CLUNY LIVESTOCK**EXPORTS**

Jersey x Holstein Crossbreds Or Australian Friesian Sahiwal – Which is the profitable, adaptable and hardy Tropical Dairy Breed?

Index

Jersey and Holstein Breeds

The dominant Dairy herd in the world for many centuries has been the Holstein-Friesian which originated in the Northern Netherlands between 100 B.C. to 100 A.D. Originally, the Holstein-Friesian was the result of crossbreeding the black and white animals of the Batavians and Friesians, who were migrant European tribes who settled in the Rhine Delta region about 2000 years ago. The major historical development of this breed took place in the two northern provinces of the Netherlands of North Holland and Friesland. This dominance is unlikely to change in terms of Holstein-Friesians holding a numerical advantage, however significant changes are taking place due to crossbreeding of Holstein-Friesian animals with Jerseys as well as other breeds.

The Jersey breed originated on Jersey, a small British island in the English Channel off the coast of France. The Jersey is one of the oldest dairy breeds, having been reported by authorities as being purebred for nearly six centuries.

The Jersey breed was known in England as early as 1771 and was regarded favorably because of its high levels of milk and butterfat production. At that early date, the cattle of Jersey were commonly referred to as Alderney cattle, later on being referred to only as Jerseys. Adaptable to a wide range of climatic and geographical conditions, outstanding Jersey herds are found from Denmark to Australia and New Zealand, from Canada to South America, and from South Africa to Japan. They are excellent grassland grazers and perform well in intensive grazing programs. They are more tolerant of heat than the larger breeds. With an average weight of 410 kgs, the Jersey produces more litres of milk per kg of body weight than any other breed; Jersey cattle will generally produce more than 13 times their bodyweight in milk each lactation.

Crossbreeding

Crossbreeding

Crossbreeding involves the breeding of two parents from different breeds. It is a powerful tool available to cattle producers to improve the production efficiency of the herd overall. Crossbreeding takes advantage of what is known as Heterosis (Hybrid Vigour).

Heterosis is characterized by the superior performance of the offspring over the average of the parent breeds, most noticeably in genetic traits such as fertility/sterility, milk production and growth rates. For example, if a Jersey sire had a milk volume average of 2,791 litres per annum in his progeny and was bred with a Holstein Friesian mother with an average volume of 3,803 litres per annum, then the parental average would be 3,297 litres p.a. So if the progeny of this mating was female, and her milk volume average was 3,612 litres p.a., then the milk production trait would be 9.5% above the parental average.

The opposite attribute of Heterosis is Inbreeding Depression, where inbred animals have reduced performance due to a higher likelihood of inheriting recessive (faulty) genes from related parents.

Crossbreeding has been most successful when applied to hybrid corn and some other plants, as well as hybrid chickens and, to a lesser extent, with pigs and sheep.

When dealing with any animals, breeding from the best animals (top 20% of sires) and feeding them the best diets (high in roughage) and providing the best health care always produces maximum results.

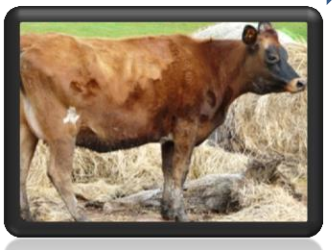
There is general agreement that the 2 breed rotational crossbreeding system works best. Under this approach, in the first generation, a Jersey sire is put to a Holstein-Friesian mother, in the 2nd generation (Rotational Cross) a Holstein-Friesian sire is used, in the 3rd generation a Jersey sire used, and so on.

Crossbreeding

Jersey Bull

Holstein Friesian Dam

Holstein Bull



F1 Jersey-Holstein Crossbred Heifer

F2 Jersey – Holstein Rotational Crossbred

The Facts Jersey x Holstein Crossbreds Compared with Holstein Friesians

- The Science
- Crossbreeding & Profitability
- Production Herd Test
- General Health
- Breeding Worth

The Facts Jersey x Holstein Crossbreds

Crossbreeding

Crossbreeding of dairy cattle in New Zealand and Australia has been conducted for over 25 years and the genetic data covers millions of cattle over this period. Data from other countries as well supports the conclusions made from the Australian and New Zealand data. Based on the results of the past 25 years, the general opinion is that Holstein-Friesian x Jersey crossbreds may well hold the greatest potential for improvement within dairy herds.

Profitability

Note HF = Holstein Friesians JH = Jersey Holstein crossbreds
F1 = 1st generation
Crossbreeding Holstein-Friesians over 25 years to Jersey cattle revealed that:

- Holstein Friesian x Jersey crossbreds require 10% less feed than Holstein Friesians purebreds. Feed costs represent 30 – 50 % of the total cost to produce milk.
- Jersey Holstein crossbreds generate a greater return on investment than Holstein Friesians.

Table 1. Net Income per hectare of parent breeds and crosses

(Holstein Friesian Sire) *From "Experiences with dairy cattle crossbreeding in New Zealand" by W.A. Montgomerie. Livestock Improvement Corporation, Animal Evaluation Unit, Hamilton NZ 2002."*
F1 is first generation cross (Jersey Sire) and Rotational Cross is 2nd generation.

	Holstein Friesians	Jersey	F1 (HF x J)	Rotational Cross (HF x J)
Net Income ($ per hectare)	**$NZ1487**	**$NZ1590**	**$1693**	**$1633**

The Facts Jersey x Holstein Crossbreds

Profitability and Comparison of Jerseys versus Holstein Friesians

Table 2. Average Breeding Worth of all cows by breed born 2000

From "4.Herd Improvement NZ Dairy Stats 2002-2003 page 32 "

Breeding worth is the ability of a cow to turn feed into profit

• Some recent reports indicate JH are now as much as 20% more profitable than HF (ref. "Green to Gold" magazine Volume 1 Number 1 feature by Russel Knutson, New Zealand Genetics 2004.)

• JH produce more fat and protein than HF

Breed	Breeding Worth ($)
Holstein-Friesian	110.0
Jersey	117.5
Ayshire	69.2
Holstein-Friesian x Jersey	118.2
Guernsey	-16.2
Milking Shorthorn	8.9
Brown Swiss	-9.5
Other	84.3
Weighted Average	112.1

The Facts Jersey vs Holstein Friesians

Profitability and Comparison of Jerseys versus Holstein Friesians

A recent study of 17,000 Holstein Friesian x Jersey crosses artificial insemination meetings in the Australian state of Victoria ran a comparison of the crossbreds performance with a Holstein Friesian averages.

Table 2. Victorian production comparison

Breed	Litres	Milk fat	Protein
HF x J	5,844	4.5 % 253 kg	3.5 % 201 kg
HF	6,500	3.9 % 251 kg	3.2 % 211 kg

The crossbreds tended to be smaller than three Holstein Friesians, therefore the farmers ran 10% more crossbred cows which resulted in a higher milk solids/hectare for the crossbreds.

The crossbred milk also averaged a lower somatic cell count, which was confirmed by the New Zealand data.

The six week in calf rate was 70% for the crossbreds and 60% for Holstein Friesians. That advantage was further maintained through a 12 week making period average for all age groups.

Analysing ADHIS (Australian Dairy Herd Improvement Scheme) , Mick Carrick, Victorian Department of Primary Industries and Professor Mike Goddard concluded that straight Holstein Friesian were more profitable than the other straight breeds, and that the Holstein Friesian x Jersey first cross was more profitable than the straight Holstein Friesian.

The Facts Jersey vs Other Breeds

Table 5. Average Breeding Worth of 1998 born bulls(reliability of 75%+)
From "4.Herd Improvement NZ Dairy Stats 2002-2003 page 2)"

Breed	Breeding Worth ($)	Number of Bulls
Ayrshire	97.6	**11**
Holstein Friesian	135.6	**202**
Jersey	**160.5**	**130**

Table 6.Top Jersey Sires are powerful component transmitters
Note: Van der Fits Fjord one of the top sires in the world

William Ads Samual, Williams Ace of Hearts and Van der Fits Fjord data
From "Green to Gold Volume 2 Number 1 page 15"

Leading Jersey Sire by name	Fat	Protein
Williams Ace of Hearts	6.1%	**4.3%**
Willand Ads Samual	5.7%	**4.2%**
Van der Fits Fjord	**5.9%**	**4.0%**

Production Herd Test

Table 3. Herd test breed averages of cows in 2002 - 2003

From "4.Herd Improvement NZ Dairy Stats 2002-2003 page 22 "

•JH are smaller than HF (say 481 kg for HF vs 446 kg for JH crossbreds) but live longer and produce milk longer. JH produce milk for one lactation more than HF (305 days is standard industry lactation period)

•JF are more disease resistant to Mastitis and have consistently lower somatic cell counts of 75,000 to 130,000. Somatic cells indicate the cell content of milk - 95% Leukocytes (white cells) and 5% epithelial, and high cell counts indicate the presence of disease. Milk sampled in bulk from 6 to 8 year old HF cows at one US dairy averaged a cell count of between 200,000 to 250,000 for HF herds, whilst JH herd milk averaged cell counts between 75,000 to 80,000. (ref. JERSEY JOURNAL Reprint April 2000).

	Holstein Friesian	**Jersey**	**Crossbreed**
Number of cows	1,110,878	374,409	**612,868**
Milk Fat(%)	4.38	5.75	**5.01**
Milk Protein	**3.55**	**4.12**	**3.82**

General Health

Table 4. Means for somatic cell count – Overall only

From "Reproductive Performance of Holstein-Friesian x Jersey Crossbreds in Predominately Holstein Herds by Tracey L. White – The Institute of Land and Food Resources, The University of Melbourne, Australia"

Somatic cell counts represent the health of a herd and the lower the count the less bacteria are present.

Group	Breed	Cell Count
Overall	Holstein-Friesian	**199,000**
Overall	**Holstein-Friesian x Jersey**	**131,000**

General Health

•Jersey Friesian (JF) herds require less maintenance, resulting in lower veterinary costs for Mastitis and other diseases (ref. JERSEY JOURNAL Reprint April 2000).
•JF produce slightly less milk (8.7%) than HF, however 2nd generation rotational crosses have outperformed purebred Holstein Friesians (ref. NZ Dairy Stats 2002-2003 pg 22 table 4.6). JH eat 10% less feed, so produce more profit.
•US data suggests JH and HF perform equally as well as each other (ref. JERSEY JOURNAL Reprint April 2000).
•JF have fewer general health problems than HF (ref. JERSEY JOURNAL Reprint April 2000).
•JF have much higher rates of fertility than HF (ref. JERSEY JOURNAL Reprint April 2000).
•JF have a better reproductive performance and fertility rate than HF (ref. JERSEY JOURNAL Reprint April 2000 and Reproductive Performance of Holstein-Friesian x Jersey Crossbreds in Predominately Holstein Herds by Tracey L. White – The Institute of Land and Food Resources, University of Melbourne).
•JF have fewer problems when giving birth particularly when compared to first-calf HF heifers (ref. JERSEY JOURNAL Reprint April 2000).
•JF are more resilient in harsh environments.
•JF have stronger, healthier feet that are well suited to concrete floors in dairies, so less money is spent on their maintenance (ref. JERSEY JOURNAL Reprint April 2000).
•JF are more resistant to heat and have virtually no feet problems and fewer calving problems (ref. “Planning and Managing a Seasonal Dairy” – David and Lynda McCartney)
•Of the one million doses of Jersey Semen used each year in New Zealand 36.1% goes into Jersey Cows and 26.6% goes into Holstein Friesians with the remaining 37.3% going into Holstein Friesian/Jersey cross and other breeds (ref. letters to JERSEY JOURNAL – David Sellars, Livestock Selection Manager, Livestock Improvement Corporation Ltd, Hamilton, NZ)
Jersey Bulls are the most reliable in terms of their genetic merit. This is measured by their sons and daughters and expressed as Breeding Worth.

Jersey Crossbreds and Australian Friesian Sahiwal

The Tropics

Jersey x Holstein Crossbreds

The success story of the Jersey x Holstein crossbred worldwide in tropical regions is acknowledged and well documented. It includes countries such as Mexico, Philippines, Thailand and Malaysia, it is the Jersey component that provides the heat resistance and the toughness.

In Malaysia and Philippines production levels of 18-20 litres have been achieved. In western Mexico in Sinaloa and Los Mochis, where the author visited, 30 litres a day in extremely high humidity conditions were achieved.

In Australia where temperatures can exceed 46 degrees Celsius in summer Jerseys and Jersey crossbreds perform exceptionally well producing up to 22 liters on pasture based systems.

Imported Australian Jersey a Holstein Crossbred - 18 litres per day

Crossbreeding in dairy herds

Findings from the "Sustainable dairy farm systems for profit" project

M5 Project Information Series - Studies on Mutdapilly Research Station and subtropical dairy farms 2001 to 2005

Lex TURNER

edited by ***Anne CHAMBERLAIN***

In a 2006 study conducted in tropical Queensland on Jersey x Holstein crossbreds, this breed appears to offer farmers in the region the potential for equal production of milk solids per hectare as a pure Holstein Friesian breed, improved reproduction, fewer calving problems, reduced somatic cell count, smaller sized for increased survival (number of years and the herd), and the flexibility of breeding cows suited to individual farming conditions. This study was known as :

Milk Production figures Crossbred Jerseys

X bred	20.8	5,833	4.44 % 259 kg	3.27 % 191 kg	495

Reproductive data from this showed that the crossbreds in the study perform better in first service conception rate 44% versus 29%, but Holstein Friesian cows obtain better results in second and other service conception rates. The small number of animals meant that any differences were not really statistically significant.

Crossbreeding in dairy herds

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USA major crossbreeding study

IN a recent visit to Australia, USA geneticist Les Hansen from the University of Minnesota explained what had led to increased interest in crossbreeding in Holstein Friesian herds in the US – declining fertility, increased health problems, cows calving fewer times and having a shorter life in the herd.

He explained that globally, HF (and similarly Jerseys in US) were becoming more closely related. The depressing effect of inbreeding is greatest on fertility, health and survival.

These concerns led to a trial on seven large Californian dairy farms, crossing European and Scandinavian breeds over HF to compare the first crosses with straight HF. There were 1,400 cow and 130 sire records analysed in the trial.

Scandinavian Reds, Monbeliarde and Normande breeds were selected for crossing with HF, because of US industry's focus on milk volume.

Overall, HF averaged more milk and total solids than crossbreds, but ease of calving, survival and fertility all favoured the crossbreds – which would have compensated for the difference in milk production to a large extent.

Australian Friesian Sahiwal

Australian Friesian Sahiwal

Is a breed that was developed by the Queensland Government in Australia over a 35 year period from 1960 to 1995. They have in the last 40 years been exported to the Philippines, Mexico, Thailand and Malaysia and are the subject of several research papers in Asia.

As a breed worldwide it has been much hyped as the answer to the tropical dairying challenge of developing a high performance dairy cow for a harsh environment. High humidity has a dramatic effect on the performance of dairy cattle in particular Holstein Friesian breed, which requires temperatures of below 24° Celsius for at least 10 hours per day. This effectively eliminates this breed for tropical conditions unless sophisticated cooling systems are utilized.

Sabah Survey 2007
DAIRY CATTLE MANAGEMENT: SURVEY ON DAIRY CATTLE LACTATION TREND IN SABAH
Bonaventure Boniface and Jupikely James Silip and Abdul Hamid Ahmad
Universiti Malaysia Sabah, Universiti Malaysia Sabah, Universiti Malaysia Sabah
28 November 2007

"A survey was conducted to obtain information on Sabah dairy cattle lactation length and lactation yield to identify the lactation trend. In the study, 18 farms with 2 types of husbandry practice namely feedlot and grazing were visited. Dairy livestock has became established part of the livestock industry with Friesian-Sahiwal crossbreed, imported from Australia and New Zealand with heredity of 62.5% Friesian 37.5% Sahiwal and 50% Friesian 50% Sahiwal respectively. Local born cattle are referred as Sabah Sahiwal Friesian (SSF). All the cows are milked twice a day. From the results obtained, the average lactation of dairy cow is around 6 liters to 12 liters per day with mean of 8.6 liters per day if there is no lactation failure. The mean for cow milked per lactation is 278 days of length and the mean for total milk yield per lactation is 2489 liters. Incidence of lactation failure happens in certain farm that had just received new imported cows, or happens in individual cow in the herd of lactating cows"

Friesian Sahiwal

The information of the survey has been obtained from selected farmers. Therefore the reliability of the data on certain aspects of dairy livestock was based on experience of farmers who provide the information.

The results of earlier studies were conducted by Murugaiyah *et. al*. (2000) and focused upon lactation performance of the crossbreed *Bos taurus* and *Bos indicus* dairy cattle in Sabah. This research had identified lactation failure in the crossbreed Friesian-Sahiwal dairy cattle in West Malaysia at the stage of the cattle udder. Lactation failure in dictionary means that failing in producing milk. Justification of such incidence in this survey shall be the cattle that failed to produce more than 5 liters per day and produce less than 120 days length per lactation is considered as the characteristics of lactation failure.

The main objectives of the 2000 survey are to obtain information on the continuous status of dairy cattle lactation:

- To identify the dairy cattle lactation trend according to categories with percentage of milk produced at the Sabah dairy farms.
- Comparing lactation yield, lactation length and average daily production (ADP) in a lactation at dairy farms.

Australian & New Zealand Friesian Sahiwal

The Sabah results were as follows:

Table 1: Milk yield according to type of dairy cattle and location

Cattle	Normal yield (liter)	Highest yield (liter)
SSF* (Sabah Sahiwal Friesian)	1300-3100	3700
SSF** (Sabah Sahiwal Friesian)	2400-5800	6556
NZFS (New Zealand Friesian	1500-3500	6002
AFS*** (Australian Friesian Sahiwal)	2405	5500
AFS* (Australian Friesian Sahiwal)	900-2000	2100
AFS**(Australian Friesian Sahiwal)	NA	NA
Sahiwal	1135-3175	4535
Friesian- Holstein***	3455	12350

Cattle	Lactation length (day)
SSF*	180-360
SSF**	260-280
NZFS*	250-320
AFS*	120-210
AFS**	250-260
LID****	180-210
Sahiwal***	290-490

Table 2: Lactation length of dairy cattle in tropical area
Source:
* Keningau DVSAI Farm
** Tawau DVSAI Farm
*** Australia Farm (Chamberlain, 1989)
**** West Malaysia Farm (Chamberlain, 1989)

Sabah 2005 – 2006 Dairy Survey

A survey was conducted on dairy farms in Sabah area, Department of Veterinary Services and Animal Industry (DoVSAI) in Kota Kinabalu, Milk Collecting Centre in Keningau and Ranau. These farms were selected as they are keeping milking record and or the cost for transportations to the location is affordable. The survey covered a period of 3 months, from December 2005 to February 2006. Name of the farms are not stated for confidential purpose.this

For the first objective in this study, categories are made according to the production level with percentage. Pie chart is used to show the dairy cattle lactation category. To categorize the milk yield into good, moderate, poor and very good or failure is according to the milk yield level. The category of more than 12 liters is consider as good, between 6 to 12 liters is consider as moderate, and those milk below 6 liters is indicated as poor production.

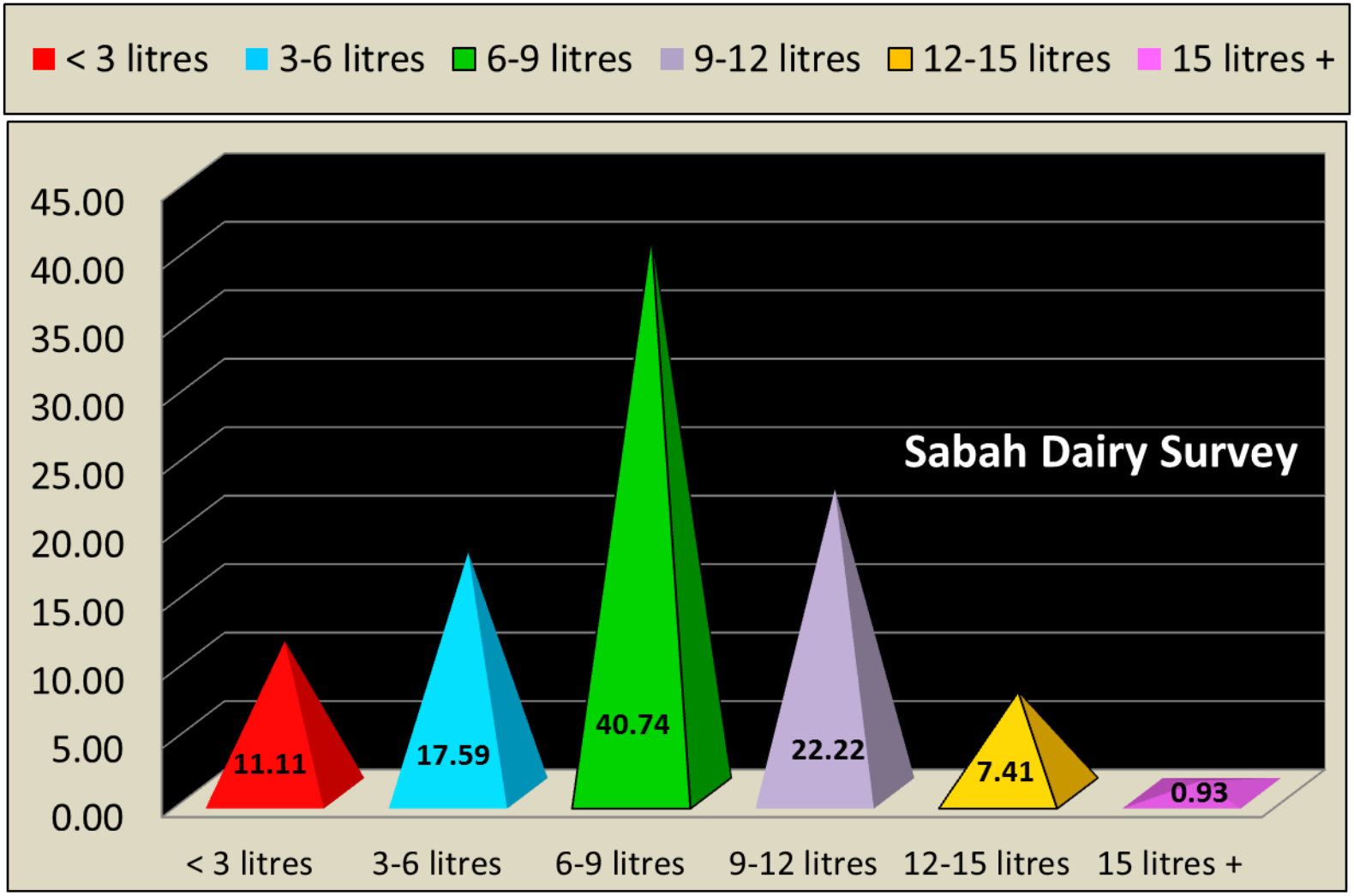
Lactation amongst Group/Farm

Data that is available for comparison are Farm A year 1991-1990, Farm B and C year 2004-2005 and Farm D year 2005 only. Table 3 show the average milk yield per day of ten months for four farms.

Table 3: Average milk yield according to farm

Farm	Average milk yield (liter) in month									
	1	2	3	4	5	6	7	8	9	10
A	7.55	8.01	7.99	7.05	6.49	6.06	5.20	4.64	3.85	2.41
B	7.40	10.00	10.82	8.40	7.70	7.70	6.60	5.50	4.60	3.92
C	14.08	16.48	14.76	13.70	12.98	12.05	11.25	9.97	8.61	6.56
D	11.80	13.08	12.72	11.38	9.87	9.46	8.47	7.70	6.84	5.72
Average	**9.92**	**11.63**	**11.32**	**10.05**	**9.14**	**8.74**	**7.88**	**6.87**	**5.85**	**4.51**

Sabah 2005 – 2006 Dairy Survey



Sabah 2005 – 2006 Dairy Survey

The Sabah dairy survey revealed that overall the performance of Australian Sahiwal Friesian, New Zealand Sahiwal Friesian and Sabah Sahiwal Friesian was in the moderate bracket.

Comment

In fairness it can also be said, that proper record-keeping, proper nutrition and management, use of superior genetic material (Bulls) are all critical factors upon the impact of production levels.

When the Friesian Sahiwal performance in Sabah an average of about 9 litres per day is compared with 16-18 litres per day in Kedah, Malaysia by Jersey x Holstein crossbreds and Holstein x Jersey crossbreds in the Australian tropics of 20.8 litres (see Queensland Department of Primary Industries survey), the heat resistance and performance of the latter breeds are vastly superior to the former.

The experience in Thailand of imported Australian-Friesian-Sahiwal Appendix 3 cattle (AFS3) is very similar. The study was conducted with standardized lactation periods in a research institution and makes interesting reading.

Performance of the AFS3 (Australian Friesian Sahiwal) in Thailand

Source

Effect of Seasonal Variations on Production of Australian Friesian Sahiwal (AFS3) Cows in Thailand

Hanchai Umpaphol[1], Surachai Chakriyarat[2], Prachom Intharachote[3], Anant Srikhao[4], Sayan Tudsri[5] and Chanvit Vajrabukka[2]

ABSTRACT

Data from Tabkwang Research and Breeding Centre, Department of Livestock Development, Ministry of Agriculture and Cooperatives, during 1993–1999, were used to determine the effect of climatic conditions on production performance of Australian Friesian Sahiwal Appendix-3 (AFS3) cows .

The results revealed that summer had the highest THI ($P<0.05$) while winter had the lowest THI ($P<0.05$). The AFS3 cows had the lowest productive performance during summer in Thailand.

Key words: AFS3 cows, production performance, seasons, tropical conditions

Thailand Survey

Let us now look at the performance of the AFS3 (Australian Friesian Sahiwal) in a Thailand Study. The Australian-Friesian-Sahiwal Appendix 3 cattle (AFS3) were imported from Australia and kept at the Tabkwang Livestock Research and Breeding Centre (TRBC), Saraburi Province, Thailand. The AFS3 was the third generation of the Australian-Friesian-Sahiwal cattle consisting of 75% Friesian and 25% Sahiwal types. Their production under the Australian conditions were 3,000 kg/lactation with milk protein and fat percentage of 3.4% and 4%, respectively (Anon, 1989).

Data collection and analysis

Records from a total 1,117 AFS3 cows during 1993-1999 were used to determine the effect of climatic conditions on milk production and reproductive performance of AFS3 cows.
The cows were fed with fresh forage and hay supplemented with meal concentrate to meet the requirement according to the NRC standard (NRC, 1989). They were twice daily (05:00 am and 3:30 pm) milked in the Herring Bone milking parlour. The udders were routinely cleaned and tested for mastitis before milking and teat dipping with iodine solution was done to prevent mastitis after milking. The cows were pregnancy checked by rectal palpation at day 60 post artificial insemination (AI).

Meteorological data from the Muak-Lek Weather Station, Saraburi Province between 1993-1999 were also used in the analysis.

Table 2. Seasonal production performance of AFS3 cows during 1993 – 1999 at TRBC, Thailand .

Milk performance	Season		
	Rainy	Winter	Summer
Number of cows	382	374	361
Lactation yield (kg/m)	1,978.2±72.64a	2,019.1±136.38a	1,837.5±188.64b
305-day standardized milk yield (kg)	2,025.2±114.28a	2,073.6±97.63a	1,962.3±104.21b
Daily milk yield (kg/day)	6.6±0.58a	6.8±0.64a	6.5±0.62b
Days in milk	298.1±13.50a	296.0±69.27a	283.6±13.52b
Service	1.82±0.24b	1.64±0.16b	2.24±0.26a
Calving interval (d)	438.5±57.89b	437.6±76.21b	483.5±76.48a
Pregnancy period (d)	277.7±5.74	278.3±6.32	276.9±6.26

The average production in Thailand was 6.5 to 6.8 litres per day and the average production of the Australian-Friesian-Sahiwal Appendix 3 cattle (AFS3) under Australian conditions was 9.8 litres.

Tropical Dairy Breeds - Conclusions

Some Conclusions

The most definitive study of the performance of Jersey x Holstein Friesian and Holstein x Jersey crossbreds by Lex Turner and edited by Anne Chamberlain 2001 to 2005 (updated 2006) is the only study of these breeds that we could obtain. It presents hard evidence that the Jersey and Holstein breeds as a crossbred derivatives of each other has huge potential in the tropics.

The anecdotal evidence of well managed and well fed Jersey Crossbreds in northern Malaysia producing up to 18 litres is also extremely encouraging. This breed requires more research in Asia, however, based on available research (Australian) it could well be the answer to the breed that is a good fit for tropical conditions.

The Australian Friesian Sahiwal is a breed developed over many decades and exported to Asia over the same period. Hard science and various research papers do not support this breed as being the answer in terms of a profitable, high production dairy cow.

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Links:

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