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**FORMATION AND SCIENTIFIC ACTIVITY OF NEMERCHANSKA,
ULADIVSKA, ILLINETSKA, MYRONIVSKA PLANT-BREEDING
STATIONS**

(the end of the 19th – the 20-s of the 20th c.)

Actuality of theme is conditioned by that Varietal and Seed Management of the Sugar Trust has made significant contribution to the development of sugar beet growing and native agricultural science and research work. Separate plant-breeding stations of network of research institutions of VSM of the Sugar Trust, the history of their creation are considered. The aim of this study is to investigate directions of the activity and to summarize the results of research of Nemerchanska, Uladivska, Illinetska, Myronivska plant-breeding stations of the Sugar Trust. In particular, the article describes that at Nemerchanska Research Breeding Station E.Y. Zalenskyi incorporated the method of statistical study of material by Halton's curves drawing, the strict individual selection method and the method of cloning of roots. Scientific handling of methods of progeny tests concerning sugar beet also belong to him. The varieties of winter wheat - Triumph Podoliya Novyi, Nemerchanska Yubileyna, Skhreschenal; rye – Petkus were created. At Uladivska Breeding Station, Uladivsky the variety of sugar beets, which in those days was admitted as a standard for the district of growing of sugar beets, was created. Mironovska Research Breeding Station had used a number of agricultural methods that significantly increased crop yield. Five-course crop rotation was offered at the station, the best predecessors were defined for sugar beet and grain-crops, the role of fallow was found out in a crop rotation. In addition, the varieties of winter wheat Yubileynaya No.103, oats No. 70 and No. 90 were created.

Key words: *Varietal and Seed Management of the Sugar Trust, plant-breeding stations, sugar beet growing, breeding, variety, seed.*

The Varietal and Seed Management of the Sugar Trust at the time of creation (29.12.1921) contained 14 plant-breeding stations (Nemerchanska, Yaltyshkivska, Uladivska, Myronivska, Bilotserkivska, Verkhniatska, Udytska, Kalnytska, Illinetska, Sytkovetska, Berezototska, Ivanivska, Ramonska, Tetkynska), Vinnytsia Seed Plant and Smilianska Mycological and Entomological Station. At the beginning of 1922 the named stations has occupied the area 6521 arpents wick tilled area amounted to 5331 ½ arpents. But this numbers gradually increased by transferring land plots of the sugar plants situated nearby.

The first was Nemerchanska Plant-Breeding Station created in 1886 in Mogyliovskyi region of Podilska -province. From the moment of its foundation the Nemerchanska Research Station has been engaged breeding the sugar beet, wheat, oats and also learned rye, asoposed to Myronivska station. During 1886–1904 the the post of Director of Nemerchanska station was held by engineer and chemist Orlovskyi and since 1904 – E.Y. Zalenskyi, which determined the aspects of work. At the first years only a mass- selection method was used in breeding at the station of sugar beet. Feedstocks were varieties of -Vilmorin blanche amelioree and Klein-Wantleben of Dippe firm. The methods of individual group selection and polarimetric determination of saccharinity percentage were lounched in 1891.

Learning the meteirological factors Orlovskyi succeeded to ascertain that in the conditions of Nemercha frosts often happened at the beginning of October. It was decided to sow out only in the first half of May for avoidance of loss of material, and to dig up roots - in the middle of September, that reduced the period of vegetation considerably. For this time it was succeeded to raise saccharinity on 1 % comparatively with a feedstock at the station.

The selection of cereals was carried out by the method of frequent individual selection from the first years of establishment's activity. Unlike the Myronivska station, the morphological description method and Halton's curves and cross-correlation tables methods were used for desgription of separate plants (according to

the weight of ear, its length, length of straw, amount of stems and others). The work resulted creation of varieties of winter wheat Triumph Podillia and Podilska Banatka.

The breeding of oats gave an opportunity to breed from the local Rykhlyk – Nemerchanskyi variety, the earliest plant variety that ripened two weeks prior to ordinary middle-ripening varieties which differ by high drought-resistingness and considerable percent of protein in grain. In addition, the variety of Ekstselsior was selected from Shlanshtedske rye, which had relatively long ear. However the last did not obtain a wide popularity, as in seed farming at that time the more productive variety – Petkuske rye was showed out.

With assigning E.Y. Zalenskyi for the position of director, the methodology of realization of selection undergone considerable changes, foremostly concerning sugar beets. The results of researches showed that Orlovsky's offers for reduction of vegetation period didn't give the expected results, because selection was carried out not with the aim of increasing the saccharinity, but on early ripening. Taking into account the influence of meteorological factors on the consequences of comparative experiments, E.Y. Zalenskyi suggested sowing the investigated groups of varieties in different climatic condition simultaneously [8, p.206-207].

It should be mentioned, that he also incorporated the method of statistical study of material Halton's curves drawing, the strict individual selection method and the method of cloning of ancestors of new races. Scientific handling of methods of progeny tests concerning sugar beet also belong to him.

1900 through 1908 the seed of beets of Nemerchanska Plant-Breeding Station (on the basis of collective progeny tests) began to approximate to the best standards of Klein-Wantzleben and Dippe by quality, and afterwards it became the best.

E.Y. Zalenskyi's discovery concerning chain of factors, that reduced saccharinity of that family in which they appeared, became very important. These factors are shown up in a form of special morphological changes of tops and root according to scientist's researches. They include 1) intensified growth of root in a width, 2) intensified growth of head, 3) deep furrow of root, 4) curly rough tops on short thick stems, 5) thin, narrow leaves, 6) excessive early ripening. Investigating

the morphological features of initial paternal forms, and also the new selected hybrids, obtained a result of breaking up of feedstock in more homogeneous genotype groups by the separate roots elimination, the scientist was succeeded to prove that using selection it becomes possible to distinguish more saccharine form, at the same time it becomes possible to define that component part of previous population, which presence reduced saccharinity. The further study of saccharinity and yielding capacity of beets resulted in a conclusion, that these indices were conditioned by certain independent genes. However, perfect combination of plumule genes in a homozygous form, at that time wasn't distinguished.

In 1915 under the influence of military events the station is evacuated in Khoroshky of the Poltava province, where the work was continued under the authority of E.Y. Zalenskyi. In 1919 the station was nationalized and transferred to the state plant-breeding stations. Seed material of Nemerchanska station was transferred to Berezototska Plant-Breeding Station of VSM of the Sugar Trust [2].

The selection of cereals also undergone substantial changes. In particular, the use of biometrical method and frequent selection was stopped within the limits of line. The last was used only during hybridization. Studying hybrids and the way they breaking up on the morphological races of Horkonkur wheat, E.Y. Zalenskyi came to the conclusion, that among identical botanical forms there is a row of physiology races that differently react on external conditions and that they took the last places by harvesting in the separate years of the latest sizes of meteorological factors despite the fact that on average for the same period they gave the way to the population that consisted of them. In 1908 the Nemerchanska station generated the Triumph Podillia Novyi variety of winter wheat, which had considerable advantages comparatively with the predecessor. The varieties of winter wheat Nemerchanska Yuvileyna and Skhreschena 1 also became very popular in the conditions of the Poltava province.

The breeding of winter rye was conducted in direction of receiving the persistent races for the morphological shape of ear: lyre-shaped, lyre-shaped and square, square. Variety of Petkus rye was taken out by the method of individual selection and characterized by high accommodation to the local climatic conditions.

Creation of new lines, considerably different from Nemerchanskyi the most early by thin membrane, greater absolute weight of grain and thick soft straw, became the result of plant-breeding work with oats. All of them became a part of the "Yuvileynyi varieties".

In 1920 Nemerchanska station was transferred to authority of the Chief Department of Sugar Industry, A. K. Lyzon was appointed as the works manager. Only since 1921, after revolutionary events, the establishment renewed its work, and formation of the landed area came to the end only in autumn of 1922. After transferring A. K. Lyzon to the Poltava district, F. K. Zygfrid became the leader of establishment, and L.I. Kowalewski was appointed to the position of the selection specialist.

As a result of heterogeneity of soils of the field areas a few crop rotations were applied in economies. In particular, in Nemercha - general for VSM plant-breeding station three 4-courses crop rotations were exploited: beet, winter, spring and sowing. In economic crop rotations with the aim of improving the soil fertility in all three farmstead (Nemerche, Popelyukhy, Kukavky) a clover was put to use.

At the station the selection of cereals (wheat, oats and maize) was widely developed, but in the Podolska province in other establishments such work was not conducted. Mainly the varieties created before were breeding: wheat – Novyi Triumph Podillia, Skhreschena, Yuvileina Banatka; oats – Nemerchanskyi The Earliest and Yuvileinyi, rye – Petkus [8].

Uladvivska (Uladvivsko-Liylivnetska) Plant-Breeding Station was created in 1888 for initiatives of Pototskyi count. Unlike Nemerchanska, Myronivska and Illinetska stations this station worked only at breeding of sugar beets under the direction of doctor of botany F. Kudelka, that headed the establishment during the first 10 years (1888 – 1898). In 1898 L. L. Sempolovskiy was appointed as the director of this station. The first twenty years of activity of the establishment were very productive. The grown factory seed satisfied not only the necessities of Uladvivskiy and the nearest in a district sugar-plants but also was supplied abroad (Germany, France, Austria).

The annual production of seed of sugar beets till 1911 exceeded 19841 poods. As the conclusions of French expedition affirmed in 1910, sowing material approximated to the best European varieties in quality.

In 1921 Uladivska Plant-Breeding Station was transferred to the authority of Varietal and Seed Management of the Sugar Trust, that considerably influenced on rapid renewal of a research work after the events of 1917 – 1920, during that the laboratory, the earth and part of property, were lost. From the moment of creation and to the moment of transferring to authority of the Chief Department of Sugar Industry, the station conducted researches only with sugar beets. The seed of elite of Klein-Wantleben served as the feedstock. Breeding was conducted by a mass frequent and individual selection. The seed of beet (pedigree) were sown on plant-breeding-comparative and selection areas, where phenological progeny tests were carried out, marking a shape and colouring of leaves, productivity, saccharinity, quality, degree of morbid affection and others.

The creation of variety of sugar beets of Uladivskyi became the important achievement of the station, which occupied the first place according to productivity not only among the varieties of the Soviet Union stations but also successfully competed abroad among the best European firms. At the end of 20-ths of the past century this variety was admitted as a standard for the district of growing of sugar beets [9, 11].

The creation of **Illinetska Plant-Breeding station** took place in 1896 for initiatives of Dobrovolskyi, manager of Illinetskyi estate. The establishment was a part of San-Donato Illinetskyi estate, and was managed by the director of sugar-plant. The work was conducted exceptionally with sugar beets by the selection of roots for saccharinity by means of polarization method. During 1916-1918 the selection leader was Rytel, who innovated an individual selection, and also changed the techniques of determination of sugar's content. Seed production became a separate direction of station's activity that consisted in reproduction in other estate's economies of Dippe and Shreiber beet seed.

In 1920, due to efforts of administrator of the station E. X. Shlezyng, the station began to revive. At the same year it was transferred to the authority of the Chief Department of Sugar Industry. The territory of establishment was extended due to joining of Barabarovka farms. In 1923 Svystunka farm and Romaniv farmstead were also transferred to Illinetska station. The methodology of research realization was considerably extended, in particular, the system four-courses and five-courses rotations were put into use, the study of cereals was started. Since 1921 the breeding of sugar beets was conducted by the method of individual selection. 200 roots were selected annually. The stripes of cannabis and other high plants were applied for isolation. The vegetative reproduction (cloning) and scission of roots on parts was launched at the station with the aim of rapid receiving a large amount of seed [3].

Myronivska Plant-Breeding Station was created in 1911 in Shevchenko district of Kyiv province on initiative of All-russian Society of Sugar-refineries (ARSSR) and the Department of Agriculture of the Russian Empire as a central research establishment from the sugar beets cultures. This date was confirmed by the archived certificate of the Russian State Historical Archives for No. 2235 dated 29.09.2010, Yevych and Verhunov mentioned it in their researches [1, p. 71–72]. However, as noted in the monograph, the 1911 should be a considered the year of formation and organization of the station, as officially it was ratified only on June, 9, 1912. The program of activity of the station was closely connected with directions and tasks of the network of research establishments of ARSSR, becoming their logical continuation. First of all it was predetermined by that its developer was S. L. Frankfurt who headed the network of the stations of Society, but each of them had its leader.

S. M. Tulaikov was appointed as the first director of the Myronivska Plant-Breeding Station, the agriculturist O.F. Nesterov and specialist O.K. Philipovskyi became his assistants.

Among the tasks of the newly-created establishment there are: 1) the field researches of crop rotations with the aim of improving the soils fertility; 2) long-term researches of different ways of growing the field cultures; 3) studies of natural factors

that had the most impact on the quantitative and quality indices of harvest; 4) the short-term field researches of agrotechnical ways and other. Since 1913 the meteorological observations were conducted at the station. It is obvious, that only field experiments were conducted in the establishment at the moment of its creation, accordingly, it structurally contained only one research department.

It should be noticed, that practically from the beginning of foundation of establishment the study of varieties of winter wheat, oats and sugar beets was also included to the program of researches, that is why in 1915 at the research station a plant-breeding department was created. K.F. Murashko was appointed as the first manager of department and after his departure to Poland – I. M. Yeremeiev took his place [7]. K.F. Murashko began actively studying and breeding of local varieties of sugar beets. In particular, he sowed received standards of seed of superelite from the Vinnytsia department of Klein-Wantzeleben, and it was the beginning of selection.

The period of 1917 – 1920 was difficult enough for the station, foremost, in relation to finance provision. In 1919 fire occurred at Myronivskiy sugar was the basic source of income, and it influenced considerably on this situation. In its turn, such situation resulted in stop of agricultural engineering researches.

The new stage of development and research activity of Myronivska plant-breeding station started in 1922 - after the foundation of Varietal and Seed Management. The establishment received significant funds for recreational work. In 1921 “Myronivka” meteorological station was created [4], in 1922 the building of plant-breeding laboratory was completed, scientific library and constantly standing museum began to function [5], in 1924 the “Works of Myronivska research and plant-breeding station” periodic press organ was found [6] and others. In the same year, according to resolution of the Second Session of Kyiv Regional Committee of Agricultural Research Work and Meeting of Researchers of VSM of the Sugar Trust, two more departments – plant pathology and entomology – started to be organized at the Myronivska station. In the following year 1925, the structure of establishment was filled up by two departments – seed-production and adaptation. In accordance with such changes the tasks and directions of researches were

considerably extended. In particular, the research-department carried out: a) the study of productivity of crop rotations with the different percents of areas of beets, b) the research of influence of fertilizers, c) the study of fallows occupied for wheat, d) the study of soils tillage and terms of sowing; the plant-breeding department – studied breeding of sugar beets, winter wheat, oats; the entomology department – studied the pests of sugar beets and means of defence from them; phytopathology department – studied illnesses of sugar beets, wheat and oats; the department of adaptation and collective experiments – made collective experiments in seed economies and state farms, studied methodology of agrotechnical work, organized professional conventions and conferences [1, p. 112].

The results of work of research and plant-breeding departments should be considered to be the best achievements of Myronivska Plant-Breeding Station. In particular, the first has established the following: 1) productivity of sugar beets increases almost in one and a half times under condition of growing them in crop rotation; 2) sets of cultures and their duty in a crop rotation influence on productivity of the plants grown therein: rises - at the increase of percentage of area under beet and reduces - at the increase of area under the fallow; 3) sugar beets productivity goes down at the excessive increase of sowing areas under them; 4) the fallow under potato considerably increases the productivity of crop rotations, and under leguminous it - does not find out noticeable influence; 5) with permanent harvests the 5-courses crop rotation from 40 and 20 % of beets became most productive at corresponding choice and duty of cultures; 6) the best predecessor of beets is considered a wheat in a clover crop rotation; and the worst are beets and oats; for a wheat the best is clean fallow. By a plant-breeding department in this period the world-wide variety of winter wheat Ukrainka 0246 was created, productive variety of winter wheat Yuvileina No.103 and two varieties of oats : No.70 and No.90 [7]. In addition, the conclusion special agreements (contractual themes) with the local population in relation to possibility of reproduction on their fields of new varieties was launched by Myronivska station (Kowalewski L.I. and Eremeiev I. M.) in functional practice.

Except for the research work, the Myronivska Plant-Breeding Station together with Maslivskiy Varietal and Seed Management Technical College (afterwards became an Institute) practiced also scientific and educational activity. First of all, it was predetermined by the closeness of location of two establishments, that gave an opportunity to the students of technical college to use the station as base for realization of selection practicing, seed-production, defence of plants, agrotechnics and others. But almost all specialists of Myronivska station worked at the University in addition to other duties. Among lecturers there were such well-known scientists as S.A. Smirnov (plant pathologist), I.V. Lindeman (entomologist), D.V. Litovkin (selectionist), A.I. Piatenko (agriculturist, soil scientist), I.M. Eremeiev (selectionist) and others [10].

Thus, the network of the experimental stations of VSM, which counted 16 establishments, 14 of them were plant-breeding research stations, 1 was a seed plant and 1 was the micro-entomological station, was a basis for realization of experimental works and practical introduction of theoretical developments of the specialists. Most effective, in particular creation of variety of winter wheat Ukrainka 0246. The activity of Myronivska Plant-Breeding Research Station was the most resultative, in particular, the creation of variety of winter wheat Ukrainka 0246, which was afterwards reorganized in an institute functioning as, Myronivskiy Institute of Wheat till nowadays. Without regard to that, all stations were founded for satisfaction of necessities of sugar industry, most achievements in selections associated with the creation of new varieties of grain-crops. In addition, the specialists and scientists of the establishments worked out the methodology of collective progeny tests, entered 4 - and 5-courses beet crop rotations, approved and applied the agrotechnics of growing of different cultures in economies, studied the biology of plants-weeds and harmful organisms worked out control supplies against them, etc.

Referenses

1. *Вергунов В. А.* Передумови становлення та діяльність Миронівської селекційно-дослідної станції (1911–1968). До 100-річчя заснування Миронівського ін-ту пшениці ім. В. М. Ремесла НААН / В. А. Вергунов,

П. П. Євич ; НААН, ДНСГБ ; за наук. ред. В. А. Вергунова. – 2-ге вид., перероб. та доп. – К., 2012. – 172 с.

2. *Войткевич И. И.* Очерки селекции сахарной свеклы / И. И. Войткевич // Бюл. Сортовод.-Семен. упр. Сахаротреста. – К. : Изд. Сахаротреста, 1923. – № 4. – С. 81–127.

3. *Ильинецкая* сортоводная станция // Сортоводные станции Сахаротреста / ССУ Сахаротреста. – К., 1923. – С. 109–122.

4. *Кузьмінська Г.* Миронівська селекційно-дослідна станція / Г. Кузьмінська // Миронівський край. – 2011. – 1 лют. (№ 8). – [До 100-річчя Миронівського інституту пшениці ім. В. М. Ремесла НААН України].

5. *Кузьмінська Г.* Миронівська селекційно-дослідна станція / Г. Кузьмінська // Миронівський край. – 2011. – 8 лютого (№ 10). – [До 100-річчя Миронівського інституту пшениці ім. В. М. Ремесла НААН України].

6. *Кузьмінська Г.* Миронівська селекційно-дослідна станція / Г. Кузьмінська // Миронівський край. – 2011. – 19 трав (№ 13).

7. *Мироновская* опытная и селекционная станция // Сортоводные станции Сахаротреста / ССУ Сахаротреста. – К., 1923. – С. 41–65.

8. *Немерчанская* сортоводная станция // Сортоводные станции Сахаротреста / ССУ Сахаротреста. – К., 1923. – С. 203–215.

9. *Уладовская* сортоводная станция // Сортоводные станции Сахаротреста / ССУ Сахаротреста. – К., 1923. – С. 329–333.

10. *Черныш О. А.* Академик В. Н. Ремесло – учёный и организатор сельскохозяйственной науки (1907–1983) (к 100-летию Мироновского института пшеницы им. В. Н. Ремесло) / О. А. Черныш, В. А. Вергунов ; НААН, ГНСХБ ; науч. ред. Н. Д. Безуглый. – К., 2011. – С. 15. : портр., фото.

11. *Шпановский А.* 40-летний юбилей Уладовско-Люлинецкой селекстанции / А. Шпановский // Бюл. Сахаротреста. – 1928. – № 11 (67). – С. 80–82.