Saving Russia's Threatened Biological Heritage

ST. PETERSBURG—If there was one thing the Soviet Union had in abundance, it was biodiversity. With around one sixth of the world's land mass, the country boasted a vast array of plant and animal species. And with this diversity to pick from, researchers over the years assembled some of the world's finest collections of biological material—including seeds, tubers, and dried plants. Until recently, these collections have barely been explored by Western scientists. But with Russian science now opening to the outside world, Western biodiversity researchers have been drawn to this wealth of material—only to find some of the most important collections stored in dangerously decaying buildings or inadequately cataloged.

The potential disaster of losing such valuable resources was quickly recognized, and biodiversity research has emerged as one important focus of Western efforts to help shore up Russia's crumbling science base. In 1992, for instance, Nikolay Vorontsov—formerly Mikhail Gorbachev's environment minister—convinced U.S. financier George Soros to donate $1 million to provide emergency $250 grants to scientists working in the field, even before Soros launched his International Science Foundation (ISF). And in St. Petersburg, Western aid is playing a key role in preserving two major botanical collections.

HAKA-STROI

Crumbling facade. The Komarov Institute.

The former imperial seat of the czars is home to the All-Russian Vavilov Institute of Plant Industry (VIR), which runs a plant gene bank matched only by that maintained by the U.S. Department of Agriculture (USDA). It houses some 380,000 genetically distinct varieties of major crop species and their wild relatives, mostly stored as seeds and tubers. And the nearby Komarov Botanical Institute possesses a herbarium containing some 6 million dried plant specimens, placing it alongside the Royal Botanical Gardens at Kew, London, and the Paris Museum of Natural History as a world-leading resource in the field of plant taxonomy. "It's the Kew of Russia," says botanist Charles Jeffrey of Kew's herbarium, "but it has been considerably underused."

Western botanists visiting the Komarov Institute, however, have been shocked to find its herbarium housed in a decaying, leaky building with dangerously archaic wiring. "It's a firetrap," says Peter Raven, director of the Missouri Botanical Garden in St. Louis, who has become the institute's main Western champion. The Komarov Institute's sorry condition stems from decades of neglect by the Soviet Academy of Sciences. Research funding was adequate, says paleobotanist Lev Budantsev, the institute's director, "but there was no money for infrastructure." The institute's plight has won it the largest single grant made by ISF, a $500,000 award granted in March 1993, to begin renovating the crumbling herbarium. Since then, Raven has persuaded other U.S. foundations to kick in more than $100,000. Now the roof no longer leaks, and smoke alarms have been fitted. But to make the precious herbarium truly safe, Raven says "we need about another $325,000" for rewiring and to repair the heating system.

Western aid has proved similarly valuable at VIR, where the main problem is not the condition of the gene bank's buildings—the institute's sponsor, the Soviet Academy of Agricultural Sciences, maintained them fairly well—but the lack of a modern cataloging system. When Western experts started exploring the gene bank in the late 1980s, they found that records were all handwritten in Russian in a single set of documents. Moreover, individual curators knew little about the bank's overall contents outside of the crop in which they specialized. "There really was no overview," says geneticist James Elgin of USDA's Agricultural Research Service in Beltsville, Maryland.

USDA set about providing computer hardware for a database system compatible with that used to manage its own seed bank. The database will be completed by early 1995, says Genrikh Razoryonov, a biologist and computer specialist recruited in 1992 from the Russian army, who describes USDA's assistance as "simply a royal present." And at a cost of only $30,000 for the necessary computers and software, says Elgin, "this is the most efficient use of money that you could ever imagine."

Western plant geneticists are now eagerly awaiting their first real opportunity to scan the gene bank, which contains specimens collected from all over the world. But of particular interest is material collected from within the borders of the former Soviet Union, as several crops, including wheat, carrots, and apples, have hotspots of natural diversity in central Asia. The bank is also assuming a new significance for Russian agricultural geneticists, who are under pressure to find hardy new crop varieties now that much of the former Soviet Union's most fertile land lies in other republics. "Our agriculture has to move north," says VIR director Victor Dragavtsev.

Now that the database project is nearing completion, VIR's Western friends want to prevent the collection itself from deteriorating. One major problem is that the institute's long-term seed storage facility on the Kuban River, near the Black Sea, lacks the deep-freeze equipment to preserve seeds in suspended animation for years on end. This means that, on average, seeds must be regrown every 5 years, at one of VIR's 12 field stations throughout Russia—a process that causes unwanted genetic shifts.

USDA estimates that it will cost around $1.5 million to provide modern deep-freeze gear and other hardware such as seed-drying equipment. But an international fund-raising effort, coordinated by the International Plant Genetic Resources Institute (IPGRI) in Rome, is already under way, having won $400,000 from the U.S. Agency for International Development plus $25,000 from the United Nations Development Program. The remaining $1 million is being sought as part of a wide-ranging package of aid to Russia being arranged from the World Bank, says Emile Frison, IPGRI's European director.

The extensive interest and support from the West must come as a welcome recognition to the institute's staff of the quality of their work, especially after the appalling hardships they have had to endure in the past to preserve the gene bank for posterity. During the 900-day siege of St. Petersburg (then called Leningrad) by German troops during World War II, 11 VIR employees starved to death. "Some of them were in charge of the potato collection," says 85-year-old Constantin Budin, the institute's oldest scientist, "but they ate only the rotten ones."

–Peter Aldhous and Alexander Dorozynski

Alexander Dorozynski is a freelance writer based in Paris.