

## Shedding Light on Mystery Pig Disease

Quick diagnosis of a virus that kills unborn and newborn pigs can help reduce losses for U.S. pork producers.

In 1987, a disease of pigs appeared so inexplicably in the United States that it was dubbed "mystery pig disease." Soon after, it spread throughout the world.

For 4 years, it remained a deadly enigma, until Dutch scientists identified a virus as the cause of the disease that is now called PRRS—porcine reproductive and respiratory syndrome.

PRRS virus produces flulike symptoms in pigs of all ages. Pregnant sows infected with the virus can abort, or farrow a few days early, bearing litters of dead fetuses and piglets. Even though they look healthy, some pigs that recover are carriers of PRRS virus and spread the disease.

A team of ARS researchers at the National Animal Disease Center in Ames, Iowa, have been studying the PRRS virus to develop better methods for its diagnosis and control. Veterinary medical officers William L. Mengeling and Kelly M. Lager, along with microbiologist Ann C. Vorwald, have devised a more accurate way to detect the virus in infected pigs.

Up to now, blood tests have been used most often to identify pigs with PRRS virus. But these tests are often negative—even when used to evaluate an infected pig.

The new test finds the virus in lung cells long after it disappears from the blood. These lung cells, called alveolar macrophages, can be easily and safely collected from live pigs.

"It's reliable enough to detect carriers of the virus, as well as to diagnose the acute disease," says Mengeling.

The economic impact of PRRS is still unknown, but many researchers consider it to be one of the most costly diseases faced by the swine industry. A recent survey of Midwestern pig farms showed that 50 percent of the pigs had been infected with the virus. Losses from PRRS have been estimated to range from \$50 to \$250 per affected sow per year.

Others on the NADC research team studying PRRS include veterinary medical officer Susan L. Brockmeier and technicians Deborah S. Adolphson and Theresa E. Rahner.—By **Linda Cooke**, ARS.

*William L. Mengeling and Kelly M. Lager are in the USDA-ARS Virology Swine Research Unit, National Animal Disease Center, P.O. Box 70, Ames, IA 50010; phone (515) 239-8254, fax (515) 239-8458. ♦*

## Preventing Deformed Snouts in Pigs

A pig with a deformed snout won't be a hot seller in the marketplace. When nasal deviations occur among porkers, it usually means disease—and extra production costs.

A 1990 USDA survey of Iowa pig farms showed that *Atrophic rhinitis*, a bacterial disease, cost producers about \$4 million a year for vaccines, medications, and death losses.

"This is an insidious disease that lowers profits by reducing weight gains and lengthening the time that it takes to get hogs ready to market," says ARS veterinary pathologist Mark Ackermann. "Worse yet, there is no cure. Prevention is always the best route."

Ackermann and other researchers at the National Animal Disease Center (NADC) in Ames, Iowa, have studied the disease for the last 7 years. *Atrophic rhinitis* is highly contagious and easily spread among pigs in confinement houses. Currently, about 40 percent of all producers vaccinate sows and nearly 30 percent vaccinate pigs.

The disease is caused by toxins produced by two bacteria—*Pasteurella multocida* and *Bordetella bronchiseptica*. Previously, researchers thought the *Pasteurella* toxin might suppress the pig's appetite, resulting in weight loss. But the NADC research team of Ackermann, molecular microbiologist Karen Register, veterinary pathologist Sharon Gwaltney, and technician Kim Driftmier confirmed that the toxin actually reduces long-bone growth.

They also found several toxic strains of *P. multocida* lurking in the tonsils. Finding the bacteria in the tonsils was important, because not all infected pigs have deformed snouts. Still the disease makes them weak and vulnerable to other diseases, such as pneumonia.

This NADC team has developed new diagnostic tests to identify toxic strains of *P. multocida* and a DNA probe to genetically identify *B. bronchiseptica*.

"Commercial vaccines are effective if the producer selects the right one. A good choice for a vaccine should contain a denatured *Pasteurella* toxin, called a toxoid, which can provide immunity without causing disease," says Ackermann.

The NADC researchers have demonstrated the effects of protecting pigs against toxin. In studies done last summer, pigs with immunity to toxin gained weight normally and didn't develop nasal or long-bone deformities.

Ackermann says that vaccination with a good combination of bacteria and toxoid should lower the number of bacteria in the environment. "Some of the commercial vaccines on the market don't have the toxoid component, so producers should carefully check the label before relying on a vaccine to protect pigs," he says.—By **Linda Cooke**, ARS.

*Mark R. Ackermann is with the USDA-ARS Swine Respiratory Disease Project, National Animal Disease Center, P.O. Box 70, Ames, Iowa 50010; phone (515) 239-8221, fax (515) 239-8458. ♦*