Ag quick CAST

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Protecting Food Animal Gene Pools for Future Generations

A paper in the series on The Need for Agricultural Innovation to Sustainably Feed the World by 2050

In the face of the mounting depletion of genetic diversity among livestock species, there is an urgent need to expand the sampling program, sustain the preservation effort, and evaluate the remaining livestock and poultry gene pools.

- Livestock breeders produce the genetic resources necessary to address domestic consumption and supply genetic resources to the world.
- The highly specialized livestock industries in North America are dominated by a small number of productive breeds for which there is a concomitant downward trend in the effective number of breeding animals and a general contraction of genetic diversity, particularly in the commercial dairy and poultry breeds.

Genetic diversity can be preserved through living populations or cryopreserved for future use.

- Living populations are advantageous because they can adapt to changes in the natural or production environment.
- Genetic material from livestock and poultry can be cryopreserved in several forms: male gametes (spermatozoa), female gametes (oocytes), embryos, embryonic cells, gonadal tissue, primordial germ cells (PGC), and somatic tissues.
- The bovine is the only farm animal species for which cryopreservation of sperm is commercially routine. The success of semen cryopreservation in sheep and goats is lower than that of cattle, but better than swine. Among the major mammalian food animal species, the pig poses the greatest challenge for semen cryopreservation.

Gene banks have been established across the globe to protect livestock and poultry industries from loss of genetic diversity that could subsequently hinder their capacity to adapt to new environmental or market pressures.

- The USDA-ARS established the National Animal Germplasm Repository in 1999, and thereby began development of livestock and aquatic gene banking for species of agricultural importance.
- Since its initiation, the NAGP has developed into the world's largest and most comprehensive repository for farm animal genetic resources.
- Since 2005, the Animal-Genetic Resources Information Network (Animal- GRIN) has been the primary vehicle for storing information about animals in the NAGP's collection.

Experts to Contact for More Information:

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