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**I. M. YEREMEIEV'S ACTIVITIES AT THE PUSHKIN BRANCH OF  
THE ALL-RUSSIA INSTITUTE OF PLANT INDUSTRY**

*The Article is devoted to the study of the initial period of Ivan Maksymovych Yeremeiev's scientific activity during his work at the Pushkin branch of the All-Russia Institute of Plant Industry. In the 1930's, under his leadership, active selection work was carried out, which resulted in varieties of winter and spring wheat, barley, oats and peas. Among them, winter wheat DS 2444/2, spring wheat Tulun 3A/32 and Tulun 70 B/8 were highly valued. In the early 1940's, the wheat department collected in total more than 160,000 plant samples, and I. M. Yeremeiev himself worked on the systematization and evaluation of world varieties of cereals for further practical use. The scientist also conducted a series of studies regarding grain resistance to disease.*

*The scientist summarized his work in scientific papers that were published throughout the study period. In his papers the author generalized and detailed the main characteristics and methods of plant breeding. A significant contribution to the theoretical development of selection was the 3-volume work «Theoretical Foundations of Plant Breeding», with I. M. Yeremeiev being the co-author.*

*This study also focuses on the work of I. M. Yeremeiev in VIR Scientific Council. For a set of scientific works, without defending a dissertation, the scientist was awarded the degree of Doctor of Agricultural Sciences in 1936. Working under the guidance of a professor, he successfully defended 5 scientific dissertations. He lectured not only at Leningrad University, but also at advanced training courses for agricultural workers.*

*The conclusions state that Leningrad period of the scientist's work was quite productive. Many scientific works have been written. In addition, the scientist received scientific recognition and a doctorate in agricultural sciences. His experience as a researcher, author and teacher has become a valuable contribution to the study of agricultural breeding in the future.*

**Keywords:** *I. M. Yeremeiev, All-Russia Institute of Plant Industry, wheat, selection, scientific and research activity.*

## **ДІЯЛЬНІСТЬ І. М. ЄРЕМЕЄВА У ПУШКІНСЬКОМУ ВІДДІЛЕННІ ВСЕСОЮЗНОГО ІНСТИТУТУ РОСЛИННИЦТВА**

*Стаття присвячена дослідженню наукової діяльності Івана Максимовича Єремєєва в період роботи у Пушкінському відділенні Всесоюзного інституту рослинництва. В 1930-х рр. під його керівництвом велася активна селекційна робота, результатом якої стали виведені сорти озимої та ярої пшениці, ячменю, вівса та гороху. Серед них високо цінувалися озима пшениця ДС 2444/2, яра пшениця Тулун 3А/32 та Тулун 70В/8. На початку 1940-х рр. відділом пшениці у підсумку було зібрано понад 160 тис. зразків рослин, а сам І. М. Єремєєв працював над систематизацією та оцінкою світових сортів зернових культур з метою подальшого практичного використання. Також вчений провів ряд досліджень стійкості зернових до захворювань.*

*Вчений узагальнив роботу в наукових працях, які були видані в досліджуваний період. У них автор узагальнив та деталізував основні характеристики й методи селекції рослин. Значним внеском в теоретичний розвиток селекції є 3-томна праця «Теоретичні основи селекції рослин», співавтором якої був І. М. Єремєєв.*

*В даному дослідженні також акцентується увага на роботі І. М. Єремєєва в науковій раді ВІРу. За сукупність наукових праць, без захисту дисертації, вченому було присуджено науковий ступінь доктора сільськогосподарських наук у 1936 р. Працюючи під керівництвом професора, успішно було захищено 5 наукових дисертацій. Він читав лекції не лише в Ленінградському університеті, а й на курсах підвищення кваліфікації агропрацівників.*

*У висновках підводиться підсумок, що ленінградський період роботи вченого був досить продуктивним. Написано багато наукових праць. Крім того, вчений отримав наукове визнання та ступінь доктора сільськогосподарських наук. Його напрацювання як дослідника, автора та викладача стали цінними надбаннями в дослідженні селекції агрокультур в майбутньому.*

**Ключові слова:** *І. М. Єремєєв, Всесоюзний інститут рослинництва, пшениця, селекція, науково-дослідна діяльність.*

Problem statement. There are many outstanding personalities in the history of Ukraine who have significantly influenced the development of our state. Studying their lives and achievements provides a better understanding of historical processes. One of them is Ivan Maksymovych Yeremeiev, an outstanding scientist, professor and a breeder of a new variety of winter wheat «Ukrainka» 0246.

Analysis of recent research and publications. Historiographical analysis of the study revealed the absence of complex facts of scientific work by the scientist in the study period. We can learn the most about the research activities from the authors' team T. Ya. Zarubailo, N. R. Ivanov, H. M. Kovalenko, V. T. Krasochkin, I. A. Sizova «rief results of Pushkin laboratories of the All-Russia Institute of Plant Industry in the field of source material studies and selection of agricultural plants» [14], V. D. Kysliakov [15], F. F. Sydorov [18]. In these publications, the scientist's work in the field of breeding is described in the context of scientific research of the All-Russia Institute of Plant Industry. The source base consists of materials from the funds of the Museum of History at Uman National University of Horticulture. The scientist's works present the great value in the research, revealing the essence of his scientific work [6, 7, 8, 9, 10, 11, 12, 13]. Important information is provided by the materials of the VIR research plans [16, 17], which describe the main tasks and results of the work performed by the Institute for a certain period. The short material is devoted to Pushkin station, which was headed by I. M. Yeremeiev.

The purpose and objectives of the study. The purpose of the study is to highlight the scientific work of the scientist during his work at Pushkin branch of the All-Russia Institute of Plant Industry and his contribution to breeding research. The paper applies general historical methods, analysis, comparison, synthesis, generalization, historical-chronological and historical-biographical retrospective methods.



Presenting main material.

Ivan Maksymovych Yeremeiev was born on January 19, 1887 in the city of Romny. He graduated from Kharkiv Institute of Technology, and from 1907 studied in France at the Agronomic Institute of Nancy. In 1916, the young scientist returned to Ukraine and got a job at the Myronivka breeding station, where he worked very hard until 1931. Under his leadership, a number of varieties of crops were bred, including the world-famous winter wheat «Ukrainka» 0246.

In 1934, Academician M. I. Vavilov invited Ivan Maksymovych to work at the All-Russia Institute of Plant Industry (VIR) at the Pushkin branch as Head of the wheat department and Deputy Director of science.

The All-Russia Institute of Plant Industry was a major research center in the breeding industry throughout the Soviet Union. Scientists were engaged not only in the breeding of many agronomic crops, but also in the distribution of seed material. The Institute has also carried out significant organizational work on variety testing and standardization of varieties. VIR departments were located in different parts of the USSR. One of the largest units was the Leningrad Breeding Station, which monitored the work of researchers throughout the northwestern zone of the Soviet Union. The center of this station was the Pushkin Laboratory, which specialized in breeding work. A whole galaxy of famous researchers of various agricultural crops worked here. For example, a specialist in the field of legume breeding, Professor V. S. Fedotov, V. E. Pisarev, A. P. Gorin, V. P. Antropov, V. F. Antropov and others [14, p. 67-68]. They were able to gather a large base of source material and breed a number of new varieties. Basically, the research was conducted with the main crops of the regional agriculture - vegetables and potatoes [14, p. 68].

In the 1930s, the station actively worked on the selection of agricultural crops. New varieties of winter and spring wheat, barley, oats and peas were bred. I. M. Yeremeiev took part in breeding of some of them, namely: winter wheat DS 2444/2, spring wheat Tulun 3A/32 and Tulun 70 B/8 [4].

The scientist summarized the practical work performed in his scientific papers, where he described in detail the methods of variety selection, the main characteristics and conclusions about their prospects for distribution. For example, as a result of tests, the variety DS 2444/2 gave quality offspring of winter wheat. After all, the main task set by the scientists of the station was to breed a frost-resistant, productive variety in the north, with good grain quality [13, p. 16-17].

Ivan Maksymovych also took part in the development of spring wheat varieties GDS 11, GDS 30 (Siverianka), Tulun 3A/32. They were bred by linear and hybrid material, standardized for some northern areas of spring wheat cultivation, both in the

European and Asian parts of the USSR (Arkhangelsk, Irkutsk, Tomsk regions, Krasnoyarsk area).

It is worth noting the variety Tulun 70 V/8, which was derived from the Canadian sample «Preston», by individual selection. It became widespread in the north-western, central and eastern regions of the non-chernozem zone of the European part of the USSR, as well as in Krasnoyarsk and Khabarovsk areas. The variety is distinguished for its high yields, flour milling and baking qualities [15, p. 22-25]. In total, from 1922 to 1947, about 30 varieties of agricultural crops were bred.

In 1936, the All-Russia Institute of Plant Industry evaluated the species and varietal material of wheat in order to reproduce and promote new varieties for production. Under the guidance of a scientist, a number of studies were carried out to improve existing varieties.

The cytology laboratory focused on studying the characteristics of adjacent genera of wheat species with a view to their further hybridization. I. M. Yeremeiev explored ways to combine the wild culture of *Aegilops* with durum wheat. The experiments were carried out using the Kostov method, i.e., cyclic crossing of wheat. As a result of such hybridization, a new variety was obtained, which had the qualities of all combined species. The biochemical laboratory carried out a detailed assessment of wheat species and varieties according to the protein characteristics.

As a specialist in phytopathology, the scientist studied diseases of cereals. Under his leadership, a study of the resistance of cereals to brown and stem rust, as well as to sawdust and hard smut was performed. The main practical task is to breed varieties to replace the severely affected «Ukrainka» variety [16, p. 9-10]. Work on the study of precocity and cold resistance was launched in Dytiache Village. I. M. Yeremeiev carried out a number of practical measures to increase drought resistance, frost-resistance and resistance to rust and the smut. Thus, research at the Pushkin station under the leadership of I. M. Yeremeiev focused on the problem of cereals [16, p. 10].

In the 1930s, the station worked on the topic «Creation of new economically valuable varieties based on wheat world collection development and the development

of new accelerated breeding methods», which was approved by VIR. For this purpose, certain regions were identified, where research was conducted in several areas of breeding science. Thus, in the Far North, precocity and cold resistance during maturation were studied; in the Leningrad region - a short growing season, ripening with excessive moisture and winter resistance with deep snow cover; in Voronezh region - resistance to fungal diseases and pests and other characteristics.

I. M. Yeremeiev along with VIR scientists created a certain procedure and method of research: 1. Selection of appropriate wheat varieties for research. 2. Method of intraspecific and interspecific hybridization of seed selection and study of inherited traits. 3. Derivation of the main indicators of frost-resistant and drought-resistant starting materials for further hybridization. 4. Study of resistance to fungal diseases of wheat varieties in the Azov-Black Sea and North Caucasus regions. 5. Breeding of winter and spring wheat varieties for Leningrad region and the Northern Territory. 6. Creation of a super elite of new varieties at VIR stations [16, p. 24-25].

An important element of the scientist's activity was his scientific and teaching work. In October 1934, a scientific council was established at the VIR Directorate, which included, in addition to Academician M. I. Vavilov and the Head of the Fruit Department M. V. Kovyl, Ivan Maksymovych. The Council considered the most important issues of research work in crop production and had the right to confer scientific degrees and academic titles [1].

In 1936, without defending his thesis, Ivan Maksymovych was awarded the degree of Doctor of Agricultural Sciences and the academic title of a full member of Lenin All-Russia Academy of Agricultural Sciences [19, p. 102]. Working as a member of VIR scientific council, the scientist trained future scientists. Among his graduate students who defended their thesis were D. V. Goriunov «Variability of the growing season duration and other economically valuable features of various ecological types of wheat in the mountain crops of the Southern coast of Crimea» (1935); P. I. Sapko «Drought resistance of barley in connection with differences in root system development» (1935); H.I. Popov «Hereditary variability of wheat traits» (1936); A. S. Krotov «Improvement of varieties of self-pollinators and

methods of obtaining elite seeds» (1938); A. Ya. Trofimovska «Local varieties of spring wheat of Leningrad region and their use in selection work» (1941) [3, 2, p. 177].

I. M. Yeremeiev worked as a teacher, lecturing to students of Leningrad University, students of advanced training courses for managers, heads of collective farms and directors of state farms, breeders, agronomists-seed scientists, agronomists-appraisers. [19, p. 102]

VIR employees and I. M. Yeremeiev's collaborative work resulted in joint 3-volume work «Theoretical foundations of plant breeding», published in 1935 [5]. Volume 1 «Genetic basis of selection» summarized research in the field of selection and genetics of plants, based on factual and practical material, which were conducted in the USSR and abroad. The principles of classification of cultivated plants, issues and methods of selection are covered: botanical and geographical bases of selection, hybridization and a number of others. Relevant issues are highlighted. Particular attention is paid to topical issues of plant phytopathology and breeding methodology, which were covered by the researcher in the third section.

I. M. Yeremeiev, a co-author with M. Yakubtsyner and A. Basova, wrote «The current state of pure lines doctrine», where the authors described the experience of foreign scientists, the available material of line variability, provide tables of spontaneous crossing in self-pollinating crops [9, p. 167-169] and the reasons for the clean line change [9, p. 172-175]. Working on this scientific work, the scientist discovered a number of «Ukrainka» wheat features, which arose as a result of natural crosses during the spread of the variety [9, p. 170-172].

Researchers have summarized the results of experimental breeding practices using re-selection within purebred varieties [9, p. 175-178]. They concluded that at different selection stages different crossing and selection methods of seed material should be used. Thus, at the initial stage, the method of one-time selection is best for self-pollinating crops. With the application of this method, such varieties of winter wheat as «Ukrainka», «Kooperatoroka», «Zemka», «Stepniachka», as well as spring wheat «Tsezium 0111», «Lutestsens 062», «Melianopus 069, oats «053» and «A315» were bred. When a new variety has already been bred, scientists recommend using re-

selection to highlight valuable economic traits. This method allows you to select an elite material for reproduction. It guarantees the preservation of varietal purity and ensures high quality of elite seeds [9, p. 178-179].

«Intraspecific hybridization» is the work created by I. M. Yeremeiev and V. Fiodorov, which addresses the issue of intraspecific hybridization of crops, in particular, the problem of hereditary trait, gene interaction [8, p. 356-360; p. 360-369], etc.. In this paper, scientists describe various methods of hybridization in order to highlight clean lines. Based on the results of practical experiments, the authors note that a clean line can be achieved in two ways: by applying the method of successive individual selection or the method of «mass transplatio», and «population method». The latter is preferred because it makes it possible to use a large number of hybrids [8, p. 390-394].

In November of 1937, I. M. Yeremeiev went to work for Leningrad State Breeding Station, which was organized on the basis of Pushkin station and the state farm «Suida» of the People's Commissariats of the USSR in the Hatchyna district of Leningrad region [18, p. 3]. Scientists were tasked with providing seed farms in Leningrad region and the Karelian-Finnish SSR with high-quality seeds of winter and spring wheat, winter rye, oats, barley, peas, spring vetch and buckwheat. Work was carried out to improve local varieties of cereals and to breed new varieties of cereals, legumes and solanaceous crops.

At the station there were 10 selection departments of groups and laboratories, on the land with an area of 52 hectares in Pushkin city and 1,389.71 hectares in Suida [18, p. 4]. The result of the station operation was the expansion of seed material, which was the object of study. In total, scientists studied and selected over 23 species of agricultural crops. They developed and improved the basic methods of selection in the field of grassland agriculture. Under the leadership of I. M. Yeremeiev, Candidate of Agricultural Sciences A. V. Navolotskii created the famous varieties of spring wheat «Tulun-32» and «Tulun-70», «Pamiat (Memory) of the Ural». They were popular in 13 regions of the non-chernozem zone of Russia and in Siberia for 25 years.



The All-Russia Institute of Plant Industry perceived its main task to be the study and development of cultivated plants collection for practical purposes and promotion in the production of the most valuable varieties. VIR has developed methods of selection and seed production and has systematically implemented measures to increase the yield of cultivated plants. By 1941, the thematic plan of tasks consisted of 17 topics.

In the early 40s, the Institute collected more than 160,000 samples of plants, which were stored for reproduction and economic distribution [17, p. 3]. The Department of Wheat, headed by Professor I. M. Yeremeiev, studied cereals and worked on the topic «Mobilization, study and evaluation of world cereals resources for practical application. Derivation of new varieties of grain crops for VIR research stations activity and development of theory and methods of selection». The staff of the Department was engaged in the study and evaluation of grain crops for practical selection and use for economic purposes. Practical research was also conducted at the research stations that were part of the Institute. In order to increase grain productivity in these areas, theories and effective breeding methods have been developed.

Working in the system of the All-Russia Institute of Plant Industry, Ivan Maksymovych was involved in the breeding of many new samples of wheat, rye, barley and oats. In total, the institute collected more than 62,000 samples of cereals.

With the beginning of the war, breeding work was partially suspended. Basically, the laboratory worked on the reproduction and study of available material of cereals and legumes. In 1941, the priorities of VIR were to divide existing collections into groups according to economic importance, parental forms, to identify new promising varieties with the highest quality characteristics. Valuable were local varieties (populations), individual forms and varieties. During this period, the collection of wheat consisted of 38,000 samples, of which 20,000 samples were subject to live support and partial reproduction [17, p. 9].

I. M. Yeremeiev summarized the results of scientific research during the period of work at Leningrad Department of VIR in such works as «Application of sparse crops in the propagation of varietal wheat seeds in collective farms» (1936),

«Techniques for creating a super-elite» (1936), «DS 2444/2 - a new variety of winter wheat» (1936), «Wheat DS 24442» (1936), «Methods of selection» (1936), «Visiting the variety» (1936), «Pearl of the Soviet North» (1939) and others [12; 11; 7; thirteen; 10; 6].

Thus, we can conclude that working within VIR system I. M. Yeremeiev systematized the existing varieties of winter and spring wheat of the USSR. Also, under his leadership, a number of new species of barley, oats, wheat and peas were bred, which corresponded to the natural conditions of different regions of the Soviet Union. In addition, during this period, the scientist was awarded the degree of a Doctor of Agricultural Sciences. As a research supervisor, he helped 5 PhD students successfully defend their dissertations. I. M. Yeremeiev systematically published his scientific works, including the 1st volume «Theoretical foundations of plant breeding» under the general editorship of Academician M. I. Vavilov. Ivan Maksymovych Yeremeiev entered the history of agricultural sciences as an outstanding scientist, inventor of new varieties of agricultural crops, author of fundamental scientific works on plant breeding and hybridization.

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*Надійшла до редакції 20.05.2021 р.*