)

Abstract

New methods of growing pine cultures on burnt areas, as well as improved standards and scales of quality assessment for the transfer of young pine trees to areas covered by forest are described in this article. These methods will be useful for forest culture producing in the belt pine forests of Priirtyshye.

Their essence and content are completely different than others accepted in practice. They based on the analysis and synthesis of the growth and development of pine cultures on burnt areas, as well as modern trends in forest growing technologies. Implementation of these proposals into the production promotes forest growing to a new level.

Keywords: belt pine forests of Priirtyshye, methods of growing forest cultures, standards of evaluation, block method, utero-transit method.

Belt pine forests of the Irtysh river area (Priirtyshye), despite the uniqueness and origin ecoprotective huge importance for the region, intensively exploited for industrial purposes over two hundred years. Especially much they suffered in the years of transition to a market economy and from multiple large-scale forest fires and only 10 years ago, under the threat of the collapse of the real state acquired the status of a natural forest reserve, created some opportunities for assessment and compilation of the general condition and to find reliable ways to recovery and transfer to a sustainable path.

Detailed study of the literature, conditions and practices of the forest culture productions, rules and regulations and assess the quality of the actual growth and development of the younger generation of the forest in belt pine forests of the Irtysh river area (Priirtyshye) based on repeated surveys and expeditions wide range of primary materials has shown that:

- in this region due to multiple forests and vast areas of large fires burnt gradually lose their forest cultural properties;
- a sharp change in forest conditions worse negative impact on growth and development of forest plantations and naturally renewed pine undergrowth;
- used in the regulatory region of indicators to assess the quality of young trees, as well as the main ways of creating plantations did not meet modern requirements forest reproduction.

Due to above reasons:

- in the belt forests of the Irtysh river area (Priirtyshye) formed at least 4,800 hectares of pine underbrush quite viable in age from 6 to 14 years who have not yet upgraded to a category of forested land;

- there was a necessity of development and implementation in production of another group of standard indicators and quality assessment scales used for the transfer of young trees in the pine forested lands, as well as new ways to create cultures that meet the situation and the requirements of modern forest growing .

Standard values for assessing the quality of young trees on burnt pine for transfer to forested land in the belt forests Priirtyshye developed based on analysis of forest indices according underwood 89 plots laid down in the reserves "Ertys ormany" (26 pcs.) and "Semei ormany" (63 pcs.) group dry pine forest types (C_2- 67 pcs.) and fresh pine (C_3 - 22 pcs.).

Development of regulatory quality indicators underwood pine on burned, according to the former wealth of experience constructing different forest cultural-indices tables implemented on the basis of studying the laws relationship key parameters describing their condition.

Standards (for crops and natural undergrowth) compiled in relation to the pure composition of young growth of pine on burned. From these standards for pine plantations are unified with the applicable regulatory quality indicators of forest cultures, translated into forested lands on natural areas and subareas of the Republic of Kazakhstan for which the main entrances, as before, are dry steppe subzone, breed, indigenous group of forest types (C_2 and C_3), age and quality grades and scales for assessing the quality of the natural pine undergrowth - dry steppe subzone, breed, two groups of forest types (dry and very dry – C_1 and C_2 , fresh and moist, C_3 and C_4), age and quality indicators. Common for them as regulatory measures are the average number of surviving plants per 1 ha (for further cultures - mean safety in %) and the average height of young trees.

Such an approach to building standards and scales greatly facilitates their application in practice and does not require changes made to the republic forms and reporting system in the reproduction of forest.

Standard values for assessing the quality of pine on burned to transform them into forested lands are based on the actual relationships between the average number of surviving plants per 1 ha, the average percentage of their safety and an average height of young trees with their age, which, in principle, similar to the processes of growth and recognized development of natural stands (Table 1).

Table 1 - Standard values for assessing the quality of pine on burned for conversion to forested land in belt pine forests of the Irtysh river area (Priirtyshye) tape designed to reflect the changes of site conditions

Group of indigenous forest types or types of forest cultural conditions	Age of forest crops, years	Standard indicators for quality classes					
		1st class			2nd class		
		The presence of viable cultivated trees thousand plants / ha at least	Preser-vation of plants,%	The average height of cultivated viable trees meter is not less than	The presence of viable cultivated trees thousand plants / ha at least	Preser-vation of plants,%	The average height of cultivated viable trees meter is not less than
Dry pine (C_2)	7	2,50	52,6	1,23	2,13	44,7	1,04
	8	2,31	47,7	1,40	1,96	40,5	1,19
	9	2,14	42,7	1,58	1,82	36,3	1,34
	10	1,96	38,0	1,75	1,67	32,3	1,48

Fresh pine (C_3)	7	2,88	60,5	1,41	2,45	51,4	1,20
	8	2,66	54,9	1,61	2,26	46,7	1,37
	9	2,46	49,1	1,82	2,09	41,7	1,55
	10	2,25	43,7	2,01	1,91	37,1	1,71

In the new regulations introduced instead of 6 years age range from 7 to 10 years, which gives them some flexibility and significantly increases the chances of pine forest to be translated into the forested lands. 6 years of age is excluded from their ranks, as at this age the plants are just starting to move away from the stress obtained them from harsh conditions burnt and do not have time to form the desired condition.

Starting point for the development of quality assessment scale natural pine undergrowth on burned than the above reason was a lack special regulation for their transfer of forested land in this region and the suitability for the purpose of their other analogs.

Scale evaluation of the quality of natural undergrowth on burned pine developed similar quality standards of pine, as many processes of growth and development similar to each other (Table 2). It set the age range from 8 to 14 years and this is due not only to the presence of large areas of forests tape natural underbrush, not yet translated into forested lands, but also to the fact that their formation is much longer, as they have successfully renewed only in good years with sufficient precipitation.

Table 2 - Assessment Scale quality natural pine undergrowth on burned for conversion to forested land in belt pine forests of Priirtyshya, work out with accounting the changes of site conditions

Group of indigenous forest types or types of forest cultural conditions	The average age of natural undergrowth years	Quality indicators			
		good		satisfactory	
		Number of viable undergrowth, thousands of units / ha at least	The average height of viable undergrowth, at least a meter	Number of viable undergrowth, thousands of units / ha at least	The average height of viable undergrowth, at least a meter
Very dry pine forests and dry (C_1 and C_2)	8	1,05	1,57	0,89	1,33
	9	1,18	1,73	1,00	1,47
	10	1,30	1,88	1,11	1,60
	11	1,43	2,03	1,22	1,73
	12	1,56	2,18	1,32	1,85
	13	1,69	2,33	1,43	1,98
	14	1,81	2,49	1,54	2,12
Pine fresh and moist (C_3 and C_4)	8	1,20	1,87	1,05	1,59
	9	1,35	2,02	1,18	1,72
	10	1,50	2,17	1,30	1,84
	11	1,64	2,32	1,43	1,97
	12	1,79	2,47	1,56	2,09
	13	1,94	2,61	1,69	2,22
	14	2,09	2,76	1,81	2,35

Besides the above standards and rating scales for young as a result of the research production proposed:

- Creation of bloc forest plantations;

- Uterine - transit way to create cultures;

- How to create dissemination biogroups on burned.

The basis for their development the circumstances as followed:

- the practice of forest growing in the region is still focused on the wood, while much priority now becomes ecological protective forestry;

- forest growing, aiming only for wood, leads to the choice of the main rocks and mobilize productive capacity only solution to its problems, and therefore the other members of woodland permanently eliminated from forest cultural objectives and, ultimately, forest cultural production will be closed on monoculture;

- protrusion main breed instead of the predominant admitting the presence of accompanying her species, affects the conservation of forest biological diversity in the region, suitable only for growing plantations and protective forestation;

- selection of the main breed for forest resources forest growing technology focuses on continuous and compacted planting plants in the form of large arrays in one step, but forest cultures doomed to long-term development in the conditions of a thickening poor clean ability and weak differentiation of trees on growth parameters, which is estimated in general as unstable and highly inflammable condition;

- existing ways of creating cultures associated with periodic thinning under which turns and unsuitable for farming purposes wood pulp, but is destroyed up to 95 % of the trees, leading to a loss irrevocable to three-quarters of all funds invested in the forest growing;

- extremely tough climatic conditions is not conducive to the establishment in that area of continuous forest crops. This is confirmed an intermittent nature of local natural forests and the tendency of woody plants in them to establish small biogroups, which are primarily related to the difference in moisture content, soil micro relief and wealth.

Modular way to create cultures has no other analogues, along with complete and partial ways of creating cultures is brand new, third way of growing, innovative patent protected by Republic of Kazakhstan №25515 for an invention entitled "Method of creating fire resistant tape planted in belt pine forests of Irtysh river area (Priirtyshya) (author S.Baizakov, S.I.Iskakov).

This point lies in the transfer of forest growing from clear massive planting crops in one portion to the individual blocks of different sizes with interblock gaps of a width not less than 200 m, which increases their fire resistance (Fig. 1 and 2).

Modular way to create cultures in practice is realized in the form of complex broken open glades landings.

Layout and size depends on the size and configuration of the site and forest cultural finally determined when developing technical working project plantations with respect to the direction of prevailing winds.

Forest quarter model

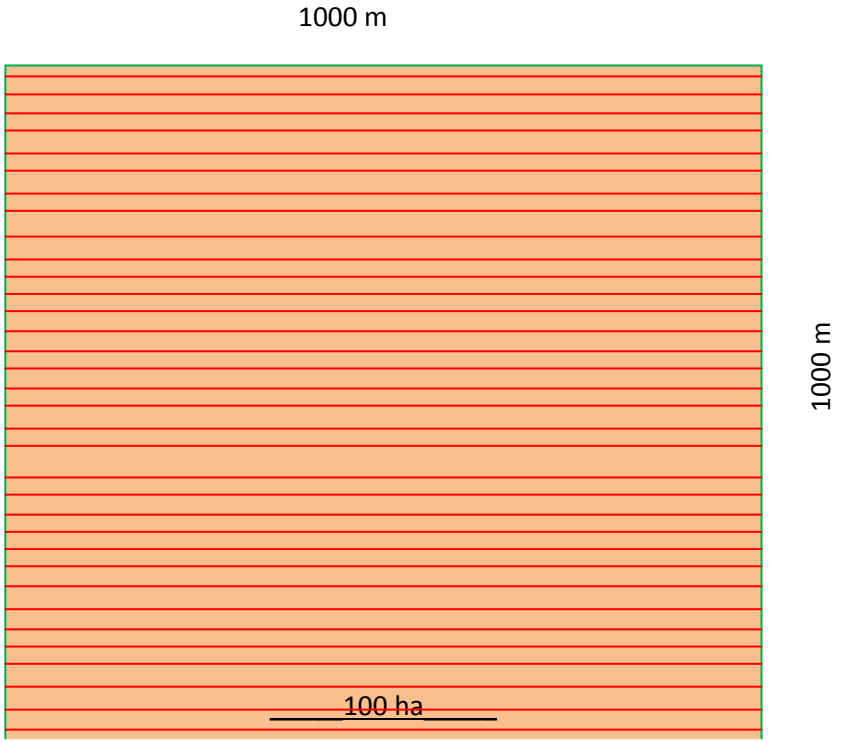


Figure 1 - Solid culture of pine on 100 hectares,

created by current technology

The total forest cover of the forest quarter - 100%

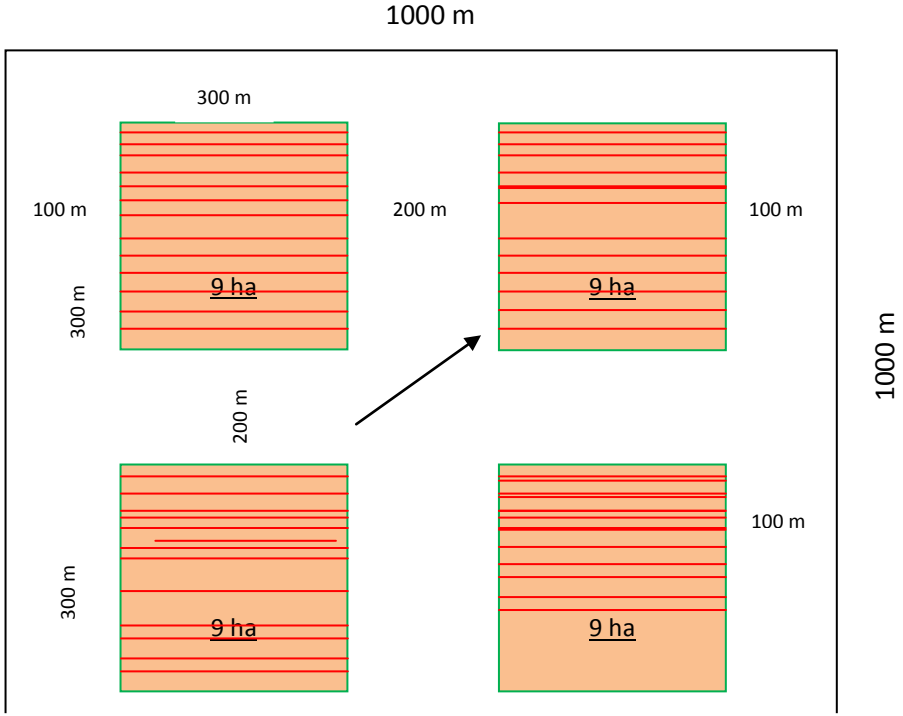


Figure 2 - Recommended layout block of pine forest cultural

on 100 hectares.

Area of 9.0 ha blocks.

The total forest cover of the forest quarter - 36%

In this method, creating cultures individual blocks may be square from 4 to 9 hectares, providing forest cultural forest cover area of 100 hectares at the level of 25-36% and contributing to operational shapeshifting burnt on the forest environment.

When transferring bloc crops category forested land accounted only specific areas of individual blocks, and the interconnect space derived from the forest cultural Fund and credited to a number of non-forest land reserves.

Indisputable advantages of the modular method of creating cultures are:

- prompt delivery of the place of firefighting equipment and people to fight the fire;
- the ability to save the remaining forest blocks in case of fire on one;
- much faster on burned forest setting is created;
- 55-65% reduction in costs of afforestation and burnt area covered with forest lands;
- ability to use interblock spaces as hayfields and pastures.

This method most closely matches the natural geographic and climatic conditions of Kazakhstan, where forests are most often insular character. Moreover, it is quite applicable in all regions and arid plains, where there is a greater risk of loss from fires continuous cultures.

Uterine - transit method of creating forest plantations is a new way that has no analogues and other innovative patent protected by Republic of Kazakhstan №26199 for an invention entitled " uterine- transit method to create cultures softwood plains of Kazakhstan" (author S.Baizakov, C.I.Iskakov, E.N. Nysanbayev).

Its point lies in the rational use of all originally planted the number of plants to be transplanted to the new forest cultural land.

Uterine - transit method of creating forest plantations is different from all existing methods of full replacement processes thinning crops through two-stage technology to transplant woody plants in part to new sites in a more diluted form as they grow in thickness and height, as well as increase the density of planting (Fig.3).

This method of creating plantations helps to eliminate all economic (cost-based and laborious), forest cultural and ecological (repeated thinning and their replication, the destruction of viable trees, turning them into waste wood, fire, pests and diseases) and technology (manual work, low degree of mechanization) shortcomings of existing methods.

Technology uterine - transit method for creating forest plantations include:

-initial planting of seedlings with an open (closed) of the root system on one of the existing schemes with a fourfold in the first and twice in the second year of the irrigation rate of 10 l of water for 1 seat;

- first transplant woody plants with a lump of former area in 6-7 years after the initial landing on the new 2 sites on one of the schemes of 3.0 x 1.5 m and 3.0 x 3.0 m leaving intact those saplings that occupy seats in the corners of these schemes, and watering twice per season per year transplant rate of 15 liters of water per 1 seat;

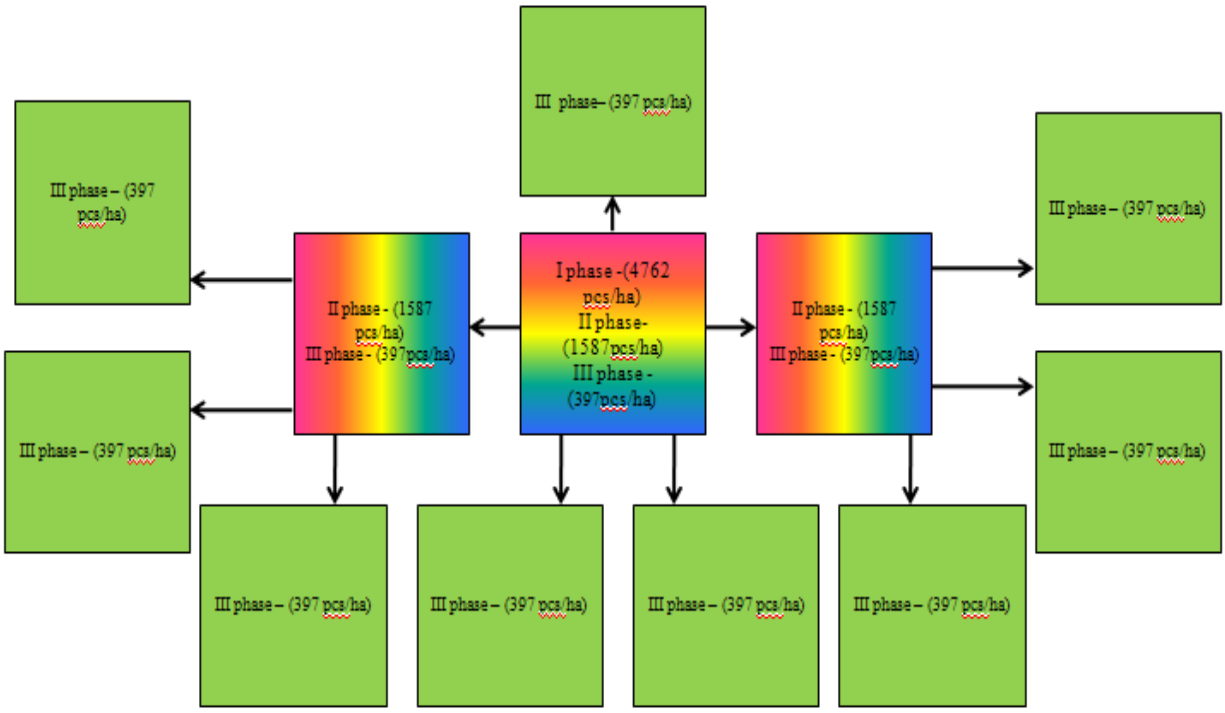


Figure 3 - Method of creation utero-transit pine plains kazakhstan (for example, a layout of planting material)

Stage I - landing biennial pine seedlings with closed (open) root system under the scheme 3.0 x 0.7 m and with the amount of planting material 4762 plants / ha ;

Stage II - the first transplant woody plants with up to 1.5 m (6-7 years after planting) on 2 new plot scheme 3.0 x 2.1 m to 1587 units / ha leaving the same number of saplings at the same place of their growth ;

Stage III - the second transplant woody plants with up to 3.0 m (the next 4-5 years after the first transplant) 9 new sites under the scheme 6.0 x 4.2m from 397 pcs / ha leaving the same number of saplings 3 ex - former places of growth.

- second transplant woody plants with lumpy even after 5-6 years after the first transplant of previous 3 new sites on 9 sites for one of the schemes of 3.0 x 4.5 m, 4.5 x 4.5 m and 4.5 x 6.0 m leaving on the previous 3 sections intact saplings those who occupy seats in the corners of these schemes and two-time watering during the growing season in the second year of transplant rate of 20 liters of water per 1 seat.

Technology allows you to set out to form a 12-15 years from 1 ha originally created cultures to 12 hectares of new crops, contributing to rapid expansion of their areas and significantly improve the environmental situation on the ground.

Time of the transfer of cultures in forested lands in uterine- transit process of their creation are set:

- crops for the initial landing as usual under existing regulatory measures;
- for subsequent crops transplanted from the initial and follow- hop - by the same standards, but a year after each (first and second) transplant.

Uterine - transit method provides:

- growing of crops without the use of forest thinnings, except, perhaps, sanitary felling;
- preventing the destruction of trees in cultures thinning as environmentally unsustainable forest growing method, and their conversion into large-sized planting material to create new areas of forest crops;
- reducing the need for planting up to 12 times;

- a gradual transfer of nurseries for growing seedlings with closed root system and large-sized form;

- widespread use of innovative methods and modern mechanization of forest growing;

- a significant improvement in the sustainability of forest crops;

- reduce the cost of growing seedlings and crops up to 12 times;

- an increase in forest cover and increasing the efficiency of forest growing up to 12 times.

Uterine - transit method of creating forest plantations forest growing process turns into a year-round activity, smoothing out seasonal work in the industry.

In principle, the above new ways of creating forest plantations are aimed at the gradual transfer of forest cultural production:

- from the solid (massive) method to island cultures, intermittent block and how to create them;

- from the main dominant species to breed, from the auxiliary (unwanted, low-value , etc.) which grow together to rock and related species;

- thickened from landing to landing thinned allowing arborist see on forest cultural site not only forest, but specific trees in the forest;

- from narrowly targeted approach of only getting merchantable timber, the multipurpose forest growing;

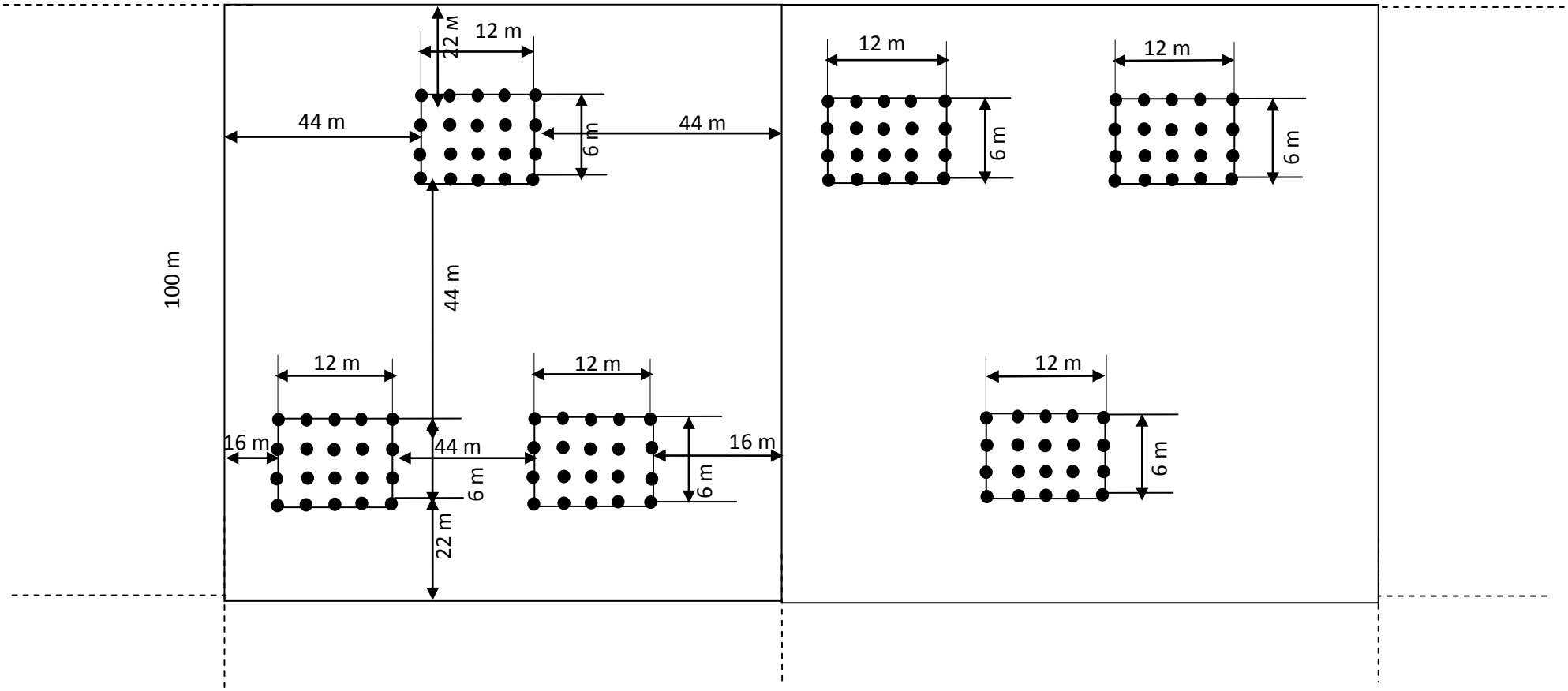
- the elimination of the practice of a great part of underwood thinnings grown their own work, to continue to use them in a living form to increase forest areas;

- from monocultural production to create a complex composition of the forest;

- from the foundation - a laborious way to create cultures to low-cost and effective type of crop;

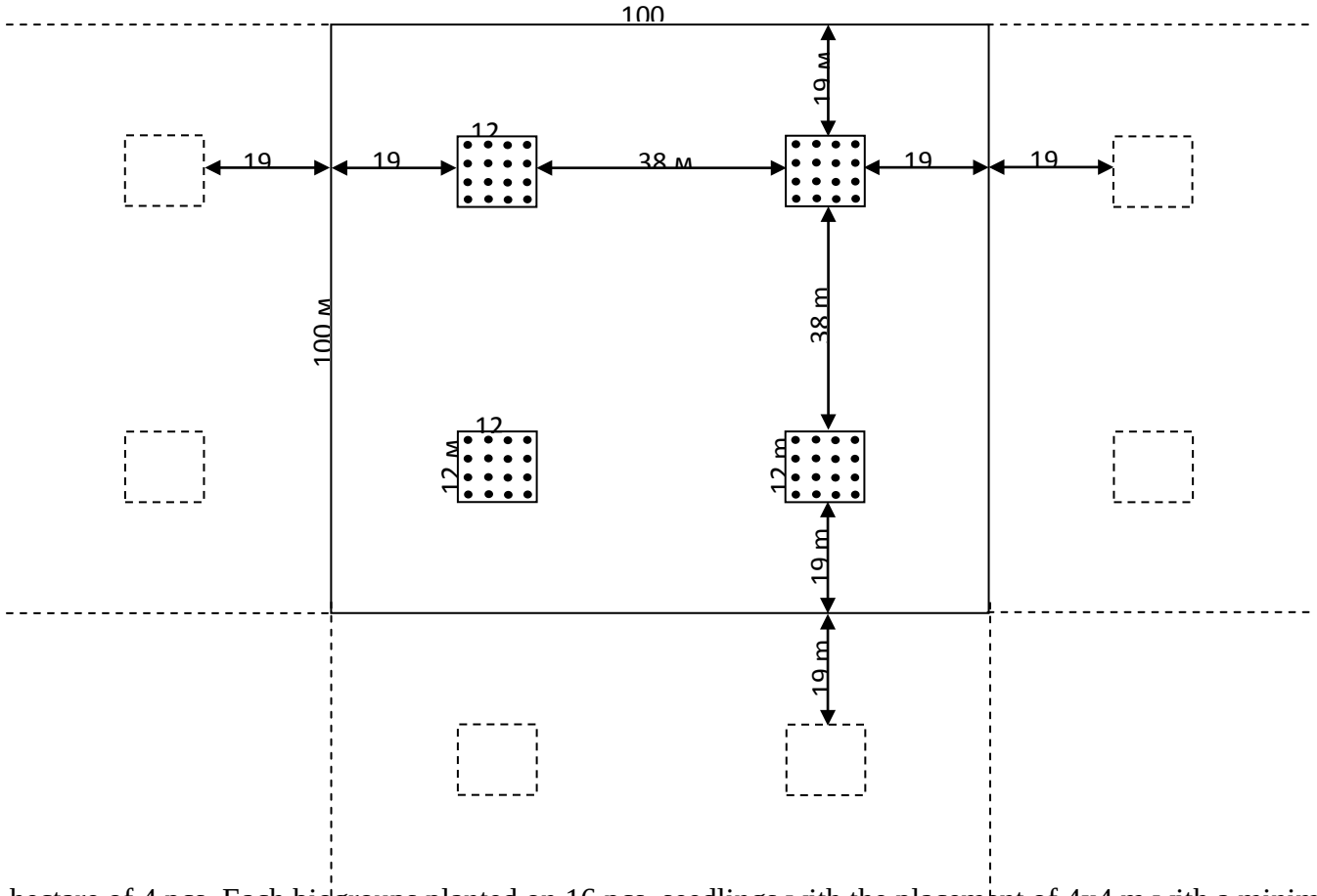
- from extensive mode to intensive forest growing and innovative ways;

- from mass gathering a huge amount of substandard seeds to the seed in small volumes, but with improved breeding and genetic properties;



Number of biogroups on 2 hectares - 6 units. Each biogroups planted 20 pcs. seedlings Scheme 3.0 x 3.0 m
minimum height of 1.0 m
Seats on 2 hectares - 120 pcs.

Figure 4 - Option of creating dissemination biogroups pine seedlings of large-sized per 2 ha forest cultural area



Number of biogroups on 1 hectare of 4 pcs. Each biogroups planted on 16 pcs. seedlings with the placement of 4x4 m with a minimum height of 1.5 m The number of seats per 1 ha - 64 pcs.

Figure 5 - Option to create and organize dissemination biogroups pine seedlings of large-sized per 1 ha forest cultural area

- from growing multimillion seedlings to grow a moderate amount of selected large-sized planting material;

- from the complex and outdated processes to simple and highly mechanized technology systems and operations.

The method of creating dissemination biogroups, we proposed and verified experimentally provides survival gardening plants within 75-100 %. Therefore, it is recommended to create biogroups 3-4 pcs per 1 ha in large burned areas, where there are no other sources of seed. Number of plants planted in a group of 16-25 pc. with a height of 1.5 to 2.5 m (Fig. 4 and 5).

Total according to the results of the research the following recommendations, which were approved in the prescribed manner and transferred production:

1. Recommendations for assessing the quality of forest plantations and natural undergrowth on burned pine for transfer to forested land in belt pine forests of Priirtyshya tape on standard indicators and scales designed to accommodate changes in site conditions.

2. Ертіс бойының жал ормандарындағы өртеңдердегі қарағай екпелері мен өздігінен пайда болған өскіндерінің сапасын оларды орман өсіп тұрған жерлер қатарына аудару мақсатында анықтауды өсу жағдайларының өзгеруін ескере отырып жасалған жаңа нормативтік көрсеткіштер мен шкала арқылы жүргізу туралы ұсыныстар.

3. Recommendations for development of forest cultural production based on new ways to create pine plantations in belt pine forests of Priirtyshya tape.

4. Ертіс бойындағы қарағайлы жал ормандарда екпе ормандар өсіру өндірісін олардың тұрақтылығын арттыруға бағытталған жаңа әдістер арқылы дамыту туралы ұсыныстар.

5. Recommendations to restore burnt, bioecological and improve fire resistance of pine crops in belt pine forests Priirtyshya tape.

For the successful implementation of the proposed recommendations in production need to radically reconsider the system of forest seed, planting material growing on the nursery and forest cultural production, transfer them to a new technical level.

Байзақов С.Б.

ЕРТІС ӨҢІРІНДЕГІ ЖАЛ ОРМАНДАРДА ҚАРАҒАЙ ӨСІРУДІҢ ЖАҢА ӘДІСТЕРІ, НОРМАТИВТЕРІ МЕН ШКАЛАЛАРЫ

Мақалада Ертіс бойындағы жал ормандарда қарағай өсірудің жаңа әдістері, нормативтері мен шкалалары келтірілген. Олардың мәні мен мағынасы осы уақытқа дейін қолданылып жүрген әдістерден мүлде басқа және осы өңірдегі қарағай екпелерінің өсіп-өну барысын жанды-жақты зерттеулер нәтижесіне, қазіргі орман өсірудің жаңа технологиялары мен басымдылықтарына негізделген. Оларды қолдану орман өсіруді жаңа деңгейге көтереді.

Кілт сөздер: қарағайлы жал ормандар, орман екпелері, орман екпелерін бөлек шоғырлар түрінде отырғызу, көшірмелі әдіспен отырғызу,.

С.Б. Байзаков

НОВЫЕ СПОСОБЫ, НОРМАТИВЫ И ШКАЛЫ ДЛЯ ВЫРАЩИВАНИЯ СОСНЫ В ЛЕНТОЧНЫХ БОРАХ ПРИИРТЫШЬЯ

В статье приведены новые способы создания культур сосны на гарях, а также усовершенствованные нормативы и шкалы оценки качества для перевода сосновых

молодняков в покрытые лесом угодья, лесокультурному производству в ленточных борах Прииртышья.

Их суть и содержание являются совершенно иными, чем приняты на практике, исходят из анализа и обобщения роста и развития сосновых культур на гарях, современных тенденций в технологиях лесовыращивания. Внедрение изложенных предложений в производство способствует переводу лесовыращивания на новый уровень.

Ключевые слова: ленточные боры Прииртышья, способы создания культур, нормативы оценки, блочный способ, маточно-транзитный способ.

УДК 574

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ВЫСШИЕ ВОДНЫЕ РАСТЕНИЯ В СИСТЕМЕ БИОЛОГИЧЕСКОЙ ДООЧИСТКИ СТОЧНЫХ ВОД ПТИЦЕФАБРИК

Аннотация

В статье рассмотрена проблема очистки сточных вод, поступающих от производственных зон птицефабрик, отходы которых отличаются высокой концентрацией органоминеральных компонентов. Применение биологических прудов с высшими водными растениями является наиболее перспективной для повышения эффективности доочистки сточных вод. Этот метод основан на практически неограниченной способности высших растений в процессах своей жизнедеятельности использовать многообразие веществ, содержащихся в сточных водах.

Ключевые слова: очистка сточных вод птицефабрик, биологическая очистка сточных вод, биологические пруды, высшие водные растения.

Безопасная утилизация жидкого помета и сточных вод, содержания и выращивания птицы и перерабатывающих цехов – актуальная проблема, требующая незамедлительного решения на предприятиях птицеводства. Отходы птицефабрик отличаются высокой концентрацией органоминеральных компонентов. Традиционно применяемые технологии очистки коммунальных, промышленных и животноводческих стоков предусматривает механическое разделение загрязненных вод и искусственную биологическую очистку их жидкой фракции. Большинство имеющихся индустриальных сооружений очистки функционируют с низкой эффективностью или с нарушениями технологии и режима эксплуатации, не обеспечивая необходимую степень очистки. В этих условиях при совершенствовании действующих систем очистки жидких отходов птицеводства наиболее перспективно применение для их подготовки к безопасной утилизации различных типов биологических прудов с высшей водной растительностью [1, 2].

В последние годы макрофиты стали успешно использоваться в практике очистки вод от биогенных элементов, фенолов, ароматических углеводородов, микроэлементов, нефти и нефтепродуктов, тяжелых металлов, различных минеральных солей из сточных и природных вод, в обеззараживании животноводческих стоков от разных форм патогенных микроорганизмов.

Прибрежно-водная растительность, выделяя при фотосинтезе кислород, оказывает благотворное влияние на кислородный режим прибрежной зоны водоема. Обитающие на поверхности растений бактерии и водоросли выполняют активную роль в очистке воды. В зарослях прибрежно-водных растений развивается фитофильная фауна, которая также