

**International Journal of Biological Engineering and Agriculture**

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## Effect of Nutrition on Winter Hardiness of Winter Wheat

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**Annotation:** With optimal timing of sowing (15.X) of winter wheat with application of increased norm and ratio (N210P110K70), mineral fertilizers are one of the ways to increase winter hardiness in comparison with the recommended norms (N180P90K60), which contributes to the increase of grain yield.

**Keywords:** winter wheat, winter hardiness, agrochemical basis, dry matter, sugar, grain yield.

**Introduction.** Cultivation of abundant and high-quality grains from winter wheat is related to feeding norms, proportions and types of mineral fertilizers used during the autumn-winter growth period [4,5,6].

If winter wheat accumulates a lot of protein in its body and the root joint before overwintering, its resistance to winter frosts decreases, and if it accumulates more sugar in these organs before wintering, its resistance to winter increases [6,7,8].

When winter wheat accumulates more sugar in its grass until winter, the respiration process increases due to the negative effects of winter frosts. As a result of the increased use of accumulated sugar in the respiratory process, heat energy is released more and resistance to winter cold increases.

This situation also depends on the types of mineral fertilizers used before overwintering of winter wheat [2,3,9,10,11].

Therefore, the effect of mineral fertilizers applied before wintering of winter wheat was studied in our research.

**Methodical part.** Field experiments were conducted in 2015-2017 at the farm "Kulmanov Umir" in the Koson district of Kashkadarya region on one level, in four plots, the size of the experimental areas is 180 m<sup>2</sup>, and the calculation areas are 100 m<sup>2</sup>.

According to the experimental options presented in the table, the annual standards of phosphorus and potassium fertilizers were applied along with planting, and nitrogen fertilizers were applied during the spring tillering (35%), tuber (35%) and earing (30%) phases of winter wheat. All other agrotechnological processes were carried out in the same way.

Researches were conducted according to the methodology of B.A. Dospekhov "Metodika polevogo opyta" [1]. The amount of sugar in the stem joint of grasses was determined by the titration method of H.N. Pochinok [7].

The depth of placement of grass joints in relation to the surface of the earth (cm); dry mass (g) and sugar accumulation (%) in 100 lawns before wintering; the number of overwintered plants (units) per 1 m<sup>2</sup> was determined in odd variants of the experiment.

The grain yield was determined in plants of 1 m<sup>2</sup> area and converted into hectares. The data obtained as a result of the research are presented in the table.

**Research results.** According to the data presented in the table, when spring wheat is planted early (15.X) in proportion to the norms and proportions of mineral fertilizers used, it was observed that the root joint is located more superficially than the surface of the earth, and when it is planted later, it is located a little deeper. However, the effect of phosphorus ( $P_2O_5=90-110$  kg/ha) and potash ( $K_2O=60-70$  kg/ha) fertilizers applied along with planting of winter wheat on the autumn growth period of lawns is significant, so the role of the deeper location of the tiller joints will be significant. This indicator showed that the control option without NPK has a greater role in the placement of 1-2 cm deeper than when phosphorus ( $P_2O_5=70$  kg/ha) and potash ( $K_2O=50$  kg/ha) fertilizers are used with reduced rates and proportions.

**Table Effect of rates and proportions of mineral fertilizers on the winter resistance of winter wheat (average in 2015-2017)**

No	Experience options	The depth of placement of the joint in relation to the surface of the earth, cm	Dry mass of 100 lawns before wintering, g	The amount of sugar in the stem joint before wintering, %	The number of wintering plants per 1 m <sup>2</sup> , units	Grain yield, tons/ha
When 15.X is planted						
1	When NPK is not applied (st <sub>1</sub> )	2	72	19,2	310	40,1
2	N <sub>150</sub> P <sub>70</sub> K <sub>50</sub>	2	80	21,3	321	60,6
3	N <sub>180</sub> P <sub>90</sub> K <sub>60</sub> (st <sub>2</sub> )	3	85	22,7	330	65,5
4	N <sub>210</sub> P <sub>110</sub> K <sub>70</sub>	3	92	24,3	335	70,4
When 1.XI is planted						
5	When NPK is not applied (st <sub>1</sub> )	2	65	16,6	304	38,8
6	N <sub>150</sub> P <sub>70</sub> K <sub>50</sub>	2	71	18,3	312	58,3
7	N <sub>180</sub> P <sub>90</sub> K <sub>60</sub> (st <sub>2</sub> )	3	75	19,5	321	62,6
8	N <sub>210</sub> P <sub>110</sub> K <sub>70</sub>	3	81	20,1	324	65,0
When 15.XI is planted						
9	When NPK is not applied (st <sub>1</sub> )	3	60	15,3	292	37,1
10	N <sub>150</sub> P <sub>70</sub> K <sub>50</sub>	3	63	16,7	310	54,7
11	N <sub>180</sub> P <sub>90</sub> K <sub>60</sub> (st <sub>2</sub> )	4	68	17,9	315	57,0
12	N <sub>210</sub> P <sub>110</sub> K <sub>70</sub>	4	73	18,4	320	59,2

However, it was shown that dry matter accumulation in 100 lawns of autumn wheat lawns before wintering was up to 19 g when planted early (15.X) and applied with higher rates and proportions of phosphorous and potassium fertilizers compared to the recommended one month later (15.XI).

When determining the sugar content of winter wheat lawns before wintering, it showed that winter wheat was higher in all cases when it was planted early (15.X) than when it was planted one month later (15.XI), and it was 3.9% to 5.9% higher. However, when winter wheat was applied in excess of the recommended rates of phosphorus and potassium fertilizers ( $P_{90}K_{60}$ ) when planted ( $P_{110}K_{70}$ ) in mid-October (15.X) 1.6%; when 1.XI was planted 0.6% and when 15.XI was planted 0.5% increase in the amount of sugar in the bud joint was observed.

It was observed that the amount of sugar in the tiller joints before wintering of winter wheat grasses is proportional to the number of overwintered grasses. That is, when winter wheat was planted in the

middle of October (15.X) and increased ( $P_{90}K_{60}$ ) compared to the recommended phosphorus and potassium fertilizers ( $P_{110}K_{70}$ ), the number of overwintered grasses was 335 pieces per 1 m<sup>2</sup> area, this indicator was 324 when planted in 1.XI grain, it was 320 grains when planted in 15.XI.

The main factor for increasing the winter resistance of winter wheat should be planting in the optimal period (15.X) and using phosphorus and potassium fertilizers ( $P_{90}K_{60}$ ) in comparison with the recommended ones ( $P_{110}K_{70}$ ). Because, when winter wheat was planted in an optimal period (15.X) and the norms and proportions of phosphorus and potassium fertilizers were increased ( $P_{90}K_{60}$ ) compared to the recommended ones ( $P_{110}K_{70}$ ), the grain yield was 70.4 tons/ha.

In the conditions of the southern regions of Uzbekistan, sowing winter wheat in an optimal period (15.X) and using ( $N_{180}P_{90}K_{60}$ ) compared to the recommended norm and ratio ( $N_{210}P_{110}K_{70}$ ) will be the main factor in increasing grain yield by increasing winter resistance.

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**Representatives of the Lamiaceae Family Included in the Red Book  
of the Republic of Uzbekistan in the Flora of the Kughitang  
Biogeographic Region**

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**Annotation:** This article contains information about the plants of the Lamiaceae family included in the Red Book of the Republic of Uzbekistan in the flora of Kughitang botanical-geographic region. The red book includes 30 species of representatives of Lamiaceae family, of which 5 species are distributed in Kughitang. The distribution areas of species are given in the form of a table and a map and their phenology is presented.

**Keywords:** Endem, rare plant, red book, specimen, reserve, kughitang botanical-geographic region.

### **Introduction.**

Red book is the conscience of each of us. Every nation has a responsibility to the world to protect it is natural resources. It is known that there are about 4300 plant species in the territory of the Republic of the Uzbekistan, among them which there are many rare, endemic and relict species that need serious protection. Surkhandarya, which is the southern region, is also rich in rare plant species. Kughitang mountain range belongs to Sherabad district and is the location of the Surkhan State Reserve. The main information about the plants of the Kughitang range is given in the works of S.A. Nevsky, R.V. Kamelin and F.O. Khasanov. We can see that the population of mentioned plant species are very low and declining by a factor of several. A recent study focused on the cause of the extinction these species and distribution of the plants that included in the Red book.

### **Materials and Methods.**

Research work based on taxonomic, route, areological, biomorphological methods were used. In the study of the area of research flora B.A. Yursev's proposed program for studying the flora of nature reserves and other large protected areas was used. The typification information for the species was checked using the Global Biodiversity Information Facility (GBIF). Distribution areas of species identified Maps.me and Google Earth. The presented map in this article is about the areas where the species are distributed was made using the ArcGIS 10.8 program.

### **LITERATURE VIEW**

- Scutellaria colpodea** Nevski in Act. Inst. Bot. Acad. Sc. URSS. 1 ser. 4 (1937) 322.-Juzz. In Фл. СССР. 20 (1954) 115.- III. Изогнутый.

Semishrub with grey Perennial herbaceous plant with grayish stems 30-60 cm high. Leaves ovate with numerous nerves 1,5-2 cm lg., obtuse. Flower in bract axils forming rare inflorescence. Calyx 2-3,5 cm lg., with 2-lobed appendix. Perianth yellow, 18-23 mm lg., dense pilose. Fruits piloset.

Status	3. A rare endemic plant in the south-western Pamir-Alay region.
Flowering	June-September
Fruiting	August-October
Ecology	Grows at gypseous slopes
<b>Distribution</b>	—South-western Pamir Alay, western branches of the Hissar range, the Baysun mountains, the Kughitang and Babatag ( Kashkadarya and Surkhandarya regions) 500 plants population were registered

2. **Scutellaria fedshenkoi** Bornm. in Beth. Bot. Centralbi. 36,2 (1918) 60. – Juz. In Фл. СССР. 20 (1954) 209.- *S. hissarica* var. *Fedtschenkoi* M. Pop. in Not. Syst. Herb. Hort. Bot. Reip. Ross. 5 (1924) 153. –*Anaspis Fedtschenkoi* Rech. f. in Notizbl. Gart. Berlin 15 (1941) 630. – III. **Федченки.**

Perennial herbaceous plant up to 50 cm high. Stems numerous, thin. Leaves grey-bluish, nearly rounded, obtuse, glabrous. Flowers with short pedicels in lax unilateral inflorescences at stem and branch apexes. Corolla dark blue.

Status	2. Rare endemic species of south-western Pamiroalai
Flowering	June-July
Fruiting	July-August
Ecology	Clefts of limestone rocks in the middle belt of mountains.

**Distribution**— South western Pamir Alay. Hissar range; between Guzar and Sherabad, the surroundings of the villages Shurab and Derbent, the Buzgalakhana gorge; the Tupalang valley, the Baysuntau ( Kashkadarya and Surkhandarya regions) Rare endemic plant, specimens very rarely can be found.

3. **Logochilus inebrians** Bge in Mem. Acad. Sc. Petersb. sav. etrang.7 (1951) 438. – Knorr. in Фл. СССР. 21 (1954) 166. –**3. г. опьяничающая.** Банги-дивана.

Erect semishrub 30-60 cm high. Stems simple or branched. Leaves broadly ovate, 3-5-lobed. Corolla white with rather dirty tint. Flowers in 4-6 in upper stem. Calyx narrowly campanulate. Nutlets glabrous, yellowish-grey.

Status	2. Rare endemic species of western Pamiroalai and Kyzylkum
Flowering	June-August
Fruiting	June-September
Ecology	Submontane plains and low foothills, up to 1200 m. on pebble-beds and fluviaatile outwash, gravelly slopes, in wormwood-grass and wormwood-forb associations.

**Distribution**— South western Pamir Alay and Kyzylkum. Nuratau, the Zirabulak and Ziadin mountains, the Zeravshan and Turkestan ranges; Kyzylkum: the Kuldjuktau ( Jizzakh, Samarkand, Surkhandarya, Navoi and Bukhara regions) Rare endemic species species, small populations can be found sporadically

4. **Salvia lillacinocerulea** Nevski in Act. Inst. Bot. Acad. Sc. URSS. 1 ser. 4 (1937) 327, *exc.* Syn. – Pobed. In Фл. СССР. 21 (1954) 279. – **III. Лиловоголубой.**

Stem erect, densely glandular-pilose. Leaves numerous, petioled, oblong-lanceolate, pinnate, dense pilosered. Flowers with pedicel 10 mm lg., 1-2 in bract axils. Calyx broadly campanulate, slightly inflated, 15-20 mm lg., densely pilosered. Perianth violet, 35-40 mm lg., naked. Fruits elliptic, 5 mm lg.

Status	2. Rare endemic species of northern Pamiroalai.
Flowering	May-June
Fruiting	June-August
Ecology	Grows at rocks and stony slopes of the middle mountainous zones.

**Distribution**—South western Pamir Alay, western spurs of the Hissar range, the Kughitang, Susyztau and Baysuntau ranges. Range endemic species, 3000 plants can be found.

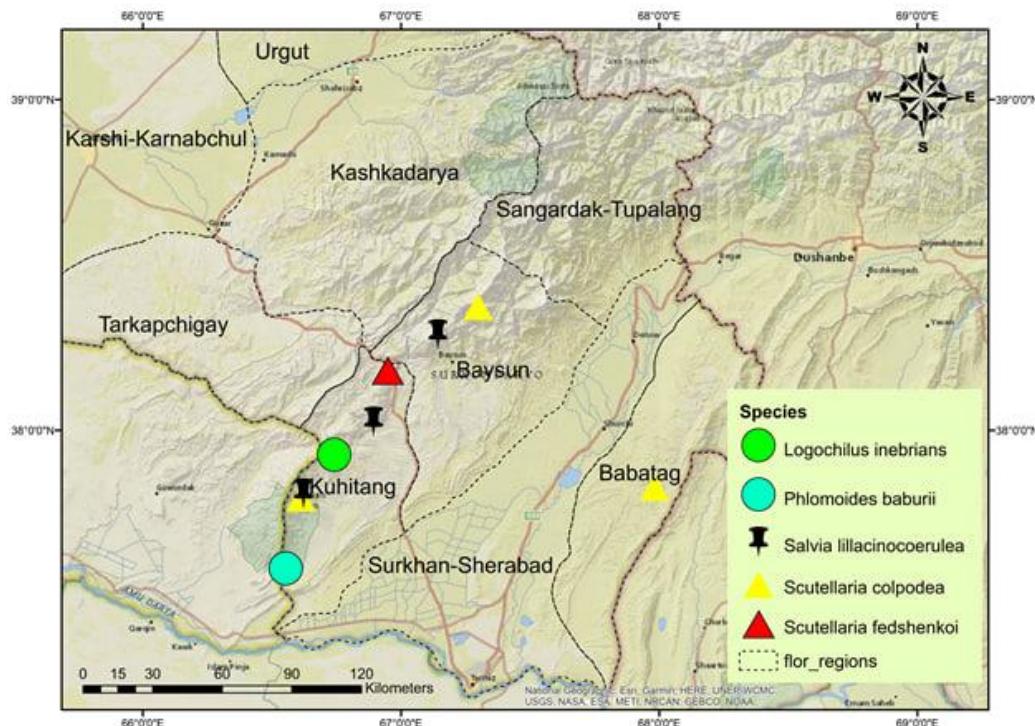
5. **Phlomoides baburii** (Adyl.). Adyl., comb. nov. *Eremostachys baburii* Adyl. in ДАН УзССР. 9 (1984) 47. – **Ф. Бабура.**

**Description**— Perennial herbaceous plant 40-50 cm high. Stem, spreading-branched from the base, glabrous. Radical leaves oblong, broadly cuneate at the base, short-petioled, glabrous; stem leaves reduced, subsessile, sharp-toothed. Flowers subsessile, in few-flowered, slightly scattered false whorls in floral leaf axils. Bracts subulate, glabrous, 4 times shorter than calyx. Calyx 16- 20 mm long, tubular-campanulate, glabrous. Calyx teeth densely ciliate on the margin. Corolla about 30 mm long, probably white or pale yellow (when dry); corolla tube scarcely prominent from calyx.

Status	1. Very rare endemic species of southern Pamiroalaj
Flowering	May
Fruiting	May-June
Ecology	Grows at . Grey clays

Distribution. Kelif-Sherabad range: nearby Aktash village (Surkhandarya region).

Using the collected herbarium specimens, a map representing the distribution area of the section was made. When species were analyzed according to phytogeographic regions of Kughitang (**Figure 1**) the following result is obtained.



**Fig.1** Distribution of species.

## **Discussion and Conclusion:**

We can cite many factors as the reason for the reduction of the areas of the plants. For example, there are more drought years as a result of climate change. It is the use of natural areas by the population as pasture for livestock. We know that representatives of the Lamiaceae family contain many alkaloids and essential oils, plants are with high medicinal properties. As a result of human misuse of resources, they are harvested and their population are limited. Nowdays more emphasis is placed on studying such plants and preventing them by studying the reason for their decline. Transplanting plants to natural landscape by multiplying them in laboratory conditions, preventing their complete disappearance.

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## **The Impact of Overhaul on the Efficiency of the Use of Construction Machines**

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**Abstract:** Overhaul (CR) of equipment can be considered from two positions - as an option for updating the fleet of vehicles (extension of service life) and as a method of improving efficiency. Equipment suppliers also use the KR to prepare machines for sale. For many Russian enterprises, at the moment, the KR is the only visible opportunity to somehow maintain their own fleet of vehicles due to the lack of funds to purchase new units.

**Keywords:** technical operation, aspects, facility, maintenance system, CM.

### **Introduction**

In the pre-perestroika period, the CM was produced at special enterprises, formed, as a rule, at large construction organizations (head offices). To date, there are almost no such enterprises left.

The implementation of the CM was taken over by the mechanization departments and the equipment manufacturing plants. If an organization produces CM on its own and for itself, then a high level of machine recovery is achieved: the readiness factor is 10...20% of the value for a new machine and decreases approximately in the same ratio with each overhaul cycle [3, 5, 7, 8, 9, 12]. If the CM is performed for the purpose of profitable sale of equipment, the scatter in the values of recovery parameters is very wide and is of a random nature. It should be noted that the quality of imported equipment overhauled at the factories of manufacturing companies is very high, and the price-quality ratio is higher than that of new machines.

The feasibility of conducting a CM depends on many factors: the financial position of the enterprise, the required level of equipment reliability, the possibility of carrying out CM and the number of overhaul cycles, the proposals of the machine market, etc. [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]

In order to assess the feasibility of CM and choose the best option for maintaining the required level of fleet performance, it is necessary to create a model of the change in time of the technical and economic indicators of the machine during operation with and without RC and optimize according to the criteria determined by the strategy and tactics of the ESAP functioning.

### **Main part**

#### **Analysis of trends in the field of improving the efficiency of the technical operation of construction equipment.**

The efficiency of the product maintenance and repair system, in accordance with GOST 15.601-98, determines its ability to maintain and restore the specified properties of these products and ensure a given level of their technical readiness at optimal time, labor and cost (efficiency indicators - according to GOST 18322).

An analysis of global trends in the field of increasing the efficiency of MS allows us to identify several main areas:

1. System analysis of MS, modeling of the main production processes.

2. Separation of heat energy into a separate area of activity.
3. Creation of a quality system for technical operation.
4. Formation of the efficiency of fuel cells at all stages of the life cycle of the machine.
5. Improvement of management and functioning of MS elements using information technologies.
6. Improvement of the TS strategy and processes.

System analysis. The perfection of the system is determined by the degree of compliance of its organization with the modern level of development of science and technology. The efficiency of the system, as the degree of realization of resources [ISO 9000:2000, clause 3.2.15], is an integral characteristic, consisting of partial performance indicators of individual processes and structures operating as part of the system.

Therefore, the improvement of technical operation, as a subsystem of ESAP, provides for a systematic analysis of enterprises for the operation of equipment and the substantiation of particular criteria for the effectiveness of their activities.

Accounting and processing of a large amount of data, calculation of indicators, process optimization, process management are impossible without the use of special information technologies.

Thus, the complex of studies to improve the MS of construction and road equipment will include:

- system analysis of the enterprise for the operation of construction machines (ESAP);
- improvement of the organization of production processes;
- development of private criteria for the effectiveness of individual processes and structures of the ESAP.

From the point of view of the organization of production processes, the efficiency of MRO of a product, according to GOST 15.601-98, can be increased by: improving the strategy of MS of a product in accordance with operational data on its reliability; development of operational and repair documentation; improvement of MRO modes.

Improvement of MRO modes. Maintenance and repair modes are understood as the frequency and composition of technical impacts (TV). Significant research has been carried out in the areas of operation of vehicles [2, 3, 4], aircraft [5], construction machines [6, 7, 8, 9] and others [12, 13]. The TV frequency adjustment is based on modeling the dynamics of the reliability and performance indicators of machines under the influence of operating factors (operating modes, climatic conditions, safety requirements, etc.) and the controlling and restoring actions of maintenance and repair. The adjustment is made by applying a system of coefficients, the values of which change as the machine ages.

### **Conclusion**

According to GOST 15.601-98, the quality of the product after maintenance and repair is determined by: the technical condition of the product received for maintenance or repair; quality of spare parts (new and remanufactured) and materials used in maintenance and repair; maintenance and repair quality.

Currently there are two problematic areas of improving the quality of service of construction equipment. The first is the development of a service based on a proprietary life support system (LSS) by organizing a dense dealer network using MRO technologies developed by manufacturers. The second is the improvement of the system of operation of the worn-out fleet of machines of general construction organizations.

The main customers of the proprietary service system are large road construction organizations that own expensive imported equipment.

The predominant part of the park of construction machines is operated by organizations of a general construction profile. As a rule, experienced engineering personnel and skilled workers of these organizations will not experience any special difficulties with the technical side of maintaining the park's performance. However, the problem is to ensure the operability of complex imported equipment equipped with servo drive systems, built-in diagnostics, automated control, especially in the absence of proprietary technical support. The intensity of the appearance of new models of construction machines is constantly increasing. The MS of machines within the framework of the existing organization of the functioning of the ESAP does not have the ability to quickly adapt to the maintenance of new equipment. They cause problems and questions of an organizational, structural, managerial nature, strategies and tactics of the functioning of the company in unusual and difficult market conditions.

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## Zarafshan National Nature Park as an Object of Ecological Tourism

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**Abstract:** The article provides information about the potential of the Zarafshan National Natural Park as an object of ecological tourism. The unique nature of the tugai forest is described, the importance of natural ecosystems in maintaining biological diversity is given.

**Keywords:** nature reserve, nature, forest, nature, park, ecosystem, biodiversity.

### Introduction.

The preservation of natural forest ecosystems, against the background of the general deterioration of the ecological situation in the region, is a task of paramount importance. In the National Biodiversity Strategy and Action Plan for Uzbekistan, tugai forests are classified as ecosystems requiring urgent conservation measures [5].

Forests, performing protective, protective, medical functions, contributing to climate regulation, are one of the most powerful factors for improving the environment and the ecological situation. Uzbekistan is a country with a rare forest cover. The area of forests in the republic is only 18.2% of the total territory of the country [7].

Floodplain forests or tugai have been preserved in the form of narrow strips or islands in the valley of some rivers of Uzbekistan on an area of about 75 thousand hectares - less than 1% of the total forest fund and make up only 2% of the strictly protected territory in Uzbekistan. Floodplain forests are of particular interest, since here there is a special complex of flora and fauna inherent only in this natural ecosystem. This is due to the combination of the river and the arid territories through which these rivers flow, as a result, a peculiar and complex ecosystem is formed, including such components as forests, wetlands, semi-deserts and a river.

**Methods.** Tugai forests are unique biotopes of great importance for the conservation and maintenance of biodiversity in Uzbekistan. That is why the ecosystem of the Tugai forest is included in the Global List of 200 of the World Wildlife Fund (Eco-region 134).

In addition to the richest biological resources, forests also have significant recreational and economic resources. Tourism is considered as a priority sector in the structure of the national economy and one of the main factors of regional development in the Republic of Uzbekistan, one direction of which is ecological tourism. There are enough unique places in the region that could successfully become objects of ecological tourism.

Zarafshan National Nature Park is considered an example of such a peculiar corner of nature. Located in the middle reaches of the Zarafshan River, a narrow intermittent strip of tugai forest,

originally dedicated to forestry, was transformed into the Zarafshan State Reserve in 1975, which was reorganized in 2018, giving it the status of the Zarafshan National Natural Park. Previously, the area of the territory was 2,066 hectares, by now it has increased to 2,426.4 hectares, of which 868 hectares are covered with forest. The nature park unites two narrow (300 - 1500m) sections stretching for 47 km on the right bank of the Zarafshan River.

**Analysis.** Tugai forests are the arena of life for many animals [1], here they find favorable living conditions. Dense thickets create protective conditions during the breeding season and in winter. The presence of a rich food base provides many birds and animals with food. One of the key factors of the rich diversity of plants and animals in the Tugai is the abundance of water. During floods that occur when snow melts in the mountains, all depressions are filled with water and for a long time enrich the tugai thickets with moisture.

The territory of the reserve is quite diverse in biotopic terms. This is due to the presence of two different natural ecosystems: tugai and semi-desert. This explains its rather high biodiversity: there are 24 species of mammals, birds – more than 200 species, reptiles – 10 species, amphibians – 2 species, fish – 18 species, invertebrates about 150 species and about 400 species of plants. As a percentage of the total biodiversity of the republic, this is: mammals - 22.2%, birds - 50.7%, reptiles - 17.2%, amphibians - 66%. 2 species of mammals, 26 species of birds, 2 species of fish, insects – species are included in the International and Republican Red Books [2].

There are many natural attractions in the Zarafshan National Nature Park that can serve as objects of an ecological tour. Vegetation. Despite the small territory, the flora of the park is quite diverse. According to the results of field research and processing of literary data, 376 species belonging to 229 genera and 69 families have been identified since the formation of the reserve to the present, the most complete of which are the families of cereals (48 species), compound (40), legumes (23), cruciferous (20), rosaceae (16), norichnik (12) [3].

The only relict tugai forest in the valley of the Zarafshan River is composed, mosaically mixing, of alder, willow, sea buckthorn, willow, grebenshchik, cattail, veinik, mixed-grass sea buckthorn, and others, in various combinations, formations. The sights of the Zarafshan Natural Park include 14 hectares of a relict species - turanga ivolistnaya. This is the only place in the region where turanga grows in such a compact form. Turangovniki consist of two species - *Turanga glaucous* (*Pópulus pruinósa*) and *Turanga variegated* (*Populus diversifolia*) - a species of deciduous trees from the genus Poplar (*Populus*) of the Willow family (*Salicaceae*) - low trees with an uneven, curved trunk and a sparse, tent-shaped crown.

To visit as a tourist attraction, turang forests are attractive in all seasons of the year. In spring - when the first sticky leaves break through, in summer – giving a pleasant coolness on a hot day, in autumn – crowns with light yellow foliage. In the Tugai, representatives of the Willow genus have become widespread, there are several species of it here: Wilhelms willow, Junger willow and Zarafshan willow. Only in the tugai of Zarafshan there are huge white willow trees. On the territory of the natural park, more than 100 hectares of the most valuable medicinal plant – buckthorn buckthorn, which is not found in such large quantities anywhere else in Uzbekistan, has been preserved and grows. This plant is represented by a wide variety of forms, differing in shape, color and size of berries.

In autumn, during the fruiting period, sea buckthorn thickets attract attention with an abundance of harvest and bright colors. Narrow-leaved loch is widespread throughout the reserve, composing sea buckthorn – loch, sea buckthorn - loch - turang, loch-hawthorn formations. The proximity of the Turkestan and Zarafshan ranges to the territory of the reserve explains the enrichment of flora by mountain representatives. Turkestan and Dzungarian hawthorn, wild plum, various types of rosehip, whole-edged barberry, blue blackberry grow here. The shrub layer consists

mainly of the comb and chingil, which occupy a significant area on the territory of the natural park and are represented by a rough comb, a branched comb, a spreading comb. A typical tugai species is the silvery chingil, which forms a tier of low-growing shrubs. Herbal tugai is composed of veiny, reed, licorice, erianthus, kendyr, cereal, wormwood formations. The most common types of herbaceous plants are erianthus ravenna, common reed, lanceolate kendyr, cylindrical imperata, ground vine, allep sorghum, knobby foxtail, field granary, meadow fescue, pochechuiny highlander, late mar, naked licorice, straight-horned fenugreek, forest prosvirnik.

The forms of herbaceous lianas are represented by fence vine, field bindweed, eastern clematis, Siberian tsinanchum, etc. The juicy bright greenery of the grass taiga attracts tourists in spring, during the flowering period of herbs. Two types of plants are included in the Red Book of Uzbekistan - Korolkov saffron and Kesselring's evergreen, whose exuberant flowering is celebrated in early spring.

**Animals.** Starting in the mountains, the intrazonal biotope of tugai thickets serves as a place for the exchange of animals of mountain and floodplain complexes. Tugai are among the richest habitats and are inhabited by a variety of animals. In the Zeravshan Nature Park. tolai hare, big-eared hedgehog, tamarisk gerbil, slepushonka, several species of voles, jackals, karaganka fox, steppe and reed cats are found, occasionally porcupine and badger. Of particular interest is the Bukhara deer (*Cervus elaphus bactrianus*), an endangered species listed in the International Red Book and Uzbekistan [4].

Thanks to the International Program for the Protection and Restoration of the Bukhara deer in its former habitat, an aviary group of Bukhara deer was created in the reserve, in 2005 several individuals were reintroduced to the tugai forest in order to restore the population of these animals. Currently, there is a population of Bukhara deer in several dozen individuals on the territory of the natural park. Representatives of the bird class include about 200 species of birds, among which there are rare and endangered. Among them is the Zarafshan pheasant. This is one of the most attractive birds of the tugai forests. Of particular interest are such bird species as the white-winged woodpecker, the croaker, the common turtle dove. Birdwatching in the nature park is possible in all seasons of the year. During the spring and autumn migration, one can observe the flights of cranes, birds of prey, goose-like, stork-like, a large number of passerines.

Only in spring and summer there are tyuvik, cheglok, golden squint, blue-lark, slyushka, southern and tugai nightingales. Gray and white herons, buzzard, white-tailed eagle, sparrowhawk, black-throated thrush and blackbird, red-backed redtail, finch, gray crow and other bird species winter in the reserve. Typical for this territory are such reptiles as the steppe turtle, yellow-bellied, desert gololaz, water snake, patterned runner, snake arrow, amphibians - green toad and lake frog.

The Zarafshan River, which flows along the natural park, is the main water source of the protected area. The existence of the tugai largely depends on the river. Zeravshan, changing its course, often washes away the shore along with vegetation, which leads to a sharp reduction in the area of tugai. Insufficient moisture leads to the fact that the tugai vegetation dries, and with them the whole complex of animals living in them dies. One of the main problems of preserving natural ecosystems is that all forests, despite the special protection regime, experience a colossal negative anthropogenic load. Tugai forests, in addition to the natural habitat of species, are also a source of livelihood and life support for the local population. The economic crisis and the strong dependence of the population on the use of natural resources for current needs, weak financing of environmental protection measures complicate this problem.

The situation is aggravated by the low awareness of the population about the need to preserve natural communities. Misunderstanding of the negative consequences of consumer attitudes to the environment leads to the fact that the rural population living near the natural park violate the

protected regime. The impacts inflicted by rural residents on the fauna and flora of forest ecosystems are different, but the most harmful of them are the following: grazing, haymaking, picking berries, fruits, medicinal herbs, poaching, cutting down trees and shrubs, collecting brushwood and dead wood. This leads to a change in forest ecosystems with the whole complex of its inherent components of flora and fauna.

The organization of an eco-tour of the Zarafshan National Nature Park, both for schoolchildren and for other age groups of the population, can contribute to raising awareness of the uniqueness of the nature of the region, will contribute to the involvement of the local population in environmental activities, will create additional jobs, increase employment, will contribute to improving environmental literacy and instilling skills of ecological culture the younger generation and the local population. Uzbekistan is a country located on the Great Silk Road. Historical and educational tourism is one of the main ones in the republic. Using this well-known product on the market as the main "magnet" for tourists, it is necessary to offer along the way what is still little known to foreign and domestic consumers, linking them together in one tour. Such by-products are ecological and ethnographic tourism, which has begun its development in the country, but has not yet gained a foothold in the international market. To attract foreign tourists, these two types of tourism should be considered as a whole.

**Conclusion.** Improper organization of the work of the initial stages of the development of ecological tourism can be accompanied by negative effects on natural complexes. The creation of infrastructure involving the construction of buildings is often accompanied by the destruction of woody and shrubby vegetation, contamination of the territory with construction and household garbage, chemical treatment of plants in the economic zone, the work of construction and agricultural machinery, violation of the environmental regime by tourists - far from a complete list of negative impacts on nature.

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## **Substantive Aspects of the Context-Digital Approach in Studying the Discipline "Microbiology"**

**Azizova Asalkhan Ruslankhan qizi<sup>1</sup>**

<sup>1</sup> "Pedagogical innovation, management of vocational education and retraining of teaching staff and their qualification improvement is the main doctoral student of the institute"

**Annotation:** This article discusses the use of contextual digital learning. Context-based digital learning is a relevant educational approach that contributes to the formation of professionally significant competencies in students of vocational education and allows you to gradually transform educational activities into professional ones.

**Keywords:** context, digitalization, teaching, learning, student, method, teacher.

The idea of creating a new Uzbekistan, put forward by the head of state Shavkat Mirmonovich Mirziyoyev in order to accelerate the development of society, did not bypass the education system. Law of the Republic of Uzbekistan dated September 23, 2020 No. 637 "On education" in a new edition, Decree of the President of the Republic of Uzbekistan dated September 6, 2019 No. 5812 "On measures to further improve the system of vocational education", Resolution of the Cabinet of Ministers dated February 26, 2021 No. 106 "On measures to further improve the system of retraining and advanced training of managerial and pedagogical personnel of professional educational institutions" and decrees put forward the requirement to restructure education on a completely new basis and sharply increase its effectiveness. Based on the above requirements, we believe that in the process of advanced training it is possible to achieve efficiency in professional activities by improving the methods of training medical personnel, in the system of vocational education, through context-digital learning technologies. teacher and his level of professional competence.

The tasks set by the education reform dramatically increase the importance of the personality and profession of a teacher in society, and make the issue of developing his pedagogical competence relevant.

Based on the goals set today by society, such as assessing the quality of vocational education and training future medical professionals in accordance with global requirements in its management, the use of modern ICT tools in the educational process, the use of innovative and creative educational methods and technologies aimed at full development topics that are assigned tasks for students in the course of the educational process.

Today, in the development of new Uzbekistan, considerable attention is paid to the teacher of professional educational institutions. Currently, the action strategy for the further development of the Republic of Uzbekistan requires the effective development of personal qualities and professional skills of teachers of vocational education.[1].

The introduction of contextual digital technologies in the theory and practice of pedagogy helps to increase the effectiveness of student learning, but there is a problem of competently combining the teaching methods of the subject with information, communication and digital learning technologies. Information technology must satisfy such basic principles of professional pedagogy as preliminary design, reproducibility, goal setting, integrity. Despite the fact that digital technologies in

professional pedagogy are a fairly young area, they are developing very dynamically. They are being actively introduced into the educational process at all levels of education - schools, colleges, universities. Thus, in a number of Kazakhstani universities, curricula and courses were introduced that actively use digital technologies in the learning process. In addition, informatization of education and Internet technologies have led to the rapid development of a new form of education - distance learning, which is the highest degree of informatization of education today. [2].

“Digital Learning Technologies (DLT) is an innovative way of organizing the educational process based on the use of electronic systems. Its goal is to improve the quality of the educational process.

To improve the quality of education in professional institutions, methods of active and cognitive activity are in demand.

At present, the theory developed by A.A. Verbitsky, which develops an active learning activity, is contextual learning.

According to Verbitsky, active, contextual learning [3] is divided into the following principles:

- ✓ personal activity;
- ✓ problematic;
- ✓ association of training and education;

Proceeding from this, on the basis of a systematic approach to the study of the problem, in this chapter we set a goal to determine the system of contextual digital technology for teaching microbiological disciplines to students of a medical college. The merit of this goal can be achieved through a statement of the essence of contextual digital learning technologies. To this end, we consider the concepts of "context", "contextual learning", "digital learning", showing the main elements of an integrative scientific and pedagogical system of contextual digital learning technology [3].

Teaching microbiology to medical college students requires a creative approach to the educational process and knowledge of the specifics of the future specialty. A comprehensive innovative approach to learning, the use of the most modern diagnostic methods in the educational process, conducting electives on topics of interest to students allow us to prepare competent specialists with creative thinking, who are ready to constantly improve and effectively apply their knowledge in practice [4].

Microbiological education refers to an education system that acts to teach students how to use and create microbiological models in the process of entertaining and creative activities aimed at developing and shaping students' knowledge about microorganisms in accordance with social, professional and personal goals.

“Microbiological training” is understood as “a process that ensures the formation in students of rational methods for studying organisms and research from the point of view of medicine and performing various microbiological studies that occur in the multifaceted work of a nurse. Microbiological training provides the basis for microbiological literacy, which allows students to navigate to some extent in an extremely large amount of microbiological innovative tools. Microbiological training is implemented in the process of teaching medicine and biology.

The purpose of contextual digital learning technology in vocational training is the formation and development of a teacher (teacher) who is able to create innovations in the learning process with a focus on the future activities of medical college students.

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## Bioecology of Pasture Grasshopper and Biological Effectiveness of Chemical Preparations Against It

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**Annotation:** The article presents the results of experiments on the study of bioecology, the development of the bogarny prus, and based on the results of the experiment conducted against larvae of different ages, Imidashans plus is recommended, sk. 0.1-0.15 l/ha. and Imidashans, VRK (200 g/l). 0.07-0.1 l/ha. in the specified rate of consumption in pastures of the southern and central regions of the Republic of Uzbekistan.

**Keywords:** Turanian Prus, adult phase, larvae, egg cod, egg, bioecology, habitat, optimum temperature, nutrient medium, favorite plant, the area of distribution.

51% of the total land area of the Republic of Uzbekistan is pastures and haypasture s. There are more than 1,700 species of plants used as forage in pastures and haypasture s. Pastures and haypasture s are very important in providing livestock with nutritious feed and producing abundant, high-quality and cheap products from them.

The productivity of free-range livestock is 20-25 percent higher than the productivity of stable livestock. The cost of the product is reduced by 30-40 percent. Since cattle are fed on pastures for 180-280 days, during this period it is not required to mow, transport, spread grass, feed and manure, and carry out irrigation. The quality of meat, milk, wool and leather products will improve dramatically. Livestock fed on pastures will be provided with vitamin blue feed for a long time.

In pastures, the combined growth of ephemeral, ephemeroïd, semi-shrub and shrub plants protects the soil from wind and water erosion. Also, it prevents sand migration, dust and pollen rising by blowing the soil, and eliminates atmospheric air pollution. By allowing atmospheric precipitation to slowly soak into the ground, it creates a reserve of moisture in the soil and protects it from physical evaporation. Perennial grasses, bushes and trees in the lands near the surface of the ground where the seepage waters act as a biological drain, reduce the process of salinization and waterlogging in the soil [5, 7, 9].

But during the growth and development of pasture plants, which are the main source of livestock feed, various types of harmful insects cause significant damage.

It is known that locusts are the most dangerous pest of agricultural crops and pasture plants. As a result of the mass increase of some harmful species of locusts, the population of many countries of the world is faced with the problem of famine.

Only after the use of modern techniques and chemicals in the fight against locusts, the damage caused by them was reduced to a minimum.

Uzbekistan is included among the countries in the world where there is a risk of constant attacks of locusts.

About 200 species of locusts are distributed in Uzbekistan, of which 8-10 species can cause serious damage to agricultural crops, pastures and other plants. Among them, Asian locust (*Locusta migratoria* L.), Moroccan locust (*Dociostaurus marocanus* Thunb.), Italian Prussian (*Sallirtatus italicus* L.), species are widespread [4;5;6]. Fighting against them is one of the urgent issues, and for several decades, chemical preparations have been sprayed on large areas. Only during 1982-1990, the area of chemically treated area was 4.2 million ha. The next outbreak of locusts was observed in 1994-1995, and the area affected by them exceeded 1 million hectares.

Up to now, the fight against this type of pests is carried out every year in large areas of our Republic, and the extent of their damage has been fully controlled.

Nevertheless, in the following years, it is observed that grasshopper species that do not form swarms multiply in the pastures around agricultural crops and cause great damage. In order to properly organize effective control measures against swarming and non-swarming species, it is necessary to have information about their distribution, morphological, biological, and ecological characteristics.

Therefore, the development of pest control measures by studying the species composition and bioecology of harmful locusts is the main task of our research.

Information about the bioecological characteristics of the pasture grasshopper is very scarce and can be found only in the works of Zimin (1934) and P.A. Ler (1962) [1;6].

However, this pest has not been studied in the pastures of the southern and central regions of our Republic.

**Research method.** We carried out research on the study of grasshoppers in the pastures of the southern and central regions of Uzbekistan during 2015-2021. Phenological and faunistic observations in research V.P. Palli [3] test of new drugs against locusts Kurdyukov V.V., Vasiliev S.V., Bunin L.D. (1995), Sh.T. It was conducted based on the methods of Khojaev (2004) [2;8].

**Results of the experiment:** Grasshopper lays its eggs in non-irrigated dry lands, compacted soils, often bordering oases, especially in areas with light sandy soils. Locusts usually lay 10-20 eggs per 1 m<sup>2</sup> of land, but in some years 140-150 eggs are laid.

The temperature of 25-30°C is the most favorable for grasshopper larvae to hatch. Larvae start hatching at the end of April and continue until the end of May. According to our observations, hatching of larvae does not differ significantly in the pastures of the southern and central regions of Uzbekistan, in each region they appear from the third decade of April. It can only vary by 2-3 days. In the southern regions of Uzbekistan, in particular, in the pastures of Guzor district of Kashkadarya region, larvae appeared on April 25, 2017, and on April 22, 2020, while in the central region, namely, in Forish district of Jizzakh region, it was observed that they appeared on April 27-25, respectively. Larvae appear from April to the end of May. Larvae mature in 35-45 days in optimal temperature and nutrient environment. In the adult phase, mating begins 12-15 days after hatching, and egg-laying another 8-10 days later.

In the pasture grasshopper, especially during the years of its many years, the instinct to live in chaos is clearly visible. In such years, grasshopper larvae gather in large swarms that are always on the move, and mature grasshoppers gather in smaller swarms and fly over short distances.

Because the larval stages of hatching, growing, and winging are so long, the egg-laying period lasts about a month, sometimes up to two months. The area occupied by larvae expands 15-20 times during the last period of development.

According to experiments, the level of wind blowing greatly affects the feeding of the grasshopper. Grasshoppers feed in the morning on windy days and when the temperature is high. On windy days, the larvae begin to feed when the air temperature is not less than 20 °C, and when there is a strong wind, when the temperature reaches 28 °C. Larvae are especially hungry in the morning and in the evening from 15 to 17. When the temperature exceeds 37 °C, the larvae stop feeding and hide in the shade.

Grasshopper larvae feed on a wide variety of plants such as cotton, legumes, oilseeds, cereals, pulses, cabbage, carrots, onions and other vegetable crops, as well as vines and mulberries. During our research, it was observed that they caused great damage to agricultural crops in 2018, when the season was dry. Only Nurota seriously damaged the dry cereal crops planted in the foothills of the mountains, adjacent to the pastures, as well as the newly cultivated chickpea, sunflower, and poliza crops. At the same time, it also eats berries and wormwood from wild plants.

**Table 1. Phenology of the development of grasshopper in the pastures of the central regions of Uzbekistan**

Months	October-March			April			May			June			July			August			September		
Decades	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Turon or pasture grasshopper	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	*	-	-	-	-	-	-	(*)	(*)	(*)	(*)	(*)	(*)

Conditional symbols: \* - egg; - - larva; + - mature insect; (\*) (-) (+) – rest phase

Grasshopper larvae also eat dried parts of various plants. Young larvae mainly damage the leaves, gnawing the center of the leaves, while the youngest larvae make holes in the leaves. Adult larvae often gnaw around the leaves, and in some cases, the middle. In addition to leaves, these larvae also eat flower buds and fruits of plants.

Grasshoppers hatched in dry areas move to more vegetated areas as the vegetation there begins to dry out, but prefers to remain in areas where plants grow in low water conditions without going deep into the oasis, as it returns to sandy deserts to lay eggs.

The egg-laying period is observed from the end of June to the end of July. The period of natural extinction lasts from August to October (Table 1).

In order to test new chemical preparations to fight against kir or turon locust, an experiment was conducted using Imidashans plus, sus.k drug against larvae of different ages of turon locust in the pastures of Nurota Karakol breeding farm, Nurota district, Navoi region in 2017-2021. It differed from the other experiments in that the treatment in this experiment was carried out using a motorized hand sprayer. In practice, water consumption corresponded to 120 l per 1 hectare of land. "Imadoshans" (0.1 l/ha) against 2-3 and 4-5-year-old larvae of locusts after 3 hours 89.6-89.4%, after 24 hours 96.5-95.8%, 72- showed 98.1-96.4% biological effect after hours.

When applied to locust larvae of the same age in the amount of 0.15 l/ha: 93.3-92.7% after the 3rd hour, 98.6-96.1% after the 24th hour, 99.4% after the 72nd hour 96.4% efficiency was recorded.

In options 3-4 of our experiment, Imidashans, s.e.k. (200 g/l) drug was tested against larvae of different ages of Turan grasshopper, and the following results were obtained. When applied against 2-3 and 4-5-year-old larvae of grasshoppers in the amount of 0.07 l/ha: after the 3rd hour - 90.2-89.6%; 97.0-96.5% after 24 hours, 97.7-96.8% after 72 hours, and when applied to locust larvae of the same age at 0.1 l/ha: 91.0-90 after 3 hours .2%, 97.9-97.6% after 24 hours, 98.4-97.9% after 72 hours (Table 2).

**Table 2. Biological effectiveness of chemical preparations against Turon grasshopper**

Pasture experience, Nurota district, Nurota Karakol breeding farm, K-45 motorized hand sprayer (120 l/ha), 2017-2021.

Options	Consumption rate, l/ha	The average number of grasshoppers per 1m <sup>2</sup> area, pcs.									Efficiency, % after n hours		
		Observations after n hours			3			24			72		
		Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total
Against 2-3 year old larvae													

Imidashans plus, sus.k.	0,1	3,7	31,9	35,6	1,2	33,5	34,7	0,6	31,6	32,2	89,6	96,5	98,1
This too	0,15	2,6	36,5	39,1	0,4	36,8	37,3	0,2	35,9	36,1	93,3	98,6	99,4
Imidashans, s.e.k. (200 g/l)	0,07	3,8	35,3	39,1	1,1	36,2	37,3	0,8	35,3	36,1	90,2	97,0	97,7
This too	0,1	3,6	36,6	40,2	0,8	39,0	39,8	0,6	37,4	38,0	91,0	97,9	98,4
Atilla, 5% em.k. ( <i>template</i> )	0,25	2,4	26,3	28,7	0,5	27,8	28,3	0,3	27,6	27,9	91,6	98,2	98,9
Control ( <i>unprocessed</i> )	-	29,8	0,3	30,1	29,9	0,1	30,0	29,0	0,2	29,2	0,0	0,0	0,0
<i>Against 4-5 year old larvae</i>													
Imidashans plus, sus.k.	0,1	3,1	26,2	29,3	1,2	27,5	28,7	1,0	27,0	28,0	89,4	95,8	96,4
This too	0,15	1,8	23,1	24,9	0,9	22,3	23,2	0,5	22,4	22,9	92,7	96,1	97,8
Imidashans, s.e.k. (200 g/l)	0,07	3,7	31,9	35,6	1,2	33,5	34,7	1,0	31,2	32,2	89,6	96,5	96,8
This too	0,1	3,9	36,3	40,2	0,9	37,7	38,6	0,8	38,7	39,5	90,2	97,6	97,9
Atilla, 5% em.k. ( <i>template</i> )	0,25	2,9	24,2	27,1	0,9	24,7	25,6	0,8	26,4	27,2	89,3	96,4	97,0
Control ( <i>unprocessed</i> )	-	23,8	0,1	23,9	22,8	0,2	23,0	22,5	0,3	22,8	0,0	0,0	0,0
EKF <sub>05</sub> =											1,9	0,7	0,6

Also, the drug atilla, which was used as a model in the experiment, showed that it is a drug with high biological efficiency against locust larvae.

**Conclusion:** The temperature of 25-30°C is the most favorable for grasshopper larvae to hatch. Larvae start hatching at the end of April and continue until the end of May. Larvae mature in 35-45 days in optimal temperature and nutrient environment. In the adult phase, mating begins 12-15 days after hatching, and egg-laying another 8-10 days later. The egg-laying period is observed from the end of June to the end of July. The period of natural extinction lasts from August to October. Imidashans plus against large and small larvae of grasshopper, sk. 0.1-0.15 l/ha. and Imidashans, VRK (200 g/l). 0.07-0.11/ha. biological efficiency is 96.4-99.4% when the drugs are used in the specified rate.

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## Determining the Oil Content of Cotton Ridges

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**Annotation:** The cotton ridges differ sharply in the oil content of the seed. The sign of oil content does not correlate with the length of the fiber and other valuable technological qualities of cotton fiber.

**Keywords:** oil content, quality, fibers, technology, cotton, length, kernels, breaking load, metric number.

When used for industrial purposes for oil extraction, cottonseed has the same importance as sunflower seeds. Even the waste of oil factories is a valuable food for animals, and the work directed to the production of oil is one of the important conditions for the implementation of the food program [1].

Cotton variety, family, and oil production are the main determinants of growth. The difference in the moisture content of seeds of different families reaches 6-8%. The influence of agrotechnical activities, climatic conditions on oil accumulation is not very clear and does not exceed 1-3% [2].

Experimental evidence shows that cotton cultivars and ridges differ in seed mass, kernel yield, and oil content. The materials for the analysis were taken from the experience of the selection department of the Andijan scientific-experimental station. The samples were taken from the middle part of the cotton bush, from the first places of 3-4 sympodia according to the generally accepted guideridges for determining the technological quality of the fiber.

Due to the increased demand for oil, the oil content of the seed is taken into account when evaluating the varieties. Because cottonseed oil is used for food and technical purposes. The amount of oil in the seed varies from 18 to 29 percent, depending on the type and variety of cotton. According to some literary sources, the proportion of oil in the chemical composition of the seed compared to other substances, especially protein, has a positive effect on its seed quality.

**Table 1. The moisture content of the seeds of the ridges involved in the experiment, %  
(Andijon ITS)**

Template and ridges	Fat, percentage			Average over the years	The difference from the seed moisture content of the control variety , %
	2015	2016	2017		
Andijan -35	16,9	18,9	18,1	18,0	-
1- ridge	19,2	17,8	19,4	18,8	+0,8
3- ridge	18,9	19,4	19,9	19,4	+1,4

4- ridge	19,5	21,6	20,2	20,4	+2,5
6- ridge	18,7	20,1	20,6	19,8	+1,8
8- ridge	20,3	21,0	20,9	20,7	+2,8
11- ridge	19,7	18,6	17,8	18,7	+0,7
14- ridge	22,4	23,0	22,1	22,5	+4,5
15- ridge	19,3	20,6	20,0	20,0	+2,0
17- ridge	22,2	22,9	23,3	22,8	+4,8
30- ridge	22,3	22,4	22,5	22,4	+4,4
76- ridge	22,2	22,4	22,1	22,2	+4,2

These families are widely used by station breeders in creating varieties. The yield of kernel content of seeds of different families ranges from 54.5 to 63.0%. According to our data, a direct relationship between the nuclear output and the absolute mass was determined.

These ridges are also important for practical selection because they are characterized by high productivity. The difference in seeding fertility in other cotton families described in the table is insignificant and up to 18.1-19.8%.

According to the average three-year results of the years of research, when analyzing the moisture content of the seed taken from the ridges, the highest indicator was 22.8% in the seed taken from the 14th ridge, while the seed taken from the 17th ridge showed a moisture index of 21.8%. with. These two ridges, in turn, compared to the moisture content of the seed isolated from the control Andijan-35 variety, the 14th ridge seed is 4.5; The seed of the 17th ridge was found to be 3.8 percent capital. Other ridges involved in the experiment were also found to have a slightly higher level of fertility compared to the model variety.

Thus, the moisture in the seeds has nothing to do with the length of the fiber. A similar phenomenon was observed in the analysis of medium fiber and thin fiber families. These ridges with different lengths of fiber do not differ significantly in terms of moisture content, and in some cases, the seed of fine fiber cotton has low moisture values.

**Table 2. Technological properties of new cotton sorghum seed oil and fiber.**

Varieties and ranges	1000 seed weight, g	Oil content, (%)		Technological properties of fiber		
		In the nucleus	In the seed	The hardness of the fiber, g/k	Metric number	Fiber breaking length gk/tex
Andijan -35	120,0	31,20	18,45	4,8	5570	25,8
L-1	116,6	35,00	21,80	4,7	5750	27,3
L-3	116,8	35,15	22,70	4,5	5820	26,9
L-4	127,0	33,40	18,90	4,6	5810	25,8
L-6	130,0	34,20	19,00	4,6	5720	26,6
L-8	140,5	33,15	19,60	4,7	5780	26,0
L-11	123,2	32,36	18,20	4,8	5680	26,4
L-15	117,7	32,40	18,30	4,5	5770	25,9
L-17	139,8	32,60	20,00	4,4	5690	25,7

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## Immunogenic Activity of a Polyvalent Radiovaccine Against Colibacteriosis, Salmonellosis and Pasteurellosis of Farm Animals.

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**Abstract:** With the help of radioactive biotechnology, a new polyvalent radiovaccine against pasteurellosis, salmonellosis and colibacilosis of farm animals has been developed. The vaccine is highly immunogenic. Its use prevents diseases and death of lambs, calves and piglets from pasteurellosis, salmonellosis and colibacilosis.

**Keywords:** Animals, radiovaccine, strain, pathogen, bacterial diseases, antigen, antibodies, blood serum, resistance, immunity.

### Introduction

It is well known that, to obtain vaccines used in veterinary medicine, the methods of physical (heating, cooling, etc.) and chemical (formalin, etc.) effects on vaccine strains of animal pathogens are most often used. But with such exposure, the antigenic structure of the cells of pathogens responsible for the creation of immunity is destroyed. Applied radiobiology involves the use of the results of fundamental studies of phenomena that can serve as the basis for the development of certain technological processes. The use of ionizing radiation to influence bacteria and viruses makes it possible to maintain high immunogenic properties while reducing their virulent properties. (D.A. Kaushansky; A.M. Kuzin 1984).

Vaccination of farm animals against several infectious diseases at the same time is of not only theoretical, but, what is very important, of great practical interest, since the terms of vaccination are significantly reduced and the material costs of immunization are significantly reduced.

Taking into account the epizootic situation of pasteurellosis among sheep and livestock in Uzbekistan over the past 25-30 years, often in the form of both monoinfection and in a mixed form of manifestation, a radiation biotechnology for the design of radiovaccines against bacterial agricultural diseases was developed in the laboratory of radiobiology of the Scientific Research Institute of Veterinary Medicine. (Bulkhanov R.U., Ryasnyansky I.V., Mirzaev B.Sh. 1999, 2001, 2004). Radiation biotechnology makes it possible to create and produce both mono- and polyvalent vaccines for veterinary medicine. Using this biotechnology, we have developed and put into practice "Associated radiovaccine against colibacilosis and salmonellosis of calves", "Associated radiovaccine against colibacilosis and salmonellosis of small ruminants" and "Polyvalent radiovaccine against colibacilosis, salmonellosis and pasteurellosis of farm animals".

The purpose and tasks. The purpose of these studies was the development and production testing of a polyvalent radiovaccine against three infectious diseases in young farm animals. The objectives of the research were to study the properties and effectiveness of the polyvalent vaccine in laboratory conditions in experiments on lambs, calves and piglets, as well as to study the immunogenic effectiveness of this vaccine in the production conditions of farms.

Materials and research methods. Experimental batches of a polyvalent vaccine containing 17 vaccine strains (E.coli-8, Salmonellae-4, Pasterellae-5) of the causative agents of these diseases in young

animals were made according to the radiation biotechnology developed at the Research Institute of Veterinary Medicine. Biocontrol of each series was carried out.

I. Experiments on lambs. Under laboratory conditions, experiments were carried out on three groups of lambs, 8 heads in each group: lambs of the 1st group were vaccinated with PRV 1 time at a dose of 1 ml / head, lambs of the 2nd group - 2 times 1 ml with an interval of 15 days, and 3 - i group served as control.

The dynamics of immunogenesis and the effect of PRV on resistance were studied by taking blood samples after 7, 15, 30 days and then once a month for a year. The titers of antibodies in the blood serum were determined by the test-tube method of agglutination reaction with 3 antigens separately. By studying the processes of immunogenesis, the number of T- and B-lymphocytes in the blood was controlled (M. Jondal e.a., 1972, N.F. Mendes e.a., 1973).

Resistance after vaccination was studied by determining the bactericidal (O.V. Smirnova, M.A. Kuzmina, 1972) and lysozyme (N.V. Chumachenko, L.A. Snegova, 1970) activity of blood serum.

The effectiveness of PRV vaccination in laboratory conditions was determined in an acute experiment on lambs by infecting them 6, 9, 12 months after immunization. Production tests were carried out on 21042 heads of lambs in the farms of Surkhandarya, Kashkadarya and Jizzakh regions of Uzbekistan.

II. Experiments on calves. In order to study the protective properties of the vaccine, experiments were carried out on 3 groups of calves, 8 heads each: calves of the first group were injected with 4 ml 1 time at 10 days of age; the 2nd group was vaccinated with doses of 3 and 4 ml 2 times with an interval of 15 days; the third group served as a control and was not immunized.

The effectiveness of PRV immunization was studied by conducting an acute experiment on infecting calves of the 1st and 2nd groups 1, 3, 6, 9, 12 months after vaccination. Production tests were carried out in 6 farms of the Surkhandarya region, 2 farms of Samarkand, 3 farms of Navoi and 1 farm of Jizzakh regions, in total on 1132 heads of calves.

Immunogenicity was studied by RA-determination of antibody titer in blood serum. Blood for research was taken 7, 15, 30 days after vaccination and then each time before infection (background), and after control infection after 15 days during the year. At the same time, the bactericidal and lysozyme activities of the blood were determined, and the dynamics of changes in the number of T- and B-lymphocytes was also studied.

III. Piglet experiments. Experiments in laboratory conditions were carried out on 24 heads of piglets of 3-5 days of age (3 groups of 8 heads each). Piglets of the 1st group were vaccinated with a polyvalent vaccine at a dose of 1 ml/head; animals of the 2nd group were vaccinated twice with an interval of 15 days with a dose of 1 ml, then at the age of 55-56 days, piglets of both groups were vaccinated again (before weaning) with a dose of 2 ml; Group 3 was a control group and was not vaccinated.

The effectiveness of PRV vaccination was tested by infecting piglets of the 1st group 9 months after the 1st or 7 months after the 2nd vaccination and piglets of the control group of the same age.

Production tests were carried out in 2 farms of Kashkadarya (160 heads of experimental groups and 30 heads in control) and Samarkand (35 heads in experiment and 10 heads of control) regions on 195 heads of experimental and 40 control piglets. Studies of the dynamics of immunogenesis and resistance indicators were carried out similarly to the methods described above.

Main results. Biocontrol of pilot batches of polyvalent vaccine showed that the vaccine is sterile, harmless, active and suitable for widespread use.

Experiments on the immunization of lambs have shown that already 7 days after vaccination, the titers of specific antibodies in the blood serum reach 1:600 against colibacillosis and salmonellosis, 1:500 against pasteurellosis. After 15 days, titers averaged 1:3200 against three diseases, on day 30

after a single vaccination, titers against colibacillosis were 1:1200, against salmonellosis - 1:800, against pasteurellosis 1:800. By the second month after vaccination, the titers were 1:40 against Collies and Pasteurella, 1:50 against Salmonella. However, with each control infection of lambs in order to determine the duration of immunity, there was a sharp surge in antibody production up to 1:2400 on average.

The results of the 2nd group subjected to double immunization showed that after the second vaccination the antibody titers averaged 1:3600, the high level of antibodies lasted a little longer than in the first group, and by the 30th day after the second vaccination reached an average of 1:1600, then by the second month after vaccination decreased to 1:50.

Immunization had a positive effect on the resistance of lambs - the bactericidal and lysozyme activity of blood serum increased, respectively, from 70% to 83% and from 24.2% to 27.8%.

After vaccination, it was also noted, at first, a slight decrease, and then an increase in the number of T- and B-lymphocytes. So on the 7th day, T-lymphocytes at a background of 2.6 thousand /  $\mu\text{l}$  decreased to 1.8 thousand /  $\mu\text{l}$ . On the 15th day after vaccination, an increase to 4.1 thousand /  $\mu\text{l}$  was noted, then the level of T-lymphocytes slowly decreased to 2.4 thousand /  $\mu\text{l}$  - 2.6 thousand /  $\mu\text{l}$  on day 45. The number of B-lymphocytes from 1.1 background increased to 2.2 thousand /  $\mu\text{l}$  on the 15th day, and on the 40-45th day it approached the norm - 1.7 - 1.3 thousand /  $\mu\text{l}$ .

Testing the effectiveness of PRV vaccination in lambs in the laboratory showed that immunity in single vaccinated lambs after 6 and 12 months is 85% and 66%, respectively, in double vaccinated 95% and 85% within a year.

Production tests at the farm named after I. Diyorov, Sariasijsky district, Surkhandarya region, for 1277 heads of lambs showed that double vaccination prevents 95% of lambs from disease and death from pasteurellosis, salmonellosis and colibacillosis. Extensive production tests in the farms of Surkhandarya, Jizzakh, Samarkand and Kashkadarya regions on a total of 21042 heads of lambs showed that during the year there was no case among vaccinated lambs, while among unvaccinated animals there was a high percentage of diseases and death from these diseases, mainly from pasteurellosis of sheep.

Experiments on calves: Immunization of calves showed that already 7 days after a single vaccination, the titers of specific antibodies in the blood serum reach 1:400 - 1:600 against colibacillosis and salmonellosis, 1:600 - against pasteurellosis. After 15 days, the titers averaged 1:2400 - 1:2800 against three diseases, on the 30th day after a single vaccination, the titers against colibacillosis were 1:400, against salmonellosis - 1:500, against pasteurellosis 1:400. By the second month after vaccination, the titers were 1:100 against Collies and Pasteurella, 1:150 against Salmonella. However, with each control infection of calves in order to determine the duration of immunity, there was a sharp surge in antibody production up to 1:2400 on average.

The results of the 2nd group subjected to double immunization showed that after the second vaccination the antibody titers averaged 1:3200-1:3400, the high level of antibodies lasted a little longer than in the first group and by the 30th day after the second vaccination reached an average of 1: 600, then decreased to 1:150 by the second month after vaccination.

The stimulating effect of vaccination on the resistance of calves was noted - the bactericidal and lysozyme activity of blood serum increased, respectively, from 60.2% to 75% and from 16.2% to 18.7%.

After vaccination, it was also noted, at first a slight decrease, and then an increase in the number of T- and B-lymphocytes. So on the 7th day, T-lymphocytes at a background of 1.5 thousand /  $\mu\text{l}$  decreased to 0.8 thousand /  $\mu\text{l}$ . On the 15th day after vaccination, an increase to 3.4 thousand /  $\mu\text{l}$  was noted, then the level of T-lymphocytes slowly decreased to 2.4 thousand /  $\mu\text{l}$  - 2.5 thousand /  $\mu\text{l}$  on day 45. The number of B-lymphocytes from 0.4 thousand/ $\mu\text{l}$  of the background increased to 2.6

thousand/ $\mu$ l on the 15th day, and on the 40-45th day it approached the norm - 1.1-1.0 thousand/ $\mu$ l. in those vaccinated once, in those vaccinated twice, T-lymphocytes reached 3.7 thousand /  $\mu$ l, the level of B-lymphocytes reached 3.2 thousand /  $\mu$ l.

It is known that the effectiveness of vaccination is most reliably determined by the infection of vaccinated and control animals with pathogens against which this vaccine was created. Given this, in the laboratory after 6; 9; and 12 months after a single vaccination, 3 heads of vaccinated and 2 heads of control calves were infected with a mixture of Pasteurella, Salmonella and Escherichia. Among the calves of the experimental groups (vaccinated), the disease and death were not noted, while the control calves fell ill and died. The effectiveness of vaccination was 100%, duration - 1 year (study period).

Conducted in 2000-2002, production tests, first on a limited livestock in 2 farms of Samarkand (168 heads) and Syrdarya (249 heads) regions, and then on a large scale - on 860 heads, showed that among vaccinated calves, the disease and death from salmonellosis, pasteurellosis and colibacillosis were not noted. At the same time, in farms where PRV was not used, the disease and death of animals were noted, as evidenced by the reports of veterinarians and requests to the institute for help in the prevention of these diseases.

Piglet vaccination experiences: carried out on 24 heads showed that in twice vaccinated piglets the number of T-lymphocytes from 0.4 thousand /  $\mu$ l (background) on days 15, 30, 60, 90 increased by 1.8; 7.2; 4.3; 1.0 thousand/ $\mu$ l, respectively. At the same time, the number of B - lymphocytes increased from 0.1 thousand /  $\mu$ l to 1.1; 1.7; 1.4; and 0.9 thousand/ $\mu$ l, respectively.

In animals of the second group vaccinated with PRV three times, changes in the number of T- and B-lymphocytes proceeded with the same dynamics, but only slightly higher than in the first group.

The study of the dynamics of immunogenesis showed an increase in antibody titers in the blood serum of vaccinated, so 15, 30, 60 days after single and double immunization, antibody titers in the blood serum of piglets were: against Pasteurella - 1:1600, 1:3200, 1:800, respectively, and by day 90 and beyond, the credits dropped to 1:50 and 1:25. Moreover, differences in antibody titers against different antigens in animals of the 1st group were noted only in the first days after vaccination.

Two and three times vaccinated PRV piglets showed an increase in the bactericidal activity of blood serum from 47.5% (background) to 72.3; 83.8; 78.8% at 15, 30, 45 days after vaccination, respectively. Whereas in the control these changes are obviously associated with age development and amounted to 48.4; 57.2; 65.5% respectively.

The dynamics of changes in the lysozyme activity of the blood serum of piglets is also noted, with a background of 10.7% in these periods of the study, it was 14.5; 18.3; 18.9% then dropped to 17.4; 16.1; 13.3%, while in the control with a background of 10.6% it was 11.4; 11.8; 12.9% in these terms and lower than in the experimental group. It should be noted that the difference between the indicators in two- and three-fold vaccinated was insignificant.

The study of the effectiveness of PRV was carried out on piglets of the 1st group 10 months after the 1st or 8 months after the second vaccination. At the same time, 3 heads of experimental piglets and 2 control heads were infected with a lethal dose of a mixture of Salmonella, Escherichia and Pasteurella. After 6 days, the control animals died with signs of a mixed infection, while in the experimental animals, disease and death were not noted.

Production tests were carried out in 2 farms of the Kashkadarya region (160 heads in the experiment and 30 in the control) and Samarkand (35 heads in the experiment, 10 heads in the control) regions for 195 experimental and 40 heads in the control. There were no cases of disease and death among the vaccinated piglets, while 8 animals (20%) from the control group died on the 5-8th day after infection.

Conclusions.

Polyvalent radiovaccine against colibacillosis, salmonellosis and pasteurellosis of agricultural animals, developed in the laboratory of radiobiology of VRI, has high immunogenic properties for one year.

Active immunogenesis in PRV-vaccinated animals is due to an increase in T- and especially B-lymphocytes in the blood and, as a result, an increase in antibody titers in the blood serum.

The positive effect of immunization on the resistance of the animal organism and active immunogenesis determined the good efficiency of vaccination and the safety of lambs, calves, and piglets.

Taking into account the positive results of the work carried out, instructions on the use of PRV for the vaccination of lambs in 1999 and for the vaccination of calves in 2001 were prepared and approved. In 2004, for this vaccine, a block of documents (TU, instructions for the manufacture and control of instructions for use) was presented and approved by the State State Budgetary Institution of the Ministry of Agriculture of the Republic of Uzbekistan.

The scope of the article does not allow to provide a large amount of material on the study of colostral immunity using PRV, where good results were obtained in passive and active immunization of pregnant animals and their offspring.

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## PERSONAL INCOME TAX

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**Abstract:** This article provides a detailed examination of personal income tax, covers the purpose of income tax, various methods of calculation, its impact on the economy and offers suggestions for improvement. The analysis provides a broader understanding of the topic and its implications.

**Keywords:** income tax, individuals, revenue system, financial collection, economic development, calculation methods, impact, proposals.

### Introduction

Income tax is a crucial component of the country's revenue system and contributes greatly to its economic development. It is a compulsory financial levy paid to individuals based on their income and plays an important role in financing public services and government initiatives. This article focuses on a comprehensive analysis of the personal income tax, including its purpose, methods of calculation, impact on the economy, and possible proposals for improvement.

Methods Section:

Purpose of Income Tax:

Funding public services: Income tax is an important source of revenue for governments and enables them to provide essential public services such as health, education, infrastructure and defence.

Wealth redistribution: income taxes play a role in reducing income inequality by redistributing wealth from high-income individuals to low-income individuals and fostering a more just society.

Calculation Methods:

Progressive tax system: most countries use a progressive tax system, where tax rates increase with income levels. This ensures that high-income individuals contribute more of their income as taxes.

b. Tax brackets: Income taxes are often divided into brackets or levels, each with its own tax rate. Individuals are taxed at different rates based on their income in each bracket.

Personal income tax[2].

The tax on the income of individuals is one of the main sources of the state budget income, and it is part of the national taxes. Its distinctive feature is that the tax is collected from the direct income of individuals.

According to Article 167 of the Tax Code, individuals with taxable income are considered as payers of income tax from individuals.[1].

Object of taxation: Object of taxation, according to Article 169 of the Tax Code, are the following incomes of individuals:

1. Income of residents of the Republic of Uzbekistan from sources in the Republic of Uzbekistan and beyond;
2. Income of non-residents of the Republic of Uzbekistan from sources in the Republic of Uzbekistan..

Taxpayers of income tax are residents of the Republic of Uzbekistan and individuals who are non-residents of the Republic of Uzbekistan receiving income from sources in the Republic of Uzbekistan.

A tax resident of the Republic of Uzbekistan is a natural person who is actually present in the Republic of Uzbekistan for more than 183 calendar days during any consecutive 12-month period in which the relevant tax period begins or ends. The taxable base is the average annual residual value (average annual value) of taxable objects from adding the residual values (average annual values) of taxable objects as of the last day of each month of the tax period. is defined as one-twelfth of the sum received, with an increasing ending[3].

#### Economic Impact of Income Tax:

revenue generation: Income taxes are an important source of revenue for governments, allowing them to finance public infrastructure, social welfare programs, and other essential services.

economic stability: income tax stabilizes the economy by reducing the fiscal deficit and financing government initiatives, which leads to economic growth and development..

#### Effects on individuals

tax burden: income tax can affect individuals, especially high earners, by reducing their income and their spending and saving patterns..

tax incentives: governments often provide tax incentives and deductions to encourage certain behaviors, such as investments in certain industries, charitable giving, or homeownership.

#### Discussion Section:

##### Simplification and compatibility:

simplifying tax laws: simplifying tax laws can increase compliance and reduce the burden on individuals, making the tax system more efficient and transparent.

technology integration: the use of technology can simplify tax processes, making it easier for individuals to file tax returns and for authorities to monitor and assess taxes.[4]

##### Progressivity and Equality:

review of tax brackets: periodic reviews of tax brackets can ensure that the progressive nature of income taxes is fair and effective in addressing income inequality[5].

social safety nets: Using income tax revenues to strengthen social safety nets can support low-income individuals and increase social welfare.

##### Conclusions and suggestions:

Personal income tax is a crucial component of the country's revenue system and contributes to economic development and social welfare. To improve the efficiency and fairness of income tax, governments should focus on simplifying tax laws, using technology for efficient processes and periodically reviewing tax brackets. In addition, diverting tax revenues to social safety nets can ease the burden on low-income individuals. Striking a balance between revenue generation and fair distribution helps create a sustainable and fair tax system.

In conclusion, understanding personal income tax and its implications is very important for policy makers, individuals and society as a whole. By continuously evaluating and improving the income tax system, governments can achieve their revenue goals while promoting economic growth, equity, and social welfare.

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## Types of Tax Inspection and Characteristics of its Organization.

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**Abstract:** This article provides an in-depth analysis of the tax inspectorate, covering its types, organization and specific features. It examines the methods used in tax audits, presents the results obtained, initiates a discussion around the findings, and concludes with valuable suggestions for improving tax compliance.

**Keywords:** tax audit, tax compliance, tax evasion, financial records, organization, methods, results, discussion, conclusions, suggestions.

### Introduction

The Tax Inspectorate plays an important role in ensuring compliance with tax laws and regulations, and in detecting and preventing tax evasion. This includes regular inspection and verification of financial statements, reports and other relevant documents of individuals and legal entities to determine the accuracy of tax reporting. This article explores the different types of tax inspection and highlights their unique features. In addition, it discusses the organization of tax audits and examines the main methods used, followed by the results, discussion, conclusions and suggestions.

**Desk Audit:** Desk audits include a thorough examination of tax returns and supporting documents in an office environment. Tax inspectors scrutinize financial records, bank statements, invoices, receipts and other relevant documents. Desk audits are typically used for routine tax audits and to assess the accuracy of reported income and deductions.

**Field Audit:** Field audits are conducted on-site at the taxpayer's premises. Tax inspectors inspect physical work premises, inventory, equipment, and records. Field audits are often conducted when complex transactions, such as transactions involving large sums of money or international transactions, require closer scrutiny..

**Electronic Audit:** With the increase in digitization of financial records, tax authorities have conducted electronic audits. This type of audit involves analyzing electronic records and using sophisticated software and data analysis tools to detect discrepancies or tax evasion schemes. Electronic audits are effective in working quickly and accurately with large volumes of data.

**Correspondence Audit:** External audits involve a series of written exchanges between the tax authorities and the taxpayer. Taxpayers are required to provide additional information or clarification on specific items on their tax returns. This type of verification is often used in simple and less complex situations.

Tax audits, also called tax audits, are conducted by tax authorities to ensure compliance with tax laws and regulations. There are different types of tax audits, each with its own characteristics. Some common types of tax audits and their organizational features:

Desk audit: desk audit is conducted remotely at the office of the tax authority. Taxpayers are usually required to provide supporting documents and information related to tax returns, which are then reviewed by tax auditors. Desk inspections are often conducted for routine inspections or when obvious discrepancies or inconsistencies are identified.

Field Audit: A field audit is conducted at the taxpayer's premises such as his workplace or home. Tax auditors visit the taxpayer's premises to examine records, assets and transactions to ensure compliance with tax laws. Field inspections are generally more extensive and intrusive than desk inspections.

Audit letters: In audit letters, the tax authority communicates with the taxpayer through written correspondence such as letters or e-mails. The taxpayer is usually asked to provide specific documents or explanations on some tax-related matters. Verification letters are often used for simpler matters or when the tax authority requires additional information

SIndustry-Specific Audit: Some tax authorities may conduct industry-specific audits focused on specific industries or sectors. These audits focus on the specific tax issues and challenges faced by businesses in these industries. Field-specific audits may involve specialized auditors with expertise in the relevant field.

Special Audit: a special audit is conducted when tax evasion or fraud is suspected. Special audits are usually more extensive and include in-depth investigations and forensic accounting techniques. They can be carried out by specialized units of the tax authority or in cooperation with other law enforcement agencies

The specifics of tax audits may vary depending on the jurisdiction and nature of the audit. However, some common features include:

Advance notice: taxpayers are usually given advance notice of an upcoming tax audit, which allows them to prepare and collect the necessary documents.

Scope and Duration: the tax authority determines the scope and duration of the audit by specifying specific tax periods or issues under consideration. The term can vary widely depending on the complexity of the audit and the size of the taxpayer's operations.

Access to records and information: tax auditors have the right to access and review the taxpayer's financial and accounting records, books, documents and other relevant information.

Interviews and Discussions: Tax auditors may conduct interviews with key personnel, including business owners, managers, and accounting staff, to gather additional information or clarify any discrepancies.

Compliance check: tax auditors check whether the taxpayer has complied with applicable tax laws, regulations and reporting requirements. They can review tax returns, supporting documents, invoices, receipts and other relevant records.

Assessment and corrections: if discrepancies or inconsistencies are found during the audit, the tax authority can make corrections to the taxpayer's tax liability and assess additional taxes, penalties and interest.

It should be noted that the exact procedures and rules relating to tax audits can vary significantly across countries and jurisdictions. Therefore, it is recommended to contact the local tax authorities or seek expert advice for specific information related to tax audits in a particular region.

The results of tax audits may vary depending on the specific type and circumstances of the audit. The results may differ from a clean audit report that shows full compliance to identify errors or inconsistencies in tax reporting. Fines, penalties and legal action may be imposed where tax evasion or fraudulent activity is detected.

The discussion section aims to analyze the implications of the audit findings and their wider implications. It can examine patterns of non-compliance, identify areas for improvement in tax

compliance, and highlight potential strategies to increase tax compliance rates. In addition, he can solve the problems faced by the tax authorities in conducting audits and propose solutions.

#### Conclusions and suggestions:

In conclusion, the tax inspectorate is an important component of tax compliance enforcement and the fight against tax evasion. By applying various types of checks, tax authorities can effectively assess the accuracy of reported information and ensure fair taxation. The following suggestions are offered to improve the efficiency of tax audits:

Using advanced data analytics and artificial intelligence technologies to improve the efficiency and accuracy of inspections

Strengthen cooperation and information sharing between tax authorities and other relevant agencies to detect cross-border tax evasion schemes.

Raise awareness and information for taxpayers about their rights, obligations and the consequences of non-compliance.

Periodic review and update of tax laws and regulations to adapt to changing economic conditions and tax evasion tactics.

By implementing these suggestions, tax authorities can optimize tax audit processes and create a culture of voluntary compliance among taxpayers.

In conclusion, tax audits play a crucial role in ensuring tax compliance and preventing tax evasion. A variety of audits, from desk audits to electronic audits, offer tax authorities the means to effectively monitor financial activity. Organizing and conducting tax audits requires careful planning and the use of appropriate methods. The obtained results provide valuable insights into the state of tax compliance, leading to discussions and recommendations for improving the tax system. Ultimately, tax audits contribute to a fair and equitable tax environment and benefit both governments and taxpayers.

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## Monitoring of Biocenoses of Zominsky Reserve

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**Abstract:** This paper examined the ecological states of Zominskaya sushi biocenoses, their resistance to the causes of climate change, and their environmental friendliness

**Keywords:** Reserve, diverse fauna, ecological state, regional (regional) and local (local) ecological problems, plant species, mountain "goats", "Red Book" factors causing the influence of nature, anthropogenic impact.

### Introduction

In total, 1 thousand 216 species of medicinal and ornamental plants grow in our reserve, including 3 species - Turkestan, Zarafshan and Yassimon, - says Akylbek Suyarov, a specialist in environmental education, public relations and ecotourism of the Zominsky State Reserve. - In addition, our subordinates will monitor and monitor the growth and lifestyle of 149 species of various animal species, broken down by class, observation and photo cards displayed in the regions. [1.]; [2.]; [3.]; [4.]; [5.].

Our controllers conduct 2 times a 1 year: autumn and spring.

The reserve includes 1 species of fish, 2 species of amphibians, 14 species of mammals, 102 species of birds, 30 species of mammals. Snow cover included in the international and Uzbek "Red Book," Tian-Shan Kungir bear, Turkestan silovsin, Severtsovskaya lowland, fox, fox, wild tungiz, black vulture, black bark, bearded kalhat, burgut, pakan-burhat, snow-white kalhat, taskara, animals and birds such as lochin and red book lochin, as well as animals such as tungiz, jaira, rabbit and many others. [6.]; [7.]; [8.]; [9.]; [10.].

Animals and birds included in the "Red Book" of the Bahmal branch of the Zominsky State Reserve, biodiversity, fresh air, icy seawater, which flows into the Sangzor River and dissolves in high-altitude snow, like us, in any human mood positive effect.

There are three types of black, apricot and savory arches in the region. About 700 species of higher plants grow here. 13 species are included in the Red Book of the Republic of Uzbekistan, 48 species are endemic species of West Turkestan. Today, 1216 plant species from 105 families of 531 series are found in the reserve, 21 of which are listed in the Red Book of the Republic of Uzbekistan. More than 20 types of medicinal plants will grow here. [11.]; [12.]; [13.]; [14.].

On the territory of the reserve there are 1 species of fish, 2 species of aquatic and land inhabitants, 14 species of mammals, 102 species of birds and 30 species of mammals.

The reserve includes 1 species of fish, 2 species of amphibians, 14 species of mammals, 102 species of birds, 30 species of mammals. Snow cover included in the international and Uzbek "Red Book," Tien Shan Kungir bear, Turkestan silovsin, Severtsovskaya lowland, fox, fox, wild tungiz, black vulture, black bark, bearded kalhat, burgut, pakan-burhat, snow-white kalhat, taskara, such animals and birds like lochin and red-book lochin.

Tourists can be brought here. But on the territory of the Zominsky and Bakhmalsky forest farms, they are allowed to monitor nature and the animals living here from binoculars and telescopes standing on the border of our Buffer Zone reserve.



### 1 images. Biocenoses of the Zominsky Reserve

During the media tour, organized in the direction of the Bakhmalsky branch of the Zominsky State Reserve, we received a lot of information that we knew and did not know.

Animals and birds included in the "Red Book" of the Bahmal branch of the Zominsky State Reserve, biodiversity, fresh air, icy seawater, which flows into the Sangzor River and dissolves in high-altitude snow, like us, in any human mood positive effect.

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## Clinical Study of Estrus Appearance Time, Duration of Estrus and Effect of Temperature and Lighting Hours on Estrus in Iraqi Mares

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**Abstract:** This study was conducted in Southern Iraq. Were subjected to the study of 15 mares with one adult stallion, between the ages of 5-20 years, during the period from February to September 2021. Cases were diagnosed by rectal palpation ,vaginal examination using a vaginal speculum and teaser. The result show revealed 13.3% of mares its seasonally polyestrous, 33.3% irregular estrus while its recorded 53.3% polyestrous animals. also The results show decreased in Follicular phase duration in June  $4.71\pm0.19$  day significant ( $p<0.05$ ), then in May, July and August  $5.91\pm0.08$ ,  $5.23\pm0.23$  and  $5.84\pm0.22$  day respectively while its increased follicular phase duration during April, February, march and September  $6.5\pm0.15$ ,  $7.2\pm0.20$ ,  $7.1\pm0.17$  and  $7.25\pm0.17$  day respectively, this results show An inverse relationship between the length of the day and the temperature with duration of the follicular phase. And The results in table 2 show the Number of mares in estrus 10,10, 12, 12, 14, 13, 13 and 12 with percentage 66.66, 66.66, 80.00, 80.00, 93.33, 86.66, 86.66 and 80.00, from February to September respectively, The highest number of estrus cases was recorded in June month, with 14 at a temperature of 42 degrees and a lighting period of 14.10 hours. While the lowest percentage was recorded in the February and march months at a temperature of 25 and 27 degrees and a lighting period of 10.52 and 11.49 hours respectively.

**Keywords:** rectal palpation, vaginal examination, vaginal speculum and teaser

### Introduction:

Chronobiology is the study of biological timekeeping, often known as the regular physiological cycles and rhythms. Numerous organisms rely on chronobiological patterns as a survival adaptation. The capacity of creatures to react to shifting cycles of light and dark enabled them to anticipate cyclical changes in their environment. Their capacity to anticipate environmental changes and adapt physiologically afforded them a survival advantage, especially in terms of reproductive success. Seasonal rhythms in reproduction enable animals to reproduce when the chance of offspring survival is highest, such as under good weather conditions and when food resources are more readily available (Murphy, 2019). Numerous periodicities control the timing of reproduction in mares seasonally polyestrous long-day breeders. Circadian rhythms last for around 24 hours, circaannual changes last for about 1 year, The breeding season and the non-breeding season are the two main phases of the mare's circannual reproductive rhythm. Additionally, four distinct periods—the breeding season proper, the autumnal transition, the winter anestrus, and the vernal transition—can be used to further categorize these circannual changes (Sharp, 2011). Estrous cycles, which last roughly 22 days, represent the correct infradian reproductive rhythms (Aurich, 2011). The time when mares have their normal estrous cycles is known as the breeding season. In the Northern Hemisphere, a mare's first ovulation typically occurs between April 7 and 9.1 days later, following

which she will begin her regular estrous cycles (Sharp, 1983). In previous studies, we've learned a lot about reproduction as such (Zaid, 2017 and 2006; Abd-Alhadi, and Ibrahim, 2022; Al-Hamedawi, 2023 and 2012; Alrubaie, 2022; Hussein, 2022), and this research is ongoing. The purpose of this study is to attempt to provide answers to the following questions: When does estrus appear? How long does it last? How does temperature and lighting affect estrus? In Iraqi mares.

### Materials and methods

This study was conducted Southern Iraq. 15 mares and one adult stallion, aged between 5-15 years, were used during the period from February to September 2021. Cases were diagnosed by rectal palpation, vaginal examination using a vaginal speculum and teaser.

### Results and Discussion:

At the time of occurrence, the duration of estrus and the estrous cycle were investigated. The first indicator is reported in days from the first signs of heat to the most recent coverage. A stallion, rectal palpation and vaginal speculum were used to detect the mares in heat, The interval from the end of one estrus to the end of the next is recorded as the duration of the estrous cycle. The seasonality aspects was determined depending on the time of its occurrence into three categories (seasonally polyestrous, polyestrous and irregular estrus animals). The present study revealed 13.3% of mares its seasonally polyestrous, 33.3% irregular estrus while its recorded 53.3% polyestrous animals, these finding agreement with (Morel, 2015; Popova, 2015), They mentioned the possibility of estrus occurring in winter and autumn Depending on feeding and keeping conditions, also (Aurich, 2011) Mention influence of hormonal drugs and other methods to stimulate the onset of the estrous cycle in a timely manner, and (Nikolov, 2008) The estrous cycle in mares is characterized by unevenness and uncertainty, both in terms of periodicity and heat duration. One of the reasons for their lower fertility is because of this.

(Voigt, 2020) reports, in the Northern Hemisphere, spring and late autumn form more irregular periods of estrus cycle activity, representing transitions between two extremes (transitional phases). And disagree with our study, also The first ovulation in the spring marks the beginning of the breeding season (Burkhardt, 2009). This difference resulted from the different regions in which the research was conducted, as well as the different breeds of horses and the method of green feeding and breeding. This dis agree with (Jassim *et al*, 2015) that mention The biggest element that can adversely affect animal performance is if domestic animals are given natural grass.

The results in table 1show decreased in Follicular phase duration in June  $4.71 \pm 0.19$  day significant ( $p < 0.05$ ), then in May, July and August  $5.91 \pm 0.08$ ,  $5.23 \pm 0.23$  and  $5.84 \pm 0.22$  day respectively while its increased follicular phase duration during April, February, march and September  $6.5 \pm 0.15$ ,  $7.2 \pm 0.20$ ,  $7.1 \pm 0.17$  and  $7.25 \pm 0.17$  day respectively, this results show An inverse relationship between the length of the day and the temperature with duration of the follicular phase. this finding coincided with (Al-Timimi and Abdul-Azeez, 2011) The duration of the follicular phase was longer in January, February, and March than in April, May, and June. Also (Ginther *et al*, 2008), Duration of the follicular phase is approximately 5-7 days, with a seasonal variation of 3-9 days. Estrus is thus extended in autumn (7-10 days) and significantly shortened in late spring and early summer (4-5 days). While disagree with (Burkhardt, 2009), Estrus cycle activity is more irregular in the spring and late autumn, representing a transition between two extremes (transitional phases). The breeding season begins with the first ovulation in the spring. This difference is due to the different study areas.

While the lutel phase duration show in table 4-1,  $14.9 \pm 0.27$ ,  $14.7 \pm 0.26$ ,  $14.33 \pm 0.14$ ,  $14.25 \pm 0.13$ ,  $14.14 \pm 0.09$ ,  $14.07 \pm 0.07$ ,  $14 \pm 0$  and  $14 \pm 0$  from February to September respectively. The result show significant increased ( $p < 0.05$ ) in February and march when comparative with other month of the study, This difference is due to the different in number of mares in estrous, The length

of the lutel phase ranged from 14-16 days, and its length was not affected by the different months during the study period. The diestrus, or luteal phase, begins at ovulation with the formation of CL, which is responsible for progesterone synthesis. These results partially agree with the researchers (Ginther *et al*, 2008; Crowell-Davis, 2007), regarding the length of the lutel phase, but differ with them in terms of its length changing with the change of season, as they mentioned estimates a 14-15 day average duration, but can be more durable in mid-summer (16 days) than in spring or autumn (13 days). And agree with (Aurich, 2011) and (Davies Morel, 2015), The luteal phase lasts 15-16 days, during which the mare exhibits no sexual receptivity to the stallion.

The duration of estrus cycle show in table 4-1,  $22.10\pm0.33$ ,  $21.80\pm0.13$ ,  $20.83\pm0.16$ ,  $20.16\pm0.16$ ,  $18.85\pm0.20$ ,  $19.30\pm0.26$ ,  $19.84\pm0.22$  and  $21.25\pm0.17$  from February to September respectively. The result show significant increased ( $p<0.05$ ) in February when comparative with other month of the study, This difference is due to the different of length of follicular phase and different the number of mares in estrous. The results showed that the length of the estrus period was shortened when the length of the lighting period and the temperature increased. Its agree with (Bergfelt,2000), The approximate length ranges between 18 and 22 days, based on a 21-day period on average. also (Klein, 2013), A mare's estrous cycle lasts about 21 days, but it can last anywhere from 18 to 24 days. Based on behavior or gonadal events.

Estrous cycle which divided to Building up phase of proestrus, Follicles are forming and producing estrogen. The mare may be in estrus, but she has not yet accepted the stallion. Estrus refers to sexual receptivity, Elevated estrogen levels in mature follicles just before ovulation. Metestrus, the end of sexual receptivity. Granulosa cells form the developing corpus luteum and begin to produce progesterone after ovulation and the last stage Diestrus, Mature CL (corpus luteum) characterizes this phase with high progesterone levels and low estrogen levels. Follicles may begin to develop but are unable to ovulate.

**Table (1) Estrus appearance time and Duration of estrus from February to September, in Iraqi mares**

month	Duration of estrus (days)		
	Follicular phase	Luteal phase	Estrus cycle
Feb.	<b><math>7.2\pm0.20</math></b> <b>a</b>	<b><math>14.9\pm0.27</math></b> <b>a</b>	<b><math>22.10\pm0.33</math></b> <b>a</b>
March	<b><math>7.1\pm0.17</math></b> <b>a</b>	<b><math>14.7\pm0.26</math></b> <b>a</b>	<b><math>21.80\pm0.13</math></b> <b>ab</b>
April	<b><math>6.5\pm0.15</math></b> <b>b</b>	<b><math>14.33\pm0.14</math></b> <b>b</b>	<b><math>20.83\pm0.16</math></b> <b>b</b>
May	<b><math>5.91\pm0.08</math></b> <b>c</b>	<b><math>14.25\pm0.13</math></b> <b>b</b>	<b><math>20.16\pm0.16</math></b> <b>b</b>
June	<b><math>4.71\pm0.19</math></b> <b>d</b>	<b><math>14.14\pm0.09</math></b> <b>b</b>	<b><math>18.85\pm0.20</math></b> <b>c</b>
July	<b><math>5.23\pm0.23</math></b> <b>c</b>	<b><math>14.07\pm0.07</math></b> <b>b</b>	<b><math>19.30\pm0.26</math></b> <b>b</b>
August	<b><math>5.84\pm0.22</math></b> <b>c</b>	<b><math>14\pm0</math></b> <b>b</b>	<b><math>19.84\pm0.22</math></b> <b>bc</b>
Sep.	<b><math>7.25\pm0.17</math></b> <b>a</b>	<b><math>14\pm0</math></b> <b>b</b>	<b><math>21.25\pm0.17</math></b> <b>b</b>
p. value	<b>0</b>	<b>0</b>	<b>0</b>

### Effect of temperature and lighting hours on estrus in mares:

The results in table 2 show the Number of mares in estrus 10,10, 12, 12, 14, 13, 13 and 12 with percentage 66.66, 66.66, 80.00, 80.00, 93.33, 86.66, 86.66 and 80.00, from February to September respectively, The highest number of estrus cases was recorded in June month, with 14 at a temperature of 42 degrees and a lighting period of 14.10 hours. While the lowest percentage was recorded in the February and march months at a temperature of 25 and 27 degrees and a lighting period of 10.52 and 11.49 hours respectively.

The results in table 2 show The cycle of estrus in the mares was always occurring throughout the study period, but in varying proportions among the mares, The course of estrus in mares is marked by inequity and uncertainty, both in terms of periodicity and heat duration, This is one of the reasons for low fertility. Exogenous factors such as age, reproductive state, nutrition, body condition, and environmental temperature, in addition to photoperiod, have a significant impact on the mare's seasonal reproductive activity. As a result, in most horse populations, a proportion of mares continue to cycle all year.

The results are consistent with (Morel, 2015; Popova, 2015), Mares are seasonal polyestrous animals. Their heat usually occurs in the spring, but it can also occur in the winter and autumn depending on the conditions of feeding, keeping, and their purpose also (Vilhanova *et.al.*, 2021) that mention The mean number of days in estrus from 2015 to 2018 was 5.701.22. In July, the shortest estrus was seen. It lasted an average of 4.67 days and 0.58 hours. The daylength on July 15th was 15 hours 40 minutes, while the monthly average for outside temperature was 21.6 +/- 0.52 °C. March had the greatest average estrus length (8.33 0.91 days). In these years, the daylength in March averaged 11 hours 48 minutes, and the average air temperature was 6.90.67 °C. Environmental aspects and estrus duration have a negative association. Estrus lasted for shorter amounts of time as ambient temperature increased ( $r = 0.754$ , P0.0001), and it lasted for shorter amounts of time as daylength increased ( $r = 0.708$ , P0.0001). . while disagree with (Voigt, 2020), spring and late autumn in the Northern Hemisphere form more irregular periods of estrus cycle activity, representing transitions between two extremes (transitional phases). The breeding season begins with the first ovulation in the spring (Burkhardt, 2009). This difference is the result of different regions and environmental conditions that surround horses during the research period.

**Table (2) No. of mares in estrus from different months, in Iraqi mares.**

month	Total no. Of mares	No. of mares in estrus	%	Temperature°	Light Hours
Feb.	15	10	66.66	25°	10.52
March	15	10	66.66	27°	11.49
April	15	12	80.00	37°	12.52
May	15	12	80.00	37°	13.45
June	15	14	93.33	42°	14.10
July	15	13	86.66	43°	14
August	15	13	86.66	45°	13.12
Sep.	15	12	80.00	35°	12.15

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## **Influence of Previous Crops on the Amount of Nutrients In the Soil**

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**Abstract:** Soils of the Republic of Karakalpakstan are salty and low in fertility. In such soils, the meliorative condition of soils should be improved and soil fertility should be increased for receiving high yield from agricultural crops. Crop rotation, organic and siderate fertilizers give good results in increasing soil fertility.

In the field experiment, studies were conducted to determine the effect of crops included in short crop rotation systems on the amount of soil nutrients. In determining the effect of mung bean, sesame, and soybeans planted before winter wheat in the crop rotation system on the amount of nutrients in the soil, when planted by the method of cotton: previous crop mung bean + mung bean for siderate + 20 t/ha of manure + winter wheat: winter wheat the amount of humus in the soil has been found to have increased to 0.040%.

**Keywords:** crop rotation, nutrients, previous crops, humus, winter wheat, fertility, soil salinity, agrochemical properties

### **Introduction:**

The soils of the Republic of Karakalpakstan are characterized by saline and low fertility. High yield of agricultural crops in these lands is achieved by using mineral fertilizers in high rates. The use of mineral fertilizers in high rates every year has a negative effect on the ecological condition of the soil and reduces the agrochemical and agrophysical properties of the soil. Therefore, it is necessary to increase soil fertility - use of crop rotation, organic and siderate crops, and include crops that leave more roots and leguminous residues in the soil. Increasing organic matter in the soil at the expense of plant residues is the most economically and ecologically effective.

**Methods of the research.** Using the field method, the experiment includes 9 variants, in four repetitions, in one layer, arranged in a systematic way.

1st variant of the experiment, continuous sowing winter wheat, 2-4th variants, sowing mung bean, sesame and soybean for grain before sowing winter wheat, 5-7th variants, sowing mung bean, sesame, soybean for grain, before winter wheat and additionally 10 t/ha manure was used and then winter wheat was sown, 8th variant, mung bean was sown for grain before winter wheat and additionally manure added in the amount of 20 t/ha, 9th variant, mung bean was sown for grain, then it was sown for siderate and additionally 20 t/ha manure was used, then winter wheat was sown.

**The results of the research and analyzing them.** Soil samples were taken from the 0-30 and 30-50 cm layers to determine the effect of crop rotation on the content of nutrients.

The productivity of agricultural crops depends on land reclamation and soil fertility. The more organic mass the soil contains, the more humus it contains. For it, it is necessary to increase the amount of plant residues left in the soil.

In the experiment, the predecessor crops planted before winter wheat, and how they affect soil fertility when winter wheat and cotton are planted, were determined in two periods, at the beginning and at the end of the operation period.

In 2019, in the control option (var. 1), winter wheat was grown (planted in the fall of 2018), previous crops, mung bean, sesame, soybean were planted and cared for.

At the beginning of the season in 2019, the amount of humus in the 0-30 cm layer of the soil was 0.720-0.730%, and at the end of the season it was 0.720-0.740%, it can be noted that the amount of humus increased by 0.010%. As can be seen from the data, in the control option of the experiment, that is, in the control option planted with winter wheat, the amount of humus decreases by 0.010% at the end of the season. In other options, due to the planting of leguminous grains and leguminous oil crops, the amount of humus did not decrease, on the contrary, it increased by 0.010%.

The total and mobile amounts of nitrogen, phosphorus and potassium from nutrients are observed to decrease in the control option at the end of the season. In options 2-9 of the experiment, these indicators differ very little.

In the fall of 2019, all options were planted with winter wheat. To determine the effect of previous crops on soil fertility, soil samples were taken from the 0-30 cm and 30-50 cm layers at the beginning and end of the 2020 season.

At the beginning of the season, the amount of humus in the soil is 0.720-0.760% in the 0-30 cm layer, and the lowest value is observed in the control variant. Preceding crops planted before winter wheat, rates of organic fertilizers applied, and intercrops have different effects on soil humus content.

At the end of the season, the amount of humus in the control option is reduced by 0.010% compared to the beginning of the season, it is worth noting that in all the options, due to the planting of winter wheat, it decreases by 0.005-0.010% at the end of the season compared to the beginning of the season, but the total amount of humus is 0.720-0.730% in the autumn of 2019, in autumn 2020 it is 0.710-0.755% and 0.730-0.755% in crop rotation options.

Previous crops, applied organic fertilizer standards have created an opportunity to increase soil fertility. When leguminous crops used in short crop rotation options are planted for grain and then winter wheat is planted (var. 2-4), the amount of humus is 0.730-0.735% at the end of the 2020 season, when manure is applied in the amount of 10 t/ha after leguminous crops (var. 5-7) it was 0.740%, 0.760% when 20 t/ha of manure was applied, and 0.775% in the 9th option, where mung bean for grain + intercrop mung bean + 20 t/ha of manure + winter wheat was planted.

So, when winter wheat is planted after the previous crops, the soil nutrition regime is short crop rotation to maintain and increase productivity, cotton: mung bean for grain + 20 t/ha of manure + winter wheat, or cotton: mung bean for grain + mung bean for siderate + 20 t/ha of manure winter wheat : achieved when winter wheat system is used.

When we determined the amount of nutrients in the soil in 2021, the effect of the second year of previous crops was revealed. In the 0-30 cm layer of the soil at the beginning of the growing season, the average of the variants was 0.700-0.755% and at the end of the season 0.700-0.750%.

In the control variant planted with winter wheat, the amount of humus at the end of the season decreased by 0.010% of the amount in spring. In options 2-4, where the predecessor crops were planted for grain before winter wheat, and then winter wheat was planted, it was 0.715-0.730% in spring and 0.715-0.735% in autumn, and there was no decrease in the amount of humus.

After legumes and oilseed crops + 10 t/ha of manure + winter wheat in 5-7 options, the amount of humus in the 0-30 cm layer of the soil is 0.730% at the beginning of the season and 0.720-0.725% at the end of the season, and the reduction of humus is 0.005-0.010% it was 0.750% and 0.755% in the 8th variant, where the mung bean for grain + 20 t/ha manure + winter wheat system was used,

and when the mung bean for grain + mung bean for siderate + 20 t/ha manure + winter wheat system was used, 0.750% and 0.750% at the beginning of the season and at the end of the season was 0.760%, and it was observed that the amount of humus increased by 0.10% at the end of the season.

Among the agro-measures that ensure the increase of soil fertility and the yield of winter wheat are crop rotation, planting legumes and oil crops (mung bean, sesame, soybean) as predecessor crops, applying manure in the amount of 20 t/ha, planting mung bean as a siderate.

**Conclusion.** In order to increase soil fertility and winter wheat yield in the conditions of saline soils of the Central region of the Republic of Karakalpakstan, short-term crop rotation, cotton : grain : grain, planting legumes and leguminous oil crops as a predecessor crop before winter wheat + 20 t/ha of manure + winter wheat, or cotton : grain : grain, mung bean for grain + mung bean for siderate + 20 t/ha manure + winter wheat : winter wheat methods should be used before winter wheat.

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## ANALYSIS OF EXISTING DESIGNS OF CRUSHING MACHINES FOR PROCESSING SOLID WASTE

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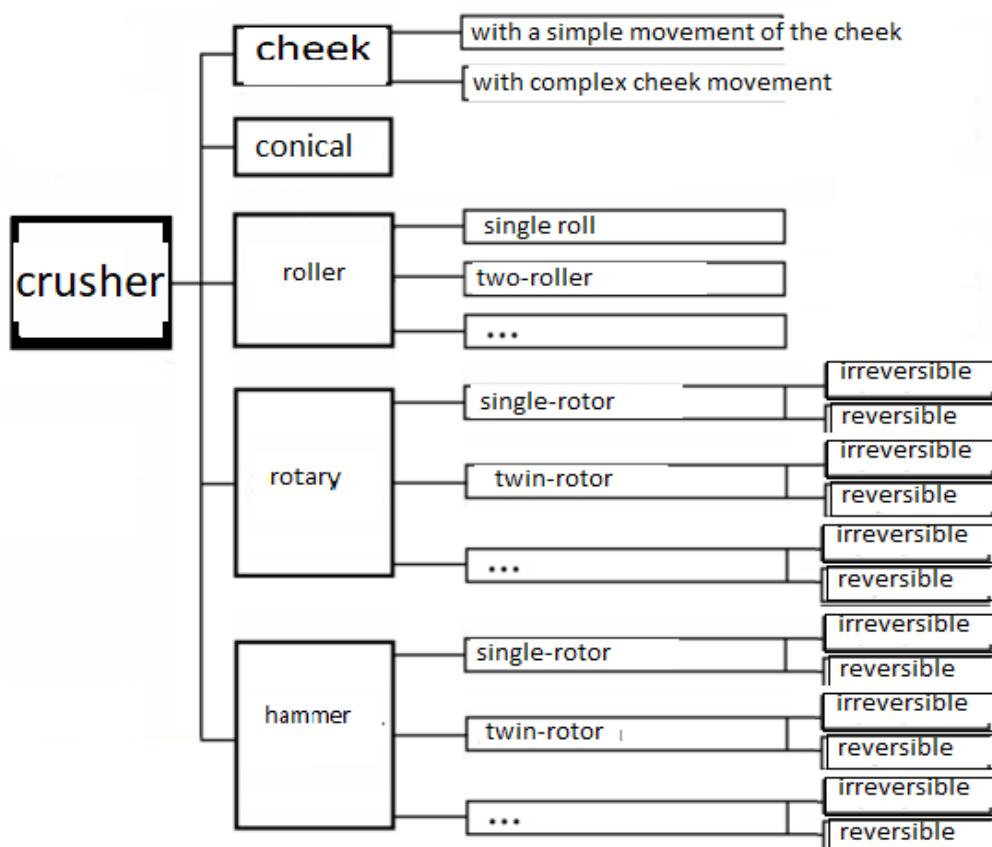
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**Abstract:** The article is devoted to the analysis of the designs of sorting machines for processing solid household waste. Based on the analysis of the advantages and disadvantages of machine designs, analogues of machines have been selected. When choosing an analogue, not only the design features, but also the properties of recycled waste are taken into account.

**Keywords:** analysis, crushing machine, degree of grinding, solid household waste.

### Introduction

Various equipment is used for crushing the constituents of municipal solid waste. The decisive factor influencing the choice of crusher design is the properties of municipal solid waste, the specific energy intensity of the waste crushing process, as well as the specific material consumption of the crusher design. Here it is necessary to add that the choice of the design of the crushing machine is also influenced by the quality of the products, versatility and maintainability [1; pp.4-11, 2; pp.7-9, 3; pp.12-16]. Figure 1 shows the classification of crushing machines by design [11, 12, 13, 14, 15, 16, 17, 18, 19, 20].



## **Fig.1. Crusher classification**

### **Main Part**

When choosing crushing equipment, it is necessary to take into account the significant characteristics of the equipment [21, 22, 23, 24, 25, 26, 27, 28]. Table 1 below presents an improved system of significant characteristics developed by the author.

**Table 1. Crusher Significant Enhanced Performance System**

crushers	The system of significant characteristics of crushers			
	Specific energy intensity	Specific material consumption-bone	Versatility	Cap. expenses
cheek	Very high(5)	Very high(5)	Low(4)	Very high(5)
cone	High(4)	High(4)	Low(4)	High(4)
Valkovaya	High(4)	High(4)	Low(4)	High(4)
Rotary	Low(3)	Low(3)	Low(5)	Low(3)
Molotkovaya	Low (3)	Low(3)	Low(4)	Low (3)^*

\* the lower the crusher scores, the more efficient it is.

The analysis of table 1 shows that, according to improved indicators, hammer crushers have undeniable advantages over other types of crushers, especially when crushing organic waste components.

In hammer crushers, the force of impacts inflicted by impactors crushes solid waste components. Hammer crushers are generally designed to grind medium to low strength materials. The production of crushing machines ranges from 3 to 400 m<sup>3</sup>/hour[4; pp.11-15, 5; pp.12-16, 6; pp.5-11]. Grinding of organic components is carried out:

- due to the impact of the hammer on the organic components of the waste and the impact of the components of the waste on each other;
- impact of organic components on the walls of the working chamber;
- collision of organic components on the blade of knives welded on the walls of the working chamber;
- between the organic components and the grate.

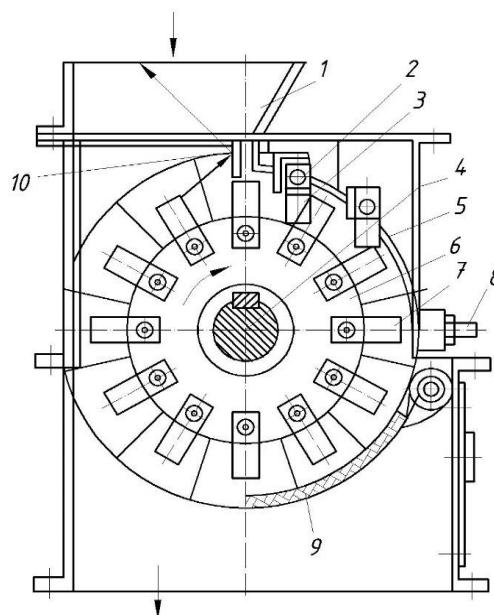
A significant part of the waste is crushed due to collision with each other.

Crushers include a crushing chamber with a grate at the bottom through which the crushed material is discharged, and a rotating shaft with beaters (impacting rotating tools, often called hammers) fixed or suspended on it. Hammer crushers come in two types - horizontal and vertical.

Figure 2 shows the design of a horizontal hammer crusher for crushing MSW. The machine was developed by the All-Russian Scientific Research Institute of Municipal Engineering. The waste is sent by means of a conveyor to the loading device 1, and then by a feeder to the working chamber, where grinding takes place with rapidly rotating hammers pivotally attached to the rotor 10. Waste fragments are fed to the plate 2, where additional grinding takes place. In addition, the grinding device is equipped with a bar 3, which crushes MSW. On the surface grate 4, additional grinding of the material takes place and fine waste falls on the lower conveyor.

Soft materials, as well as metal objects that are difficult to grind with hammer blows, hit the plate 9 from the end of the surface grate. Large pieces, moving the shutter 8, fall into the slot 7 and

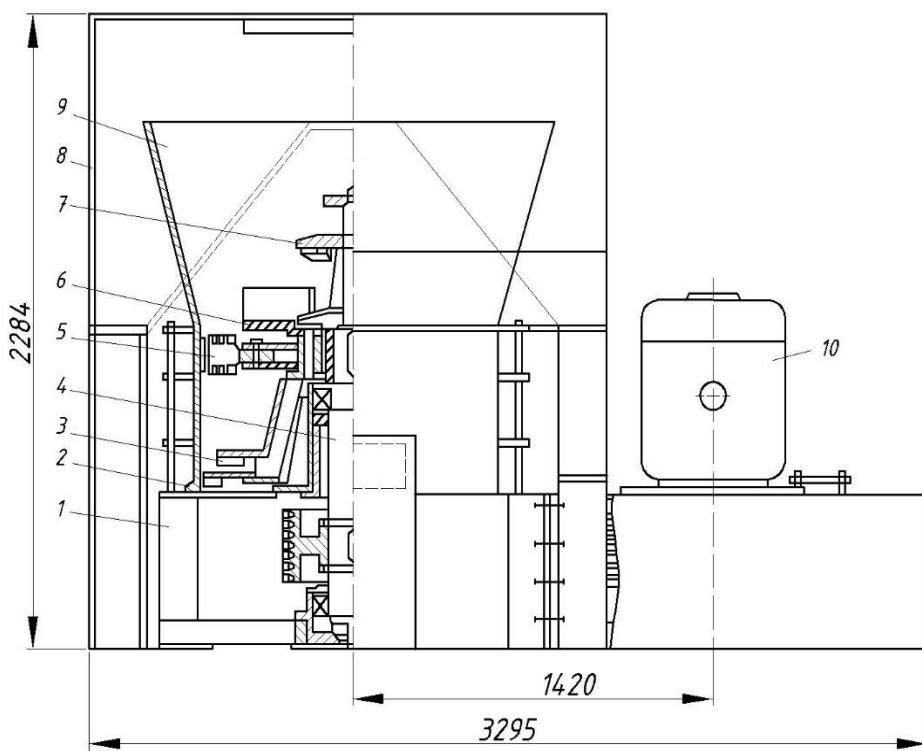
are then taken aside, and the remaining material under the action of a toothed crusher, in which left 5 and right 6 rolls rotate at different speeds, grinding the material. When strong materials are fed into the crusher, one of the rollers moves back and the gap between the rollers increases, passing the object down to the collecting conveyor installed under the crusher.



**Fig.2. Hammer crushing machine designed by the All-Russian Research Institute of Municipal Engineering**

The crushing machine for crushing solid waste designed by the All-Russian Research Institute of Municipal Engineering differs from conventional hammer crushers by the presence of "combs", between the fixed teeth-knives of which hammers rotating on the rotor pass, thereby increasing the crushing effect of the crushing machine. Hammers 7, hinged on the rotor 6, which is installed in the casing 4 of the crushing machine, act on the waste coming through the feed opening 1. A crushing plate 5 and combs are also attached to the body. The teeth of the combs 3 are suspended on the axes 2. In front of the first comb, a breaking plate 10 is installed. After the crushing plate, a breaking bar is installed, the distance of the working edge of which to the circle of rotation of the hammers can be adjusted with a bolt 8. A grate 9 is installed at the bottom, the position of which relative to the hammers can also be adjusted. Indestructible objects are thrown by hammer blows onto the impact plate 10, and from it they ricochet into a vertical shaft, where they lose speed, fall into the unloading chute and are removed. It should be noted that the tests of crushing machines, made according to the above scheme, revealed their shortcomings, for example, during processing, various fibrous materials (rags) were wound on rolls and quickly brought them to a non-working state. At the same time, the principle of the machine seems to be promising; fine-tuning the design is an urgent task.

Figure 3 shows a crusher with a vertical shaft, which is installed in the Minsk Waste Processing Plant.



**Fig.3. Vertical Shaft Hammer Crusher Separator**

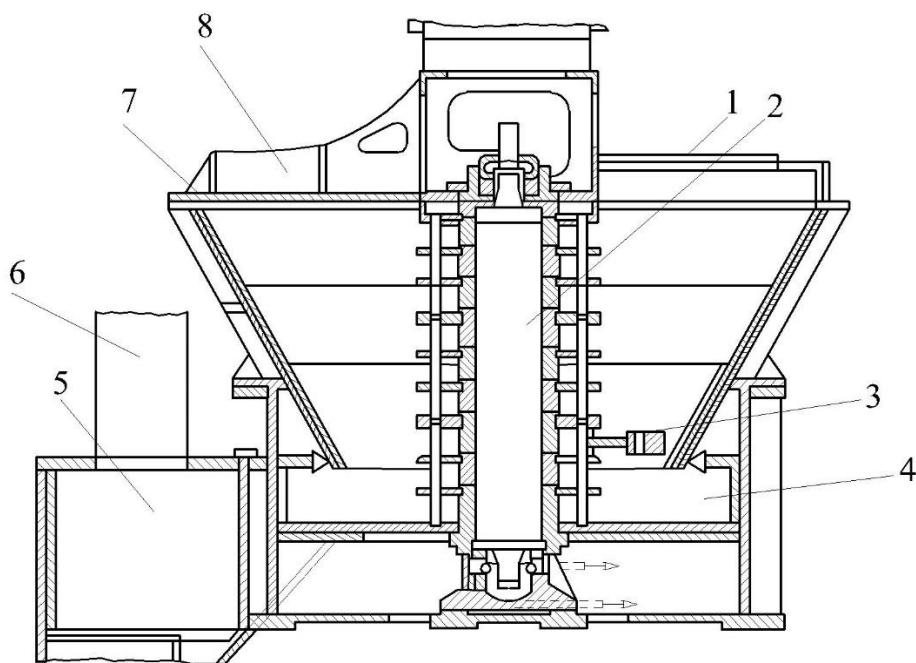
The crushing machine - separator is designed for additional grinding of compost and glass during the processing of solid waste. The crushing machine (DM) consists of a base 1, on which the crusher body 2 is mounted, a vertical drive shaft 4 and a crushing element, including hammers (beater) 5, rippers 7, a spreader 6, with knife guides and a discharge disk 3. From the top to the body a loading hopper 8 is attached, inside of which a receiving cone 9 is placed.

The shaft of the machine is driven by an electric motor 10 and a V-belt drive. The compost to be crushed is fed into the receiving hopper and falls on the cultivator, made in the form of three conical discs installed one above the other.

It should be noted the abundance of various designs offered by leading firms in the USA, Germany, France, England and Japan for the processing of solid waste.

In most cases, these are hammer and impact crushers, which have been modified to reflect the specifics of waste processing. For example, impact and hammer crushers are equipped with beak-shaped beaters and hammers that crush and tear the material being processed. Impact plates are not smooth or corrugated surfaces, but are equipped with protrusions with sharp edges (knives). When crushing waste with a significant proportion of rags, paper, polyethylene, for example, in the National Recycling (USA) crushers, the crusher rotor is reversed, which increases the tearing and abrasive effect [1; pp.3-77; pp.23-26, 8; pp.11-15, 9; pp.7-11, 10; pp.32-36].

Figure 4 shows a hammer crusher from Tollemache (Great Britain).



**Fig.4. Crusher of the Tollemache system (Great Britain)**

In the Tollemache crusher, the raw material is loaded into opening 1 of the cover 7 of the hatch and enters the working area of the grinder, where it immediately falls under the action of a strong air flow created by the vertical rotor 2. Soft components are reflected by hammers 3 and the air flow is directed to the opening 8 of the cover 7. The crushed waste enters the cylindrical chamber 4, from where it enters the cyclone 5 and further down to the discharge conveyor, and the dusty particles are taken out into the exhaust pipe 6. The cyclone 5 is placed on a carriage that allows it to be removed from the DM during repair work.

The technical characteristics of the Tollemache DM system are presented in Table 2

**Table 2. Technical characteristics of the DM system "Tollemache"**

No	Main parameters of crushers				
1	Type	42	58	72	92
2	Productivity, t/h	15-18	30	40	60-70
3	Drive power, kW	110-148	258	368	552-736

Over 150 Tollemache type 42 crushers installed in various countries. The largest shredders type 92 are used in the USA and Japan.

#### **Выводы**

1. An analysis of the principles of operation of all the above impact crushers, as well as a patent search on this topic, showed that waste is effectively crushed after passing through preparatory manual sorting and fractional sorting on drum screens on hammer crushers.
2. Based on the analysis of the advantages and disadvantages of impact crushing machines, it was found that hammer crushers with a vertical shaft are more efficient than those with a horizontal shaft.
3. Based on the use of the principles of physical modeling, prototypes of impact crushers have been developed.

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## Isolation of Rhizobacteria from the Cotton Rhizosphere in Medium Salinity Soils and Creation of a Basis for the Preparation of the Preparation (in the Example of Yazyovon District, Fergana Province)

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**Annotation:** In this article, special attention is paid to immobilizing cells of microorganisms on various carriers in agriculture today, determining the possibilities of maintaining the physiological properties of immobilized rhizobacteria, forming a new generation of multifunctional high-efficiency biopreparations in the form of dry powder that keep their properties stable, as well as developing a biotechnological strategy for managing biochemical processes in the soil. is being given [5,7,8].

Also, the effectiveness of biopreparations based on rhizobacteria, which accelerate the growth of agricultural plants, was determined.

**Keywords:** microbiological preparations, flocculant, microorganism, rhizobacterium, biological agent, Bacillus genus, culture, enzyme, stress factors, secondary metabolites, immobilization.

### Introduction

The agrarian sector occupies a large part of the economy of our republic, and it is necessary to solve the problems of agriculture. Soil fertility and productivity in the agricultural fields of our republic is one of the future promising results [2,3]. Choosing an effective biological agent as a basis for a biopreparation and the correct selection of an adsorbent-filler is one of the main decisive problems in the development of effective preparations based on living microorganisms [1,4].

In our republic, it is a very responsible task to prevent soil poisoning, water pollution, and extinction of rare plants and animals. One of the main problems in agriculture today is the degradation of soil fertility. Primarily to prevent chemical contamination and salinity, which in turn directly affects productivity. In addition, considering that the quality of agricultural products depends on the quality of the soil and the importance of improving the ecological condition of the soil [5].

In some economically developed countries, a new system of agriculture - sustainable agriculture and organic farming - is being introduced. Its main principles are based on the partial or complete replacement of mineral fertilizers and chemical pesticides with biological ones. Due to the high demand for ecologically safe food products in the countries of the EH organization (market demand in the volume of 100 billion dollars) and in order not to pollute the environment, about 10% of enterprises in Europe have switched to a new system of growing plants [6,7].

### RESEARCH METHODS

Rhizobacteria is one of the potential and brilliant tools in creating sustainable agricultural practices and maintaining existing traditions. Therefore, it is necessary to find out whether it is possible to use

the beneficial properties of any bacteria, taking into account the various conditions of the environment and the characteristics of plants. Development of dry powder forms of microbiological preparations [5,6].

When it comes to the effective use of biopreparations intended for various purposes, special attention should be paid to the problems of developing their preparation form, that is, the need to develop high-tech processes that preserve the stability and activity of the preparations.

Local types of microorganisms play a special role in improving soil fertility. They have a significant positive effect on increasing plant productivity and soil fertility

In order to determine the effect of microorganisms inoculated with Hypan on seed seeds, it was determined by the method of inoculation by diluting the suspension of Hypan biopreparation in water at a ratio of 1:1000 to a special cassette. Colonization of rhizobacteria on cotton seedlings in microvegetative and vegetative experiments was carried out according to the general methods developed by I.K Kurdish and others [3,4].

The seed was depilated and sterilized by keeping it in concentrated sulfuric acid for 5 minutes. Then, they were washed 5 times with sterile water and cultivated for 48 hours at a temperature of 28°C in moistened sterile Petri dishes.

The grown seeds were bacteriized for 1 hour with a suspension of rhizobacteria grown in meat peptone broth and diluted to the level of 10-7 KHB/ml.

When carrying out experiments in field conditions, a working solution was prepared by mixing the composition of microorganisms with water in a ratio of 1:1000. Before planting, the seed was treated with a suspension of the drug (12.0 liters of hairy seed and 10.0 liters of hairless seed per 1 ton of the working solution). During processing, the seeds were cooled for 1-2 hours. The seed was dried in a cool, direct sunlight place and then planted.

During the cotton vegetation, the soil was treated by spraying the working solution in the amount of 500-600 l/ha.

The analysis of vegetative experiments was carried out during the period of seed germination, leaf emergence, tillering, flowering pods. Biometric parameters were compared to the control variant in terms of main stem length, sympodial branches, bracts, flowers, pods and number of opened pods [11,12].

## RESEARCH RESULTS AND THEIR ANALYSIS

It is known from the scientific literature that plants tolerant to stress factors have many mechanisms that help to stimulate metabolic processes and limit the effects of stress factors.

According to the literature, it has been shown that the amount of osmoprotector has increased in microorganisms resistant to salinity, and based on them, technologies for the preparation of dry bacterial preparations resistant to NaCl have been created.

It is also worth noting that until now in the agricultural practice of our country monoculture of microorganisms was used to harvest vegetables, but in this study, the use of complex cultures and their effectiveness were tested in the conditions of different salinity soils of Fergana region (Table 1).

Based on several years of screening, strains resistant to chlorine and sulfate salinity (up to 200 mM) were selected from the cotton rhizosphere, it was determined that they belong to *Bacillus subtilis*, *Bacillus megaterium*, and *Pseudomonas stutzeri* species, and a biotechnological basis was formed for the production of the complex "Zamin-M" biopreparation. It was found that domestic strains included in the biopreparation "Zamin-M" show a high level of synthesis of indolyl acetic acid (ISA) even under stress conditions (ph-9).[7,8].

**Table 1 Description of the salinity of the irrigated lands of Yozyovon district, Fergana region2022 year**

№	Array name	Watere d gan land area, ha	By degree of salinity										Field, ga		Including moderately and strongly salted		
			unsalted		weak		average		strong		very strong		saline lands, ha		in relation to the total irrigated area		relative to the total salinity area
			ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	%
1	Uzbekistan	1387,0	546,9	39,4	636,6	45,9	203,4	14,7	-	-	-	-	840,1	60,6	203,4	14,7	24,2
2	Xonobod	1589,3	462,4	29,1	132,0	8,3	575,7	36,2	419,2	26,4	-	-	1126,9	70,9	994,9	62,6	88,3
3	Gulistan	3101,4	237,9	7,7	355,5	11,5	1850,4	59,7	657,6	21,2	-	-	2863,5	92,3	2508,0	80,9	87,6
4	Ishtirxon (Yokubov)	637,6	423,0	66,3	146,3	22,9	45,2	7,1	23,1	3,6	-	-	214,6	33,7	68,3	10,7	31,8
5	Chuliguliston	671,6	325,8	48,5	345,8	51,5	-	-	-	-	-	-	345,8	51,5	-	-	-
6	Yangiobod (Z.Ganiyev)	1509,5	307,5	20,4	58,0	3,8	747,1	49,5	397,0	26,3	-	-	1202,1	79,6	1144,1	75,8	95,2
7	Yangi buston (Sh.Rashidov)	1560,8	600,3	38,5	314,7	20,2	645,8	41,4	-	-	-	-	960,5	61,5	645,8	41,4	67,2
8	Pir Maxmud (Korasokol)	1172,4	608,4	51,9	224,0	19,1	340,0	29,0	-	-	-	-	564,0	48,1	340,0	29,0	60,3
9	U.Toshboym	1251,1	260,4	20,8	366,2	29,3	300,9	24,0	323,6	25,9	-	-	990,7	79,2	624,5	49,9	63,0
10	Koratepa	1893,8	478,5	25,3	226,0	11,9	722,6	38,2	466,7	24,6	-	-	1415,3	74,7	1189,3	62,8	84,0
11	Katortol	1463,2	-	-	-	-	448,2	30,6	1015,0	69,4	-	-	1463,2	100,0	1463,2	100,0	100,0
12	I.Yusupov	1363,3	382,9	28,1	402,1	29,5	524,4	38,5	54,0	4,0	-	-	980,5	71,9	578,4	42,4	59,0
Total by district:		17601,0	4634,0	26,3	3207,2	18,2	6403,6	36,4	3356,3	19,1	-	-	12967,0	73,7	9759,9	55,5	75,3

**CONCLUSION:** Globally, salinity is one of the major threats to agricultural production. Nevertheless, the issue of using saline lands to meet the food needs of the growing population is urgent, and the viability and functional properties of immobilized cells have been determined. The technology of obtaining the dry preparation form of "Zamin-M" biopreparation immobilized with flocculant has been developed and implemented.

The ability of soil rhizobacteria to accelerate the growth and development of plants in conditions of salinity stress has been providing great benefits in the field of sustainable development of agriculture in the whole world.

It consists in developing an optimized technology for extracting concentrated microbial biomass from the culture liquid, obtaining the immobilized form of the biopreparation, and obtaining the dry form of the biopreparation. As a result of the research, it was determined that the bacterial isolates isolated from the conditions of saline soils belong to the genus *Bacillus sp.* improving the production technology of dry powder form immobilized with Hypan flocculant "Zamin-M" biopreparation, which increases the productivity of saline soils, will bring great results.

As a result, the effect of the Zamin-M biopreparation inoculated on Hypan showed high results in seed germination, root length, stem length, average dry mass (Fig. 1). [9,10].



**Figure 1. Fertilization status of cotton seed as affected by Hypan flocculant**

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## Selection of Promising Potato Variety Samples for the Next Term

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### **Annotation: Promising potatoes for the future selection of varietal samples.**

For growing vegetables, melons and potatoes at the Research Institute, 36 varieties of potatoes of local and world selection were tested in the soil and climatic conditions of the Tashkent region and a technology for their cultivation was developed.

As a result of the research, it was recommended to selectively obtain varieties suitable for cultivation in the climatic conditions of the Tashkent region.

**Keywords:** potato, leaf, stem, flower, variety, tuber, selection, productivity.

### Introduction

In Uzbekistan, potatoes began to be cultivated as an agricultural crop at the beginning of the second half of the XIX century. At the beginning of the XX century, the potato planting area was 1.4 thousand hectares, in 1940 it was 23.6 thousand hectares, and in 1991 it was 40 thousand hectares.

Currently, potatoes are sold in 138 countries of the world for 20-22 million. planted per hectare, 320-335 mln. tons of gross crops are grown. Potato-growing countries are China, Russia, India, Ukraine, USA, Germany, Poland, Belarus, the Netherlands and France are considered as The average yield is 15-17 t/ha worldwide. [1;3].

Potato productivity depends on many factors, among which the genetic productivity of the variety present in the plant and embodied in the seed is of leading importance. Therefore, one of the main factors for increasing the yield of potatoes is the correct selection of the variety and sowing of quality seeds. It allows for increasing the yield by 1.5-2 times by properly selecting the seed tubers of the variety and quality.[5;6].

In 2022, at the Research Institute of Vegetables, Field Crops, and Potatoes, samples of local and world selection of potato varieties were planted to test the soil and climate conditions of our Republic. The experiments were conducted based on the generally accepted methodical manuals of B.J.Azimov, B.B.Azimov "Methodology of conducting experiments in vegetable, vegetable, and potato growing" (2002), and the statistical analysis of the results was carried out by B.A. Based on Dospekhov's "Metodika polevogo opyta" (1985) dispersion method, it was carried out using Microsoft Excel.[2;4].

Experiments In the experimental areas of the Scientific Research Institute of Vegetables, Field Crops, and Potatoes, the following varieties of potatoes, brought from foreign countries and local varieties, were planted and studied.

Dutch Picasso, Evolution, Royal, Sante, Arizona, Manitou, Kuroda, Saviola, Arielle, Red scarlet German Smena, Adretta, Gala, Russian Kronos, Romance, Mikado, Red bullet Sineglazka, Hungarian Botant, Balatoni rossa, White lady, Demon, Dizera, Spunta of France, as well as lines

№01, №02, №05, №9, №12 local varieties Umid-2, Kuvonch 1656, Tashkent ertagisi, Sarnav, Pskom, are used in Balatoni. In the experimental field of Bogizagon varieties, samples of each variety were planted in a 70×25 cm scheme in 2 rows of 5 m length on March 25 in an experimental field that was prepared in advance. [6;7;9]. Before planting, potato collection samples were placed for germination in a special room with an air temperature of +14-18 C°, air humidity of 70-80%, and quality germination in 20-25 days after the day of planting.

In the experimental version, 36 samples of varieties were planted. In the collection of planted potatoes, phenological observation, and biometric measurements were carried out on a variety of samples. After every 10 cultivars, a local cultivar Pskom was planted as a control cultivar. Kronos, Picasso, Evolution, Umid-2, Red Bullet, Romantika, Mikado, Royal, Folva, and Smega varieties were compared with the control variables in the first ten. 10% of the standard Pskom variety germinated in 14 days, 75% germinated in 20 days, while Evolution, Red Bullet, Romantika, Mikado, Smega, and Arizona varieties germinated 1-2 days earlier than the control option.

When the number of plant stems was studied in these 10 varieties, the number of stems in Kronos, Picasso, Evolution, Red Bullet, Romantika, and Mikado varieties was 0.2 more than the control variety; 0.3; 0.5; 0.2; 0.7 times more was found. In the next 20 varieties, Dizera, Sante, Arizona, Manitou, Kuvonch, Spunta, Adretta, Gala, Red Scarlet, and Saviolla have been tested in comparison with the control Pskom variety. It took 14-20 days for 10-75% germination of potato seedlings in the control Pskom variety, while Dizera, Arizona, Spunta, Gala, and Kuroda varieties germinated 1-2 days earlier than the control option. The germination of Adretta Manitou, Joy 1656 varieties was equal to the control option.

In the next 30, Sneglazka, Ariyelle, Red scarlet, Tashkent ertagisi, Sarnav, Botant, Balatoni rossa, White lady, Demon, Balatoni large varieties were compared with the Pskom variety.

It took 13-21 days for 10-75% germination of potato seedlings in the control Pskom variety, while Sneglazka, Tashkent ertagisi, Botant, Balatoni rossa, White lady, Demon, Balatoni large varieties germinated 1-2 days earlier than the control option. Also, it was found that these varieties had 47.9 to 63.6 percent higher values than the control option in terms of weight and yield of tubers per bush.

Potato germination of Sarnav, Red scarlet varieties was equal to the control variant.

When the samples of Bozhigaon, №01, №02, №05, №9, №12 were compared with the Pskom variety, it took 15-23 days for 10-75% germination of potato seedlings in the Control Pskom variety. new lines №01, №02, №05, №9, №12 germinated 1-2 days earlier than the control variant. If the number of stems is 0.1 to 0.5 more, and the stem height is 5.2 to 13.3 cm, the total yield is 58.2 than the control Pskom variety; 58,2; 50,0; 54,5; 33,5; 58,2 percent higher than the control option was reflected in the experiments.

## CONCLUSION

To preserve the various samples of the potato collection as a gene pool, 36 varieties of potatoes were planted and studied in the conditions of the Tashkent region in early spring.

Also, when comparing samples of this variety with the local Pskom variety, Evolution, Red Bullet, Romantika, Mikado, Simega, Arizona, Dizera, Arizona, Spunta, Gala, Kuroda, Sneglazka, Tashkent ertagisi, Botant, Balatoni rossa, White lady, Demon, Balatoni saga and in the experiments, the germination, budding, and flowering of seedlings of the new lines №01, №02, №05, №9, №12 were 1-3 days earlier than the control option, the number of stems and the yield of the stem were 40-50% higher than the control option. found its reflection.

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## Use of Soy Flour in a Balanced Diet

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**Abstract:** This article discusses the possibility of using soy flour as a food additive in order to expand the range of finished products and to enrich vegetable fillings with complete proteins containing essential amino acids. It also provides the results of the use of secondary food products, in particular the use of radish leaves, which are thrown into waste, after the use of root crops, both in catering establishments and housewives, although it is rich in vitamins and minerals that are necessary for the human body, which have phytoncidal properties.

**Keywords:** Soy flour, dietary supplement, complete protein, balanced diet, essential amino acids.

### Introduction

Soy is one of the technological plants that seem to be specially created by nature for the benefit of man. It finds exceptionally wide application in the national economy. Very promising is the production of minced meat and fish products of increased nutritional value due to the enrichment of their concentration with milk protein isolates, blood of slaughter animals, soybeans, sunflower, etc. However, there is almost no evidence to enrich the nutritional value of fillings of vegetable origin.

In this regard, the task was set to explore the possibility of using soy flour as a food additive in order to enrich the fillings from vegetable products to increase the protein content and expand the range of finished products. At the same time, special attention is paid to the waste-free use of food products.

A huge number of radish leaves, both in catering establishments and housewives, are thrown into waste after using root crops, although it is rich in vitamins and minerals that are necessary for the human body, especially in early spring. 100 g of radish contains 15-44 mg of ascorbic acid, 0.05 mg of vitamin B1, and the taste and smell of radish are due to the presence of essential oils and glucosides, which have volatile properties. In addition, in order to organize a balanced diet, enrichment of ready-made food products with high-grade proteins containing essential amino acids is of no small importance. It has been established that soy protein in terms of amino acid composition, i.e. in terms of the content of essential amino acids, it may well replace the proteins of meat and eggs.

Soy is also an oil plant (up to 27% oil in seeds), so products from it are very high in calories. A positive feature of soy is the presence of many valuable nutrients in it. It is recognized that such a rich natural complex of protein, fat, carbohydrate, mineral salts and vitamins, as in soy, is not found in other products of plant and animal origin. The proximity of the composition of soy protein to

animal proteins makes this crop especially valuable. At present, soybean production is expanding from year to year, which is associated with the need to solve the protein problem of human nutrition. Such a high rate of soybean production is due not only to the chemical composition, but also to the economic profitability of the crop, which is especially enhanced as a result of a comprehensive study and organization of processing of raw materials on a broad industrial basis. Therefore, it is of particular interest to study the possibility of using radish leaves, soy flour and other additives for nutritional and organoleptic properties of food products. Experimental part. The objects of the study were semi-finished products and ready-made flour culinary products with the fillings "Manti with potatoes" and "Manti with greens".

When developing the recommended recipe, the technological processing carried out by the authors was taken as a basis, allowing you to choose the optimal products for the filling in terms of composition and quantity.

<b>Product name</b>	<b>Manti with potatoes</b>	<b>Manti with greens</b>
	net wt, g	net wt, g
Ingredients for the filling:		
onion	34	34
potato	34	-
Leaf of radish	-	34
carrot	8,4	-
Mutton fat	8,2	8,2
Soy flour	4,1	4,1
Weight of minced meat:	88,7	88,7
Ingredients for the dumpling:		
Wheat flour	47	47
Soy flour	4,7	4,7
Water	23	23
Sour cream	20	20
<b>With sour cream, pcs</b>	<b>160 (3 pcs.)</b>	<b>160 (3 pcs.)</b>

An objective assessment of the quality of finished culinary products is impossible without knowledge of its physical and chemical parameters.

The effect of adding soy on the physicochemical parameters of the studied samples was studied. The results of the study to determine the content of solids and ash in semi-finished products and finished products of prototypes are presented in table 2.

**Table 2**

The content of solids and ash in the studied (experimental) samples of manti with the addition of soy flour

<b>The name of indicators</b>	<b>Manti with potatoes</b>		<b>Manti with greens</b>	
	<b>raw</b>	<b>boiled</b>	<b>raw</b>	<b>boiled</b>
Dry content	35,83	34,04	38,10	36,20
Ash content	1,1630	1,0950	1,1001	0,0580

These tables show that the loss of solids during heat treatment is up to 5%.

There is a decrease in ash during heat treatment in "Manti with potatoes" by 6% and "Manti with greens" by 13%.

The study of the protein content of semi-finished products before after heat treatment revealed that in products with the addition of soy flour, an increase in protein content is observed (table 3).

**Table 3**

Protein composition of the studied samples

The names of samples	Sample	Average amount of protein, %
<b>Manti with potatoes</b>		
Experiment (raw)	1	11,31
Boiled	2	9,52
Control (raw)	3	3,6
Boiled	4	3,12
<b>Manti with greens</b>		
Experiment (raw)	1	11,52
Boiled	2	10,86
Control (raw)	3	4,48
Boiled	4	4,07

**Conclusion.** During heat treatment, the protein content decreases in "Manti with potatoes" from 11.31 to 9.52%, in "Manti with greens" from 11.52 to 10.88%.

In semi-finished products and finished products with the addition of soy flour, there is also an increase in the fat content in "Manti with potatoes" up to 27.50 before heat treatment and 18.1% after heat treatment.

In "Manti with greens" 30.98 to 26.50% after heat treatment.

Analyzing the obtained data, it can be noted that the addition of soy flour in products increases the content of protein and fat. The dynamics of nutrient losses in control and experimental samples is similar.

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## **Prevalence of the Viral Infections Among Calves in Livestock Farms Located in the Samarkand Region of Uzbekistan**

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**Abstract:** The article presents the information of serological studies utilizing the RNGA strategy for the presence of antibodies to the infections of infectious rhinotracheitis, viral diarrhea, rota- and coronavirus infection and parainfluenza-3 in cattle. 473 blood sera from unvaccinated cows and calves under 1 year old from 25 farms within the Samarkand region of the Republic of Uzbekistan were considered. The results of the study showed that there was a wide range of virus positivity among animals, with antibody titers falling between 1.6-53 log<sub>2</sub>. The most common infections observed in animals are caused by rotavirus, resulting in diarrhea, as well as infectious rhinotracheitis. To a lesser extent, animals may also contract coronavirus and parainfluenza-3, with respiratory syncytial infection virus being the least frequent.

**Keywords:** respiratory, gastrointestinal diseases, calves, cows, blood, serum, antibody titer, IHT.

**Introduction.** The wide spread of gastrointestinal and respiratory diseases in young animals causes great damage to agricultural production, hinders the development of animal husbandry, is one of the reasons for the decrease in productivity and breeding qualities of animals, a high percentage of forced slaughter and death, and high costs for treatment and prevention. Gains in sick and recovered animals are reduced by 2-3 times. With further exploitation, recovered animals do not always fully develop the functional activity of the reproductive organs and the mammary gland. Mortality and forced slaughter is from 5 to 50 - 70% of the number of diseased calves [1,2,3,4,5,6].

Diseases of the respiratory tract and gastrointestinal tract of cattle have a large proportion among other diseases - up to 90%. The main percentage of diseases occurs in young animals. The presence of antibodies to the viruses of infectious rhinotracheitis, viral diarrhea, rota- and coronavirus, respiratory syncytial infection and parainfluenza-3 of cattle in the blood sera of adult cattle indicates that the animals had contact with these pathogens during postnatal development. By the presence of antibodies, one can judge the infection of animals in the herd or the circulation of viruses among them [7,8,9,10,11].

**Materials and methods.** To study the presence of antibodies to the viruses of infectious rhinotracheitis, viral diarrhea, parainfluenza-3 rota-, coronavirus and respiratory syncytial infection of cattle, 473 blood serum samples from unvaccinated cows and calves under the age of 1 year from 25 farms of the Samarkand region of the Republic of Uzbekistan were examined.

The work was carried out in the conditions of the Department of Microbiology, Virology and Immunology of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology, as well as in the farms of the Samarkand region of the Republic of Uzbekistan. To study the role of viruses and bacteria in the etiological structure of calf enteritis on the territory of the Republic of Uzbekistan, serological studies of blood sera in the IHT and bacteriological studies of the biomaterial were carried out.

The presence of antibodies was determined in the reaction of indirect hemagglutination (IHT) using erythrocyte diagnosticums, which are bovine erythrocytes sensitized with antigens of the infectious

virus rhinotracheitis, viral diarrhea, rota- and coronavirus infection and parainfluenza-3 with the help of conjugating substances - 0.1% chromium chloride with trypan blue. Diagnosticums were stored in a preservative, which is a 0.3% phenolized isotonic sodium chloride solution with 1% normal rabbit serum for 1 year from the date of manufacture.

IHT is set by diluting the studied blood sera in a Takachi microtiter solvent in a volume of 0.025 ml in dilutions from 1:2 to 1:256.

**Results and discussions.** Table 1 presents data on the determination of antibodies to the viruses of infectious rhinotracheitis, viral diarrhea, rota- and coronavirus infection and parainfluenza-3 in cattle in cows and unvaccinated calves under the age of 1 year.

Tables 1-2 present data on the assessment of seropositivity and the determination of antibodies to the viruses of infectious rhinotracheitis, diarrhea, parainfluenza-3, respiratory syncytial, rota- and coronavirus infection of cattle in cattle.

**Table 1.** Results of determining the seropositivity of animals during monitoring studies of blood sera of cattle from farms in the Samarkand region of the Republic of Uzbekistan

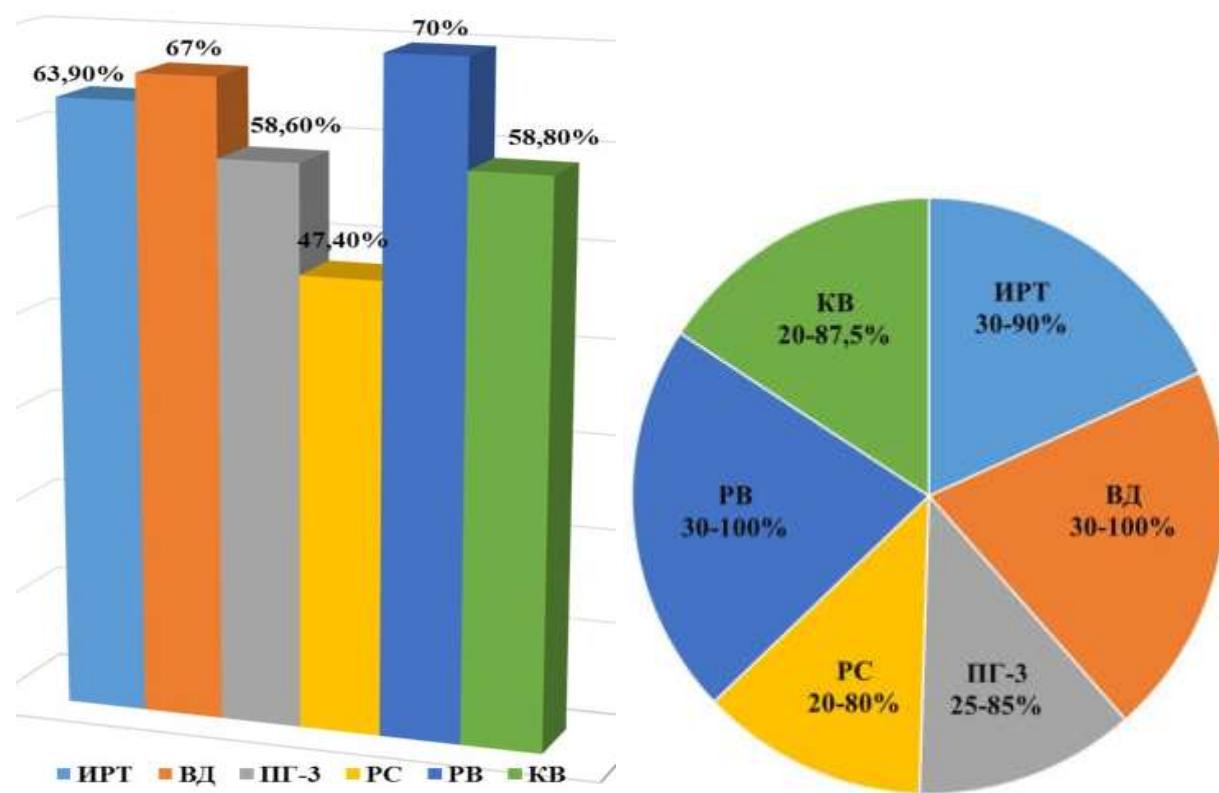
The names of the farms	Number of samples tested	Infectious rhinotracheitis		Viral diarrhea		Parainfluenza -3	
		Number of seropositive calves	%	Number of seropositive calves	%	Number of seropositive calves	%
«Mingtapa zamini»	8	7	87,5	8	100	6	75
.«Omonboy hosili»	20	14	70	15	75	13	65
“Tojnor momo”	20	15	75	18	90	13	65
“AGRO GOLD SPRING”	20	16	80	17	85	14	70
“Olazot”	20	18	90	20	100	17	85
“Nurbuloq musaffo diyor”	20	16	80	17	85	14	70
“Kelajak”	20	14	70	15	75	13	65
“Loish Nurli Kelejak”	20	15	75	18	90	16	80
“Khushvakt Abdullaev”	20	13	65	14	70	12	60
“Markayev Mamur Zamini”	20	14	70	14	70	15	75
“Saypullayev Olimjon Nurli Zamon”	20	11	55	10	50	9	45
“Urgut Nasl Chorva”	20	13	65	11	55	12	60
“Utkir Bodomlari”	11	7	63,6	8	72,7	6	54,5
“Nurli Zamin Qushxona”	20	9	45	8	40	5	40
“Jakbar Mamasoliyev Chorvasi”	10	6	60	6	60	5	50
“Abdurahmon Mardonov chorvasi”	10	4	40	4	40	5	50
“Dutorchi”	20	14	70	13	65	14	70
“Kahramon”	22	9	40,9	8	36,4	7	31,8
“Askar Bakhtiyorovich”	20	14	70	14	70	15	75
“Utkir chorva invest”	20	15	75	18	90	13	65
“K.Eldor”	20	8	40	9	45	7	35
“Obodonchilik”	20	11	55	10	50	9	45
“Azam Azamar Agro”	20	18	90	20	100	17	85
“Akmal Toshpulatovich”	20	6	30	6	30	5	25
“Siyob Shavkat Orzu”	22	11	50	11	50	9	40,9
“Nortoy Shodiyev Baraka chorvasi”	10	5	50	4	40	4	40
Total:	473	303	63,9 ±	316	66,7 ±	275	58,6 ±
			3,2		4,2		3,3

**Table cont'd**

<b>The names of the farms</b>	Number of samples tested	Respiratory syncytial infection		Rotavirus infection		Coronavirus infection	
		Number of seropositive calves	%	Number of seropositive calves	%	Number of seropositive calves	%
«Mingtepa zamini»	8	5	62,5	8	100	7	87,5
«Omonboy hosili»	20	11	55	17	85	14	70
“Tojnor momo”	20	10	50	18	90	15	75
“AGRO GOLD SPRING”	20	12	60	17	85	14	70
“Olazot”	20	16	80	19	95	17	85
“Nurbuloq musaffo diyor”	20	12	60	18	90	15	75
“Kelajak”	20	11	55	16	75	12	60
“Loish nurli kelajak”	20	14	70	17	85	14	70
“Khushvakt Abdullaev”	20	11	55	16	75	14	70
“Markaev Mamur zamini”	20	10	50	14	70	13	65
“Saypullaev Olimjon nurli zamon”	20	8	40	11	55	10	50
“Urgut nasl chorva”	20	9	45	12	60	11	55
“Utkir bodomlari”	11	4	36,4	7	63,6	5	45,5
“Nurli zamin qushxona”	20	5	25	11	55	10	50
“Jakbar Mamasoliev chorvasi”	10	4	40	6	60	4	40
“Abdurahmon Mardonov chorvasi”	10	3	30	5	50	4	40
“Dutorchi”	20	11	55	13	65	12	60
“Kakhramon”	22	8	36,4	11	50	11	50
“Askar Bakhtiyorovich”	20	10	50	14	70	13	65
“Utkir chorva invest”	20	10	50	18	90	15	75
“K.Eldor”	20	6	30	9	45	9	45
“Obodonchilik”	20	8	40	11	55	10	50
“Azam Azamar Agro”	20	16	80	19	95	17	85
“Akmal Toshpulatovich”	20	4	20	6	30	4	20
“Siyob Shavkat orzu”	22	8	36,4	10	50	9	40,9
“Nortoy Shodihev Baraka chorvasi”	10	2	20	7	70	3	30
Total:	473	228	47,4±	330	69,8±	282	58,8±
			3,2		3,6		3,4

Table 1 shows that in the farms ".Olazot", "Azam Azamar Agro" 90% of the animals were seropositive for infectious rhinotracheitis virus and 87.5% of "Mingtepa zamini". 80% AGRO GOLD SPRING, Nurbulok Musaffo Diyor, 75% Tojnor Momo, Loish Nurli Kelajak, Utkir Chorva Invest, 70% Omonboy Khosili, Markaev Mamur Zamini, Dutorchi, Askar Bakhtierovich. In other farms, 30-65% of animals were seropositive for RTI.

100% of animals, Tojnor momo, Loish Nurli Kelajak, Utkir Chorva Invest, 90% of animals, AGRO GOLD SPRING, "Nurbulok Musaffo Diyor" 85%, "Omonboy Khosili", "Kelajak", "Khushvakt Abdullayev", "Markaev Mamur Zamini", "Utkir Bodomlari", "Askar Bakhtierovich" 70-75%, and in other farms 30-65% animals.



**Diagram 1-2.** The etiological structure of viral pathogens pneumoenteritis in the Samarkand region of the Republic of Uzbekistan

To the parainfluenza-3 virus, 75-85% of the animals were seropositive in the farms "Mingtapa Zamini", "Olazot", "Loish Nurli Kelajak", "Markaev Mamur Zamini", "Askar Bakhtiyerovich", "Azam Azamar Agro". 60-70% of animals in the farms "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Nurbulok Musaffo Diyor", "Kelazhak", "Khushvakt Abdullaev", "Urgut Nasil Chorva", "Dutorchi", "Utkir Chorva Invest". In other farms, 25-54.5% of animals were seropositive.

100% of animals were seropositive to the respiratory syncytial infection virus in the farms "Olazot", "Azam Azamar Agro", "Loish Nurli Kelajak", "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Nurbulok Musaffo Diyor", "Kelazhak", "Khushvakt Abdullaev", "Markaev Mamur Zamini", "Dutorchi", "Utkir Chorva Invest" 50-62.5% of animals. In other farms, 20-40% of animals were seropositive.

To the rotavirus infection, 100% of the animals were seropositive in the farm "Mingtapa Zamini", 85-95% of the animals in the farms Olazot", "Azam Azamar Agro", "Loish Nurli Kelajak", "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Nurbulok Musaffo Diyor", "Utkir Chorva Invest", 50-75% of animals in farms "Kelajak", "Khushvakt Abdullaev", "Markaev Mamur Zamini", "Dutorchi", "Kakhramon", "Askar Bakhtiyerovich", "Utkir chorva invest", "Saipullaev Olimjon nurli zamon", "Urgut nasil chorva",

Table 2. The level of average antibody titers during monitoring studies of blood sera of cattle from farms in the Samarkand region of the Republic of Uzbekistan (log2)

The names of the farms	Number of samples tested	Infectious rhinotracheitis	Viral diarrhea	Parainfluenza -3
««Mingtapa zamini»	8	4,3	5,3	4,5
«Omonboy hosili»	20	4,8	5,0	4,2
“Tojnor momo”	20	4,6	5,2	4,4

“AGRO GOLD SPRING”	20	3,8	4,2	4,0
“Olazot”	20	4,0	4,4	4,2
“Nurbuloq musaffo diyor”	20	3,8	4,0	3,6
“Kelajak”	20	3,8	4,0	3,6
“Loish nurli kelajak”	20	4,2	4,2	3,8
“Khushvakt Abdullaev”	20	4,4	4,6	4,0
“Markaev Mamur zamini”	20	3,8	4,0	3,6
“Saypullayev Olimjon nurli zamon”	20	4,2	4,4	4,0
“Urgut Nasl chorva”	20	3,6	4,0	4,0
“Utkir bodomlari”	11	3,8	3,8	3,6
“Nurli zamin Qushxona”	20	4,4	4,2	4,0
“Jakbar Mamasoliev chorvasi”	10	4,0	4,0	3,8
“Abdurahmon Mardonov chorvasi”	10	4,2	4,2	3,8
“Dutorchi”	20	3,8	3,8	3,4
“Kakhramon”	22	2,8	3,0	2,8
“Askar Bakhtiyorovich”	20	3,8	3,6	3,2
“Utkir chorva invest”	20	4,4	4,8	4,0
“K.Eldor”	20	3,2	3,4	2,8
“Obodonchilik”	20	4,4	4,6	4,0
“Azam Azamar Agro”	20	4,6	4,6	4,0
“Akmal Toshpulatovich”	20	2,8	2,6	2,4
“Siyob Shavkat Orzu”	22	4,0	3,8	3,2
“Nortoy Shodiyev Baraka”	10	2,8	2,8	2,4
Total:	473	3,9±0,11	4,1±0,13	3,7±0,11

Table cont'd

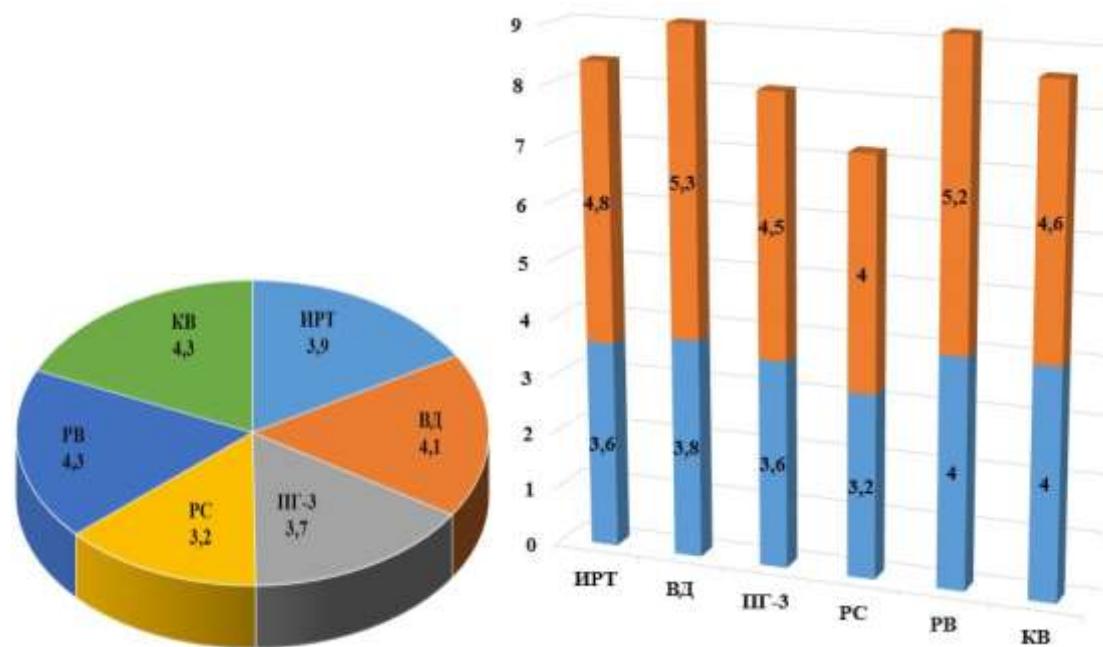
The names of the farms	Number of samples tested	Respiratory syncytial infection	Rotavirus infection	Coronavirus infection
«Mingtepa zамиni»	8	3,3	4,7	4,3
«Omonboy hosili»	20	3,6	4,2	4,0
“Tojnor momo”	20	4,0	5,2	4,4
“AGRO GOLD SPRING”	20	3,6	4,6	4,0
“Olazot”	20	3,8	5,0	4,6
“Nurbuloq musaffo diyor”	20	3,2	4,2	4,2
“Kelajak”	20	3,2	4,0	4,0
“Loish nurli kelajak”	20	3,4	4,8	4,4
“Khushvakt Abdullaev”	20	3,4	4,6	4,4
“Markaev Mamur zamini”	20	3,2	4,2	4,0
“Saypullayev Olimjon nurli zamon”	20	3,8	4,4	4,4
“Urgut nasl chorva”	20	3,2	4,6	4,6
“Utkir bodomlari”	11	3,4	4,0	4,0
“Nurli zamin qushxona”	20	4,0	4,6	4,2
“Jakbar Mamasoliev chorvasi”	10	3,0	4,4	4,2
“Abdurahmon Mardonov chorvasi”	10	3,2	4,6	4,0
“Dutorchi”	20	3,2	4,6	4,6
“Kakhramon”	22	1,6	3,8	3,6
“Askar Bakhtiyorovich”	20	2,8	3,8	3,6
“Utkir chorva invest”	20	3,6	4,2	4,2
“K.Eldor”	20	2,4	3,8	3,2
“Obodonchilik”	20	3,8	4,8	4,4
“Azam Azamar Agro”	20	3,2	5,0	4,8
“Akmal Toshpulatovich”	20	1,8	3,2	3,0
“Siyob Shavkat Orzu”	22	2,8	4,0	3,8
“Nortoy Shodiyev Baraka chorva”	10	1,6	3,6	3,2
Total:	473	3,2±0,13	4,3±0,09	4,1±0,09

"Utkir bodomlari", "Nurli zamin kushkhona", "Jakbar Mamasoliev chorvasi", "Abdurakhmon Mardonov chorvasi", "Obodonchilik", "Siyob Shavkat Orzu "Northoy Shodiev baraka chorvasi". 45% of animals in the farm "K. Eldor" and 30% "Akmal Toshpulatovich".

To the coronavirus infection virus from 25 farms in Samarkand region in 10 farms - "Mingtapa Zamini", "Omonboy Khosili", "Tozhnor Momo", "AGRO GOLD SPRING", "Olazot", "Nurbulok Musaffo Diyor", "Khushvakt Abdullaev", "Markaev Mamur Zamini", "Askar Bakhtiyerovich", "Utkir Chorva Invest" 70-87.5% of animals were seropositive, in 8 farms - "Kelazhak", "Markaev Mamur zamini", "Saipullaev Olimjon nurli zamon", "Urgut nasil chorva", "Nurli zamin kushkhona", "Dutorchi", "Kahramon", "Askar Bakhtiyerovich", "Obodonchilik" 50 -65% of animals, in 7 farms - "Utkir Bodomlari", "Zhakbar Mamasoliyev Chorvasi", "Abdurahmon Mardonov Chorvasi", "K.Eldor", "Akmal Toshpulatovich", "Siyob Shavkat Orzu", "Nortoy Shodiev baraka Chorvasi" 20 - 45.5% of animals.

When analyzing the results of Table 1, it can be seen that out of 473 studied blood sera of cows of calves under one year old with erythrocyte diagnosticums, antibodies to the infectious rhinotracheitis virus were detected in 63.9% of the examined animals, to the diarrhea virus - 66.7%, parainfluenza-3 - 58.6 %, respiratory syncytial virus - 47.4%, rotaviruses - 69.8%, coronaviruses - 58.8% (diagram 1).

Analysis of the study of the etiological structure of pathogens of viral pneumoenteritis in cattle in the farms of the Samarkand region shows that infectious rhinotracheitis in cows and calves was recorded from 30% to 90% of the examined animals, viral diarrhea - from 30% to 100%, pararipp-3 - from 25 % to 85%, respiratory syncytial infection - from 20% to 80%, rotavirus infection - from 30% to 100%, coronavirus infection - 20% to 87.5% of the examined animals (diagram 2).



**Diagram 3-4.** The level of average antibody titers during monitoring studies of blood sera of cattle from farms in the Samarkand region of the Republic of Uzbekistan (log2)

In 25 farms, antibody titers (table 2) to infectious rhinotracheitis virus were at the level of 2.8-4.8 log2.; diarrhea 2.8-5.3 log2.; parainfluenza-3 2.4-4.5 log2.; respiratory syncytial infection -1.6-4.5 log2; rotavirus infection 3.2-5.0 log2.; coronavirus infection 3.0-4.8 log2.

According to the results of studies of 473 blood serum samples from animals from 25 farms of the Samarkand region of the Republic of Uzbekistan, the average titer for infectious rhinotracheitis virus was - 3.9 log2, for viral diarrhea 4.1 log2, for parainfluenza-3 - 3.7 log2, respiratory syncytial infections -3.2 log2, rotaviruses - 4.3 log2, coronaviruses - 4.1 log2.

**Conclusion.** The results of a survey of livestock farms in the Samarkand region indicate that all animals are infected with infectious rhinotracheitis, parainfluenza-3, diarrhea, rota-, corona-, respiratory syncytial viruses of cattle, calves have been ill with pneumoenteritis, in the etiological structure of which infectious rhinotracheitis viruses play a large role, parainfluenza-3, diarrhea, rota-, corona-, respiratory syncytial viruses.

Animals are predominantly infected with rotavirus infection, diarrhea, infectious rhinotracheitis, to a lesser extent - with coronavirus, parainfluenza-3 virus, and slightly - with respiratory syncytial infection.

Such a wide distribution of pathogens of these diseases indicates the re-infection of newborn calves even in the early prenatal period of development. This leads to massive outbreaks of pneumoenteritis in calves.

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## Genetic Testing of Sheep for Prolactin (PRL) Gene

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**Annotation:** Modern breeding methods are aimed at searching for molecular genetic markers that interact with economically useful traits. One of the main characteristics of markers is polymorphism, which is a change in the nucleotide sequence in the DNA molecule caused by various mutations. Its manifestation is the allelic spectrum. The PCR-RFLP method is considered the standard point mutation analysis for the diagnosis of allelic polymorphism of candidate genes. One of the promising genes that are considered markers of sheep productivity is the prolactin (PRL) gene.

**Keywords:** DNA marker, milk, gene, protein, polymorphism, genotype, sheep, allele, prolactin, casein, texel, prekos, karakul sheep, test.

### Introduction

An important place in animal husbandry is occupied by DNA technologies in a number of promising methods used in the study of productivity.

At present, a number of DNA markers have been identified for the development of quantitative and qualitative traits in farm animals that affect meat and dairy productivity. The prospect of selection with the use of markers (Marker Assisted Selection, MAS) is that they are stable in ontogeny, are determined at an early age, which is very important, independent of environmental conditions, their determination does not require large expenditures, but at the same time the quality of breeding is significantly improved. process and improve its efficiency. An important characteristic of markers is polymorphism, which is a change in the nucleotide sequence of the DNA marker due to various types of mutations, its manifestations are the allelic spectrum.

The protein composition of sheep's milk has not been studied enough or is presented even to a lesser extent than milkiness. There are only reports on the content of complex proteins in sheep milk such as total protein, casein and whey protein, as well as on the genetic polymorphism of some protein fractions.

Recently, however, up to 20 different protein components have been found in milk (Tepel A., 1979; Gorbatova K.K., 2001), but they were found mainly in cow's milk (Kharetdinov R.A., Gataullin AM, 2000).

Currently, the physicochemical and technological properties of milk are being studied depending on its protein composition and genetic polymorphism of proteins. These studies will be applied when using sheep's milk as a raw material for the dairy industry. In countries where, due to natural and climatic conditions, the breeding of dairy cattle is associated with great difficulties, the only source

of milk production is dairy sheep and goat breeding (Mills O., 1989). These livestock industries are intensively developing in Iraq, Iran, Pakistan and some Mediterranean countries (Italy, Spain, France, Greece, Portugal), are important in the agricultural economy of the Caucasian countries of the CIS (Azerbaijan, Armenia, Georgia), as well as the North Caucasian republics of Russia (Dagestan, North Ossetia, Alania).

Research in sheep breeding is aimed on the use of the genetic potential of sheep in milk production. Selection based on genetic markers of productivity is aimed at working with animals with a high genetic potential for live weight gain and milk yield.

PRL and  $\beta$ -LG genes are promising marker genes associated with milk production traits.

Improvement of the breed, based on a more complete assessment of the genotype of animals using marker technologies, using hereditary protein polymorphism. A change in the frequency of a certain allele, type of protein or blood group during selection in the herd may indicate a relationship between immunogenetic properties and productivity [1]. This made it possible to use marker genes in practical breeding [2]. For example, in the Karakul breed, it was found that the AA genotype for  $\beta$ -Lg affects milk productivity: individuals with this genotype produce more milk compared to other genotypes [3]. According to other studies, milk from sheep with a heterozygous AB genotype is better suited for cheese production [4]. For the production of cheese, the kCn protein, type B, is a priority [5].

The PRL gene is located on chromosome 20; the PRLA and PRLB alleles differ in position at amino acid 38 (His/Tyr). The gene is responsible for the production of protein and lactose in milk, encodes the enzyme prolactin, which plays an important role in the development of the mammary gland and milk secretion [7,8]

The sheep genome was sequenced in 2012 (The International Sheep Genomics Consortium et al., 2010). The combination of the decoded genome with a high-density SNP-chip makes it possible to discover significant genetic polymorphism in meat and dairy productivity.

The foregoing predetermined the purpose of the present research and served as the basis for the study of gene polymorphism, PRL, in the  $\alpha$ -casein gene (CSN1S1).

**Materials and methods.** The studies were carried out during 2020-2021 at the KSUP "Khvinevichi" of the Republic of Belarus in the Republic of Belarus and at the farm "Nurabad Keng Dalasi" of the Republic of Uzbekistan.

The analysis was carried out in the DNA laboratory of the Grodno State Agrarian University. The experiment was carried out on a population of sheep of the Karakul breed of sheep (10), prekos (10), texel (10).

Modern breeding methods are aimed at searching for molecular genetic markers that interact with economically useful traits. One of the main characteristics of markers is polymorphism, which is a change in the nucleotide sequence in the DNA molecule caused by various mutations. Its manifestation is the allelic spectrum [3, 4]. The PCR-RFLP method is considered the standard point mutation analysis for the diagnosis of allelic polymorphism of candidate genes [4]. Some of the promising genes considered markers of sheep productivity are prolactin (PRL), beta-lactoglobulin ( $\beta$ -LG) genes.

### Detection of the received results

Restriction fragments are analyzed by gel electrophoresis (on a 2-4% agarose gel stained with ethidium bromide at a voltage of 120-140V for 30-60 min) followed by visualization on the GelDoc XR+, BIORAD gel-documentation system.

Genetic and statistical analysis of the obtained results was carried out using formulas. Calculation of the frequency of occurrence of genotypes was determined by the formula:  $p = n/N$ , where  $p$  is the frequency of a certain genotype,  $n$  is the number of animals with a certain genotype,  $N$  is the total number of animals. WITH

The calculation of the frequency of occurrence of alleles was carried out according to the formula:  $P(A) = 2N_1 + N_2 / 2n$ , where P is the allele frequency; A - allele; N1 is the number of homozygotes for the studied allele; N2 is the number of heterozygotes; n is the sample size of animals. (9.10)

The allele frequency (for two-allelic systems) was determined by formulas (1), (2).

$$P(A) = (2AA + AB) / 2n, \quad (1)$$

$$q(B) = (2BB + AB) / 2n, \quad (2)$$

where P (A) is the frequency of allele A;

AA, BB are the number of individuals with a homozygous genotype;

AB is the number of individuals with a heterozygous genotype;

n is the number of individuals in groups;

q(B) is the B allele frequency.

The determination of genetic balance was carried out using the  $\chi^2$  test, according to the law

Hardy-Weinberg, according to the formula (3):

$$\chi^2 = (\Phi - T)^2 / T, \quad (3)$$

**Results and its discussion.** Prolactin proteinaceous hormone produced by specialized cells anterior lobe pituitary gland vertebrates.

The PRL gene is located on chromosome 20; the PRLA and PRLB alleles differ in position at amino acid 38 (His/Tyr). The gene is responsible for the production of protein and lactose in milk and encodes the prolactin enzyme, which plays an important role in the development of the mammary gland and milk secretion [7,8].

### ***Sheep genotyping for the prolactin gene (PRL)***

The following primers were used to amplify the prolactin gene fragment:

- for - 5' ACCTCTCTCGGAAATGTTCA – 3'
- rev – 5' CTGTTGGGCTTGCTCTTGTC – 3'.

PRL: PCR program "hot start" - 3 min at 95°C; 30 cycles: denaturation - 1 min. at 940C, annealing - 2 min. at 580C, synthesis - 2 min. at 720C; completion - 5 min at 720C.

HaeIII endonuclease was used to restrict the amplified region of the PRLR gene. 2 µl. buffer for restriction enzymes, 1 µl. endonuclease HaeIII, 2 µl. H2O. The reaction was carried out at a temperature of 37°C.

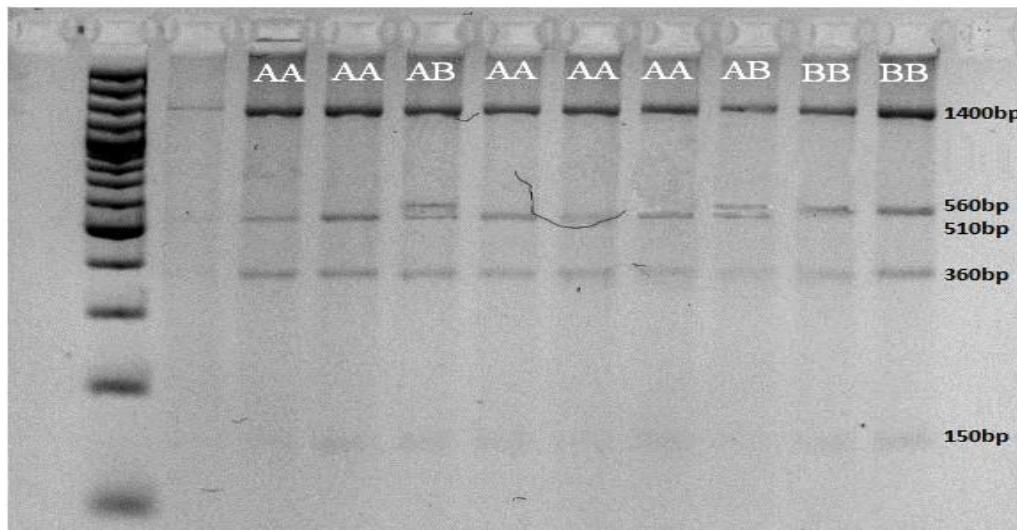
Restriction gene products were separated electrophoretically in a 2% agarose gel (at 130 V) in TBE buffer under UV light using ethidium bromide on a GelDocRX+ (BIORAD) gel-documentation system.

Digestion of amplification products with HaeIII restriction enzyme at 370C identified the following genotypes.

- PRL AA - 1400 b.p., 510 b.p. 360 bp 150 bp
- PRLAB - 1400 b.p., 530 b.p., 510 b.p. 360 bp 150 bp;
- PRLBB – 1400 b.p., 530 b.p., 360 b.p. 150 bp.

Analysis of polymorphism of prolactin genes revealed the presence of two alleles - PRLA and PRLB and three genotypes, homozygous (PRLAA, PRLBB;) and heterozygous (PRLAB) (Table 1)

Electrophoregram of PCR-RFLP prolactin (PRL) result



**Picture 1. Electrophoretic analysis of restriction products, when determining the prolactin genotype**

**Table 1 Occurrence of alleles and genotypes of PRL- gene in sheep**

Index	n	Genotype frequency						Allele frequency		$\chi^2$	
		AA		AB		BB					
		n	%	n	%	n	%	A	IN		
<b>Texel</b>											
O	10	7	70.0	1	10.0	2	20.0	0.75	0.25	1.8	
E		5	50	2.5	25	2.5	25				
<b>Prekos</b>											
O	10	4	40.0	3	30.0	3	30.0	0.55	0.45	1.81	
E		4.5	45	1.5	15	4	40				
<b>Karakulskaya</b>											
O	10	4	40.0	6	60.0	-	-	0.70	0.30	2.75	
E		6.5	60	3.5	20	-	-				

O- actually observed indicator, E - theoretically expected indicator

Prolactin polymorphism is characterized by a high (0.75) concentration of the A allele in the Texel and Karakul breeds (0.70), an average concentration in the Prekos (0.55) PRLA and a low (0.25) PRLB allele in the Texels and Karakul breeds, which found reflected in the presence of homo- and heterozygous genotypes: PRLAA - 7 (70.0%) in texels, 6 (60.0%) karakul, 4 (40%) prekos. PRLBB - 2 (20%) in texels and 3 (30.0%) preskews, absent in Karakul.; PRLAB - texels 1 (10.0%), precuts 3 (30.0%) and karakul 6 (60.0%).

Homozygous individuals with the BB genotype were not found, which is due to the genotypes of the ancestors of Karakul sheep.

In the group of Karakul sheep, the B-allele was found only in heterozygotes. This frequency distribution is likely due to homozygotization predominantly for one allele and may lead to the loss of a gene variant.

In our studies, two alleles A and B were found in sheep of the Karakul breed with frequencies of 0.80 and 0.020, respectively, and the homozygous AA genotype is more common (60%).

Indicators  $\chi$  (1.8 - 2.75) indicate the genetic balance in the studied animal population.

As a result of the PCR-RFLP study, the breed characteristics of the polymorphism of the allelic spectrum of the PRL genes of sheep of the Texel, Prekos and Karakul breeds were established.

The obtained data can be used as a genetic characteristic of the sheep population of this breed, as well as find application in selection and breeding work aimed at preserving genetic diversity.

## Conclusion

As a result of the study, the PCR-RFLP method established the breed characteristics of the polymorphism of the allelic spectrum of genes, PRL sheep breeds texel, prekos, karakul. The data obtained can be used as a genetic characteristic of the population of sheep of this breed, as well as find application in selection and breeding work aimed at preserving genetic diversity.

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## Effect of Innoprovet Probiotic on Live Weight Indications of Rabbits

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**Annotation:** In this article research the effective effect of Innoprovet probiotic on growth and development performance of young Californian rabbits. The obtained results were processed in Microsoft Office Excel 2007 computer program by mathematical statistical methods and biometrically processed.

**Keywords:** Rabbit breeding, probiotic, innoprovet, growth, development, rabbit, Californian breed, measurement, scales.

**Actuality.** Mamlakatimizda chorvachilik qishloq xo‘jaligining yetakchi tarmoqlaridan biri hisoblanib, aholini oziq-ovqat mahsulotlari bilan ta’minlashda alohida o‘rin kasb etadi. Animal husbandry is considered one of the leading branches of agriculture in our country and occupies a special place in providing the population with food products.

Quyonchilik chorvachilikning tez yetiluvchan va sermahsul tarmoqlaridan biri hisoblanadi. Rabbit breeding is one of the fastest growing and productive branches of animal husbandry. The quality and quantity of the product grown in rabbit farming depends primarily on the conditions of keeping rabbits based on proper rational feeding and zoohygienic standard requirements, breeding work, and endogenous and exogenous factors of the external environment. In addition, increasing the number of rabbits in our country, in the process of breeding them from the time of birth to the period when they are able to eat independently, proper care, systematic rational feeding and effective use of man-made factors. is of great practical importance. Because newborn rabbits are born in a wet state with closed eyes, without wool and very thin. Newborn rabbits grow and develop very intensively in the first days of their life. The main reason for this is that the milk of mother rabbits is rich in valuable nutrients. Mother rabbit milk contains 26,5 % dry matter, 11,5 % protein, 11,9 % fat and 1,5 % ash.

Probiotics are live microorganisms that provide significant positive benefits when administered in sufficient amounts. The use of useful probiotics in the process of feeding rabbits stimulates their digestion, creates unfavorable conditions for pathogenic microorganisms in the digestive organs, and changes the pH environment. Strengthens the intestinal barrier functions and changes the toxins produced by pathogens. Probiotics are also called biologically active supplements containing microorganisms. Russian scientist Ilya Mechnikov was one of the first to learn about the benefits of probiotics. I. Mechnikov found that bacteria that produce lactic acid inhibit the activity of putrefactive bacteria. Based on this, I. Mechnikov recommended that lactic acid bacteria can be used for health purposes. The term probiotic appeared later in the 1980s. In Russia, probiotics are controlled under GOST 52349-2005 and are included among functional food ingredients whose

benefits have been scientifically proven. Probiotics live in symbiosis with gastrointestinal microorganisms, produce enzymes that digest food and enhance their absorption, increase animal productivity, and increase their immune status to infectious diseases. Probiotics not only normalize the qualitative and quantitative composition of intestinal microflora after the use of antibacterial agents, in most cases they are an effective method of treatment, prevention and increase of productivity of farm animals.

**The purpose of the study.** Determining the effect of Innoprovet probiotic on the growth and development indicators of young California rabbits of the experimental breed, which are kept at the farm of O. Qurbanova, located in the Pastdargom district of the Samarkand region.

**Material and methodology.** Experiments were carried out on rabbits belonging to the California breed, which are kept in the house of O. Qurbanova, located in the Pastdargom district of the Samarkand region. In the experiment, the body mass of the offspring taken from the mother rabbits that gave birth was measured from the time of birth until they began to feed independently (21 days) on a special SF-400 ( $10\pm1$ g) brand electronic scale, from 30 days to 120 days of age. Live weight indicators during the period were measured by weighing on Aote scale ( $10\pm5$ g). As a result of the measurements, indicators such as the average live weight of rabbits in the experiment  $\bar{X}$ , the coefficient of variation  $Cv\%$ , and the error of the average arithmetic value ( $S\bar{X}$ ) were determined. During the experiment, the amount of food and water (probiotic) used for each rabbit was accurately calculated. Innoprovet probiotic was used as follows: 1 g of powdered probiotic was dissolved in 100 ml of boiled water. After that, we prepared a 1:1000 ratio solution by putting the prepared primary probiotic solution on 900 ml of boiled and warmed water, and put the finished solution in 100 ml bottles designed for drinking water specially prepared for rabbit children. The obtained digital data were biometrically processed using the Microsoft Office Excel 2007 computer program.



*Innoprovet probiotic administration and measurements to experimental rabbits.*

The baby rabbits were separated at one month of age. In order to study the effect of young rabbits separated from their mothers on the growth and development indicators, 2 groups were formed to test the effectiveness of Innoprovet probiotics obtained as part of the innovative project number PZ-2020123121 implemented at SSUV. Group 1 was the experimental group ( $n=10$ ) and group 2 was the control group ( $n=10$ ). Both groups were fed with 1 different type of pelleted feeding method. Innoprovet probiotic was added to the water of rabbits in the experimental group at a ratio of 1:1000. The control group was not given probiotics.

**Research results.** Growth rates of young California rabbits in the experiment are presented in Table 1 below. The results of the conducted scientific studies showed that young rabbits show the highest growth and development indicators from the age of 30 days to the age of 90 days. That is, the live weight of rabbits in the experimental group significantly differed from the live weight of rabbits in

the control group that did not receive the innoprovet probiotic. These differences can be seen from the table below.

**Table 1. Effect of probiotic on growth performance of rabbits. (n=10)**

<b>Age, day</b>	<b>Control group</b>			<b>Experimental group</b>		
	<b><math>\bar{X} \pm S_{\bar{X}}</math></b>	<b>C<sub>v</sub> %</b>	<b>lim</b>	<b><math>\bar{X} \pm S_{\bar{X}}</math></b>	<b>C<sub>v</sub> %</b>	<b>lim</b>
<b>Newborn</b>	50,5±1,89	11,8	40-60	49,5±2,29	14,63	35-60
<b>7</b>	104±3,05	9,29	90-120	108±3,67	10,73	95-130
<b>10</b>	134±6,99	16,5	105-165	163,5±7,4	14,3	135-210
<b>15</b>	167±6,11	11,55	140-195	192,5±6,51	10,7	170-230
<b>21</b>	260±11,65	14,16	210-320	301,5±6,33	6,64	270-330
Probiotic Innoprovet (-)				Probiotic Innoprovet (+)		
<b>30</b>	391,8±14,07	11,92	315-470	471,7±	14,3	325-540
<b>45</b>	927,0±21,8	7,44	860-1005	1016±1,57	4,97	960-1200
<b>60</b>	1460,0±29,7	6,43	1300-1580	1676±44,9	8,47	1880-1400
<b>90</b>	2485,5±44,83	4,98	2300-2780	2940±53,67	5,77	2650-3200
<b>120</b>	2977±39,27	4,17	2820-3200	3265±80,7	7,81	2900-3650

For example, the live birth weight of rabbits in the experimental group was 49,5 g, while this indicator was 50,5 g in the control group. Almost no significant differences were observed between the two groups. By the age of 7-10-15-21 days, rabbit children in the control group gained 104, 134, 167, 260 g and in the experimental group 108, 163,5; 192,5; 301,5 g, the difference between the groups is 3.8 in favor of the experimental group; 22,0; 15,27 and 15,96 % or 4 respectively; 29,5; 25,5 and 41,5 g more.

At the age of 30 days, the average live weight of rabbits in the experimental group was 471.7 g, and according to this indicator, it was 79.9 g or 20.4% more than the live weight of rabbits in the control group. At the age of 45 days, the average live weight of rabbits in the experimental group was 1016.0 g, and according to this indicator, it was 89 g or 9.6% more than the live weight of rabbits in the control group. The average live weight of rabbits in the experimental group at the age of 60, 90 and 120 days is 1676; 2940; It was observed that the live weight of rabbits in the control group was 3265 g.

As can be seen from the data in the table above, the live weight indicators of rabbits in the experimental group using Innoprovit probiotic in terms of growth and development indicators in the 45-60-90-120-day period are respectively 89; 216; 454.5 and 288 g or 9.6; 14.8; 18.3 and 9.67 percent prevailed. This means that the growth and development in the experimental group of rabbits was relatively good as a result of the effective effect of the Innoprovet probiotic.

**Conclusions.** Newborn rabbits are very fragile in the early stages of their lives, and until the young rabbits are three weeks old, a number of biological and physiological changes take place in their bodies, that is, when the young rabbits reach the age of one week, their bodies are covered with fluffy wool. it is covered, its eyes open at the age of ten or twelve days, when it reaches the age of fifteen days, 16 milk teeth are replaced by permanent teeth, by the age of three weeks it leaves the nest and begins to feed itself. The use of innoprovet probiotic, which we used in the growth and development of California rabbits, will be more effective in other rabbit breeds. By using this probiotic, it is possible to increase the number of useful microorganisms living in a symbiotic state in the digestive organs of rabbits and accelerate their activity.

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