# From Russia with Seeds: The Story of the Savitskys, Plant Geneticists and Breeders

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The most dramatic waves of the Russian emigration occurred in the first decades of Communist rule. This paper presents a peculiar émigré story that started in Soviet Russia of the 1930s–40s, continued in the post war Western Europe and ended in the USA. Such a theme very rarely, if ever, becomes a subject of historical discussion. The focus of the paper is the circumstances of life and work of the married couple – Vyacheslav Fabianovich Savitsky (1902–1965) and Elena Ivanovna Kharechko-Savitsaya (in the USA – Helen Savitsky) (1901–1986) who were geneticists and plant breeders. Their fate was utterly exceptional: the Savitskys had chosen to continue their research on sugar beets during the Nazi occupation of the Soviet Union in 1940s, then left their homeland with the retreating German troops, and finally made notable contributions to monogerm sugar beet breeding in the USA. In this paper I will analyze the multiple reasons for their emigration. I will also discuss the circumstances of their life in the USA, as well as the reasons of immediate success of their research projects.

***Keywords:*** Vyacheslav Fabianovich Savitsky, Elena Ivanovna Kharechko-Savitsaya, Soviet agricultural science, plant genetics, plant breeding, monogerm sugar beet, N.I. Vavilov, T.D. Lysenko, WWII, Nazi occupation, the USA.

The Savitskys' story[1] is first and foremost a story of the collaboration of the Soviet scholars with the German authorities during the Nazi occupation and their subsequent emigration. Such a theme very rarely, if ever, becomes an object of detailed analysis. Clearly the most discussed waves of emigration in the XX century are the one that happened in Russia during the first decades of the Communist rule, and the second one that occurred in Western Europe facing the Nazi regime[2]. In this paper I analyze the multiple and extremely complicated reasons for the Savitskys' collaboration with the Nazis and their decision to emigrate with the retreating German troops.

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[1] The paper is based on the published as well as on archival documents. Among the consulted archives were: Archive of VIR (mostly Nikolay I. Vavilov's personal collection; Dmitriy I. Tupitsyn's personal collection); Russian State Archive of Economy (RGAE); Russian State Historical Archive (RGIA); State Historical Archive of Ukraine (GIAU, Ukraine); Archive of the Ukrainian Institute of Sugar Beet Industry, Kiev, Ukraine (mostly Olga K. Kolomiets', Maria G. Bordonos', and Ivan Ya. Balkov's private collections). All the archival documents on the Savitskys are from H. Savitsky's Private Collection (the USDA-ARS Agricultural Research Station, Salinas, California, USA); these files were kindly granted to me by Dr. Robert T. Lewellen, former Research Geneticist, ARS, Salinas Station. Some of the documents from the collection (mostly published papers) are now in the process of digitization. I am most grateful to Dr. Lee Panella, Research Geneticist, ARS, USDA, and Mr. Tom Schwartz of the American Society of Sugar Beet Technologists, responsible for this work, for their decision to share with me some of the digitized files. This work is ongoing, so probably additional files from the Savitskys' archive will eventually be available to historians online.

[2] For the general context of the Russian emigration, see, e.g., Ruchkin, Zatsepina, 2011; Ulyankina, 2010; Alexandrov, 2005; Sabennikova, 2002; Pronin, 2000.

Simultaneously the Savitskys's story is one of the glorious experimental work of Soviet breeders in the USA. Therefore, I will also discuss the reasons for the immediate success of their breeding projects as well as circumstances of their American life and research activities.

The Savitskys's story began on the eve of WWII in the All Union Sugar Beet Research Institute in Kiev, where Vyacheslav and Elena worked on the selection and cytology of sugar beets. By 1940 the Savitskys had completed a PhD course in Leningrad, written their doctoral theses, and were both granted the title of professor[3]. Elena focused on the embryology and cytology of sugar beets. Vyacheslav was especially interested in the selection of single-germ (monogerm) sugar beet variety that promised a revolution in sugar beet production. They made quick progress in their research and produced dozens of innovative publications on the subject.

What exactly happened to them during the end of 1930s – beginning of the 1940s? Why did these enthusiastic, motivated scholars who were already distinguished in their homeland and abroad prefer to emigrate? To answer these questions one must be acquainted with the situation in the Soviet plant breeding and agricultural genetics before and during WWII.

## Vavilov, Lysenko and Pre-War Situation in the Soviet Plant Breeding

Until the beginning of the WWII, Soviet plant science held a leading position in the international scientific community (Elina, 1997, 2002). The key figure in this field was an outstanding breeder and geneticist Nikolay Ivanovich Vavilov (1887–1943), who set up and headed the Institute of Plant Industry (VIR, according to the Russian abbreviation) in Leningrad. Numerous laboratories and the institute's experiment station studied the genetics, cytology, taxonomy, and other disciplines of plant science. Vavilov organized expeditions to many foreign countries and collected a wide range of genotypes of crop plants. More than 180 expeditions, including 40 foreign ones, were conducted from 1917 to 1933. This resulted in the creation of a valuable collection of cultivated plants – the world's first large scale gene bank and the essential basis for breeding. By the mid-1930s, VIR had grown to an enterprise with 1,500 staff members, hundreds of breeding stations, and possessed seed collections of more than 250,000 samples[4]. Visiting Leningrad in 1930s, renowned German geneticist Erwin Baur claimed that the Soviet Union had gained reputation as the most advanced country in plant breeding and applied genetics. Many foreign scholars worked in the Soviet Union with Vavilov in VIR and other agricultural and genetic institutions: the Americans Dr. Hermann J. Muller (future Nobel Prize winner), Dr. Karl Offerman, Dr. Daniel Raffel, Dr. Rosalee Raffel, the Bulgarian geneticist Doncho Kostov, and others (Mikulinsky, 1987, p. 224).

Stalin's 'Great Break' and collectivization changed the policy of the favorable state attitude towards the broad development of plant science, both practical and theoretical, to the urgent mobilization of plant breeders to fulfill the socialist reconstruction of agriculture. As collectivization caused a crisis in agricultural production and famine in Ukraine, Soviet agriculturalists came under pressure to "increase yields by all means". Plant breeders were expected "to produce new valuable breeds in shortest periods" (Elina, 2005, p. 153).

[3] On the Savitskys, see: V.F. Savitsky, 1965; Savitsky H., 1964–1968; McFarlane, 1993a, b; Maksimov, 2008; Ulyankina, 2010, p. 494; Stevanato, Panella, 2013, p. 17–21.

[4] On Nikolay Vavilov, see for example: Pringle, 2008; Loskutov, 1999; Cohen, 1991; Bachteev, 1988.

Public attention was focused on Trofim Denisovich Lysenko, an agronomist of peasant background and little academic education who proposed ambitious breeding projects[5]. Lysenko started with his method of 'vernalizing' winter seeds, which he propagated as a panacea for increasing grain yields (and at the same time, a new technique of breeding). Even without relevant expertize and experimental testing this method was widely accepted in the Soviet Union. Encouraged by this success, Lysenko began promoting other 'panaceas' based on vernalization and on his theory of 'phasic development of plants' ('stages in plant development').

Lysenko promised bigger, faster, and cheaper crops, which were badly needed in the faltering agricultural system of the Soviet Union. In tandem with the communist philosopher Isaak Present, Lysenko was able to use ideology in his appeal to Stalin and other government leaders. Stalin personally gave him strong support at a large public conference in 1935. Soon after, Lysenko became President of the All-Union Agricultural Academy (VASKhNIL, according to the Russian abbreviation) and thus gained great power in Soviet agricultural science.

This was prior to their labeling of Mendelian genetics as 'formal' and 'bourgeois', and the open persecution of geneticists. Nonetheless the rise of Lysenko during 1930s led to dramatic changes in plant breeding research policies.

First of all, the gathering of world plant resources was labeled as "overtly theoretical" and unflatteringly compared to the practical potential of Lysenko's agrobiology. For example, the newspaper *Pravda* wrote in October 1937 that "VIR's expeditions absorbed huge amounts of people's money. <…> we must declare that practical value of the collection did not justify the expenses" (cit.: Medvedev, 1993, p. 86). Then, the research staff of the breeding institutes were instructed to practice Lysenko's 'agrobiology' methods; those who did not follow Lysenko and openly opposed his approach experienced opposition on all levels to their own research projects.

Simultaneously the fate of Soviet scholars was affected by the general situation in the country, where political purges started from mid 1930s. Those scientists who had worked abroad or contacted actively with their foreign colleagues became subject to persecution. On the eve of WWII, Vavilov and his close colleagues and associates throughout the country suffered oppressions; a number of prominent scholars – Georgy D. Karpechenko, Grigory A. Levitsky, Leonid I. Govorov and others – were sent to prison under the fabricated accusations and executed. Nikolay Ivanovich Vavilov was arrested in 1940, and during the war his colleagues knew nothing about his fate.

## War and Occupation: Plant Breeding Materials as Objects of Seizure

Nevertheless, by the 1940s, Soviet plant science still kept the leading position in the international breeding community and was of particular interest to the German policy makers in the field of science. The Russians and the Germans had an especially close relationship in plant breeding and agricultural genetics before the war, in 1920s–1930s. Along with the traditional Russian attitude to German science, this was a result of personal friendship and scientific contacts between Nikolay Vavilov and his German partners.

The war immediately shifted the norms of scientific ethics. German scientists grasped the opportunity to visit the famous institutes and to usurp the collections and breeding material

[5] For analysis of Lysenko's rise and Lysenkoism, see, e.g.: Joravsky, 1986; Krementsov, 1997; Roll-Hansen, 2005.

of their former partners. For example, the director of the Kaiser Wilhelm Institute for Biology (Kaiser-Wilhelm-Institut für Biologie, KWIB), Fritz von Wettstein, emphasized the significance of the seizure of seed collections as the crucial task for the war time development. A special group of experts was organized to outline a plan for the capture of Soviet breeding institutes. The Germans planned to continue research, reproduction, and preservation of plant materials in Russia, and were later going to transfer this activity to the institutions on the territory of the Third Reich.

After the Nazi troops had invaded the Soviet Union, during the autumn of 1941 the Military High Command ordered the seizure of all scientific institutes and plant breeding stations in the occupied regions. Since most of the top Soviet scientists had been evacuated, the Germans were sent to the occupied territories to manage the institutes[6].

The seed collections and plant breeding materials of VIR and of several other big institutions – the All Union Sugar Beet Research Institute in Kiev, the All Union Institute of Genetics and Plant Breeding in Odessa – became a main object of the plunder.

Most of the VIR's collection was kept in the institute's headquarters in besieged Leningrad; the siege lasted from 1941 to 1944[7]. VIR's Central Station of Genetics and Plant Breeding at Detskoye Selo, twenty-four kilometers south of besieged Leningrad, was among those institutions that faced occupation. Dr. Walter Hertzsch, head of KWI's branch for Plant Breeding (Kaiser-Wilhelm-Institut für Züchtungsforschung, KWIZ) in East Prussia, was sent to Detskoye Selo to supervise the research. The Germans also directed many other well-known breeding and genetics stations and institutes in Ukraine, Belorussia and Crimea during this period. In all these institutions the policy was to persuade the Soviets to continue their scientific research for German interests (Elina, Heim, Roll-Hansen, 2005, p. 168–172).

Here I suggest several key motivations for the collaborations that ensued between some of the Soviet scientists and the new regime. According to the rules of the scientific ethics in plant science, Vavilov and his colleagues regarded their seed collections and plant materials as property of the international scientific community (and, hence, of mankind). Scholars who stayed in the occupied laboratories felt responsible for preserving these objects. This may be the reason why some of them continued working under the Germans, despite the inevitable accusations of collaboration and betrayal.

A second motivation could have been connected with the policy of neglecting classic plant breeding, sanctioned by Lysenko and his patrons. The accession of 'agrobiology' led to the concealed protest by many breeders for whom Lysenko's rise could result in institutional obstacles and even discharge.

Finally, a number of geneticists and plant breeders were sent to prison under fabricated political accusations; some of them, including Vavilov, were executed.

Meanwhile, the Germans who were involved in plant breeding stressed their adherence to classical breeding and strongly opposed Lysenko's 'agrobiology'. Thus, the protest against 'agrobiology' as well as fear to follow the dramatic fate of imprisoned breeders and geneticists seem to be the most evident motivations for collaboration. However, the latter could have also been motivated by financial, ethnic and other private reasons, or by concerns for security.

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[6] For a detailed analysis, see: Elina, Heim, Roll-Hansen, 2005; Heim, 2003; Flitner, 1995; Deichmann, 1995; Müller, 1991.

[7] Evacuation was attempted in August 1941. But only 'strategically important' seeds – of rubber-bearing plants, medicinal and tanning herbs, etc. – were saved by air at that time to Krasnoufimsk and other locations in the Urals and Siberia (Krivchenko, Alexanyan, 1991).

For example, among those who agreed to cooperate was Yevdokiya Ivanovna Nikolaenko, a wheat breeder from VIR's Detskoye Selo station. Her research was focused on immunity (fungi decease resistance) and its inheritance in different varieties of wheat from the world collections[8]. Nikolaenko agreed to accompany the wheat collection of about 800 samples when it was moved to the Baltic countries with the retreating Nazi troops. Could she refuse? Probably, yes. When the Germans were forced to leave the Baltic region and began evacuation, Nikolaenko fled. After the Soviets came to Latvia she returned to the experiments with the collection. But soon after Nikolaenko was arrested for collaboration and sentenced to 20 years of hard labor in the concentration camps (GULAG) (Miluitina, 1997).

The Maikop Plant Breeding Station in the Krasnodar region of the North Caucasus, was occupied for only half a year in 1942. Vera Akseleevna Sansberg, an ethnic German, continued her research on potato breeding, however, she never regarded her activity as collaboration. Sansberg refused to accept a salary and even got away with posting signs that read "Germans are not allowed!" at the experimental field. As a Soviet patriot, V.A. Sansberg never considered emigration. Nevertheless, after the war the Soviet Secret Service (NKVD) arrested Sansberg for collaboration with the Nazi and sent her to the GULAG[9].

## The Savitskys Before and During WWII

The All Union Sugar Beet Research Institute (AUSBRI, or SBI) in Kiev, where the Savitskys worked, also experienced occupation. At that time they both were renowned professors and each headed a laboratory with a staff of coworkers.

Vyacheslav Fabianovich Savitsky (also translated Viacheslav, Wiacheslav; Savicki, Savitski) was born September 8, 1902, in the Don Region (the so-called Region of Don Army) (Glazyrin, 2012)[10]. His father was a veterinarian. Apparently, his family later moved to Central Russia, because Vyacheskav graduated from the Elez classic gymnasium (secondary school) in 1919[11]. In spite of the tough years of Civil War and his 'non-proletarian origin' he managed to gain entrance to the famous Agricultural Institute in Kharkov and graduated with the equivalent of a Bachelor of Science degree in agronomy in 1924[12].

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[8] Nikolaenko also had serious personal reasons to continue her research during the occupation. Nikolaenko's husband had been arrested and she simply had no other opportunity to sustain her family: two little daughters and her sister who was almost blind (Yakovleva, Lassan, Filatenko, 1994).

[9] On Sansberg, see: Tat'yana K. Lassan, former VIR archivist, interview by Olga Elina, August 14, 2002. I am also grateful to Tat'yana Lassan for her help in collecting materials from the VIR Archive, including the unpublished memories of Dmitriy I. Tupitsyn, the head of Maikop station in 1960s.

[10] H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA). There is indication in Vyacheslav's American papers that the place of his birth was *Stanica*. This word, however, is the local name for small town, village, and would certainly need to be followed by an additional precise place, e.g. *Stanica Veshinskaya*, etc. There are quite a few inaccuracies in the quoted biographical data that I referred to: these can be attributed both to the translations mistakes and to the cultural and institutional discrepancies between the Soviet Russia and the United States of the period. I was able to verify a good part of questionable data; however some work remains to be done.

[11] H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA). See also: McFarlane, 1993a, p. 2–3.

[12] This institution was founded in 1816 as the Marimont Institute of Agriculture (near Warsaw, Poland), later known as the Institute of Agriculture and Forestry in New Alexandria (near Pulavy, Poland,

Elena Ivanovna Kharechko (also Harechko, Haretchko, Chareczko) was born February 17, 1901 in Poltava, Ukraine. Her father was a prominent physician who managed his own clinic. He was also president of the local medical society and a member of the city council. After the revolution, the family was persecuted and lost all their property. Elena visited the Poltava gymnasium for girls and, after graduation, entered the same Agricultural Institute in Kharkov. While a student, she met Vyacheslav Savitsky, and they became close friends[13].

Elena Ivanovna Kharechko-Savitsaya, 1948, Salt Lake City, Utah, USA. Hereinafter: Helen Savitsky's Private Collection (the USDA-ARS Agricultural Research Station, Salinas, California, USA

Following their graduation from the Institute, Vyacheslav and Elena could work as agronomists but preferred to continue their education. They were both passionate about breeding and entered the High Courses for Breeding in Kharkov. In 1926, after the presentation of their dissertations, each was granted '*the diploma of agronomist*' (equivalent of Master of Science) by the Agricultural Institute.

After graduation, Vyacheslav accepted a position at the Belaya Tserkov Breeding Station (also known as the White Church Breeding Station). Elena first went to Vavilov's Institute of Applied Botany in Leningrad (from 1930 – Institute for Plant Industry, VIR) where she worked on cytology and inbreeding of rye. Later she joined Vyacheslav at the Belaya Tserkov Station; as head of the Laboratory for Cytology she was assigned to work on sugar beet embryology and cytology. Vyacheslav also taught at the Belaya Tserkov High Courses for Breeding organized by the Station[14]. It was at Belaya Tserkov that they were married.

At the end of 1930s, the Savitskys were transferred to the All Union Sugar Beet Research Institute (SBI, later the All Union Research Institute for Sugar Industry, today – the Ukrainian Research Institute for Sugar Industry)[15] in Kiev and simultaneously entered a *'doctor of science'* course (an equivalent of a PhD) at Leningrad University. They both studied and worked on their theses under N.I. Vavilov and Professor Georgy Dmitrievich Karpechenko, Vavilov's close colleague and prominent plant breeder. Elena worked at the Laboratory of Cytology at VIR; Vyacheslav's research was on the heredity and variation in genera *Beta vulgaris L.* (Savitsky, 1939). Both carried out their breeding experiments at VIR Central Station of Genetics and Plant Breeding

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at that time a part of the Russian Empire); the institution was transferred during WWI to Kharkov to eventually become the Kharkov Agricultural Institute (Elina, 2005, p. 221; Elina, 2012).

[13] H. Savitsky's Private Collection (Archive of the USDA-ARS Agricultural Research Station, Salinas, California, USA).

[14] Ibid.

[15] On the history of the Institute and its research programs, see, e.g.: Roik, 1997.

at Detskoye Selo. After the completion of high quality research, each was granted the title of professor (McFarlane, 1993a, p. 2).

At the SBI, Vyacheslav held the position of Head of the Genetics Laboratory; he also taught at the Kiev Agricultural Institute. V. Savitsky was especially interested in the selection of a sugar beet variety with single-germ (monogerm) seeds instead of multigerm[16].

The task of searching for plants with monogerm seeds was assigned to a junior staff member of the Laboratory, Mariya G. Bordonos, and her assistant Olga K. Kolomiets. According to Bordonos, more than 22 million seedbushes (1023 hectares) were examined, with 109 plants producing monogerm seed (Bordonos, 1938, p. 24–27). Vyacheslav's hybridization studies revealed that the monogerm character was recessive. The monogerm varieties he produced in the SBI at that time were characterized by a number of negative characteristics: poor vigor, late maturing seed plants, low tonnage, low sugar content, and low seed yield (Orlovsky, 1947). As V. Savitsky later stated,

Vyacheslav Fabianovich Savitsky, 1948, Salt Lake City, Utah, USA

> "Demands which will be made for improved size and weight of monogerm seed and for increased vigor of seedlings will make it necessary to develop the most appropriate agronomic methods for seed production which will produce seed of the highest quality. However, the main problems in this field must be solved by breeding work" (Savitsky V., 1952, p. 334).

While still in the Soviet Union, Vyacheslav had published about 50 books and articles on sugar beet breeding; the most impressive was "The Genetics of the Sugar Beet", part of the 3-volume book "Sugar Beet Breeding" (translated also as "Sugar Beet Industry")[17].

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[16] An individual sugar beet (*Beta vulgaris*) plant develops from one true seed. In nature almost all *B. vulgaris* seeds are multigerm. Botanically, a multigerm seed is composed of two to six fused individual fruits called a glomerule. A seedball with a single true seed (fruit) is called monogerm. Until the discovery and use of genetic monogerm, all commercial beet varieties were multigerm. Multigerm seed used by farmers produced multiple seedlings emerging very closely together. To obtain maximum yield, all but one seedling needed to be removed by hand singling and spacing. The combination of monogerm seed with other modern agricultural practices allowed precision sowing and changed the sugar beet crop from one of intense manual (stoop) labor to one of complete mechanization. Without the monogerm trait, it is doubtful that sugar beet could be grown economically in current western agriculture (Biancardi, Panella, Lewellen, 2012; Austin, 1928).

[17] The book was published by the SBI, at that time renamed to the All-Union Research Institute of Sugar Industry (RISI): Savitsky, 1940.

Elena's research focus was on the embryology and cytology of the sugar beet; she headed the Cytology Laboratory at the SBI. In particular, she studied the problems of self-sterility and self-fertility, polyploidy, and chromosomal behavior. Her resume of those years listed 26 publications (Savitskaya, 1940). Visiting scientists were impressed by the high quality of her research. Following a visit to her laboratory, the American Dr. G.H. Coons stated: "Her cytogenetic work was exceptional in quality and she stands alone in this particular field of work" (cit: McFarlane, 1993a, p. 4, 15).

During WWII, the Institute was evacuated to Frunze (now Bishkek), Kirgizia, but the Savitskys preferred to remain in Kiev. They managed to set up a small secret room in their house to hide Vyacheslav. The SBI staff member, Efim V. Tonkal', who was responsible for evacuation, was only able to locate Elena – who then refused to leave without her husband. When the German troops took the city in 1941, the Savitskys returned to the Institute, renamed the Plant Breeding Institute, and continued their research on sugar beet. According to Elena's papers she was assigned as a Professor of Cytogenetics at the Plant Breeding Institute in 1941–1942[18].

In 1943, when the defeated German army was forced to retreat from Kiev the Savitskys decided to go with them. To understand their motivations one needs to be aware of the situation in the SBI and around the Savitskys.

The Savitskys were close friends of Nikolay Vavilov. It is worth mentioning that Vavilov visited the Savitskys many times and inspected their experimental plots. Moreover, Elena reported later that she met Vavilov in May 1940, not long before his arrest:

> "He looked very tired and sick. I was at Vavilov's home. Mrs. Vavilov told me that when Vavilov left home in the morning and rode to the Institute, he called her to tell when he arrived at the Institute. Before leaving the Institute after work, he also called her to tell that he was leaving for home. He feared that he might be arrested any moment and informed his wife that he was still safe. She would then know should he disappear after he was arrested. This was the last time I saw Vavilov. In the summer he went to Poland (occupied at that time by Russian troops) to collect samples of wheat and was arrested during this expedition… After his arrest, Vavilov disappeared. Nobody, including his family, ever heard anything about him"[19].

Thus the Savitskys were well informed about Vavilov's drastic fate; some of their colleagues and friends from the SBI were also arrested.

Moreover, the Savitskys were in scientific correspondence with many foreign plant breeders and had a number of visitors from abroad in their laboratories at the ISB. For instance, during the 1930s, visitors from the US included Dr. G.H. Coons, Sugar Plant Investigation Unit, the USDA; H.W. Dalhberg, research manager from the Great Western Sugar Company; Professor H.J. Muller, who at that time worked at the Department of Genetics, University of Indiana. One should remember that contacts with 'bourgeois' scientists at that time inevitably led to 'accusations of treason against the Homeland'.

Meanwhile the Savitskys themselves explained their motivations for emigration in a special letter where they also stated their political views and scientific preferences. The letter was written in English and I've preserved the author's original style:

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[18] Letter from H. Savitsky to Mr. Ernst Kay D. Litt, International Biographical Center, Cambridge, England, November 2, 1979 / H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA).

[19] Helen Savitsky. My remembrance of N.I. Vavilov. Unpublished manuscript / H. Savitsky's Private Collection. Partly this manuscript was quoted in: Cohen, 1980; Cohen, 1991.

"We were never members of any political party <...>, but we are not indifferent to the political matters. We detest the communists and their ideology to the bottom of our hearts. All their doctrines and their actions are repulsively and unendurably for us. We tried to go abroad during all our life, but unsuccessfully. We are free from them at last, but they try to catch us here also. Beside these decent in views, we suffered from them much. They pursued our families and us during many years. My two brothers were killed by them. The brother of Mrs. Savicki is deported to the concentration camp in Siberia; her sister was perished in exile. Many others our relatives were killed or deported by them. All these people were engineers, physicians etc., did not take part in the political activity and were exterminated by communists in order of mass terror. If it was not succeed us to disappear in time, we should be exterminated also. Nobody of you know doesn't know what a horrors are done behind the iron-curtain. We can't live with communists. We prefer to die, than to live in such a manner. We have lost all we are not afraid to expose ourselves to the danger of bombardment in Germany to become free from them only. We don't like the fascism also, for it is youngest brother of communism. We favor such a government, which can secure a reasonable liberty of personality, the human rights on a democratic basis, and which doesn't turn their people into slaves and their country into a huge concentration camp.

V. Savicki, January 9, 1947"[20].

This is a unique opportunity for a historian to read the document explaining the motivation behind collaboration between the Soviet scientists and the Nazi occupants. In most cases, scholars who worked under the Germans ended in the GULAG, and even those who survived preferred to keep silent on the issue. As a historian, I am far from taking the Savitskys' explanation for the full truth. Of course, they interpreted the facts of their biography in a favorable context. One should also remember that this letter was written in mid 1940s partly to explain their attitude towards Nazism: it was important for the USA authorities to know that the pair had not collaborated with the Germans voluntarily.

However there are some important facts mentioned by the Savitskys: two of Vyacheslav's brothers, both engineers, had been executed; Elena's brother and sister were exiled to Siberia. Elena's family bourgeois origin immediately framed them as 'unreliable' in the Soviet Russia. Combined with the information on their colleagues' imprisonment these family circumstances could become a very strong motivation to flee.

The Savitskys knew well that any moment they could be arrested, and they lived in constant fear and expectation of the NKVD visit. Given this background, one can better understand their motivation for collaboration and emigration.

The Germans allowed the Savitskys to take along some of their personal belongings, including a large number of scientific books, a few pieces of laboratory equipment, and genetic seed stocks[21]. This gave the Savitskys a brilliant chance to go on with their research projects that were extremely important for these ambitious and science-motivated breeders. Vyacheslav's parents and Elena's sister Kseniya left with them.

So, the Savitskys succeeded in their attempt to emigrate. Their first stop was in Poznan, Poland, where they spent two years and found employment at the University of Poznan. Vyacheslav was hired as a plant breeder and geneticist to breed cereals, kok-sagys and root

[20] Quotation from: McFarlane, 1993a, Appendix 6, p. 24.

[21] The suggestion that the Savitskys took with them the genetic seed stocks is apparently based on the Savitskys' recollections that they shared with Dr. John S. McFarlane (McFarlane, 1993a, p. 9).

plants. Elena was employed as a cytologist, working with interspecific hybridization in cereals, and also taught cytogenetics as a professor[22].

When the Germans were driven out of Poland in 1945, the Savitskys went with them to Halle, East Germany. The later stated that they had lost all of their genetic seed stocks during this move (McFarlane, 1993a, p. 6). For a short time, both Vyacheslav and Elena were employed at the University of Halle and also for the Sugar Beet Breeding Firm Schreiber in Nordhausen.

## Long Way to the USA

Following the signing of the Yalta agreement, East Germany was placed under the control of the USSR. The Savitskys fled to Regensburg, West Germany, and were employed at the Ukrainian Agricultural University with the titles of Professor.

After WWII ended, the United Nations Relief and Rehabilitation Administration (UNRRA) set up a displaced persons camp near Oberammegau, Bavaria, West Germany, for refugees from the USSR and other countries under communist control. The Savitskys were placed in the US zone of this camp and immediately started negotiations to immigrate to the United States.

This process was extremely difficult; a number of prominent American scientists and organizations helped the Savitskys. Among them were: Dr. G.H. Coons, Head Pathologist in Charge of Sugar Beet Investigation Division, the USDA; Professor Hermann J. Muller; Professor Bentley Glass; the Genetics Society of America and its Committee for Aid to Geneticists Abroad; the USA Beet Sugar Manufacturers Association, etc.

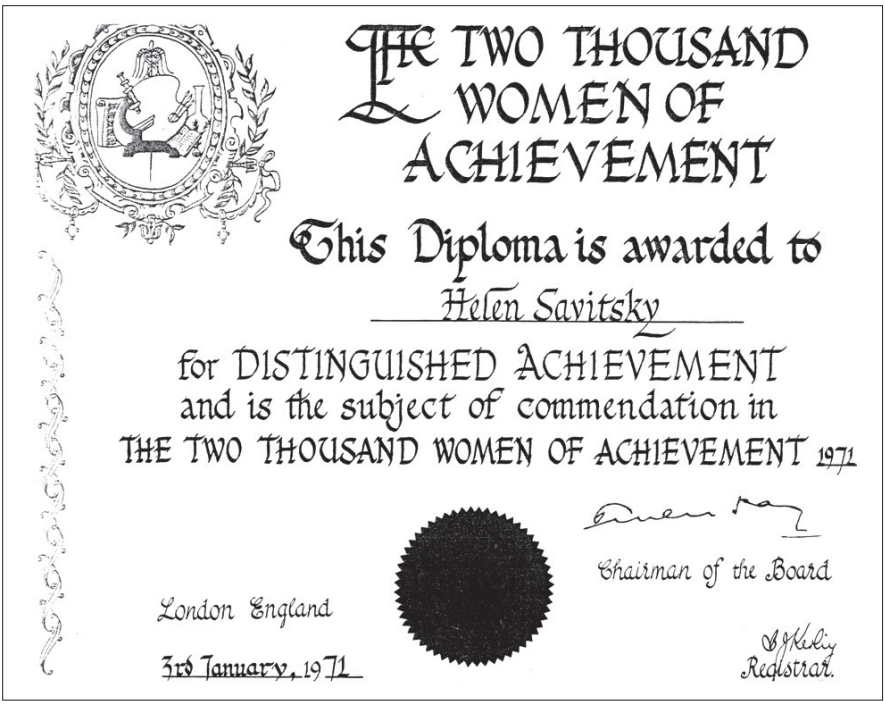
Coons, who visited the Savitskys in the Soviet Union during 1930s, was the first person who received a letter from Vyacheslav describing their plight and requesting help in obtaining permission for the family to immigrate to the USA. On July 8, 1946, Coons was officially informed by UNRRA that the Savitskys were in the displaced persons camp with permission to write and send packages. He was unable to do anything directly but referred the Savitskys' letter to Muller, Chairman of the Committee on Aid to Geneticists Abroad of the Genetics Society of America[23].

While in the USSR, H.J. Muller was also acquainted with the Savitskys and was most sympathetic to the pair. He immediately sent a letter to the members of the Genetics Society requesting their help in finding employment for the Savitskys. On July 24, 1946, B. Glass, a member of the Genetics Society Committee on Aid, wrote to Coons regarding his conclusions from conversations with other committee members. He pointed out that few American scientists, other than Muller, knew enough about the Savitskys to recommend them for specific places. He suggested that Coons prepare a full personnel report indicating their personal qualities, scientific standing, and their command of the English language. He also emphasized the desirability of contacting agricultural experiment stations in states that grew sugar beets and the large sugar companies regarding possibilities for employment (McFarlane, 1993a, Appendix 4, p. 18–19).

Coons did exactly what was recommended to him: he prepared a report on the Savitskys, and contacted state agricultural experiment stations and major private sugar companies, such as the USA

[22] Letter from H. Savitsky to Mr. Ernst Kay D.Litt, International Biographical Center, Cambridge, England, November 2, 1979 / H. Savitsky's Private Collection.

[23] On the Committee on Aid to Geneticists Abroad of the Genetics Society of America see: Jones, 2008.


THE TWO THOUSAND WOMEN OF ACHIEVEMENT

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Beet Sugar Manufacturers Association and the Beet Sugar Development Foundation, for providing employment or financial aid. However, these initial efforts were discouraging. The Rockefeller Foundation and the Society of Ukrainian Scholars were also contacted without success. The Sugar Plant Investigations Unit, the USDA, announced the need for geneticists in Costa Rica and Venezuela. Contacts were made but again the replies were negative (Ibid, Appendix 5, p. 20–22).

In late November 1946, a breakthrough finally occurred which eventually led to the solution of Savitskys' immigration problem. John McFarlane, who worked for the Curly Top Resistance Breeding Committee (CTRBC) on sugar beet breeding in their department at Salt Lake City, moved to Salinas, California. A suggestion was made that his position and salary be used to employ the Savitskys[24].

A major hurdle in getting the Savitskys to America had now been overcome, but visas, affidavits of support, and travel funds still were needed. In addition, a decision was required regarding the entire family.

[24] The Curly Top Resistance Breeding Committee was a nonprofit organization of all beet sugar companies in the western United States that were operating in areas subject to the devastating curly-top disease. Funds were provided to the Division of Sugar Plant Investigations to accelerate research on curly top and related problems, largely through breeding. The discussed position was connected with Sugar Plant Investigations Field Laboratory stationed at Salt Lake City and worked under the direction of Dr. F. V. Owen. Suggestion was made that McFarlane position be transferred to the Federal government and his CTRBC salary be used to employ the Savitskys. Dr. Owen attended a Denver meeting of representatives of the CTRBC on November 21, 1946, and obtained their approval for the suggested transfer proposal (McFarlane, 1993a, Appendix 5, p. 8–9).

The National Register of Prominent Americans and International Notables

To all to whom these presents shall come, Greetings. Be it known that, by virtue of the authority vested in them, the Board of Trustees of The National Register of Prominent Americans and International Notables do hereby recognize

Helen Savitsky, Ph.D.

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1978 ~ 1979

Geoffrey Parsons, Ph.D. — Executive Director

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One of the many cases of recognition in "The National Register of Prominent Americans and International Notables" for Helen Savitsky, 1978–1979, USA

Professor Muller, who had just been awarded a Nobel Prize, handled the negotiations with the officers of the State Department. For example, he visited Chief of the Visa Division, who took a sympathetic attitude toward the Savitskys' immigration but expressed some concern about their possible collaboration with the Germans. The Savitskys had to explain the situation. The above quoted letter was written exactly for the SD to clarify their attitude towards Nazism and the reasons of their forced collaboration with the Germans. The correspondence of this period indicated that many people were involved in and assigned to the Savitskys case and their assistance proved most helpful (McFarlane, 1993a, Appendix 5, p. 9–11).

As a result, the Savitskys family was transferred first to a transit camp in Munich, then to Bremerhaven to await passage to New York. In November 1947 they began their voyage to America.

They arrived in New York City and were met by a member of the Committee on Aid to Geneticists Abroad, former émigré from the USSR and prominent geneticist Theodosius H. Dobzhansky. As no information had been received from the Savitskys regarding any seed stocks (including monogerm seeds) they might be bringing, to avoid possible difficulty with the customs, the USDA representative edited special memorandum requesting that entrance of any plant material accompanying the Saviskys be expected. It is worth saying that in addition to their main baggage they carried some 800 books with them (McFarlane, 1993b, p. 126–128).

First at Salt Lake City, Utah, then at Salinas, California (from 1961), the Savitskys made notable contributions to the development of sugar beet breeding.

While in Salt Lake City, their main target was to find monogerm seeds. A decision was made that a place for their search should be in the seed fields near Salem, Oregon. Vyacheslav

examined several selected fields and identified five monogerm plants in the Michigan Hybrid 18 variety; these plants and others were taken to the laboratory in Salt Lake City. A careful study reveled that only two were true monogerms; one of these two, SLC 101 line was selected for most intensive study and increase.

His quick success can be attributed to Vyacheslav's keen sense of observation and his previous experience: the discovery had been made first in the Soviet Union, and he was aware of the plants characteristics associated with the monogerm character, namely, low inbred vigor and very late bolting.

However, another version of these events exists. As described by John S. McFarlane, in New York City the Savitskys stated that they had lost all seed stocks during their wanderings in Europe. There were a small number of breeders who did not think this was the true story. For example, Dr. Robert Oldemeyer, who worked at the time for Great Western Sugar Company, Longmont, Colorado, insisted that during the summer of 1947, when the Savitskys were allowed to correspond with their American colleagues, they enclose a few seeds of monogerm sugar beets to Dr. Coons. Coons looked for an opportunity to get the seed planted in Oregon by salting the stock seed of the variety Michigan Hybrid 18 with a small amount of monogerm sugar beet seed. As Oldemeyer stated, the Savitskys could not have carried the monogerm seed with them because they did not arrive in the USA in time for it to be planted and harvested in 1948. So, V.F. Savitsky actually knew exactly where to look on his searches of the Oregon seed fields (Oldemeyer, 1998).

The SLC 101 line was self-fertile and the task was to produce self-sterile monogerm seeds[25]. Work was also undertaken to receive hybrids with monogerm beets resistant to curly top virus[26]. These research programs led to the development of commercial monogerm resistant cultivars. By the 1960s, practically all sugar beet farmers in the USA and in Western Europe were growing monogerm cultivars[27].

Elena – now an American cytogeneticist, Dr. Helen Savitsky, was involved in her husband's studies with the monogerm character, doing cytological research in the sterility of monogerm seeds[28].

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[25] According to Dr. Robert T. Lewellen, former Research Geneticist ARS, Salinas Station, USA, there were two distinct breeding philosophies in USA on self-fertile sugar beet. In general, companies and breeders east of the Rocky Mountains did not use or want self-fertility in their programs. Breeders, including Owen and McFarlane in the western curly top areas were using self-fertility to fix resistance. H. Savitsky made the first crosses between SLC 101 and CT resistant lines for them in the greenhouse at Salt Lake City. Under Owen, McFarlane, and others, it was an advantage to maintain the self-fertility to select and fix desirable disease resistance, monogerm, O-type, combining ability, and other traits. Ultimately, these early monogerm inbreds were extensively used as seed bearing parental lines in monogerm hybrids in all areas of USA and parts of Europe. Dr. R.T. Lewellen, personal communication / Letter to the author, February 8, 2013.

[26] See, e.g.: Savitsky V., 1952a; Savitsky V., 1952b; Murphy, Savitsky V., 1952. Curly top virus (CTV), or beet curly top virus (BCTV), is widespread throughout arid and semi-arid regions of the world. The virus has a wide host range, causing disease in over 300 species in 44 plant families; the most commonly infected hosts include sugar beets (for which the disease was first named). Symptoms vary depending on the host; leaves of beets become very twisted and curly. In tomato, yield is reduced, and the fruit that is produced ripens prematurely.

[27] Decisions were made to distribute seeds of SLC 101 and of subsequent monogerm hybrids via the Curly Top Resistance Breeding Committee and later via the Beet Sugar Development Foundation to domestic sugar beet breeders and in time via the USDA to European breeders (McFarlane, 1993b, p. 129).

[28] See, e.g.: Savitsky H., 1952.

In 1958, the Savitsky were invited to spend six months at the Max Plant Institute of Cell Biology, Rosenhof, near Heidelberg, Germany, assisting with a monogerm breeding program. There the Savitskys became convinced in the advantages of using polyploidy as a preferred technique in sugar beet breeding. Following that visit to Germany, studies on triploid hybrids were initiated to become Vyacheslav's main research project. This work continued at the USDA Agricultural Research Station at Salinas, California, where the Savitskys moved in 1961.

In the late 1950s, Helen was assigned the difficult task of interspecific hybridization in genus *Beta* L. She aimed to transfer the gene for nematode resistance found in wild beets, *Beta procumbens,* to sugar beets, *Beta vulgaris*. Many attempts had been made by geneticists from both the USA and Europe to perform such a transfer, without any success. The conclusion was that such hybridization was, perhaps, impossible. As Helen's colleague from the Salinas station, geneticist Dr. Lewellen, recollected, "she used elegant techniques that involved changing the ploidy level of sugar beet to match that of *B. procumbens*"[29]. The initial crosses produced seedlings only with a shoot, but no roots. By grafting the *B. vulgaris* x *B. procumbens* interspecific seedlings to bolted sugar beet, she was able to rescue these seedlings and then to make backcrosses to sugar beet. The next stage was to develop nematode-resistant triploid plants with 18 sugar beet chromosomes and 9 *B. procumbens* chromosomes. Additional backcrosses produced alien addition plants. Dr. Helen Savitsky selected the plants possessing 18 chromosomes from sugar beets plus one extra from *B. procumbens* bearing the gene for nematode resistance. From the backcrosses to sugar beet she was able to identify plants in which a chromosome section, bearing the resistance gene, apparently was translocated to one of the sugar beet chromosomes.

Helen also made a contribution to the studies on triploid hybrids. By a precise colchicine treatment of seedling beets and use of male-sterility she produced triploid hybrids of curly-top-resistant beet. As she stated, "my husband and I worked for about six years to make all sugar beets resistant to this virus (curly top virus. – *O.E.*). We did it. And the sugar beet industries throughout this country and the world use it"[30].

According to the American Society of the Sugar Beet Technologies, Dr. Helen Savitsky "has attained international recognition in her field of research"[31]. She received the Meritorious Service Award from the American Society of the Sugar Beet Technologies and the Award of Merit from the Sugar Industry of the Netherlands. The Sugar Beet Investigation Division received a Superior Service Award from the USDA for "development of basic parental lines and hybrid varieties of monogerm sugar beet"; Helen was named among major contributors[32]. She was a member of the Genetics Society of America and of many other American and foreign professional societies. Helen Savitsky's name appeared in several prestigious encyclopedias and dictionaries: "Two Thousand Women of Achievement" (1961, 1970–1971), "Thirty-Two Outstanding American Women in Recognition of their Notable Achievements in Thirty-Two

[29] Dr. R.T. Lewellen, personal communication, 2008, p. 1.

[30] Linda Kozub, Her Sugar beet Goes On (undated and incomplete file from the unidentified newspaper). H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA).

[31] 40-year Veteran Research Helen Kharetschko Savitsky. Note of the American Society of the Sugar Beet Technologies. February 24, 1970. H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA).

[32] Letter to H. Savitsky from Thomas Theis, Chief Tobacco and Sugar Crops Research Branch, May 17, 1968; The USDA Superior Service Award. Signed by Orville L. Freeman, Secretary of Agriculture. H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA).

Fields of Endeavor" (1971), "Community Leaders and Noteworthy Americans" (1975–1976), "National Register of Prominent Americans and International Notables" (1978–1979), "Personalities of America. Honoring America's Leaders" (1978–1979).

According to Helen's will, all family savings were left for philanthropy. She bequeathed sums of money to individuals at the Salinas station and in the community; to Stanford University – for scholarships in genetics; to the California Beet Growers Association – to support sugar beet research; and to the American Society of the Sugar Beet Technologies – that they be used to establish the Savitsky Memorial Award[33]. "This award memorializes the contributions of Vyacheslav and Helen Savitsky for their discovery and development of the monogerm gene in sugar beets. This discovery has provided for the near-elimination of hand-labor for thinning sugar beets throughout most if not all sugar beet growing countries". The largest single bequest was to the Monterey County Symphony Association. In the Salinas Californian newspaper it was reported: "The Monterey County Symphony Association has received a bequest in the amount of $129,269, the largest single bequest in the 41-year history of the organization. The bequest was left by Helen Savitsky, a Salinas resident for the past 25 years. Savitsky, a renowned geneticist with the U.S. Department of Agriculture, attended the Symphony concerts at Sherwood hall"[34].

The Savitsky Memorial Award is among the most prestigious in the sugar industry. There are no specific criteria for this award and it is given at the discretion of the American Society of the Sugar Beet Technologies (ASSBT) to individuals who have had a significant impact on the national and international sugar beet community. The recipient of the Savitsky Award can be from any country. Nominations are submitted by members of the ASSBT to the Savitsky Award Committee; after review by the Committee, the nomination is submitted to the ASSBT where it requires unanimous approval.

This is the glorious end of the Savitsy story and their "two world class achievements"[35]. Hundreds of other such stories – of fellow Soviet plant scientists – usually ended with persecution and the GULAG during the Lysenkoism era.

* * *

Above I have presented a case study on the exceptional fate of a couple who started as successful Soviet scholars, lived through Nazi occupation and transfer to Western Europe, immigrated to the USA, where they were fortunate to make outstanding contributions in plant breeding and agricultural genetics. As Helen Savitsky declared, "Throughout my career, I've found there is always a need for my specialization in sugar beet research"[36]. Was this success rooted in the Soviet background and 'migrated sugar beet seeds' or is this a result of scientific inspiration of a gifted geneticist and breeder? This question is difficult to answer.

I tried to analyze multiple motivations for their collaboration and emigration: from responsibility for preserving breeding objects, opposition toward 'agrobiology' and ambitious plans for experimental research to constant fear of imprisoning. It is common knowledge that "history knows no if". However, if someone were to ask me what would have happened to them if they had refused to leave, the answer seems quite clear. They would have been accused

[33] Dr. Robert T. Lewellen, personal communication, 2008, p. 2.

[34] Monterey County Symphony receives $129,000 bequest // Salinas Californian newspaper. 1986.

[35] Ibid. P. 1.

[36] Linda Kozub, "Her Sugar beet Goes On" (undated and incomplete file from the unidentified newspaper). H. Savitsky's Private Collection (Archive of the USDA–ARS Agricultural Research Station, Salinas, California, USA).

of collaboration with the Nazis and sent to the GULAG. Regardless of whether they would have survived or not, they would have certainly fallen under the pressure of Lysenkoism.

The Savitskys' story also shows that not only scientists themselves but also laboratory seeds and plants changed countries during and after WWII. Thus this story has another dimension: within its context the term 'migration' takes a new meaning that enables us to discuss the problem of war migration of scientific objects. I will focus on this theme in my future papers.

**Acknowledgments:**

I wish to express my deep gratitude to Dr. Robert T. Lewellen who kindly granted the copies of his personal communications on the Savitskys and the files from H. Savitsky' personal archive. Dr. Lewellen also took on the painstaking work of revising the sugar beet breeding terminology in this paper. His assistance and friendly help was invaluable. Dr. Lee Panella's and Dr. Tom Schwartz's willingness to share with me some of the digitalized files from the collection of sugar beet literature was greatly appreciated. Special thanks are extended to Nikita Maksimov, Dr. Nikolay V. Raik, and Dr. Tat'yana K. Lassan who shared with me some of the documents of interest for this research. I am also indebted to Lloyd Ackert for his considerable help in polishing my English in this paper.

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## Из России с семенами. История селекционеров и генетиков растений Савицких

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Главные потоки русской эмиграции связаны с периодом после революции 1917 г. В этой статье представлена особая эмигрантская история, которая началась в Советской России в 1930–40-е гг., продолжалась в послевоенной Западной Европе и завершилась в США. Подобные случаи редко становятся предметом историко-научных исследований. В центре внимания этой статьи – пара селекционеров и генетиков, муж и жена Савицкие, Вячеслав Фабианович (1902–1965) и Елена Ивановна Харечко-Савицкая (в США – Элен Савицки) (1901–1986). Их судьба оказалась исключительной: Савицкие предпочли продолжить свои исследования по односемянной сахарной свекле в период нацистской оккупации СССР, а затем покинули Родину. В результате они внесли значительный вклад в улучшение этой культуры в США. В настоящей работе показано начало их исследований по сахарной свекле в СССР, проанализированы множественные причины решения эмигрировать, рассмотрены обстоятельства успешных работ по односемянной свекле в США.

***Ключевые слова:*** В.Ф. Савицкий, Е.И. Харечко-Савицкая, СССР, сельскохозяйственная наука, генетика растений, селекция, односемянная сахарная свекла, Н.И. Вавилов, Т.Д. Лысенко, Вторая мировая война, нацистская оккупация, США.