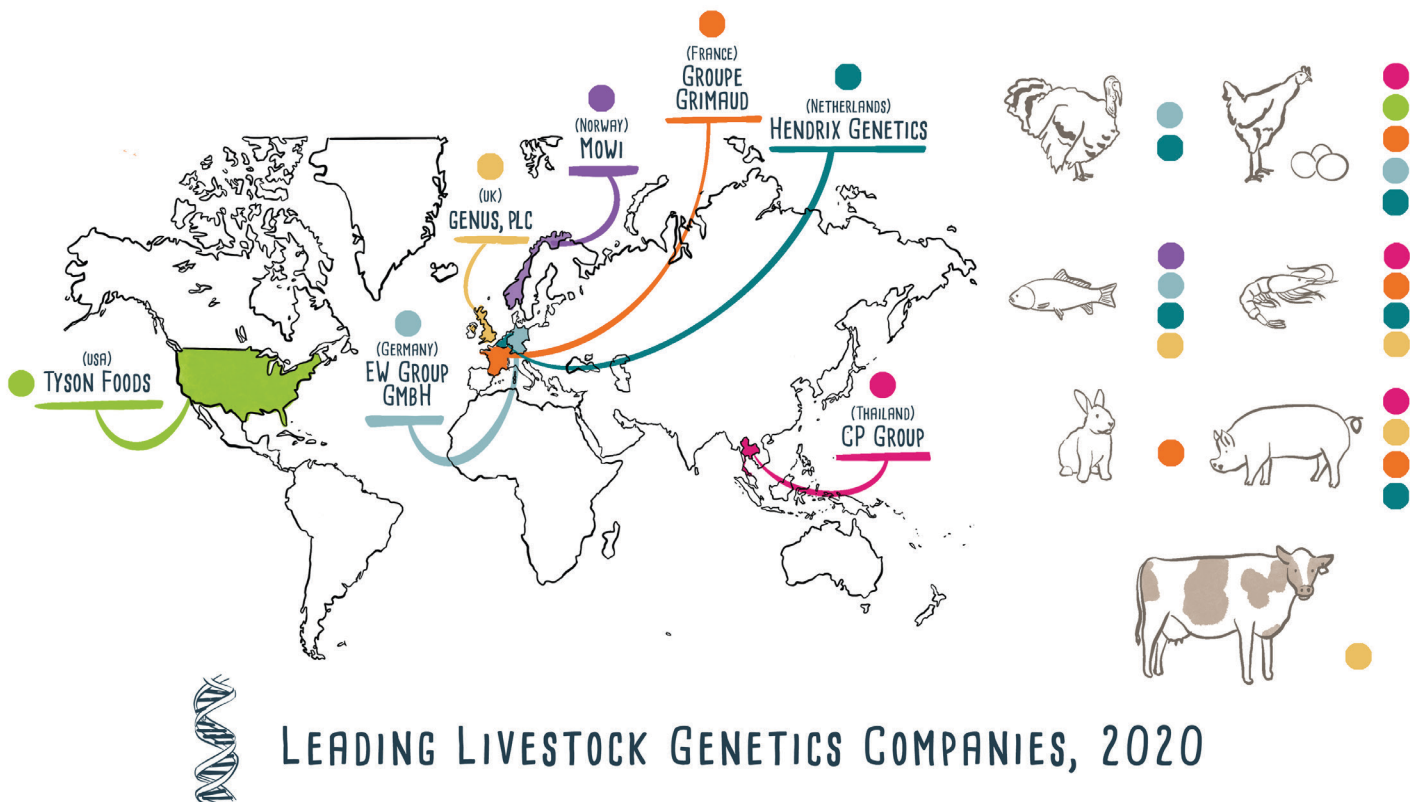


Livestock genetics – IN A NUTSHELL –



The **Livestock Breeding** or **Livestock Genetics** sector focuses on breeding material (e.g., live animals, semen, embryos) and reproductive technologies for industrial production. The dominant species include chickens, turkeys, pigs, cattle, and high-value farmed fish and seafood (salmon, tilapia, trout and shrimp). The industry typically selects for genetic traits to maximize production (i.e., rapid growth and high yields) and to facilitate production, processing and transport of uniform animal protein products on a massive scale. Industrial breeds can't survive without high-protein feeds, expensive medications and climate-controlled housing. This report focuses on three sub-sectors of industrial livestock genetics – poultry, swine and aquaculture.



Highlights from the full report:

The value of the livestock genetics sector is relatively tiny (at less than one-fifth the size of the global seed industry), but its proprietary genetic stock underpins a massive animal protein industry that has far-reaching impacts on greenhouse gas emissions, the environment, animal welfare and more.

The widespread adoption of industrial livestock genetics is the primary driver of the loss of farm animal genetic diversity worldwide.

Globally, just three companies control the vast majority of poultry genetics, making it the most concentrated sector in the industrial food chain. Entire continents and many countries depend on just two industrial breeders to provide the genetic stock for the world's chicken broiler industry.

Before the turn of this century, China was home to more pig diversity than any other country (with 72 breeds). By 2005, more than two-thirds of China's pigs (74%) were raised in industrial systems that rely on just one hybrid breed.

From 2018 to 2020, the deadly African Swine Fever virus wiped out up to 60% of China's pig herd. At a cost of some US\$60 billion, China responded to the crisis by importing pig meat for domestic consumption and replacing industrial breeding stock. Thousands of sows and boars were airlifted into China via private charter jets. In 2020, China opened the world's largest industrial pig farm, housing 84,000 sows with capacity for two million pigs a year.

Industrial livestock breeders, as well as private equity investors, are flocking to fish farming and genetics because aquaculture is booming worldwide; and the potential to apply genetic selection and genomics to high-value species is relatively untapped.

Similar to land-based factory farms, industrial salmon operations have become massive breeding grounds for environmental pollution, diseases and parasites.

Chew on this

Regrettably – following-on from the Terminator seed technology (a.k.a. suicide seeds) – researchers in Norway are using gene-editing to develop salmon that are engineered to be sterile. The aim is to prevent escapees from interbreeding with wild salmon, but it is also to protect proprietary fish stock. However, the prospect of commercialising gene-edited salmon with engineered sterility genes is a potential nightmare because engineered sterility is reversible and cannot function as a reliable biocontainment tool.