**US farms hit by bird flu – but a vaccine might make things worse**

Bird flu is rampaging across the Midwestern US this week. So far 13 million chickens and turkeys have been culled or earmarked for destruction to stop the spread of H5N2, an offspring of Asia's H5N1 bird flu. Minnesota, the top US turkey producer, declared an agricultural emergency after announcing infected farms almost daily for two weeks. Iowa, the top egg producer, killed 3.8 million hens on one farm alone.

US agriculture officials hope the outbreaks will diminish as summer warmth and sunshine destroys flu viruses in the environment. But their bird flu problems may be only beginning. Wild ducks could infect the rest of the continent next autumn.

And while H5N2, unlike H5N1, seems to pose little threat to humans, the $45 billion US poultry industry is already suffering, as China, South Korea and Mexico ban US produce. Producers are calling for a poultry vaccine, and the US Department of Agriculture says it is developing one. But that might just make the problem worse by encouraging the spread of "silent" infections.

**Running wild**

The H5N2 virus story started last summer, when the H5N1 virus hybridised with others in wildfowl in Siberia to create a a new strain, H5N8. This reached the US, where it further hybridised to spawn the H5N2 that has now reached nine Midwestern US states and Ontario, Canada.

US Department of Agriculture chief veterinary officer John Clifford said last week that most of the early farms infected got the virus from the environment, not other farms, suggesting it was introduced by wild birds. If wild birds are carrying it, says Jeffrey Hall of the US National Wildlife Health Center in Madison, Wisconsin, "these viruses could persist and spread in northern hemisphere waterfowl populations for an extended period".

Ducks are now headed to North America's arctic nesting grounds. If they spread H5N2 there, southbound migrants next autumn could carry it into eastern North America. Three eastern states are among the top ten egg producers in the US, while seven produce nearly two-thirds of US chicken.

**Vaccination trap**

At the moment, an infected farm must kill all of its birds to stop H5N2. Poultry producers want a vaccine instead. Researchers at the US Department of Agriculture are starting tests, and Clifford says he is talking to vaccine companies.

But "vaccination will always be the last option for avian influenza," says Henry Wan of Mississippi State University, who discovered H5N1 in 1996. Widespread poultry vaccination in China, Indonesia and Egypt has not got rid of that strain.

On the contrary, vaccinated poultry spread the virus without getting sick, making its spread invisible. Vaccination has moreover driven the evolution of H5N1 as these viruses adapt to the vaccinated birds. China is now trapped, say researchers: it wants to give up expensive poultry vaccination, but if it did, ubiquitous, silent infections with H5N1 would decimate the unvaccinated birds.

Even if the US avoided this trap, vaccination would hurt its poultry exports, worth $3 billion a year. Tests cannot distinguish vaccinated from infected birds, so importers reject meat and eggs from countries that vaccinate their poultry.

Ruben Donis of the US Centers for Disease Control and Prevention calls relying on vaccines to control bird flu "unrealistic". It might be possible to use an H5N2 vaccine on some high-risk farms with careful monitoring for silent infections, he says. But "so far, there is no reason to believe that H5 could not be controlled through culling", plus sanitary precautions aimed at keeping environmental viruses out of henhouses.

Depending on when – and if – summer weather starts killing off stray viruses, and more effective sanitary measures kick in, that could mean millions more dead chickens and turkeys, even before the ducks fly south again next autumn.

**Update, 28 April 2015:** *Since this article was first published on 27 April 2015, the number of birds culled in Iowa has changed and we've updated the article accordingly.*