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CHICKEN GENOME PLUCKED BARE BY INBREEDING

Modern livestock is bred to be super-productive. But at what cost? In the first genetic assessment of an entire agricultural product, scientists have found that, on average, super-productive modern chickens have lost more than half the genes present in ancestral populations. Some have lost 90%.

This means most of the world's chickens lack characteristics that evolved when they lived in the wild, and may be useful again to help them face stress and disease as livestock.

Scientists want to breed DNA for traits such as disease resistance, or "animal well-being", back into commercial birds without introducing undesirable traits at the same time.

Inbreeding is a concern with chickens, as the industry is dominated by a few big corporations that produce billions of birds from a handful of private breeding lines.

Homogenised hens

Bill Muir of Purdue University in West Lafayette, Indiana, and colleagues used the recently sequenced chicken genome to measure genetic diversity across these lines, and compared it with 19th century breeds and wild chickens.

They found that chickens had already lost a lot of genetic diversity before modern breeders got started.

In the 19th century, breeders turned the common European chicken – variably coloured birds with erratically shaped combs that periodically laid clutches of green speckled eggs – into breeds such as the White Leghorn. These were white birds with identical combs that laid a single white egg daily.

"The basic level of inbreeding was already 10% when modern poultry companies came into being," Muir told *New Scientist*.

Closer than auntie

That means 10% of the genes of any two birds from the four classic breeds that were adopted by modern producers are already identical.

Commercial breeding has pushed this commonality to 15% over the whole industry. That makes any two chickens more closely related than aunts and nieces in a typical human population, who on average share 12.5% of their genes.

Most of the remaining genetic differences are between different companies' breeding lines, which never cross. Within lines, though, much more has been lost.

Lines of chickens bred for eating share at least 30% of their genes. Some lines of laying hens share a staggering 90% of genes – meaning they have also lost 90% of their potential diversity.

Muir is heading an effort to reintroduce ancestral genes into modern chickens.

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