Vavilov Institute Scientists Heroically Preserve World Plant Genetic Resources Collections During World War II Siege of Leningrad

The following is the eighth in a series of articles by Soviet germplasm experts written exclusively for DIVERSITY. Past DIVERSITY profiles have featured various individuals whose efforts have singularly contributed to the preservation of global plant genetic resources. At a time when the 74-year-old Soviet Union is being restructured in a way that makes the fate of established national institutions such as the Vavilov Institute of Plant Industry (VIR) uncertain, DIVERSITY recounts the story of the great personal sacrifice made by VIR scientists who risked their lives to preserve plant genetic resources collected by their revered leader N.I. Vavilov for the Soviet people and the world. DIVERSITY commemorates, on this 50th anniversary of the Siege of Leningrad (St. Petersburg), those extraordinary men and women whose unselfish dedication to the survival of humanity through the conservation of the world's irreplaceable genetic heritage transcended war and politics.

by S.M. Alexanyan and V.I. Krivchenko

The history of the organization and preservation of the Soviet Union's collection of cultivated and wild plants--one of the world's largest collections-is complicated and interesting. It abounds with periods of great activity and slumps, splendid successes, and dramatic events. One pivotal event during this turbulent era was the blockade of Leningrad during World War II.

This world collection had been established in Russia in 1890 at the initiative of Professor R.E. Regel of the Bureau of Applied Botany. Later, due to N.I. Vavilov's energetic efforts, the collection of genetic resources became the main task of the Institute of Plant Industry (VIR). During the 20 years of this outstanding scientist's work, an enormous genebank of plants was formed which by 1941 numbered more than 187,000 varieties (see DIVERSITY, no. 16,pp 5-7).

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The war and rapid German occupation of the European part of the country sharply transformed the Institute's activities and its experiment stations. As early as autumn 194 1, citizens of Leningrad were forced to live according to the conditions of wartime. While some scientists and technical workers were sent to the front, a great number of specialists worked on constructing fortifications around Leningrad. The small number of workers who remained at VIR began the hurried evacuation of the USSR's world genebank collection. At first, they prepared duplicates of the most valuable part of the collection which then consisted of 40,000 varieties of field crops.

Many difficulties surfaced with the collection of potatoes in particular. The main portion of this collection-6,000 varieties-were reproduced at the Pavlovsk experiment station, located 45 km southeast from Leningrad. As the period of gathering this crop coincided with combat operations near the city, Pavlovsk was ablaze from enemy bombings and the experiment field with the potato collection was under fire. Clearly, it was imperative that the work be accomplished quickly and thus it was necessary to dig up the unripened tubers.

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Senior Research Scientist, Department of Tuber Crops
Ensured preservation of VIR potato collection and regenerated samples annually.

Scientific workers A.Y. Kameraz and O.A. Voskresenskaia managed to gather this critical collection in short time, amassing whole allotments of each sort or variety. To help with the task of removing the collection boxes from the field, Kameraz requested assistance from a military unit. The Red Army soldiers respected the importance and needs of the Institute and helped transport the collection by military trucks to a building in St. Isaac's Square. For several days this work continued until the fascists seized Pavlovsk.

By the autumn of 1941 it became increasingly difficult to work in the Institute. The building was unheated as there was neither firewood nor coal. Because of unrelenting firing on the city's center, the building's windows were broken and had to be boarded up. The Institute was cold, damp, and dark.

It became necessary to take measures to prevent the plunder of the grain by a starving population.

The gathered potato collection was transferred to the Institute's basement where it was kept until March 1942. Professor V.S. Lehovich, one of those responsible for preserving the potato collection in the severe winter of 1941-42, recounted how difficult it was for him, together with two to three assistants, to maintain adequately warm temperatures in the basement. They burned everything to get heat: boxes, paper, cardboard, and debris from destroyed buildings. To guard and care for the collection they established 24-hour vigils for the scientific workers at a special outpost near the potato storage area.

These dedicated workers, numb with cold and emaciated from hunger, breathed freely only when assured that the collection was successfully transported across the ice of Lake Ladoga, by way of the "Road of Life," as this one route over ice was the last way out of Leningrad. Arriving at the end of its destination, the collection was placed in special storage in the Ural mountains.

Hitler's Victory Party Saves VIR from Bombs

In the dark, frozen building of the Institute, the remaining workers intensively prepared the seeds for long-term preservation in the city. While they divided the collection into several duplicate parts, bombs and shells continued bursting

around the Institute, damaging St. Isaac's Cathedral nearby. Fortunately, VIR's safety was assured because it was located near the German consulate and the Astoria Hotel where Hitler had planned to hold a victory banquet and had even preordered the printing of the guests' invitations.

In spite of these difficult conditions, the scientific activities in the Institute continued uninterrupted. A scientific plan was agreed upon in 1942 for the transfer of the most important food and industrial crops to the East. The Institute continued its work despite the unusually severe winter of 1941-42. January and February were the most terrible months of the blockade, with temperatures falling to record lows of minus 36-40°C.

The Collection Saved from a Starving Population

While throughout Leningrad hunger was rampant, housed in the Institute building was a great number of sorts and varieties of crops in the genebank with a total weight of several tons. Because citizens of the blockaded city knew about the Institute, it became necessary to take measures to pre-

Abraham Y Kameraz
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Saved potato collection

vent the plunder of the grain by a starving population.

In order to do this the genebank was divided into several duplicate parts for evacuation by airplanes and trucks on the "Road of Life." The collection that remained in Leningrad was also divided into two parts and placed in storage in various sites of the building so as to avoid the destruction of the entire collection in case of shells hitting the building. From each variety 100 seeds of cereal and 200 seeds of other crops were selected.

The Soviet scientists chose torment and death in order to preserve Vavilov's genebank.

The collection varieties, scattered throughout 40 rooms of the building, were consolidated into 16 rooms on the first floor in order to be as far as possible from the cold and pillagers. Strict orders were issued for access to the collection. Rooms where the varieties were stored were sealed and no one was permitted to remain alone with the collections in these rooms: room keys were kept in the safe of one of the Institute's executives. Once a week, R.Y. Kordon, the Institute's keeper, opened the doors, checked the condition of the boxes, and resealed them.

Each day difficulties in the work of the Institute increased. New trouble arose with the invasion of rats. The collection needed to be repacked. Seeds housed in board and paper containers were transferred to metal ones; tin boxes were tied together in packs of four to nine pieces and weighted down. The people, barely alive from hunger and cold, boarded up the door and window sills with iron, and spread poison and shattered glass to fill up the rat holes.

At this point starvation was raging in the blockaded city, killing tens of thousands of citizens, among them many of the Institute's workers. In January, A.G. Stchukin, a specialist in groundnuts, died at his writing table. G.K. Krier, head of the herb laboratory, and D.S. Ivanov, a rice specialist, also succumbed. After Ivanov's death, workers found several thousand packs of rice in his collection that he had preserved while dying of starvation. L.M. Rodina, a keeper of the oat collection, suffered the same fate. Other workers-M. Steheglov, G. Kovalevsky, N. Leontjevsky, A. Malygina, A. Korzun and others-died of starvation as well. As they slowly starved, they refused to eat from any of their collection containers of rice, peas, corn, and wheat. They chose torment and death in order to preserve Vavilov's genebank.

New troubles arose for the starving and emaciated disciples of Vavilov with the beginning of the spring of 1942. By that time, the storage life of seeds of many vegetable, cereal, leguminous, and other plants had elapsed as the aging process became more intense due to influences of cold and dampness. It was necessary to provide an urgent resowing of plants and receipt of reproduction of plants. As the city was still blockaded, a satisfactory plot of land was found on the outskirts of Leningrad but nevertheless within immediate proximity of the front.

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Head, Rice Collection
In charge of preservation of rice collection.

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In charge of storage of medicinal plants.

Seed Regenerated at the Front Line

In May, field work began. Lacking horses and tractors, three to five hectares of land were cultivated by hand using spades. The potato collection was sown in the "Lesnoy" state farm. Despite extreme danger due to the intensity of shelling and bombing in the area, the work was completed.

That same year the Institute requested that many selection stations across the country, which were sent collection varieties, preserve all varieties, organize their propagation, and transfer them to the Institute's collection. In that way we managed to preserve many thousands of crop varieties.

In February 1944, a group of workers left Krasnoufimsk in the Urals region (where the evacuated part of the Institute was lo-

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In charge of rice collection.

Yelena S. Kilp
Junior Research Scientist, Department of Grain Crops
In charge of preservation of grain crops

cated) for Leningrad. There they selected a considerable part of the collection that was preserved in the central building of the Institute and transferred and sent it by post for reproduction. In August 1944, at the height of the war, the Institute workers ordered new high quality and collection material on all varieties from abroad. Thus, little by little, the Institute's creative life was revitalized.

In spite of these difficult conditions, the scientific activities in the Institute continued uninterrupted.

In 1946, after the war had ended, the Institute worked out an elaborate plan to resow and restore germination of the whole genebank in the fields of experiment stations and state selection stations. This program of restoring and maintaining the VIR's collection of world varieties was completely accomplished.

Thus, thanks to the heroic efforts of scientists and technical personnel of the Institute, the genebank concentrated in the Institute was saved from destruction and loss of germplasm. This heroism cost the lives of many scientists and caused much suffering and deprivation for those who survived. Yet this most dangerous period of the N.I. Vavilov Institute was overcome.

Vavilov's invaluable genebank, organized before the period of terrible ordeal that befell the Soviet peoples, was almost completely preserved thanks to the selflessness of workers and scientists of the Institute, and it continues to play an important role in selection research not only for Soviet plant breeders, but for the entire world.

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