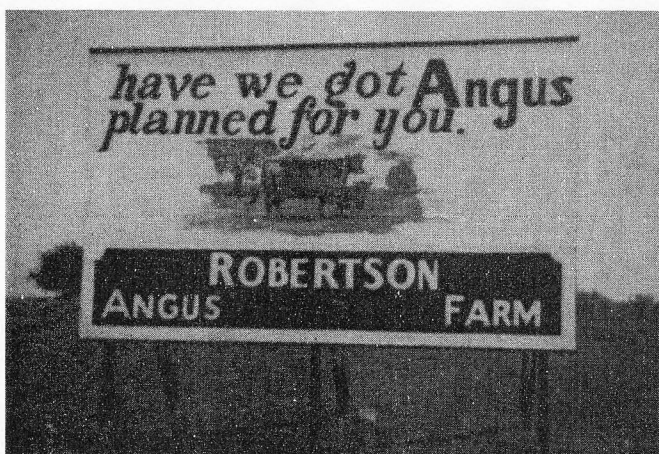


*How's this for promotion? It not only advertises an individual herd—it puts in a good word for the breed. This sign is near Preston, Mo., at the junction of Hwys. 54 and 65. It's owned by Minnie Lou Robertson, whose small Angus herd is one of the oldest in the state.*



## Foot-and-Mouth Vaccine Offers Long-Range Help

Development of a new vaccine for foot-and-mouth disease, announced last June by USDA, doesn't mean much in the short-run to livestock producers in this country.

"But it offers tremendous benefits over the long range if it lives up to its potential," says John K. Atwell, deputy administrator of USDA's Animal and Plant Health Inspection Service (APHIS).

The new vaccine, created by genetic engineering from one of the major proteins in the coat of the foot-and-mouth virus, was developed under a cooperative agreement between USDA's Agricultural Research Service and Genentech, Inc., a San Francisco-based research firm. Because the new experimental vaccine is not made from the whole virus, it may offer safe, effective and inexpensive protection from one of the most serious animal diseases.

"Foot-and-mouth disease exists throughout most of the rest of the world," Atwell says. "Fortunately, the U.S. is free of this debilitating disease—has been since 1929."

### Causes Heavy Losses

Where it is endemic (occurs frequently), foot-and-mouth disease causes heavy losses in cattle, sheep, goats and swine. Continuous vaccination is necessary to enable livestock producers in infected countries to cope with the disease.

The break-through in the new vaccine was in the application of "recombinant DNA technology," a form of genetic engineering whereby a single gene or small series of genes from one organism is inserted into the DNA of another organism. Because only a segment of the virus is used, the vaccine cannot produce the disease in a vaccinated animal.

Because of DNA technology, greater quantities can be produced in a shorter time than was possible with previous methods of production, and the vaccine can be stored for long periods without refrigeration. The new vaccine, which is expected

to be more economical to produce, is effective against only one of the seven major types (and more than 60 sub-types) of virus. When similar vaccines are developed to cover these other types, there could be a combination into one application.

"USDA is committed to eradicating foot-and-mouth if the disease should enter this country," Atwell says. "We'd use the standard techniques of quarantine along with slaughter of infected and exposed animals."

### Drastic Changes

"We recognize, however, that agriculture and society have changed drastically since 1929 when we last wiped out an outbreak of this disease. Today, economic, environmental and political factors dictate a more flexible approach to eradication. For example, we now have many large feedlots and dairy operations—each containing thousands of animals—that might make a slaughter-only policy difficult and extremely expensive.

"Thus, in the face of a rapidly spreading outbreak, we would consider using vaccine to help slow the disease until more conventional eradication tools could be applied. To that end, for the past two years, USDA has been establishing a foot-and-mouth disease vaccine 'bank' by buying antigen from Bayer Laboratories in West Germany. Antigen for this bank is also being produced at USDA's high-security facility at the Plum Island Animal Disease Center off the coast of Long Island, N.Y."

The antigen—the basic element in the production of vaccine, which can be stored much longer than the vaccine itself—is being stored in West Germany and at Plum Island.

"If the new vaccine proves to be as good as it looks, this might cut our costs of an FMD vaccine bank considerably," Atwell says.

### Greatest Potential

But Atwell believes the new vaccine's greatest potential is in its long-range benefits. "Again, if it proves as good as it looks, this would be a tremendous help to other nations throughout the world to reduce—and possibly even eliminate—this costly disease. And, of course, the less disease

that exists throughout the world, the less chance for it to invade this country."

Currently, foot-and-mouth disease is considered to exist in all countries of the world except North and Central America and Panama; Australia and New Zealand; Japan; the Scandinavian countries; Ireland and Northern Ireland.

Foot-and-mouth is a virus disease that affects all cloven-hooved animals, including cattle, swine, sheep, goats and deer. It produces blisters on the feet, mouth and teats of affected animals. While rarely fatal, the disease drastically reduces meat and milk production.

### Outbreak Worth \$10 Billion

"If there were a disease outbreak of foot-and-mouth in the U.S., it could cost as much as \$10 billion in direct and indirect costs the first year alone," Atwell contends. "Meat and milk production could be reduced by as much as 25%."

"We take great pains to keep the disease out by restricting the import of livestock, meat and meat products from infected countries," he says. "Similarly, USDA would not license production of conventional whole-virus vaccine against the foot-and-mouth disease in the U.S. for fear the virus might escape from the production facility. For that reason, all work with the foot-and-mouth disease virus is confined to biocontainment facilities at the Plum Island Animal Disease Center." A