

# Russian, PNNL scientists advance seed production, oil remediation

Staci Maloof, PNNL

While searching for a better way to grow turf grass in light of stricter government regulations, a Washington state seed company found help from an unlikely source. Former Soviet Union scientists who supported the production of weapons of mass destruction during the Cold War are now sharing their expertise through a U.S. nonproliferation program.

Dye Seed Ranch, a seed processing and production company based in Pomeroy, Wash., sought technical expertise for its turf grass seed operation from the Department of Energy's Pacific Northwest National Laboratory. PNNL scientists linked the company with Russian scientists who had developed a plant growth stimulator and an oil remediation biotechnology.

The Russian scientists work at Biochimash, a former Soviet weapons development center, the prestigious Lomonosov Moscow State University and the Russian State Institute for Gas and Oil.

## Testing begun

In August, Dye Seed and scientists from PNNL and the three Russian organizations began testing the plant growth stimulator and oil-eating microbes throughout the Northwest. The testing came after the signing of a Cooperative Research and Development Agreement in June that formalized Dye Seed's interest in pursuing commercial opportunities with PNNL and the Russians.

A DOE program called Initiatives for Proliferation Prevention, or IPP, funded the laboratory studies and subsequent verification tests that will be performed at PNNL. IPP was established in 1994 to create non-defense jobs for former Soviet weapons scientists by linking them with U.S. companies interested in commercializing their non-weapons technologies. (For more on IPP, go to Web site [www.nn.doe.gov/ipp.shtml](http://www.nn.doe.gov/ipp.shtml).)

"We couldn't do any of this without the laboratory and IPP," said Steve Stilson, Dye Seed general manager. "The preliminary lab results for these projects are very promising. If these field tests show potential, it would be beyond my wildest dreams."

The research addresses two issues faced by companies such as Dye Seed. First, a plant growth stimulator could shorten the current 18 months that seed producers wait after planting before harvesting their first crop. The wait has become more difficult in states such as Washington, where burning of turf grass fields — a traditionally effective method of increasing seed production yields — has been banned. Second, a microbe capable of remediating oil-contaminated fields also may hold promise for industries looking for new methods to clean up agrochemicals.



**Natalia Nikishenkova, a scientist with Biochimash, shows how grass seed treated with the plant growth stimulator Symbiont is nearly three times the size of the control group's grass seed.**

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Biochimash's plant growth stimulator is a mixture of fungi and bacteria called Symbiont, so-called because of the symbiotic relationship between microbes and the plant root in soil. Initial studies showed the simulator increased the growth rate of grasses and many broad-leaf plants by 40 percent under controlled conditions.

"Rather than waiting 28 days for Kentucky Blue Grass seeds to germinate, that process may take only seven days with Symbiont," Stilson said. Dye Seed has processed and marketed seed — primarily Kentucky Blue Grass — for private and industrial customers since 1949. About 60 percent of the world's Kentucky Blue Grass is produced in the Pacific Northwest.

Scientists from PNNL and the Russian organizations are testing Symbiont in Stanfield, Ore., Pomeroy, Wash., and the Tri-Cities — each with different soil types and moisture status. At each site, scientists measure Symbiont's growth-enhancing abilities when applied to planted seeds and to an existing plant.

### Cleaning up oil

Under the second project, Dye Seed is eyeing microbial strains developed at Biochimash and the Russian State Institute for Oil and Gas. The company anticipates it could either commercialize the oil remediation application or support further research into its potential for cleaning up agrochemicals. In this research, the microbes help break down the oil and restore the soil.

The scientists also expect to conduct field tests in Shelby and Roundup, Mont., this month to measure the effectiveness of five oil-eating microbes at varying combinations and concentrations in soil contaminated with oil. After the tests, Dye Seed can decide if it will pursue similar tests on agro-chemicals.

"We're addressing two issues with one new relationship — the need to ensure Russian scientists with biological, chemical and nuclear weapons knowledge stay employed in non-defense jobs and the desire to share the latest scientific advances," said Debbie Dickman, PNNL manager of nonproliferation product lines.

If either technology proves effective, Dye Seed could patent the product in the United States, and the Russians would control patents in Russia and the other newly independent states of the former Soviet Union. ♦