A Lesson from History: The Tragic Fate of Evolutionary Genetics in the Soviet Union

By Vassiliki Betty Smocovitis
University of Florida

By the 1920's, Soviet scientists had gained international recognition for their pioneering work in many fields of biology. Most notable among these efforts was a unique school of population genetics that synthesized insights from genetics and Darwinian selection theory with knowledge of the structure of wild populations of animals and plants, in order to understand the mechanisms of adaptation and evolution. In the 1920's, Sergei Chetverikov and other Russian population geneticists anticipated the evolutionary synthesis that occurred in the west in the 1930's and the 1940's. Among the contributions of the Russian school of evolutionary theory were the concept of the gene pool, the independent derivation of the concept of genetic drift, and the first genetic studies of wild populations of the fruit fly Drosophila melanogaster. The school trained young evolutionists such as N. V. Timofeeff-Ressovsky and Theodosius Dobzhansky, who later played key roles in establishing modern evolutionary theory in Germany and the United States. The Russian school affirmed that evolutionary change consists of changes in the frequencies of Mendelian, particulate genes within populations.

This flourishing center of evolutionary research, and most of its scientists, suffered a tragic end. Beginning in the late 1920's, biology in general and genetics in particular was increasingly perceived as dangerous to the political spirit of Stalinist Russia, then pushing to transform itself from an agrarian state into a modern nation. A persecution of genetics and geneticists began in the early 1930's. It was fueled by the rhetoric of Trofim Lysenko (1898-1976), an agronomist with little education and no scientific training, but with grand ambitions for Soviet agriculture based on his mistaken belief in a Lamarckian mechanism of inheritance and organic change. According to Lamarckian and Lysenkoist theory, exposure of parent organisms to an environmental factor such as low temperature directly induces the development of adaptive changes that are inherited by their descendants – a theory of evolution by the inheritance of acquired characteristics, rather than by natural selection of genes.

Western geneticists and evolutionary biologists had already shown that Lamarckian inheritance does not occur. Declaring genetics a capitalist, bourgeois, idealist, and even fascist-supported threat to the state, Lysenko led a vicious propaganda campaign that culminated in 1948 with the official condemnation of genetics by Stalin and the Central Committee of the Communist Party. Among the casualties of Lysenkoism was Nikolai Vavilov, one of the pioneers of plant breeding, who died of starvation in a prison camp, and the entire school of population geneticists, who were dispersed or destroyed. Lysenkoism quickly led to the wholesale destruction of the very areas of Soviet biology that had gained world prominence in the 1920's.

The Soviet policy against genetics and evolution had disastrous consequences for the Soviet people. In addition to wreaking rural destruction rivaled only by that of Soviet

collectivization, Lysenkoism thwarted the development of agricultural science. The Soviet Union was left out of the global agricultural revolution that occurred in the middle decades of this century, fueled in part by genetic innovations such as hybrid corn. Despite rising opposition, Lysenko remained in power until 1965, following Khrushchev's ouster. Soviet biology was never able to recover effectively from this period. Its earlier promise lived on only in individuals like Dobzhansky, a towering figure in evolutionary biology, who carried insights from Russian population genetics to the west when he immigrated to the United States in 1927.

The full consequencies of Lysenkoism and Stalinist biology have yet to be determined, but are now under study by scholars who are gaining access to formerly restricted government sources.[1] Although they debate details, all scholars agree that the reign of Lysenkoism was an especially grim period in the history of science. It is the classic example of the negative consequences of misguided anti-science policies and ideological control of science. The lesson learned is that free inquiry, informed government support of basic and applied sciences, and open debates on scientific subjects – especially those declared threatening or dangerous by special interest groups – are essential for the health and prosperity of nations.

1) M. Adams, in E. Mayr and W. Provine (eds.), The Evolutionary Synthesis (Harvard University Press, Cambridge, MA., 1980), pp. 242-278; D. Joravsky, The Lysenko Affair (Harvard University Press, Cambridge, MA, 1979); N. Krementov, Stalinist Science (Princeton University Press, Princeton, NJ, 1997); V. Soyfer, Lysenko and the Tragedy of Soviet Science (Rutgers University Press, New Brunswick, NJ, 1994).

Source: University of Oregon Ecology and Evolution Group EvoNet.org website (http://evonet.sdsc.edu/evoscisociety/lesson_from_history.htm).