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Dying Breeds

Livestock are developing a largely unrecognized biodiversity crisis

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Jorgensen

This mulefoot hog represents about 1 percent of its breed's surviving population.

When it comes to milk production, nothing beats Holsteins. For the farmer who takes care to keep them cool, sated with high-energy chow, and milked regularly—often under the management of a sophisticated computer—these familiar black-and-white cows produce an average of 2,275 gallons of milk each per year. The average Brown Swiss, in contrast, produced only 1,820 gallons last year, and a Jersey less than 1,600.

The Holstein's milk generation has become so legendary that the roughly 9.2 million of them in the United States now represent an estimated 91 percent of the nation's dairy stock. Not surprisingly, Holsteins have achieved almost as daunting a dominance of dairying in many other Western nations, notes Richard H.L. Lutwyche of the Rare Breeds Survival Trust in Stoneleigh Park, England.

However, what's good for the individual farmer may not reflect what's in the best long-term interest of the animals or even dairying, argues H. Peter Jorgensen, a founder and former director of the Institute for Agricultural Biodiversity at Luther College in Decorah, Iowa. The focus on a single breed is eroding the bovine gene pool, he argues, creating increasingly clonelike generations of all too genetically similar animals.

Were a disease to develop for which Holsteins carried some particular inherited susceptibility, U.S. milk production could crash. Or if faltering economic conditions made low-tech, grass-fed dairying the only affordable approach, farmers might again want animals that can produce a lot of milk without coddling. Kerrys, Dutch Belted, and Milking Devons may carry genes for some of these traits. However, being among the world's rarest dairy breeds, their ability to supply such features would disappear if they were allowed to die off.

Dairy cows aren't the only livestock whose genetic diversity is waning rapidly. Of 15 breeds of swine raised in this country just 50 years ago, 8 are now extinct and most of the remaining purebred types are seriously imperiled, according to the American Livestock Breeds Conservancy (ALBC) in Pittsboro, N.C. The organization's most recent North American livestock census identifies hosts of other once-popular horses, goats, sheep, and asses poised on the brink of extinction.

Worldwide, at least 1,500 of the roughly 5,000 domesticated livestock breeds "are now rare—represented by less than 20 breeding males on the planet or less than 1,000 breeding females," explains Keith Hammond, senior officer for Animal Genetic Resources with the United Nations Food and Agriculture Organization (FAO) in Rome.

For the past decade, his department has been coordinating surveys and status reports on livestock breeds in FAO's 180 member nations. Its latest data suggest that 5 percent of those highly endangered breeds disappear from the face of the Earth annually—which, Hammond notes, comes to an average of more than one a week.

Overall, he told SCIENCE NEWS, "a larger proportion of genetic resources is in danger [of extinction] in the animal sector than in any other area of agrobiodiversity."

All domesticated livestock today belong to one of some 80 species. However, only about 14 of

these play an important role in food and agriculture.

Farmers have worked with these animals over the centuries to develop highly specialized breeds that embody distinct combinations of traits. The French alone developed 200 different breeds of cattle during the 18th and 19th centuries within the two domesticated bovine species, Jorgensen notes, and the British developed 40 different breeds of sheep.

From arid regions have emerged hardy cows able to weather heat and drought. Siberia produced a breed of cattle that tolerates winter temperatures as low as -60°C (-76°F). Elsewhere, breeds have arisen with especially strong resistance to disease and parasites, superior mothering qualities, prodigious strength for draft applications, or a tendency to lay down predominantly lean tissue.

Colonial Williamsburg Foundation

Dominique chicken, now bred largely for show.

However, since World War II, agriculture has been undergoing a transformation—moving from a family enterprise to big business. This change, which the ALBC describes as industrialization, has had a profound effect on which breeds remain popular.

Farmers once had perhaps 30 cows, each of which had a name. Today's herds typically number hundreds and sometimes thousands of nameless animals. Accompanying the change in scale has been the introduction of technology to gauge production efficiency.

"When my dad was farming," Jorgensen recalls, "he would put a scoop of feed in front of each cow and hay in the manger. We didn't have the technology to precisely measure what went in and out of each animal," a requirement for quantitative comparisons of breeds. Today, as cows enter stalls in the dairy barn, a sensor identifies each individual from the computer chip in her ear. Then software analyzes the cow's recent milking performance and triggers a feed dispenser to meter out precisely how much she will need.

Robert Hawes traces the dawn of a similar revolution in chicken husbandry to competitive egg-laying tests that the Agriculture Department began offering in the 1920s. The compelling results convinced farmers that they could reliably expect more eggs—and money—from particular breeds, says Hawes, a poultry expert at the University of Maine in Orono.

Before long, many of the more than 60 breeds that had been raised in the United States were abandoned in favor of just a handful of high performers. Today, Hawes says, five breeds supply almost all of the chicken meat and brown eggs sold as food. White eggs now come almost exclusively from a single breed, white leghorns.

Though bird fanciers still raise other species, Hawes says their emphasis is on producing pretty chickens, often at the expense of utilitarian traits, such as an ability to lay many eggs or eggs with firm shells.

Swine and several other species are losing genetic diversity in response to another trend: crossbreeding.

Though virtually all purebred swine are pigmented and sport bristly hair, most children picture the pig only as the pink movie star Babe. Such unpigmented and frequently hairless pigs—which usually result from a crossing of several different breeds—constitute the majority of pigs raised in the United States and Britain, notes Lutwyche.

Promoted by vertically integrated hog operations—industrial firms that not only mass-rear hogs but also slaughter them and package the meat for supermarkets—these pigs have been bred to bulk up quickly on a high-protein diet, laying down fairly lean meat. In Britain, Lutwyche notes,