Asia Dairy Network Website News Number 9
from John Moran, your ADN Coordinator

Welcome to the ninth edition (Feb 2015) of the ADN News. This newsletter discusses the very important issue of breed suitability for tropical small holder dairy (SHD) farm systems.

The genotypes of dairy stock imported onto tropical dairy farms

The intense genetic improvement programs for dairy stock being undertaken in the developed dairy industries of Australasia, North America and Europe will through continuing importations, lead to higher genetic merit cows in the developing countries, such as in tropical Asia, Africa and Latin America. Such selection programs are leading to reductions in genetic diversity of the world's dairy cow population. Such losses in genetic variability increase disease susceptibility in high producing genetic lines. For example, the recent outbreak of "mad cow disease" in the UK has been attributed to the increased susceptibility to the disease due to the lack of genetic diversity in the country's population of Friesian dairy cows, as a result of intense selection for high cow performance.

The more specialised a domestic animal becomes, the more specialised an environment it will require. For example, Friesians require better environmental support than a beef cow, which could survive under wild conditions. Friesian cows would greatly suffer in the wild with their huge udders while their calves are weaker and take longer to walk unassisted compared to beef breed calves.

Selection for increased milk production and cow performance has continued for more than a century in Europe and has produced dramatic results with cows producing more than 50 L/day of milk under optimal feeding and herd management. Dairy selection programs have also been undertaken in tropical regions utilising the tropical adaptation genes of Zebu (*Bos indicus*) stock. The resultant progeny have been nowhere near as productive as their temperate counterparts because of environmental and genetic constraints. The more recent importations of dairy stock to tropical developing countries have almost entirely been based on Friesians. This has been primarily due to the often mistaken belief that such stock would always be the most productive in their new environment.

Even within the temperate dairy gene pool, there are breeds that exhibit a greater degree of tropical adaptation than do Friesians, such as Jersey, Brown Swiss and Red Danish. In addition, there are synthetic dairy breeds bred specifically for tropical conditions that although in short supply, could be the centre of a breed multiplication scheme within the host country. Such breeds include the Australian Friesian Sahiwal, Australian Milking Zebu, the Brazilian Girolanda and purebred Sahiwal.

High performing genotypes require excellent farm management to help them achieve their potential. Under the more traditional farm management that exists in many tropical SHD systems, such animals will often perform poorer than the local stock. This is primarily because of their propensity to preferentially utilise their body reserves to produce milk during early lactation. Without sufficient nutrient intakes, they will lose weight and upset the hormonal balances to allow them to regain their normal oestrus cycle for many months following calving. Reduced reproductive performance of high grade Friesians is an all too common feature of traditional feeding and herd management on tropical SHD farms. In fact, the inability to get back in calf within several months due to lactation anoestrus can represent up to 20 or 30% of imported dairy stock being culled and slaughtered after just one loctation.

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The following Table1 presents recent data derived from SHD farms in Bangladesh, relating to the genetic improvement of the local dairy animal, known as the Pabna Milking Cow (PMC) through cross breeding with established improved dairy breeds. The Sahiwal crossbreds were either Sahiwal x PMC or Sahiwal x (PMC x Friesian), the Friesian crossbreds were either Friesian x PMC or Friesian x (PM x Sahiwal) while the Jerseys crossbreds were either Jersey x PMC or Jersey x (PMC x Sahiwal).

Table 1 Performance of three breed types in Bangladesh

	Sahiwal	Friesian	Jersey
Birth weight (kg)	26.3	27.2	24.0
Lactation length (days)	282	290	302
Lactation yield (kg)	1735	2893	3024
Average milk yield (kg/d)	6.2	10.0	10.0
Fat%	4.4	4.1	4.9
Solids Not Fat (SNF) %	8.0	8.0	8.1
Age at first service (months)	29.8	27.1	25.0
Services per conception	1.3	1.7	1.2
Days to first post-partum heat	137	149	98
Calving interval (days)	419	430	382

Compared to the Friesian crossbreds, the Jersey crossbreds were the 3.2 kg lighter at birth but had a 12 day longer lactation length, produced an extra 131 kg milk over their entire lactation and had an 0.8% higher fat% and 0.1% more Solids Not Fat contents. In addition, they were 2.1 months younger at first service, required 51 days less to first post-partum heat, and 0.5 less services per conception and subsequently had a 48 day shorter calving interval. Western data usually shows Jerseys to produce less milk per day than Friesians but these data showed identical daily milk yields (10.0 kg/cow/day). The poorer performance of the Sahiwals compared to the Friesian crossbreds is also apparent from these data, although the Sahiwals required less services per conception, had fewer days to first post-partum heat and shorter calving intervals than the Friesians. Clearly, under traditional SHD management in a hot and humid environment where cows were only producing 10 kg/cow/d on average, Jersey crossbreeds outperformed Friesian crossbreds.

No matter what genotype is favoured for dairy development programs, farm management practices almost always can be redressed to better utilise their productive potential. Not only do these improvements need to be directed towards providing better cow comfort and nutrient status, a more concerted effort in addressing all aspects of cow welfare will almost always reap benefits.