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ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

БАЯНДАМАЛАРЫ

ДОКЛАДЫ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

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TO THE PROBLEM OF PHYTO-AMELIORANTS INFLUENCE ON THE PRODUCTIVITY OF THE RE-SALTED LANDS IN THE SOUTH KAZAKHSTAN REGION

Abstract. The green cover of the planet is the most valuable of man's achievements. But in spite of this, until now not all the possibilities of plants have been taken into account and used by mankind. The main cultivated plants were domesticated several thousand years before our era. The ways of optimal artificial regulation of plant ontogeny are still unknown, which without pathogenetic consequences can lead to their maximum productivity. The establishment of ways to regulate plant ontogeny - which is extremely important for harvest programming taking into account the fertility of soils - is associated with the establishment of regularities that allow regulating photosynthesis, periodicity and dynamics of growth, nitrogen exchange.

At present, the state of the vegetative cover of the Earth is deteriorating. The main reason is diversity and different directions of pathological phenomena that occur in plants. Pathological phenomena are combined into three categories: pathological reactions, pathological processes and diseases.

The most dangerous are the violations that lead to the complete or partial disappearance of certain plant species. The reasons for the disappearance of plants are diverse. They can be related not only to man's anthropogenic activities, but also to certain natural disasters. The most important of them are: 1) physical extermination for agricultural and forestry purposes, for mining, construction and industrial production. The results of the research showed that phytomelioration is a set of measures to improve the state of the environment through the production or maintenance of natural plant communities. Improving the utilization of irrigated lands by phytomelioration is also environmentally and economically viable.

Key words: phyto-amelioration, productivity, plant, salt, land, improvement, soil, impact, biomeliorant, bean seeds, clover, fertilizers.

Introduction. Phyto-amelioration is a set of activities improving the environment with the help of the cultivation of natural plant communities and showing service. Phyto-amelioration is divided as humanitarian, engineering, bio-productive, interior and environment protective. As a result of a wide range of intraspecific selection, plant phyto- ameliorants, fodder which is the source of energy and 15 perspective types and ecotypes of suitable plants for the production of medicinal plants on medium saline soils watered by saline water have been found. According to the given data, strong saline clay layers of desert soils contain 48 t / ha salt. The ground phytomass of 18-20 t / ha of halophyte plants removes 8-10 tons of salts from 1 hectare soil per year. Due to evaporation, halophyte plants hinder the increase of salts to the surface the earth. Green pavement effect consists of 2.5 t / ha salt. As a result, the amount of salt in the soil area where halophytes are planted comprises 10-12,5 tons per year. Many scientists have carried out the reclamation works for desalting soils for 4-5 years in the medium saline soils and 6-7 years in strong saline soils [1].

Methods

In our case, we have conducted experiments on the soil of re-salted rice field of Karatobe village of Zhanakorgan region and non-arable land of Nurtas village of Turkistan region. Perennial legume plants were chosen as perspective bio- ameliorants for gray irrigated saline soils. They are: conventional alfalfa *(Medicago sativa)*, White clover *(Trifolium repens)*, conventional camel alfalfa *(Melilotus offisinalis)*.

Results

Perennial legume plants chosen for the study are saturated with the soil nitrogen. Their root system is developed very well as a result of which they serve for many years and influence on the emergence of humus and are characterized with a strong phyto- ameliorantion impact. In addition, the cover and strongly developed root system of perennial legume plants protect them from soil removal and flying. Therefore, they are considered as soil formers [2].

Prior to planting the plants, an analysis was conducted on the water extract of soil types that are going to be studied (table 1).

Table 1 – The result of the laboratorial analysis conducted on the water extract of the soil types

Salt ions mg / dm3	Nurtas village of Turkistan region	Karatobe village of Zhanakorgan region	According to the amount in water extract, mg / dm3
Cl^-	244,71	75,3	350
SO_4^-	0,629	2,602	500
NO_2^-	0,18	0,248	0,1
NO_3^-	169	30,93	45
NH_4^+	6,081	5,034	2,5
CO_3^-	-	-	100
HCO_3^-	305	305	1000
Ca^{2+}	572,6	157	200
Mg^+	300	123	100

The analysis works were carried out according to the following characteristics:

1) a concentration of sulphate, hydrocarbonate and carbonates, chloride, calcium, magnesium;
2) a concentration of of the nitrogen ions according to the photocolorimetry method;
3) the amount of of humus in the soil;
4) the general degree of salinity;
5) moisture;
6) the pH environment.

According to the analysis results, high exponent of the salt elements was identified in the soil of Nurtas village. The amount of chloride, nitrate, ammonium and calcium ions in the soil of Nurtas village showed slightly higher results in comparison to the soil of Karatobe village. Nitrates are 169 mg / dm^3, ammonium - 6.081 mg / dm^3, calcium 572.6 mg / dm^3, magnesium is 300 mg / dm^3 in the soil of Nurtas village, while in the soil of Karatobe village magnesium is 123mg / dm^3, ammonium 5,034mg / dm^3 and nitrite 0.248 mg / dm^3. The amount of these ions in the soil is higher than the standard. As the analysis results have shown, the carbonate ions were not observed in the composition of the soil.

A higher amount of cations and anions was observed in normal saline gray soils in the South Kazakhstan region. All micro and macro elements in the soil composition are necessary for the plants nutrition. The shortage and increase of the required elements in the soil have a negative impact on the plants. There is a considerable difference between the soil compositions of Nurtas and Karatobe villages. While studying the soil of Nurtas village, phyto-amelioration works were conducted on the soil of Karatobe village. Therefore, it is important to improve chemical and physical structure of the saline areas in the soil of Nurtas village.

The salinity degree of soils taken for conducting the study was defined before growing plants (figure 1).

Basically, saline soils are those the amount of mineral salts in which is of 0,25% and more that are malicious for the agricultural plants.

The amount of salt of the soils in the study objects is higher than 0.25%. According to table 1 in the second part: the soil of Nurtas village is defined as a strongly saline soil comprising the salinity degree of 1,9%, while the soil of Karatobe village referred to a medium saline soil of 0,6 % salinity degree.

The plants under the control were grown in the laboratory and field (figures 2, 3).

The plants were grown in the soils in two ratios: in the initial soil and the manure added soil in 1:1 ratio.

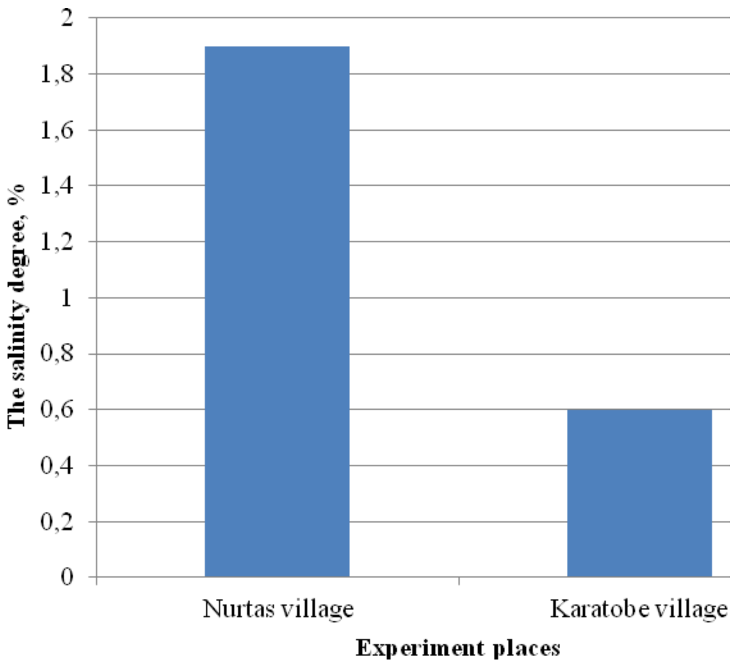
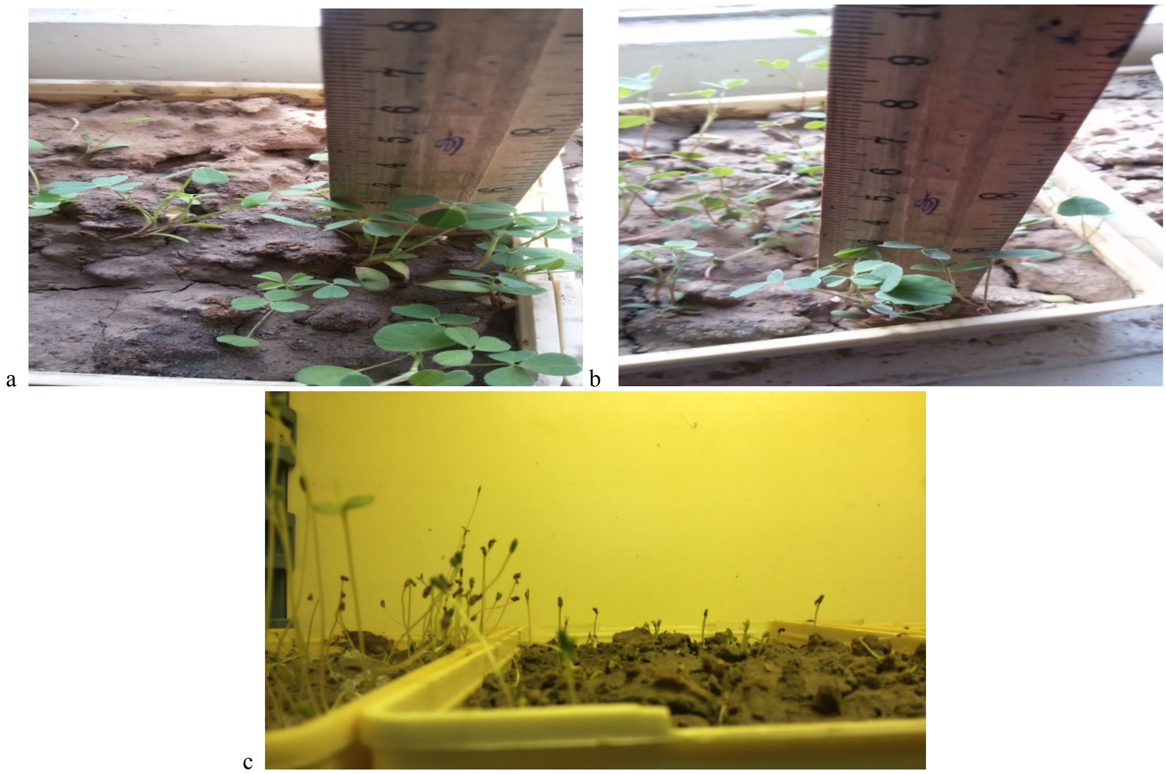


Figure 1 - The salinity degree of soil types taken as the study objects

The plants were cultivated in bottomless wooden boxes of 100x50x100 sm in the field, while in nature case they were planted in saline gray soils of the study objects. The repeatability of the experiment is three times. Analysis works were carried out to define the humus of the soils of the study objects as a result of which the soil humus of Nurtas village was 0,6%, while the soil humus of Karatobe village was defined as 1.04%.



a b c

Figure 2 - The plants grown in the laboratory: a, b – plants grown in the soil type taken from Karatobe village; c – the plants grown in the soil type taken from Nurtas village.

a b c

Figure 3. The plants grown in the field case: a – the plants grown in the soil of Karatobe village;
b, c - the plants grown in the soil of Nurtas village.

Mutagenic energy and productivity of plants grown in the laboratory were observed (table 2).

Analyzing the suitability of herbaceous plants seeds, that is, their mutagenic energy and productivity is of great importance as it is the proof of getting a qualitative product. The pictures of analysis works conducted on the productivity and mutagenic energy of the plants are given in the appendix (Appendix B).

Table 2 - Mutagenic energy and productivity of herbaceous plants under the control

Crops names	Productivity, %	Mutagenic energy
Melilotus	95,5	4
Trifolium repens	94,85	4
Medicago sativa	96,1	3

A higher mutagenic exponent was observed in conventional camel alfalfa among other the plant seeds. Its mutagenicy showed 96,1 % in comparison with conventional alfalfa and the white clover.

The saturation of plants in the soil with organic substances depends on their longevity. The main function of the plants in their growth development is due to their rooting in the soil and penetrating into the soil structure. Therefore, paying much attention to the peculiarities, usage and planting technologies of plants grown in agro systems is of paramount importance as it enables to get qualitative products in the agricultural field.

While choosing the study plants as phyto-ameliorant, firstly, the root system structure and their importance in all agricultural system and secondly, growth dynamics in all types of soil were taken into account. As it is well-known, the root system of plants freely penetrates into all layers of the soils structure with their grid-like items and affects the soil directly and indirectly. At the same time, an analysis was carried out on the role of plants in the soil structure formation.

The soil formation is dependent on the climate, relief and geological structure and affected by many ecological factors. The soil connects a biogeocenotic system with ecosystem and becomes the main joints component between them. This kind of ecosystem is an organizing plant. As the trophical relations initiative, plants are considered as producers of the first yields and the unique energy sources of the soil formation. Plants absorb one part of the solar energy and distribute to the biosphere throughout their existence while the rest of the living organisms absorb the solar energy collected by them [3].

In natural ecosystems, plants provide the normal balance of organic substances. The structural condition of soils used for arable fields are much worse than those of forests, pastures and green meadows due to growth of cultural plants leading to the balance disruption of organic substances in them. Farming does not affect the soil structure and richness in the same way and therefore, all soils cannot be phyto-ameliorants [4].

Cultural works on the arable fields such as the usage of different kinds of heavy machineries, irregular watering and using different fertilizers have potential negative consequences on the physical properties of the soil and the conditions of organic substances. For this reason, perennial herbaceous plants have a strong phyto-ameliorantant effect and are considered as a soil structure former [5].

Agrarian salinity tolerant plants were used in assessing the gray saline soils. Agrarian salinity-tolerance is a proper development of living organisms in a saline soil and an ability of giving yields meeting the needs of the agriculture in a such condition. Agrarian salinity- tolerant plants are camel alfalfa, sunflower, sorghum, cotton, canola, wheat and beets. The average salinity-tolerant plants: wheat, soy, corn, carrots, tomatoes, pepper, cloves. Low-salinity- tolerant plants: clover, celery, radishes, peas, foxtail [6].

For this purpose, meliorative properties of conventional camel alfalfa, conventional alfalfa, white clover and legumes herbaceous plants that were taken as the study object according to their salinity-tolerant exponents were considered.

Camel alfalfa (*Melilotus*) is used as food for animals in agriculture. conventional camel alfalfa provides more food biomass and has a property to improve the structure of the soil [7].

Camel alfalfa is used as a phyto- ameliorant to return saline or lands requiring recultivation in agricultural farms in the West Siberia, Kazakhstan and other regions.

Camel alfalfa is also used to decrease the salinity degree of saline soils in agricultural fields and farming. In most cases, using camel alfalfa in regions growing rice is of great importance.

Furthermore, camel alfalfa is used for recultivation of lands used for industrial purposes [8].

Conventional camel alfalfa is the best saline tolerant plant. Its roots are able to withstand different soluble saline concentrations in soils. Due to this property, its root and green mass can develop in the saline soils. Simple plants roots cannot spread in the dense layers of saline soils and the nature's sharp variable dry climate cannot provide them with water. For this reason, most plants dry before reaching a vegetation period. However, roots of camel alfalfa penetrate into the all deep soil layers, 40 sm in the first year and 100 sm in the following year and use the water spread in the whole soil layers. In this way, camel alfalfa roots loosen the whole layers of the natural structure from the saline soil very well. Alive and dead roots parts composed in soils affect the salt in the saline layers being washed away to the deep soil layers. They considerably decrease the mineralized groundwater level in the process of desalting saline soils or biological melioration. This possibility is created by a lot of gathered organic mass alongside with camel alfalfa in and on the soil (approximately 200 kg / ha of wet weight). Moreover, camel alfalfa lessens the temperature of the earth by forming meadow grass resulting in physical evaporation on the earth surface and salt concentration in the top layer [9].

Camel alfalfa is cold and drought tolerant and can live combined with other cultural plants in simple and complex agrophytocenoses. As a phyto-ameliorant, camel alfalfa is distinguished with its stability [10].

а  б

Figure 4. а – Conventional camel alfalfa; б - A three-year root system

Conventional alfalfa (*Medicago sativa*) is a perennial legumes plant and used for green fertilizer and fodder in the agriculture. It has also been used as pet food for agricultural purposes for a long time and is grown in almost every territory of the country today. There are more than fifty varieties of conventional alfalfa. However, only some varieties are used in the agriculture. They are very similar in terms of morphology and characterized by their tolerance to cold, alkaline environment, disease and drought [11-15].

It gives the high yield as a green fertilizer. In the case of irrigation, they give from 8–10 to 80–120 tons of grass. Living compatible with nitrogen stabilizer bacteria, alfalfa collects nitrogen from the atmosphere in the vessels of the collection. Nitrogen lives in harmony with stabilizer bacteria; alfalfa accumulates nitrogen from the atmosphere in its roots and meadow residues. Within 2–3 years alfalfa accumulates as much nitrogen in the soil as in 40-50 tons of manure (about 300 kg of nitrogen is accumulated in 1 ha of soil). When alfalfa biomassa collapses, it becomes a light humus and obtains the property of reducing the soil acidity with absorbable substances improving the soil structure. Alfalfa can be good initiative for the growth of cotton, wheat and other cultural crops. The alfalfa effect is kept for several years [12].

Deeply settled and strongly developed root system of conventional alfalfa improves the soil structure, increases its water and air conductive ability and affects the humus accumulation. In a thick meadow, it cleans valleys from weeds. Being used as phytosanitary, it is stable against different diseases damaged by nematodes and heals soils [13]**.** They use rain worms and collapsed type of soil microorganisms after improving their life function state as food. In its turn, it results in the decrease in the number of plant illnesses and increase in productivity [14].

Conventional alfalfa is also grown in valleys, and it improves meadows and pastures. It is kept in grass meadows for 10 years. It has an ability of growing fast after being cut. It has a tendency of growing in the medium saline soils; alfalfa grows in the same place for 4-6 years and is drought tolerant. Its roots can penetrate into the deep soil layers and able to provide alfalfa with water. It increases soil fertility and supplies with nitrogen. Alfalfa withstands erosion processes [15].

a b

Figure 5.a – conventional alfalfa; b –one-year root system

It improves the soil moisture incentively White clover *(Trifolium repens)* is a perennial legumes herbaceous plant. Its root system is fringed, penetrates the soil up to 50 sm depth, but the separate roots are located at a depth of 1 m. It can grow in different types of soil, but only strongly acidic environment complicates its growth. Through it likes moist environment, white clover is drought tolerant. It can grow in winter and is resistant to compaction, therefore it often grow in pastures. Compacted soils do not affect its growth. It is useful as pasture food for wild and domestic animals. Particularly, proteins are mostly accumulated [16].

Figure 6 – White clover

As it was mentioned above, all types of perennial herbaceous plants are used for the soil moisture improvement. In most cases, they impact much better for the accumulation of organic substances and soil structure improvement than other plants. After growing these plants, other cultural plants can be planted as well. At the same time, perennial herbaceous plants improve not only humus structure, but also the aggregation composition of the soil structure and increase their ability of withstanding erosion [17-19].

Legume herbaceous plants are well known as a nitrogen former. In this regard, an increase in the amount of the nitrogen ions was observed when carrying out analysis work on the soil in which the plants were grown [20].

An analysis work was conducted on the controlled initial soils in which the herbaceous plants had been grown and soils with manure to define their chemical composition, as a result their salinity degrees were identified (Figures 7, 8)

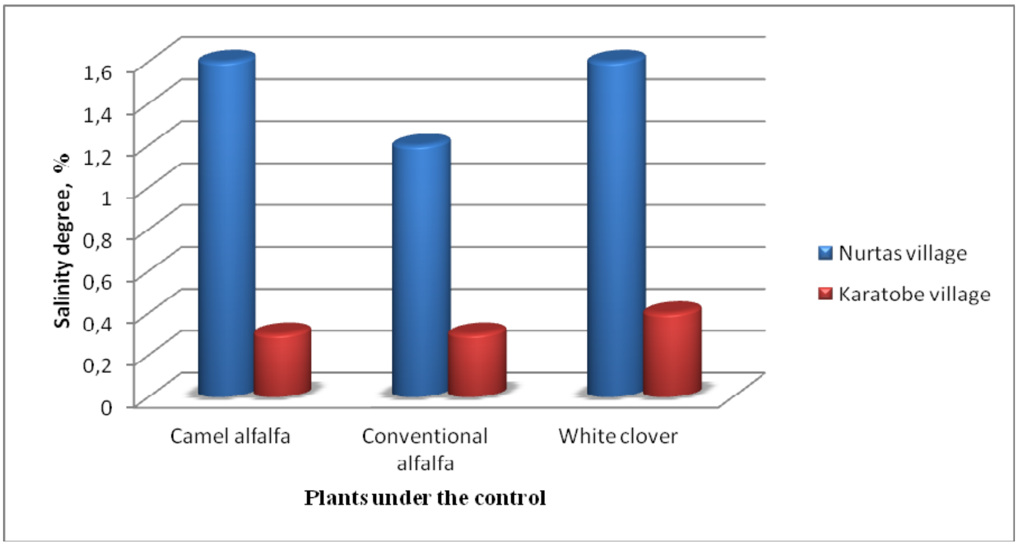


Figure 7 - A change level of salinity degree of the soil types under the control after growing plants without adding manure

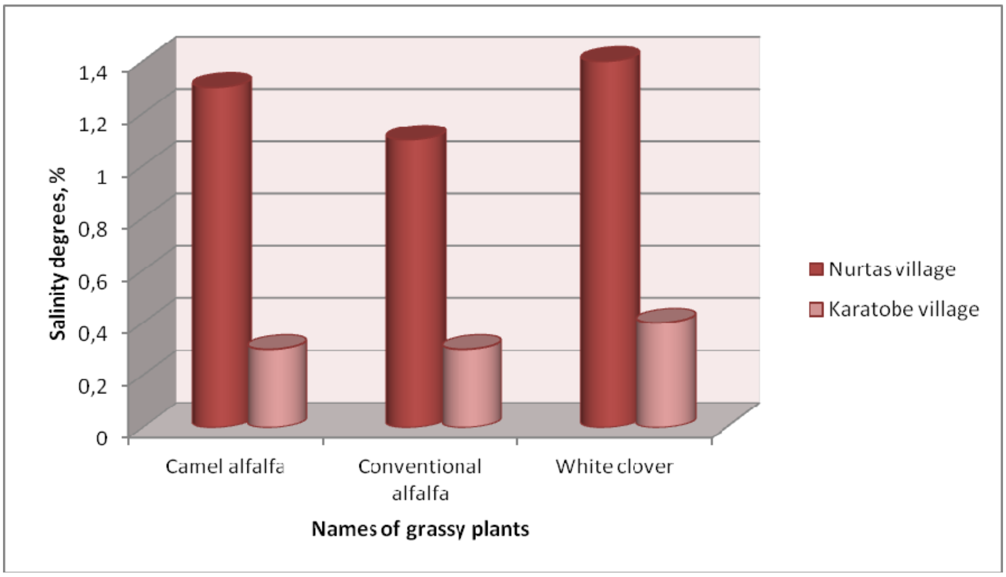


Figure 8 - A change level of salinity degree of the soil types under the control after growing plants with adding manure

The soil salinity degrees of the study objects have decreased after growing the plants. The salinity degrees in the two versions of the soil types have decreased more than the initial soil types (before growing the plants). The salinity degree of the soil types without adding manure: the salinity degree of the manure added soil of Nurtas village decreased up to 1,6 %, conventional alfalfa grown soil – 1,2%, white clover – 1,6%, while the salinity degree of the soil of Karatobe village in which camel alfalfa, conventional alfalfa and white clover had grown reduced up to 0,4%. The salinity degrees of the soils under the control were the same in all types in which the plants had benne grown.

The salinity degree of the manure added soils: the salinity degree of camel alfalfa grown soil of Nurtas village decreased to 1,3%, conventional alfalfa grown– 1,1%, white clover grown – 1,4%, the salinity degree of the camel alfalfa and conventional alfalfa grown soil of Karatobe village reduced to 0,3%, and white clover grown to 0,4%.

The duration of the experiment conducted on the soil types chosen for growing the plants under the control is 2 months.

Manure is one of the most important fertilizers for plants and a source of food necessary for their growth. It is not only plants food, but also affects the soil structure. Manure impacts pH environment of the soil. A regular penetration of manure reduces the soil acidity and saturates the soil with calcium, magnesium and other micro elements [21].

The salinity degree of the manure added soil types was considerably reduced in comparison of the soil without manure.

Table 3 – The result of the analysis works carried out on the chemical composition of the soil types not containing manure in which the plants under the control had grown (water extract, mg / dm^3)

The study objects	Plants name	Salt ions mg / dm^3							
		Mg^{2+}	NH_4^+	Ca^{2+}	HCO_3^-	NO_3^-	NO_2	Cl^-	SO_4^{2-}
Nurtas village	Camel alfalfa	193	1, 242	264,9	168	590	0,092	150,7	0,599
	Conventional alfalfa	139	1,089	259,8	165	600	0,91	166,5	0,596
	White clover	250	2,905	150,2	305	602	0,528	188,9	0,602
	The controlled soil type	300	5,034	574,6	305	169	0,18	244,71	0,629
Karatobe village	Camel alfalfa	34	1,784	60,1	72	222	0,324	62	1,91
	Conventional alfalfa	46	1,416	65,3	73	196	0,675	53	1,8
	White clover	22	1,375	85,2	201	200	0,231	58,92	1,6
	The controlled soil type	123	5,034	157	305	30,93	0,248	75,3	2,602

Table 4 - The result of the analysis works carried out on the chemical composition of the manure added soil types in which the plants under the control had grown (water extract, mg / dm^3)

The study objects	Plants name	Salt ions mg / dm^3							
		Mg^{2+}	NH_4^+	Ca^{2+}	HCO_3^-	NO_3^-	NO_2	Cl^-	SO_4^{2-}
Nurtas village	Camel alfalfa	180	2,242	220,4	122	1008	0,074	131,7	0,569
	Conventional alfalfa	120	2,089	200,4	122	1060	0,304	150,5	0,496
	White clover	228	3,905	163,2	305	556	0,447	181,9	0,602
	The controlled soil type	300	5,034	574,6	305	169	0,18	244,71	0,629
Karatobe village	Camel alfalfa	24	1,694	50,2	61	342	0,334	56	1,72
	Conventional alfalfa	36	1,306	60,3	61	216	0,825	43,9	1,632
	White clover	12	1,285	80,12	183	269	0,301	59,02	1,53
	The controlled soil type	123	5,034	157	305	30,93	0,248	75,3	2,602

The amount of chemical elements in the soil composition has decreased. The changes in the soils compositions of the two versions are shown in Figures 5-6.

During the analysis works on the manure added soil, it was noticed that the amount of nitrogen component ions in the soils not containing manure increased by 5 times. The amount of nitrates of conventional alfalfa in the manure added soil type of Nurtas village increased from 169 mg / dm^3 to 1060 mg / dm^3 in comparison with other herbaceous plants. A high amount of nitrates defined in Karatobe village was identified in camel alfalfa grown version and it increased from 30.93 mg / dm^3 to 342 mg / dm^3. The nitrogen accumulating property of conventional alfalfa and the amount of nitrogen in the manure composition were taken into consideration.

Due to the abundance of organic substances in its composition, manure has a positive effect on the physical, chemical, mechanical and biological soil properties. A regular manure use increases humus and nitrogen composition in the soil and saturates it with the basic substances. The manure added soil version loosens easily and improves the water and air passage [22].

The difference between the given ions was noticed in all cations and anions (Tables 3, 4; Figures 5, 6). Calcium and magnesium cations were absorbed by the plants in the both versions. It is known that cations are well absorbed by plants; in this regard, ammonia nitrogen cation in the initial soil form in Nurtas village decreased to 6,081mg / dm^3, in the camel alfalfa grown to 2,242mg / dm^3, in the conventional alfalfa grown- 2.089 mg / dm^3, white clover grown– 3,905 mg/dm^3. In the grey saline soil of

Karatobe village, ammonia nitrogen reduced to 5,034 mg/dm^3, camel alfalfa grown to 1,694 mg/dm^3, conventional alfalfa grown - 1,306 mg/dm^3, white clover grown to 1,258 mg/dm^3[23].

The amount of chlorides and hydrocarbonates in the soil composition have considerably reduced. However, chlorides and hydrocarbonates were not defined while carrying out the analysis work on the plants composition. A half part of anions was washed away while watering the plants. It is necessary to identify the absorption and biological translocation coefficient of the grey soils [24].

Table 5 - pH exponents of the study plants grown soil

№	Crops name	The study objects name	
		Nurtas village	Karatobe village
		pH - environment	pH - environment
1	Initial soil form	5	5
2	Camel alfalfa	7,342	7,365
3	Conventional alfalfa	7,409	7,076
4	White clover	7,798	6,930

pH environment of soil has a positive effect on the plant growth. A favorable condition of pH soil environment for growing cultural plants cultivated in the agriculture is shown in table 6.

Table 6 - A favorable condition of pH soil exponent for the main types of plants

Cultural plants	**pH optimal exponent**
Wheat	6,0-7,6
Tea	4,8-6,2
Tomato	6,3-6,7
Or Carrot	5,5-7,0
Peas	6,0-7,0
Potato	5,0-5,5
cabbage	6,7-7,4
Шалқан	5,5 and more
Cucumber	6,0-7,0

That is, they have a positive effect on the soil structure in accordance to the descriptions of the herbaceous plants chosen for the study.

Conclusion

1. While planting, the soils' pH showed an acidity environment, it changed to neutral and slightly alkaline environment after the plants had grown. This case showed that the herbaceous legumes plants affected not only physical and chemical compositions of the soils, but also their pH environment.

2. Among other plants seeds, the sprouting exponent of conventional camel alfalfa was high. Its sprouting was 96,1 % in comparison with conventional alfalfa and white clover.

3.The salinity degree of the soils of the study objects reduced after the planting. The salinity degree of the soil types without adding manure: the salinity degree of camel alfalfa grown soil of Nurtas village decreased up to 1,6 %, conventional alfalfa grown– 1,2%, white clover grown– 1,6%, while the salinity degree of the soil of Karatobe village in which camel alfalfa, conventional alfalfa and white clover had grown reduced up to 0,4%. The salinity degrees of the soils under the control were the same in all types in which the plants.

4. The salinity degree of the manure added soil types: the salinity degree of camel alfalfa grown soil of Nurtas village decreased to 1,3%, conventional alfalfa grown– 1,1%, white clover grown– 1,4%, while the salinity degree of the camel alfalfa and conventional alfalfa grown soils of Karatobe village reduced to 0,3%, and white clover grown soil to 0,4%.

5. The amount of nitrates of conventional alfalfa in the manure added soil type of Nurtas village increased from 169 mg / dm^3 to 1060 mg / dm^3 in comparison of other herbaceous plants. A high amount of nitrates defined in Karatobe village was identified in the camel alfalfa grown version and it increased from 30.93 mg / dm^3 to 342 mg / dm^3. The nitrogen accumulating property of the conventional alfalfa and the amount of nitrogen in the manure composition were taken into consideration.

6. The cations were well absorbed by the plants; in this regard, ammonia nitrogen cation in the initial soil form in Nurtas village decreased to 6,081mg / dm^3, in the camel alfalfa grown– 2,242mg / dm^3, in conventional alfalfa grown - 2.089 mg / dm^3, white clover grown– 3,905 mg/dm^3. The ammonia nitrogen in the soil of Karatobe village reduced to 5,034 mg/dm^3, while in the plants it decreased to 1,694 mg/dm^3, 1,306 mg/dm^3 and 1,258 mg/dm^3.

7. Improving the re-salinity of the irrigated lands that were degraded in the condition of the South Kazakhstan region by the phyto-amelioration method was efficient ecologically and economically.

Д. Сунакбаева

ОҢТҮСТІК ҚАЗАҚСТАН АУМАҒЫНДАҒЫ ҚАЙТАРА ТҰЗДАНҒАН ЖЕРЛЕРДІҢ ӨНІМДІЛІГІН АРТТЫРУ ДЕҢГЕЙІНЕ ФИТОМЕЛИОРАНТТАРДЫҢ ӘСЕРІ

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Аннотация. Адамзаттың ең үлкен құндылығы – әлемнің жасыл желекті болуы. Бірақ бұған қарамастан, бүгінгі күнге дейін өсімдіктердің барлық мүмкіндіктеріне адамзаттың назар сала бермейді.Негізгі өсірілетін өсімдіктер біздің дәуірімізге дейінгі бірнеше мың жыл бұрын өсірілген.Патогендік өзгеріссіз өсімдіктің өнімділігін арттыру, онтогенезін оңтайлы әрі жасанды реттеу әдісі әлі күнге дейін белгісіз. Өсімдіктердің онтогенезін реттеу жолдары - бұл топырақтың құнарлылығын ескере отырып, егін жинау бағдарламалары үшін өте маңызды болып табылады – фотосинтезді реттеу, өсімдіктің динамикасы мен мерзімділігін , азот алмасуын реттеуге мүмкіндік беретін заңдылықтарды белгілеуге байланысты болады.

Қазіргі уақытта Жердегі өсімдік жамылғысының жағдайы нашарлауда. Негізгі себеп - өсімдіктерде кездесетін патологиялық құбылыстардың алуан түрлілігі мен әртүрлілігі. Патологиялық құбылыстар үш категорияға біріктіріледі: патологиялық реакциялар, патологиялық процестер және аурулар.

Ең қауіпті өзгерістер - өсімдіктердің кейбір түрлерін толық немесе ішінара жоғалуына дейін әкелетін процесстер. Адамның антропогендік әсерінен ғана емес, белгілі бір табиғи апаттарға да қатысты болуы мүмкін. Олардың ішіндегі ең маңыздысы: 1) ауыл шаруашылық және орман шаруашылығында, тау-кен өнеркәсібінде, қазба байлықтары өндірісінде өсімдіктердің жойылып кетүі. Зерттеудің нәтижелері фитомелиорация табиғи өсімдік қауымдастығын өндіру немесе қызмет көрсету арқылы қоршаған ортаның жай-күйін жақсарту жөніндегі шаралар жиынтығы болып табылады, сондай-ақ фитомелиорациялау арқылы суармалы жерлерді пайдалануды экологиялық және экономикалық тұрғыдан тиімді болып табылады.

Түйін сөздер: фитомелиорация, өнімділік, өсімдік, тұз, жер, жақсарту, почва, әсер, биомелиорант, бұршақ тұқымдары, жоңышқа, тыңайтқыш.

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ВЛИЯНИЕ ФИТОМЕЛИОРАНТОВ НА УРОВЕНЬ ПОВЫШЕНИЯ ПРОДУКТИВНОСТИ ВТОРИЧНЫХ ЗАСОЛЕННЫХ ЗЕМЕЛЬ НА ТЕРРИТОРИИ ЮЖНО-КАЗАХСТАНСКОЙ ОБЛАСТИ

Аннотация. Зеленый покров планеты – самое ценное из достижений человека. Но несмотря на это до сих пор не все возможности растений учтены и использованы человечеством. Основные возделываемые растения были одомашнены за несколько тысяч лет до нашей эры. Все еще неизвестны пути оптимальной искусственной регуляции онтогенеза растений, которая без патогенетических последствий может привести к их максимальной продуктивности. Установление путей регуляции онтогенеза растений – исключительно важное для программирования урожая с учетом плодородия почв – связано с установлением закономерностей, позволяющих регулировать фотосинтез, периодичность и динамику роста, азотный обмен и др.

В настоящее время ухудшается состояние растительного покрова Земли. Основной причиной является разнообразие и разнонаправленность патологических явлений, возникающих у растений. Патологические явления объединены в три категории – это патологические реакции, патологические процессы и болезни.

Наиболее опасны нарушения, которые ведут к полному или частичному исчезновению определенных видов растений. Поводы для исчезновения растений разнообразны. Они могут быть связаны не только антропогенной деятельностью человека, но и некоторыми стихийными бедствиями. Важнейшими из них являются: 1) физическое истребление для сельскохозяйственных и лесохозяйственных целей, для добычи

полезных ископаемых, строительства и промышленного производства. Результаты исследований показали, что фитомелиорация - комплекс мер по улучшению состояния окружающей среды путем производства или поддержания естественных растительных сообществ. Улучшение утилизации орошаемых земель методом фитомелиорации также является экологически и экономически целесообразным.

Ключевые слова: фитомелиорация, продуктивность, растение, соль, земля, улучшение, почва, влияние, биомелиорант, семена фасоли, клевер, удобрения.

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