

Helping Pigs Resist Edema

Midwest pork producers may someday be able to raise pigs with a natural ability to resist edema disease caused by an intestinal *Escherichia coli* bacterium. That's welcome news for producers who lose money when pigs get sick from *E. coli* F18—a strain that doesn't cause disease in humans.

ARS scientists in Ames, Iowa, discovered that resistance and susceptibility to F18 are linked to a gene for a specific blood group. This linkage was concurrently discovered by Peter Vögeli, a scientist with ETH, the technical university of Switzerland in Zürich.

The research began when ARS microbiologist Julia F. Ridpath at the National Animal Disease Center in Ames, Iowa, and veterinarian Brad Bosworth—formerly with ARS and now with Pig Improvement Company (PIC) in Franklin, Kentucky—explored the idea that there could be a genetic basis for some pigs' superior resistance to F18. PIC is a member company of the Biotechnology Research and Development Corporation (BRDC) of Peoria, Illinois, which funded this research.

That NADC work led to a gene marker now incorporated into a test that can be used by breeders to identify resistant pigs. The patented test, validated on over 500 pigs, is a more effective strategy than vaccinating pigs against F18. Vaccines don't always afford sufficient protection, and the cost of vaccines and antibiotics further cuts producers' profits.

Pigs with edema disease are swollen around the eyes. They stagger when they walk and often fall down or just lie on their sides. The characteristic buildup of body fluids is caused by rapid growth of *E. coli* F18 bacteria in the small intestines of 3- to 14-week-old pigs shortly after weaning. The death rate among pigs with full-blown edema is about 25 percent.

Pigs that are resistant to the disease don't have intestinal receptors, Bosworth says. "The lack of receptors makes it impossible for *E. coli* F18 bacteria to stick or attach to the intestinal wall. We think the approach of breeding healthier, more disease-resistant pigs will be less costly for producers than increasing the use of antibiotics."

Another way to reduce the problems caused by *E. coli* F18 bacteria is to feed pigs differently. Susceptible pigs can be fed a diet higher in animal protein, a tactic that prevents the bacteria from taking hold. Weaned pigs should be fed more animal proteins in place of soybean meal.

BRDC has granted PIC an exclusive license for the commercial use of the edema-resistance test worldwide, except in Switzerland.—By **Linda McGraw**, ARS.

This research is part of Animal Diseases, an ARS National Program described on the World Wide Web at <http://www.nps.ars.usda.gov/programs/appvs.htm>.

Julia F. Ridpath is in the USDA-ARS Enteric Diseases and Food Research Unit, National Animal Disease Center, P.O. Box 70, Ames, Iowa 50010; phone (515) 663-7372, fax (515) 663-7458, e-mail jridpath@nadc.ars.usda.gov. ♦

For Outstanding Forage, New CD-II Wheatgrass

Cattle and wildlife on western rangelands may soon be grazing on a rugged new grass from USDA's Agricultural Research Service. Known as CD-II, the plant is a crested wheatgrass from plant breeders at the agency's Forage and Range Research Laboratory at Logan, Utah.

CD-II is "leafy, vigorous, and tolerant of drought, insects, and diseases," says geneticist Kay H. Asay, who is with ARS at Logan. And according to Asay, CD-II "produces few if any purple leaves in spring."

That's a plus. In crested wheatgrass, purple leaves are a sign of stress and reduced growth.

A perennial, CD-II is well adapted to semiarid rangelands of the intermountain and western Great Plains that get 10 to 16 inches of precipitation a year. "CD-II is suitable for planting at elevations up to 6,000 feet," notes Asay, "and should provide abundant forage in early spring through about midsummer."

In harsh environments where competition from weedy annuals is a problem, CD-II emerges more readily than many other kinds of crested wheatgrass. Related to Hycrest, another crested wheatgrass developed by Asay and colleagues at Logan, CD-II is leafier and produces more growth in early spring.

Asay says livestock and wildlife—including deer and elk—readily graze CD-II's abundant foliage. However, because it becomes dormant and less palatable in midsummer, Asay says it should be planted in combination with other grasses and shrubs that can provide forage for that time of the year.

CD-II is the result of 11 years of plant breeding and testing by Asay and ARS co-researchers N. Jerry Chatterton, Kevin B. Jensen, Richard R-C. Wang, Douglas A. Johnson, and W. Howard Horton at Logan; and Stanford A. Young of Utah State University. ARS—in collaboration with the university—released initial supplies of seed in 1996.

Six companies have licenses to sell the new grass. Two of them—Round Butte Seed Growers, Inc., of Culver, Oregon, and Wheatland Seed, Inc., of Brigham City, Utah—sold supplies for the first time in 1998.

Big Sky Wholesale Seeds, Inc., of Shelby, Montana, plans to begin selling CD-II this year, as do Rainier Seeds, Inc., Port Orchard, Washington; and Newfield Seeds Company, Ltd., of Nipawin, Saskatchewan, Canada. Grassland West Company of Clarkston, Washington, will market CD-II next year.—By **Marcia Wood**, ARS.

Kay H. Asay and colleagues are with the USDA-ARS Forage and Range Research Laboratory, Utah State University, 695N 1100E, Logan, UT 84322-6300; phone (435) 797-3069, fax (435) 797-3075, e-mail khasay@cc.usu.edu. ♦