USING RARE BREEDS IN ORGANIC FARMING SYSTEMS (2)

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INTRODUCTION
It is no longer prudent to leave the world's animal genetic resources up to forces of nature or industry. Maintaining genetic diversity in domestic farm livestock has too large a role to play in biosecurity and the future of our food. Already, too many traditional breeds have been lost in the quest for maximum productivity and cheap food – but at what cost? Sadly, higher productivity does not necessarily mean increased quality or greater profits and the cost to the environment is rarely factored into profit calculations. Traditional breeds have rich and diverse characteristics that make each of them unique. Many of these qualities make them well suited to lower input, free-range and organic livestock enterprises. In addition, the uniqueness and quality of the produce often makes them higher value commodities.

I am passionate about preserving for future generations rare and endangered breeds of farm livestock. I believe strongly that organic farmers have a role to play as the primary custodians of these breeds into the future. What I hope is to one day hear people say “Thank God that organic farmers had the vision and foresight to keep these traditional breeds. Can you imagine what food would be like without them”?

Sadly, we can imagine. The food most widely available to us is generic, tasteless, and of inferior food value.

With this in mind what I hope to get across in this presentation is an increased awareness of the world-wide trend towards diminishing genetic variation in domestic farm livestock. More specifically I would like
- Every landholder to keep and keep-registered a rare or endangered breed
- Every consumer to purchase rare breed commodities…meat, milk, eggs, fibre…

Only then can we reverse the trend of diminishing biodiversity in domestically farmed livestock.

A CASE FOR QUALITY AND UNIQUENESS
Rare and endangered livestock do not fit the mould for a marketplace that demands continuity and uniformity….but therein lies their unique selling position- “uniqueness”. In the UK it is an absolute pleasure to be able to walk into specialty butchers shops that are accredited by the Rare Breeds Survival Trust. In these stores, you are bombarded with unique flavours. The question is not whether you would like to eat pork, lamb, chicken or beef. The question is what breeds are on the menu today? When was the last time you tasted pork from a Wessex Saddleback, Large Black or a Tamworth pig? Have you ever had the choice? On the other hand, when was the last time you complained that the pork you buy today is dry, tough and tasteless? And what about chicken meat? I know that there are people in the room who are guilty of answering “it tastes like chicken” when asked to describe the flavour of a meat with no discernable flavour at all. You know that’s true. Does anybody here remember what chicken is supposed to taste like? Both the chicken and pork industries are now dominated by commercial hybrid genetics developed by a handful of multinational corporations. Animals are bred for fast growth, efficient utilization of grain fodder (which might otherwise be used to feed people) and for constantly uniform carcasses - consistently dry, consistently flavourless and consistently on the supermarket shelves. My message is that quality comes from pure bred genetics which is rapidly being lost. If we want quality and diversity, we need to preserve the pure breeds.

AGRICULTURAL BIODIVERSITY – THE SAD TRUTH
A recent international study conducted by the Animal Genetic Resources Group of the FAO incorporated the results from 153 countries from around the world. The study highlighted the following;
- 15 species account for over 90% of global livestock production and of these, the following are at risk of extinction;
  - 53% of all turkey breeds
  - 39% of Duck breeds
  - 22% of Ass breeds
  - 52% of all chicken breeds
  - 33% of all pig breeds
  - 20% of sheep breeds
  - 42% of horse breeds
  - 24% of cattle breeds
  - 18% of goat breeds.
- over the past 15-20 years, 300 out of 6000 breeds (5%) identified by FAO have become extinct.
- The World Watch list for Domestic Animal Diversity identifies 1,350 breeds that currently face extinction. We are currently losing 1-2 breeds every week (5).

Maintaining biodiversity in our food source is not just about quality, it is also matter of food security. If we do not halt the loss of these breeds, we are limiting the potential for future adaptation and change in our food source.
THREE UNIQUE CASE STUDIES
The following three examples are indicative of how the genetic variability of animal genetic resources is being put at risk. Different species are affected in different ways. Different breeds affected to varying degrees. Each leads to the narrowing of the genetic variability.

Case Study 1. Pig Breeds Risk Factor = Hybridisation. (2)
With 33% of all pig breeds being endangered globally, there are currently 8 pure breeds of Pig in Australia. (Wessex Saddleback, Large Black, Tamworth, Berkshire, Duroc, Hampshire, Large White, Landrace). 4 other breeds once existed in Australia, but have now been lost in Australia. (Poland China, Gloucester Old Spots, Middle Yorkshire White, Welsh). The Welsh breed of pig was lost to Australia in 1995. Although these breeds do exist in other countries, they no longer constitute a genetic resource for Australia or contribute to the genetic variability of the nation’s pig breeds. All 8 pig breeds remaining in Australia together contribute less than 1% of the national pig herd of 356,000 sows in 2002 and are currently being maintained by fewer than 50 operators. The vast majority of the pig industry in Australia is dominated by cross bred genetics (commercial hybrids) that are developed by 3 major firms; Hyfarm Pty Ltd, PIC Australia, and CEFN Genetics. These hybrid pigs are bred for fast growth rates in an intensively housed environment. They have very little hair cover and this together with the white colour of their skin makes them highly prone to sunburn. These pigs are not bred for outdoor environments and are therefore less suited to organic enterprises which free-range pigs outdoors. Sadly, the breeds better suited to organic & free-range enterprises are on the decline. Organic farmers would be well advised to seek out these breeds before they are no longer available.

Case Study 2. Dairy Cattle Breeds Risk Factor = Inbreeding & AI (2)
13 Pure cattle breeds are recorded as being used by the Australian Dairy Industry. Of the national herd, 70% are Holstein, 10% are Jersey and 4% are a Holstein/Jersey crosses. This means that 85% of the genetic variability in dairy cattle breeds is represented by only 16% of Australia’s total dairy herd. But let’s take a look at the level of genetic variability of the number one dairy breed in Australia – the Holstein. In 1997, the top five Holstein ancestors in Australia were bulls from the United States of America that together made up 30% of the Australian Holstein gene pool (1). The increasing use of Artificial Insemination in the Australian dairy industry has led to unprecedented increases in inbreeding coefficients in our national herd. Although Holsteins are by no means rare, the variability within the breed is rapidly diminishing to a point that ancestors with a large genetic contributions accounted for 80-90% of the inbreeding in the population in 1997. Throughout the 1970’s, the majority of predominant Holstein ancestors were born in Australia. Since that time, there has been sequential introgression of prominent ancestors from USA. In 1990, only 2 sires (Pawnee Farm Arlinda and Round Oak Rag Apple Elevation) accounted for 25% of all genes segregating in US registered Holstein cattle (6). Biodiversity within individual breeds is becoming of increasing concern. Some geneticists believe that commercial Holstein farmers will, like the pig industry, be cross breeding within 10-20 years to reintroduce the genetic variability they are currently eroding from the national herds. With Australia being the third largest exporter of dairy products in the world, we can only wonder how the future effects of inbreeding will impact on the economic performance of this industry and the lives of individual farmers.

Case Study 3. Goat Breeds Risk Factor = Genetic Swamping (2)
There are 14 breeds of goat listed as being present in Australia. Five are meat/fibre breeds, six are dairy breeds and three are feral breeds. Australia is the world’s largest exporter of goat meat, with the majority of goats being harvested from feral populations. In 2001 the Australian farmed goat industry was approximately 200,000 head. The 2001/02 Australian goat slaughter was 859,000 head, with 138,781 being exported. In the past 12 years Boer goats (1993) and Kalahari Red goats (1999) were introduced into Australia. Both of these are large framed meat breeds from South Africa, introduced with a view to “improving” the carcass quality of goat meat in Australia. The Australian feral goat is a hardy goat breed which has adapted over more than one hundred years in the Australian outback regions. Feral goats are harvested from the wild and currently constitute a resource that forms the foundation of a significant industry worth around AUS$45.7 million. This locally adapted breed may soon be altered by “genetic swamping”. With the introduction of the exotic goat breeds into the wild, the Australian feral goat is likely to be changed forever within a very few generations. Whether this is a good or bad thing we do not know but it is a large scale experiment with biodiversity that is currently being run without parameters. Our perception of feral animals in Australia is largely one where see the animals as no more than pests that degrade the environment. In many
cases this accusation may be true, but they are also a harvestable resource and asset that needs to managed. I personally am concerned about the unpredictability of new breeds of goat being introduced into the wild populations.

**WHY IS IT IMPORTANT TO MAINTAIN GENETIC VARIABILITY?**

1. **Choices & Ability to adapt**
   Animals need to be able to be locally adapted to their environment. Not all animals suit all environments (e.g., large framed Holstein cattle require high levels of good quality feed to sustain their milk production. They do not tolerate hotter climates as well as the smaller framed breeds (e.g., Jersey). Some breeds are better suited to extensive grazing systems (e.g., Ayrshires) while others require a high level of supplementary feeding (US genetics is largely based around animals that are lot fed). With changing trends, we need to ensure we have the right breeds to suit all eventualities.

2. **Minimise inbreeding depression**
   Inbreeding occurs in situations where there is limited genetic variability, leading to decreases in production and performance known as inbreeding depression. This may be in terms of decreasing fertility, production, size, or an increased number of physical abnormalities that affect performance.

3. **Disease resistance or susceptibility.**
   Different breeds exhibit varying levels of disease resistance. If too high a percentage of any industry relies too heavily on any one breed and that breed falls susceptible to a particular disease, then it puts at risk the food producing capacity of that industry and the livelihoods of many people. (e.g. The Welsh pig died out in Australia in 1995 due to its susceptibility to stress. As the breed had been bred more and more for leanness, scientists discovered the “Halothane” or stress gene in pigs that is linked to level of leanness. The leaner the animals became, the more problems they experienced with stress. In sheep breeds, rare breeds such as the Wensleydale have been shown to have a gene that gives it a high level of natural resistance to Scrapie).

In the next 25 -30 years, the demand for meat and milk will double (5) and this will put increasing pressure on the productive capacity of our animal genetic resources. It will also put increasing pressure on the biodiversity of our animal genetic resources as industry selects for a narrower range of production characteristics, striving to meet the challenges of a growing population that draws more heavily on environmental assets than ever before.

**WHAT CAN BE DONE TO REVERSE THE TRENDS?**

1. **If you have farming land, then keep a rare breed. Consider which breed will best suit your enterprise. It may not be the entire herd or flock. It may just be a satellite herd or flock that you keep for their conservation value. Alternatively, you may find that a certain breed suits your organic practices better than the conventional or hybrid breed you have previously been using.**

2. **Keep up the registrations of all rare breeds with the recognised breed registry. When breed numbers reach low levels, knowing the animal’s pedigree is essential to being able to minimize inbreeding and maximize the future prospects of the breed. Since objective measurements have been introduced to most animal industries, there have been falling numbers of breed registrations as animal pedigrees are of less economic importance than the measures of their productive capacity. From a conservation point of view, maintaining accurate pedigree records is essential to the ongoing welfare of the breeds.**

3. **Use rare breed commodities. Eat rare breeds. Use rare breed fibres. I always get strange looks when I tell people that unless they eat rare breeds of domestic farm livestock, they will die out. If we don’t utilize endangered breeds, then who will?**
Photo left. Fiona Chambers with one of only 75 registered purebred Wessex Saddleback sows left in the world. They are globally endangered and ranked “critical”. Photo right. An organically-reared Wessex Saddleback sow after farrowing naturally in a forest paddock. Wessex Saddleback pigs are one of the casualties of declining variability in domestic farm livestock.

REFERENCES