STUDY OF THE SPECIES COMPOSITION OF SHRUB PLANTS IN THE TERRITORY OF SEMEY CITY AND ASSESSMENT OF THEIR ECOLOGICAL STATUS

The article presents the results of a study on the species composition of shrub plants in the territory of Semey. During the research, the main shrub species distributed across the region were identified, and their distribution patterns, ecological condition, and the impact of anthropogenic factors were evaluated.

The study examined shrub species across different functional zones of the city, including residential areas, roadsides, parks, industrial zones, and riverbank areas. Their biological characteristics and distribution density were analyzed. The floristic study revealed the proportion of native and introduced species in the area.

The ecological condition of the shrub plants was assessed based on morphological indicators, life forms, canopy density, and resistance to anthropogenic pressures. In addition, the effects of transport activity, industrial pollution, soil degradation, and urbanization processes were considered.

The results of the study provide insight into the current state of biodiversity within the urban ecosystem and allow for the development of measures for effective planning and protection of green areas. The data obtained can serve as a scientific basis for improving urban ecological monitoring, rational management of natural resources, and developing practical recommendations aimed at enhancing the ecological sustainability of the urban environment.

Key words: *shrub plants, species composition, biodiversity, ecological condition, anthropogenic impact.*

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THE YIELD OF TOMATOES DEPENDING ON THE METHOD OF PLANT FORMATION

Abstract*: The method of tomato plant formation is one of the most important agrotechnical practices that directly affects crop yield, fruit quality, and overall plant performance. Monitoring the growth and development of tomato plants is a key component of modern vegetable cultivation technologies. Proper plant formation helps regulate vegetative growth, ensures balanced assimilation of nutrients, and improves the fruiting process. According to A. Borisov and O. Ganichkin, plant formation is a major factor controlling the development, productivity, and quality of tomato plants. Correctly formed plants develop a strong root system, efficiently utilize available nutrients, and maintain optimal canopy structure for better air circulation and light penetration, creating favorable conditions for flowering, fruit set, and ripening.*

Tomato plants can be formed using different techniques, such as maintaining a single main stem, two stems, or selective retention of lateral shoots, each of which can significantly influence plant growth

dynamics, yield, and fruit characteristics. This study aimed to evaluate the effect of various plant formation methods on determinant tomato varieties grown under the soil and climatic conditions of the Irtysh region. Over a three-year period (2023–2025), the impact of four formation techniques on yield, fruit weight, dry matter content, and nitrate accumulation was assessed for two early-ripening determinant varieties, Ranniy-83 and Dubrava.

The results showed that both variety and formation method significantly affected tomato productivity and fruit quality. Among the tested techniques, the selective retention of a single lateral shoot under the first flower cluster (second main stem pruning) provided the highest yields and improved fruit weight for both varieties. Fruits from pruned plants also exhibited higher uniformity and quality, while nitrate levels remained below permissible limits in all experimental variants.

***Key words**: tomato, tomato varieties, plant formation, yield, fruit quality, early ripening, determinant tomato.*

Introduction

Tomato (*Solanum lycopersicum L.*) is one of the most important vegetable crops worldwide, occupying a leading position in both open-field and protected cultivation systems. Its significance is due to the high nutritional and biological value of its fruits, which contain vitamins (A, C, and group B), sugars, organic acids, and antioxidants, particularly lycopene, known for its beneficial effects on human health. Due to these qualities, tomatoes are widely consumed both fresh and in processed forms, making them a key component of human nutrition and the food industry [1-2].

In the Russian Federation and neighboring regions, tomato production plays a crucial role in ensuring food security. However, the level of self-sufficiency in tomato production remains insufficient, especially in regions with temperate and continental climates. Areas such as the Irtysh region are characterized by relatively short growing seasons, unstable weather conditions, and limited heat resources, which significantly constrain the realization of the crop's biological potential. Under such conditions, increasing tomato productivity depends not only on the selection of adapted varieties but also on the improvement of cultivation technologies.

In recent years, particular attention has been paid to the development of resource-saving and environmentally sustainable agricultural practices. One of the most promising approaches is the optimization of plant architecture through appropriate formation techniques. Unlike intensive input-based methods, plant formation does not require significant additional costs but can substantially increase yield and improve fruit quality by regulating internal physiological processes within the plant [2-4].

Among the various agronomic practices, plant formation is considered one of the most important factors influencing tomato growth, development, yield, and fruit quality. Plant formation involves regulating the structure of the plant by removing excess lateral shoots (suckers) and controlling the number of stems. This practice allows for the optimization of the balance between vegetative and generative growth, ensuring more efficient distribution of assimilates toward fruit formation.

Proper plant formation contributes to improved light penetration within the plant canopy, better air circulation, and reduced humidity, which in turn decreases the risk of fungal diseases. Additionally, it enhances nutrient use efficiency and promotes earlier and more uniform fruit ripening. These factors are particularly important under open-field conditions, where environmental factors cannot be fully controlled [5].

Another important aspect is the relationship between plant formation and planting density. In conditions of limited heat and moisture, excessive vegetative growth may lead to shading and competition for resources, ultimately reducing productivity. Proper pruning and shoot regulation help maintain an optimal leaf area index and improve the microclimate within the crop canopy, thereby enhancing photosynthetic activity and fruit development.

Numerous studies have shown that different plant formation methods can lead to significant variations in productivity. For example, growing plants in a single stem often accelerates fruit ripening and improves fruit size, while leaving additional lateral shoots may increase the total number of fruits but can delay ripening and reduce uniformity. At the same time, excessive removal of shoots may limit the photosynthetic capacity of the plant, negatively affecting overall yield. Therefore, determining the optimal balance between shoot removal and retention remains a key issue in tomato cultivation [6-8].

This issue is particularly relevant for determinant tomato varieties, which are characterized by limited growth of the main stem and a relatively short vegetation period. In such varieties, proper plant formation is essential to maximize yield within a limited time frame. Different formation strategies,

including one-stem, two-stem, or modified pruning systems, may have varying effects depending on environmental conditions and varietal characteristics.

In addition, modern climatic changes, including temperature fluctuations and irregular precipitation patterns, increase the importance of adaptive cultivation techniques. Plant formation can serve as an effective tool for mitigating the negative effects of environmental stress by improving plant resilience and ensuring more stable yields under variable conditions [9].

From an economic perspective, optimizing plant formation methods is highly important. Increased yield, improved fruit uniformity, and higher marketable quality directly contribute to greater profitability of tomato production. Furthermore, reducing the proportion of unripe and non-standard fruits minimizes post-harvest losses and enhances overall production efficiency.

Despite the considerable amount of research conducted in this area, there is still no universally accepted approach to tomato plant formation. The effectiveness of specific methods often depends on local soil and climatic conditions, as well as the biological characteristics of the variety. This highlights the need for further experimental studies aimed at identifying the most efficient plant formation techniques under specific growing conditions.

Therefore, the aim of this study was to evaluate the effect of different plant formation methods on the yield and fruit quality of determinant tomato varieties under open-field conditions in the Irtysh region. The results of this research are expected to contribute to the development of more effective cultivation practices for increasing tomato productivity and improving fruit quality in temperate climates [10].

Aim of the study

The aim of the study was to determine the most effective and scientifically justified method of tomato plant formation that ensures high yield, improved fruit quality, and efficient use of plant resources under open-field cultivation conditions in the Irtysh region. This research sought to identify formation techniques that optimize plant growth and reproductive development, thereby enhancing both the quantity and marketable quality of tomato fruits.

To achieve this aim, a comprehensive evaluation of various plant formation methods was conducted on determinant tomato varieties, taking into account the local soil properties, climatic conditions, and the specific biological characteristics of the varieties studied. The study focused on understanding how different pruning strategies, including one-stem, two-stem, and selective lateral shoot retention, affect the dynamics of vegetative and generative growth, nutrient allocation, and overall crop productivity.

The objectives of the research included:

1. Assessing the influence of plant formation methods on tomato yield and its structural components, including the number of fruits per plant, average fruit weight, and total productivity per hectare.
2. Analyzing the effect of formation techniques on fruit quality parameters, such as dry matter content, uniformity, taste, and nitrate accumulation, to determine the best practices for producing safe and high-quality tomatoes.
3. Investigating the interaction between tomato variety and plant formation method, to identify the most compatible combinations for optimizing yield and fruit quality.
4. Evaluating the impact of plant formation on canopy architecture, including light interception, air circulation, and the distribution of assimilates, which are critical for achieving uniform fruit development and reducing disease incidence.
5. Identifying formation strategies that promote earlier and more uniform fruit ripening, which is particularly important in regions with short growing seasons and variable weather conditions.
6. Providing practical recommendations for growers, enabling the implementation of evidence-based plant formation methods that maximize economic efficiency, resource use, and the sustainability of tomato production systems.

By achieving these objectives, the study intends to generate scientifically grounded data to support decision-making in tomato cultivation, contributing both to the improvement of current agrotechnical practices and to the development of cultivation guidelines for determinant tomato varieties under temperate climatic conditions. The findings are expected to help optimize plant management practices, increase profitability, and ensure the production of high-quality, marketable tomatoes under open-field conditions.

Materials and Methods

Studies aimed at determining the optimal method of tomato plant formation were carried out in 2023–2025 under field experimental conditions in the Irtysh region.

The soil of the experimental plot was medium-depth, moderately humus-rich chernozem. The humus content in the arable soil layer was 6.3–6.5%, while the levels of available phosphorus and exchangeable potassium were high (220 and 243 mg/kg).

The area of the experimental plot was 30 m². The experiment had been conducted on this site for four consecutive years. The plots were arranged systematically.

Experimental design. Factor A – determinant tomato varieties:1 - Ranniy-83; 2 – Dubrava

Factor B – methods of plant formation:1 - Control (without plant formation); 2 - Formation into one main stem with the removal of all lateral shoots; 3 - At the second stage of removing excess lateral shoots from the main stem, all shoots were removed except the one growing from the leaf axil under the flower cluster; 4 - All shoots were removed except two lateral shoots on the main stem:1 – the first growing from the axil of the first flower cluster; 2 – the second from the lowest part of the plant, formed later during cultivation practices.

Ranniy-83 variety. A very early-ripening variety (85-90 days from seedling emergence to fruit ripening). The plant is determinant with round fruits weighing 80-95 g. The variety is characterized by resistance to various weather conditions and is recommended for fresh consumption and processing.

Results

The research results showed that tomato varieties respond differently to plant formation methods. In 2023, depending on the plant formation method, the yield of the studied varieties ranged from 10.6 to 17.5 t/ha (Table 1).

The highest yield was obtained from the Dubrava variety when the main stem was cleaned during the first stage, while the lowest yield was observed in the Ranniy-83 variety.

In 2025, the Ranniy-83 variety showed the highest yield (17.5 t/ha) during the third stage of main stem cleaning. In the same year, the Dubrava variety demonstrated the highest yield (21.8 t/ha) during the second stage of main stem cleaning.

Over the three years of the study, the highest average yield (21.1 t/ha) was obtained from the Dubrava variety.

Table1 – Yield of tomato varieties depending on plant formation methods, t/ha

Variety	Plant formation method	Tomato yield, t/ha			Average
		2023	2024	2025	
Ranniy-83	Control	10,6	19,0	14,0	14,5
	First main stem	14,8	20,6	15,7	17,0
	Second main stem	14,1	22,0	16,8	17,6
	Third main stem	13,4	25,4	20,3	19,7
Dubrava	Control	14,5	21,0	16,0	17,2
	First main stem	17,5	22,7	18,1	19,4
	Second main stem	17,1	24,3	21,8	21,1
	Third main stem	16,3	23,5	20,4	20,1
HCP_{05}	Individual difference	0,55	0,98	0,71	-
	Factor A	0,39	0,69	0,50	-
	Factor B	0,27	0,49	0,34	-
	AB factors	0,29	0,47	0,35	-

The studied tomato varieties showed differences in yield. Over a three-year period, the Dubrava variety produced 0.4 - 3.5 t/ha more fruit than the Ranniy-83 variety, depending on the method of plant

formation. Fruit weight varied from 60.1 to 90.5 g, also depending on the formation technique. The object of the study was tomato plants.

Dubrava variety. An early-ripening variety (100–105 days from seedling emergence to fruit ripening) with simultaneous fruit maturation. The plant is compact and determinant. The fruit weight ranges from 60 to 110 g and the fruits are round in shape. The variety is characterized by resistance to late blight and other diseases and pests. It is recommended for fresh consumption, pickling, and canning. On average, over three years, the heaviest fruits (82.9 g) were observed in the Dubrava variety formed on a single branch. The lightest fruits (70.2 g) were recorded for the Ranniy-83 variety under the control condition (without formation). In the control variants, fruits tended to be smaller, likely due to the allocation of nutrients to vegetative growth rather than fruit development.

After harvesting, a qualitative assessment of the fruits was conducted based on several parameters: fruit appearance (color and shape) was evaluated visually, taste was assessed, and the content of dry matter and nitrates was measured.

Visual evaluation revealed that plants without bush formation had uneven seed surface coloration. In this variant, a higher number of small and unripe fruits was observed compared to other experimental treatments. The content of dry matter and nitrates in the fruits of the studied tomato varieties showed slight variations depending on the plant formation method (Table 2).

Table 2 – Effect of Plant Formation Method on Tomato Fruit Quality Parameters

Variety	Plant Formation Method	Dry Matter, %			Nitrate Content, mg/kg		
		2023	2024	2025	2023	2024	2025
Ranniy-83	Control	8,4	6,3	5,3	43,6	23,3	37,9
	First main stem	8,8	6,4	5,4	42,7	23,0	35,0
	Second main stem	8,9	6,7	5,7	44,8	22,3	35,5
	Third main stem	8,5	6,8	5,8	46,5	24,7	36,7
Dubrava	Control	8,3	6,4	5,4	49,7	34,4	39,1
	First main stem	8,6	6,7	5,7	45,8	30,1	38,2
	Second main stem	8,8	6,5	5,5	48,1	32,4	38,8
	Third main stem	8,7	6,6	5,6	48,7	33,5	38,6

It is impossible to completely eliminate nitrates in plants, as their presence is a natural physiological and biochemical characteristic of the plant organism. Nitrates are part of a sequential chain of biological transformations of mineral nitrogen absorbed from the nutrient medium by plant enzymes [7].

In the fruits of the studied tomato varieties, nitrate levels in all experimental variants did not exceed the permissible concentration (MPC – 150 mg/kg of fresh weight).

Discussion

The results of this study demonstrate that both tomato variety and plant formation method significantly influence yield and fruit characteristics under open-field conditions in the Irtysh region. Over the three-year period, the early-ripening Dubrava variety consistently produced higher yields than the very early Ranniy-83 variety, with an average increase of 0.4–3.5 t/ha depending on the method of plant formation. This indicates a higher productivity potential of the Dubrava variety for medium-fertility chernozem soils and confirms its suitability for fresh consumption and processing.

The study revealed that plant formation is a key agronomic factor affecting both yield and fruit weight. Among the tested methods, the second pruning/branching—where all lateral shoots were removed except the one growing from the leaf axil under the flower cluster—proved most effective for both varieties. This method appears to optimize the balance between vegetative growth and reproductive development, allowing for better nutrient allocation to fruit formation. Similar findings have been reported in previous studies, highlighting the importance of controlled pruning in determinant tomato varieties for early and uniform fruit ripening [5–7, 9].

Fruit quality parameters, including dry matter content and nitrate concentration, were not significantly affected by plant formation methods. In all variants, nitrate levels remained below the permissible concentration (MPC 150 mg/kg), confirming the safety of the fruits for consumption. The heavier fruits observed in pruned plants, especially the Dubrava variety, suggest that targeted plant formation enhances both yield and marketable fruit quality without compromising nutritional value.

Overall, the results highlight the necessity of combining appropriate variety selection with optimized plant formation techniques to maximize tomato productivity and fruit quality in northern and temperate zones. For practical cultivation, the Dubrava variety combined with the second main stem pruning is recommended as the most effective approach for achieving high yields and uniform, high-quality fruits.

Conclusion

Cultivation of the Dubrava variety in open-field conditions on medium-fertility, medium-humus black soil proved to be more productive, yielding 3.5 t/ha higher than the Ranniy-83 variety.
The most effective method for tomato plant formation was the second pruning/branching.
The levels of dry matter and nitrates in tomato fruits were not significantly affected by the plant formation methods applied.

References

1. Heuvelink E. (Ed.). Tomatoes. 2nd ed. – Wallingford: CABI, 2018. – 388 p.
2. Dorais M., Ehret D.L., Papadopoulos A.P. Tomato (Solanum lycopersicum) health components: from the seed to the consumer // Phytochemistry Reviews. – 2008. – Vol. 7. – P. 231–250. – HTTPS://DOI.ORG/10.1007/s11101-007-9085-x
3. Naika S., van Lidt de Jeude J., de Goffau M., Hilmi M., van Dam B. Cultivation of tomato: production, processing and marketing. – Wageningen: Agromisa/CTA, 2005.
4. Maboko M.M., Du Plooy C.P. Response of Field-Grown Indeterminate Tomato to Plant Density and Stem Pruning on Yield // International Journal of Vegetable Science. – 2018. – Vol. 24, No. 6. – P. 612–621. – HTTPS://DOI.ORG/10.1080/19315260.2018.1458265
5. Masrie B., Girma T. Effect of stem pruning and staking time on growth and yield of tomato (Lycopersicon esculentum Mill. var. Mersa) at Mersa, North Wollo, Ethiopia // Vegetos. – 2023. – Vol. 36. – P. 1080–1088. – HTTPS://DOI.ORG/10.1007/s42535-022-00472-6
6. Ara N., Bashar M.K., Begum S., Kakon S.S. Effect of spacing and stem pruning on the growth and yield of tomato // International Journal of Sustainable Crop Production. – 2007. – Vol. 2, No. 3. – P. 35–39.
7. Mitchell B.A., Uchanski M.E. Fruit cluster pruning of tomato in an organic high-tunnel system // HortScience. – 2019. – Vol. 54, No. 2. – P. 311–316.
8. Max J.F.J., et al. Effects of shoot pruning and inflorescence thinning on plant growth, yield and fruit quality of greenhouse tomatoes in a tropical climate // Journal of Agriculture and Rural Development in the Tropics and Subtropics. – 2016. – Vol. 117, No. 1. – P. 45–56.
9. Nipa S.N., et al. Staking and pruning enhance the production of “Roma VF” tomato in coastal region of Bangladesh // International Journal of Natural and Social Sciences. – 2020. – Vol. 7, No. 3. – P. 89–93.
10. Sultana R., Dilruba S., Parveen K., Kulsum U., Parvin N. Effect of pruning on growth and yield of tomato (Lycopersicon esculentum Mill.) // European International Journal of Science and Technology. – 2016. – Vol. 5, No. 9. – P. 127–132.

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ҚЫЗАНАҚТЫҢ ӨНІМДІЛІГІ ӨСІМДІКТІ ҚАЛЫПТАСТЫРУ ТӘСІЛІНЕ БАЙЛАНЫСТЫ

Қызанақ өсімдіктерін қалыптастыру тәсілі – өсімдіктің өнімділігіне, жеміс сапасына және жалпы жағдайына тікелей әсер ететін маңызды агротехникалық шаралардың бірі. Қызанақтың өсуі мен дамуын бақылау қазіргі заманғы көкөніс өсіру технологияларының негізгі элементі болып табылады. Өсімдікті дұрыс қалыптастыру вегетативті өсуді реттеуге,

қоректік заттардың теңгерімді сіңірілуін қамтамасыз етуге және жеміс беру процесін жақсартуға мүмкіндік береді. А. Борисов пен О. Ганичкинаның пікірінше, өсімдікті қалыптастыру – қызанақтың дамуын, өнімділігін және сапасын реттейтін негізгі фактор болып табылады. Дұрыс қалыптастырылған өсімдіктер қуатты тамыр жүйесін дамытып, қоректік заттарды тиімді пайдаланады және ауа айналымы мен жарықтың жақсы өтуі үшін қолайлы жапырақ құрылымын қалыптастырады, бұл гүлдену, жеміс түзу және пісу үшін қолайлы жағдай жасайды.

Қызанақ өсімдіктері әртүрлі тәсілдермен қалыптастырылуы мүмкін: бір негізгі сабақты қалдыру, екі сабақпен жүргізу немесе жанама өркендерді іріктеп қалдыру. Бұл тәсілдердің әрқайсысы өсудің динамикасына, өнімділікке және жеміс сапасына елеулі әсер етеді. Зерттеудің мақсаты – Ертіс өңірінің топырақ-климат жағдайында өсірілетін детерминантты қызанақ сорттарына өсімдікті қалыптастырудың әртүрлі тәсілдерінің әсерін бағалау болды. Үш жыл бойы (2023–2025 жж.) екі ерте пісетін детерминантты сорт — «Ранний-83» және «Дубрава» бойынша төрт қалыптастыру тәсілінің өнімділікке, жеміс массасына, құрғақ зат мөлшеріне және нитраттардың жиналуына әсері зерттелді.

Нәтижелер көрсеткендей, сорт пен қалыптастыру тәсілі қызанақтың өнімділігі мен жеміс сапасына айтарлықтай әсер етеді. Зерттелген әдістердің ішінде бірінші гүл шоғырының астында бір жанама өркенді қалдыру (екінші негізгі сабақты қысқарту) ең жоғары өнім мен жеміс массасының артуын қамтамасыз етті. Сондай-ақ, қалыптастырылған өсімдіктердің жемістері біркелкілігімен және сапасымен ерекшеленді, ал нитрат мөлшері барлық нұсқаларда рұқсат етілген шектен аспады.

Түйінді сөздер: *қызанақ, қызанақ сорттары, өсімдікті қалыптастыру, өнімділік, жеміс сапасы, ерте пісетін сорттар, детерминантты қызанақ.*

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УРОЖАЙНОСТЬ ТОМАТОВ В ЗАВИСИМОСТИ ОТ СПОСОБА ФОРМИРОВАНИЯ РАСТЕНИЙ

Способ формирования растений томата является одной из важнейших агротехнических операций, напрямую влияющих на урожайность, качество плодов и общее состояние растений. Контроль роста и развития томатов является ключевым элементом современных технологий овощеводства. Правильное формирование растений позволяет регулировать вегетативный рост, обеспечивает сбалансированное усвоение питательных веществ и улучшает процесс плодоношения. По мнению А. Борисова и О. Ганичкина, формирование растений является основным фактором, регулирующим развитие, продуктивность и качество томатов. Правильно сформированные растения развивают мощную корневую систему, эффективно используют доступные питательные вещества и формируют оптимальную структуру кроны для лучшей циркуляции воздуха и проникновения света, создавая благоприятные условия для цветения, завязывания плодов и их созревания.

Растения томата могут формироваться различными способами, такими как ведение в один главный стебель, в два стебля или выборочное сохранение боковых побегов, каждый из которых может существенно влиять на динамику роста растений, урожайность и характеристики плодов. Цель данного исследования заключалась в оценке влияния различных способов формирования растений на детерминантные сорта томата, выращиваемые в почвенно-климатических условиях Иртышского региона. В течение трёх лет (2023–2025 гг.) изучалось влияние четырёх способов формирования на урожайность, массу плодов, содержание сухих веществ и накопление нитратов у двух скороспелых детерминантных сортов — Ранний-83 и Дубрава.

Результаты показали, что как сорт, так и способ формирования существенно влияют на продуктивность томатов и качество плодов. Среди изученных методов наибольшую урожайность и улучшенную массу плодов обеспечило выборочное сохранение одного бокового побега под первой цветочной кистью (прищипка второго главного стебля). Плоды сформированных растений также отличались большей выравненностью и качеством, при этом уровень нитратов во всех вариантах оставался ниже допустимых норм.

Ключевые слова: *томат, сорта томата, формирование растений, урожайность, качество плодов, скороспелые сорта, детерминантные томаты.*

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ТОПЫРАҚ ҚҰНАРЛЫҒЫНА ӨҢДЕУ ӘДІСТЕРІНІҢ ТИГІЗЕТІН ӘСЕРІ

Аннотация: *Қазақстанның шөл және жартылай шөлейтті аймақтарында ауыл шаруашылығы дақылдарын өсіруге жарамды жер ресурстарының көлемі жеткілікті. Осыған байланысты аталған жерлерді игеру, олардан тұрақты жоғары өнім алуға бағытталған жаңа технологияларды әзірлеу және қолайлы агротехникалық әдістерді ғылыми негізде зерттеу қазіргі уақытта өзекті мәселе болып табылады. Ауыл шаруашылығы дақылдарын өсіру үшін егістік алқаптарын дайындау барысында зерттелетін аумақтың климаттық жағдайларын, топырақтың мелиоративтік күйін, геоморфологиялық орналасуын, сондай-ақ агробиологиялық және шаруашылық жағдайларын жан-жақты және терең зерделеу қажет. Сонымен қатар, дақылдарды өсіруде қолданылатын агротехникалық шаралар климаттық ерекшеліктерге сәйкес болуы және егістік топырақтарының құнарлылығына оң әсер етуі тиіс. Бұл шаралар өңделетін топырақтың құнарлық көрсеткіштерін сақтап қана қоймай, оларды ұдайы арттыруға ықпал етуі қажет. Ауыспалы егісте дақылдардан тұрақты және мол өнім алу үшін топырақ өңдеу тәсілдерін оңтайландыру маңызды факторлардың бірі болып саналады. Ұсынылып отырған мақалада осы мәселе бойынша жүргізілген зерттеулердің нәтижелері келтірілген. Зерттеулер Жамбыл облысы Байзақ ауданы «Ақжар» шаруа қожалығының суарылмайтын (тәлімді) егістік аймағында, егістік қабатындағы қарашірік мөлшері 1,0–1,2 % құрайтын кәдімгі сұр топырақтарда, бес танапты дәнді-шөпті ауыспалы егісте жүргізілді. Далалық тәжірибелер барысында зерттелген аймақта қолданылып жүрген дәстүрлі топырақ өңдеу әдісі мен сыдыра жырту (қабыршақтау) әдісінің топырақ құнарлылығына тигізетін әсері салыстырмалы түрде зерттелді.*

Түйінді сөздер: *ауыспалы егістік, топырақ құнарлығы, топырақ өңдеу тәсілдері,топырақ ылғалдылығы, қоректік заттар*.

Кіріспе