Vet.Med.J.,Giza. Vol.56, No.4. (2008) :319-331.

MILK YIELD AND GROWTH PERFORMANCE OF BALADI AND CROSSBRED COWS UNDER NORTH OF NILE DELTA CONDITIONS

NEAMA A. ASHMAWY*; S.A. IBRAHIM*; A.M. EL-GAAFARAWY**; H.A. EL-REGALATY** and M. E. ALI**

Animal Prod. Dept., Faculty of Agric., Cairo Univ., Giza, Egypt.

Animal Prod. Res. Inst., Agric. Res. Center, Ministry of Agric., Giza, Egypt.

Received: 20.1.2009
Accepted: 22.2.2009

SUMMARY

Twenty four healthy lactating Baladi cows (local breed) and Friesian x Baladi cows (1st group) and their calves (2nd group) were studied during summer and winter seasons in North of Nile Delta of Egypt to investigate the effects of summer and winter conditions on the production efficiency. Milk yield (kg) during summer was lowest in the two breeds of cows when compared to values observed during winter. Lactating period was longer in crossbred than Baladi cows. Milk yield/day was higher in Friesian x Baladi than that in Baladi cows during both summer and winter. Milk components (fat, protein and total solids) were higher during winter than during summer at all times of testing, while an opposite trend was observed in milk lactose and solid non-fat (SNF) in the two breeds. Birth weight of calf and calf/dam percentage in Baladi breed was lower than the crossbreds during the two seasons. Breed of dam exerted a pronounced effect on birth weight, where purebred Baladi calves averaged 22.2, 24.8 kg which were lower than that crossbreds (31.0, 31.5 kg) during summer and winter, respectively that is not a maternal effect only it included the individual genetic effect as well .

The calf/dam weight percentage in crossbred scored the highest percentage (7.36 and 7.32%) while the purebred Baladi calves means were 6.04 and 6.48% during summer and winter , respectively. The average weight of the animals in the two breeds increased as the animal grew with age; the increased weight during winter was greater than that during summer. The daily average growth rates during winter and summer were (0.487 vs 0.563 kg) and (0.475 vs 0.515 kg) in Baladi and crossbreds, respectively. In both

breeds, live weight of calves at six months of age showed that, the calves which were heavier at birth (crossbred calves) were also heavier at six months of age. The means of calf weight at six months which were born during winter were greater than those born during summer.

On the other hand, dam weight at calving, birth weight of calf, weaning weight for calf, average daily gain, lactation period and total milk yield were studied using records for Baladi and their crossbred cows covering the period from 1998 till 2007. Data were analysed for the effect of season and breed on milk production and growth performance.

Key words: cows, crossbred, Baladi, milk yield, milk composition, calves, birth weight, body weight, summer, winter, North Delta.

INTRODUCTION

Milk yield and growth rate of animals are determined by two factors : (1) their genetic potential for milk yield or growth and (2) the environmental conditions to which the animals are exposed (Afifi et al, 2004; Gader et al, 2007; Makgahlela et al, 2007 and Muasya et al, 2007). An important environmental factor influencing animal performance is climate. Althought precise comparisons are few, observations indicate that gain and efficiency of feed conversion are reduced as much as 25% under the hot summer conditions.

The ability of an animal to cope with a new environment depends on specific compensating mechanisms that activated via the body's regulatory systems. Essential to this process is the ability of the animal to detect and interpret a disruption in its internal equlibirium and then to initiate appropiate behavioral and/or metabolic responses to restore homeostasis. This overall process commonly is referred to as negative feedback. Warm climates depress feed intake, milk production and quality, growth rate and reproductive performance in dairy cows, also, metabolic heat production declines (Bakir and Kaygisiz, 2004; Malacarne et al, 2005; Akbas et al, 2006 and Das et al, 2006).

Environmental factors, animal characteristics and thermoregulatory mechanisms, including conduction, radiation, convection and evaporation affect the exchange of energy between the dairy cow and its environment.

The objective of this study was to investigate the effects of summer and winter conditions on the production efficiency of Baladi and Friesian x Baladi crossbred cows in North of Delta region. In addition to help breeders to choose the type of breed which is more productive (milk and meat) and more adaptable under these conditions.

MATERIALS AND METHODS

The present study was carried out at El-Serw Experimental Station, located in the northern part of the Nile Delta, the investigation was implemented throughout two seasons, summer (July, August and September) and winter (January, February and March) in Egypt.

Feed and management :

The animals were divided into two groups, the first group consisted of 12 Baladi cows which were 37 - 72.2 months old and 12 Friesian x Baladi cows which were 38 - 85.7 months old. All examined cows were between the 1st and 4th parity. The second group consisted of their calves which include 12 Baladi calves (weighing 20 - 28 kg) and 12 Friesian x Baladi calves (weighing 22-40 kg) were studied during the first six months of age. Cows were fed on berseem hay (2 kg/head/ day) plus concentrate mixture (5.5 - 8.0 kg/head/ day) while rice straw was offered ad libitum. The rate of feed stuff was determined according to Cow's live body weight and milk production level. Calves were allowed to suckle on milk (1 - 2.5 kg/head) twice a day at 8.00 h and 17.00 h, during 15 weeks of age till weaning. Thereafter, feeding in summer and winter was the same 2 kg calf starter, 2 kg wheat straw and 1 kg hay/head/ day was offered twice a day at 8.00 h and 16.00 h and water was freely available. Feeding procedure of the two types of calves is illustrated in Table (1) , while chemical composition of feedstuffs introduced to cows and calves is shown in Table (2) .

Table 1. Feeding procedure of Baladi and Friesian x Baladi calves till weaning

Age (Week)	Milk kg / head / day						Calf Starter	Hay
	Baladi			Friesian x Baladi				
	8.00 h	17.00 h	Total	8.00 h	17.00 h	Total		
1	1.5	1.5	3.0	1.5	2.0	3.5	--	--
2	2.0	1.5	3.5	2.0	2.0	4.0	0.150	--
3	2.0	2.0	4.0	2.0	2.5	4.5	0.250	--
4	2.5	2.0	4.5	2.5	2.5	5.0	0.350	--
5	2.0	2.0	4.0	2.0	2.5	4.5	0.500	0.4
6	2.0	1.5	3.5	2.0	2.0	4.0	0.600	0.4
7	1.5	1.5	3.0	1.5	2.0	3.5	0.700	0.6
8	1.5	1.5	3.0	1.5	1.5	3.0	0.800	0.6
9	1.5	1.0	2.5	1.5	1.0	2.5	0.900	0.7
10	1.5	1.0	2.5	1.5	1.0	2.5	1.000	0.7
11	1.0	1.0	2.0	1.0	1.0	2.0	1.100	0.8
12	1.0	1.0	2.0	1.0	1.0	2.0	1.200	0.8
13	1.5	0	1.5	1.5	0	1.5	1.300	0.9
14	1.5	0	1.5	1.5	0	1.5	1.400	0.9
15	1.0	0	1.0	1.0	0	1.0	1.500	1.0

Table 2. Chemical composition of feedstuffs.

Feeds	Dry Matter (DM)	Organic Matter (OM)	Composition of dry matter (%)				
			Crude Fiber (CF)	Crude Protein (CP)	Ether Exract (EE)	N-free Exract (NFE)	Ash
Concentrate	89.7	89.95	15.5	16.2	3.11	55.14	10.05
Calf starter	89.5	90.99	15.32	17.5	3.05	55.12	9.01
Berseem hay	88.3	86.5	26.5	11.7	2.55	45.75	13.5
Rice straw	90.5	82.97	38.9	3.15	1.65	39.27	17.03
Berseem	9.03	87.7	25.02	13.9	2.67	46.11	12.3
Wheat straw	92.56	88.48	34.43	3.0	1.44	49.61	11.52

Procedure :

Total milk yield in the dam group (first group) were recorded twice daily at 5.00 h and 17.00 h during lactation period in both breeds during two seasons (winter and summer). Representative milk samples (30 ml) were taken once weekly from the morning and evening milking of each cow. Butter fat, total protein, lactose, total solids and solids-non fat (SNF) were determined in milk samples by using Milkoscan analyzer-130 series - type 10900 - A/SN. Foss Electric - Denmark.

In the second group (calves), the average weight of the calves in the two breeds as the animal grows with age, live weight at six months of age and calf birth weight and calf / dam percentage were determined during the two seasons in both breeds.

Data of 1293 records, for 745 Baladi cows and 548 Friesian x Baladi cows covering the period from 1998 to 2007 were obtained from the El-Serw experimental station, in the North part of the Nile Delta. The records ranged between the 1st and 4th parity. The records were divided into : winter and summer to study the effect of breed, season and environmental conditions on milk production of dams and growth rates of calves under North Nile Delta area.

Data were statistically analyzed using the general linear model procedure (SAS, 1997). Differences among means were checked according to Duncan (1955).

RESULTS AND DISCUSSION

This study was carried out during the natural cold environment of winter and the hottest time of summer. Maximum and minimum ambient temperature were 31.6°C and 22.0°C during summer and 17.2°C and 8.3°C during winter, respectively. Relative humidity was 65.7-58.5% and 69.5-64.7% during summer and winter, respectively.

1- Milk yield :

a- season effect :

Total milk yield, daily milk yield and lactation period during summer were lower in the two breeds of cows when compared to values recorded during winter, in both records and experimental data (Tables 3 and 3.a) probably due to the decrease in blood volume during summer due to evaporation through respiratory tract and skin surface or due to the decrease in efficiency of biosynthesis of milk components during summer. Habeeb et al, 1991, indicated that, lactation curve of Holstein cows calved in summer were less steep than cows calved in fall and winter. The obtained results are in agreement with those of Dupreez et al., 1990, Hyder and Samee 2002 , Malacarne et al, 2005, Das et al, 2006 and Gader et al, 2007.

Table 3. Statistical analytical results of total milk yield (kg), daily average (kg) and lactation period (day) as affected by breed and season(experimental data).

Breed	Item	Summer	Winter	Overall mean
Baladi	Total milk yield (kg)	656.83 ± 378.91^{b}	900.0 ± 582.54^{a}	778.42 ± 140.13^{B}
	Daily average (kg)	4.23 ± 0.85^{a}	4.29 ± 1.70^{a}	4.26 ± 0.37^{B}
	Lactation period (day)	146.67 ± 67.57^{b}	188.50 ± 77.38^{a}	167.58 ± 20.96^{B}
Friesian x Baladi	Total milk yield (kg)	1860.58 ± 933.43^{b}	2309.25 ± 719.57^{a}	2084.92 ± 239.15^{A}
	Daily average (kg)	7.49 ± 2.69^{a}	6.84 ± 1.10^{a}	7.16 ± 0.57^{A}
	Lactation period (day)	247.83 ± 80.52^{b}	334.17 ± 70.01^{a}	291.00 ± 24.51^{A}

a,b within rows, means with different superscript letters differ significantly (P<0.05).
A,B within columns, means with different superscript letters differ significantly (P<0.05).

Table 3.a. Statistical analytical results of total milk yield (kg), daily average (kg) and lactation period (day) as affected by breed and season (records).

Breed	Item	Summer	Winter	Overall mean
Baladi	Total milk yield (kg)	521.89 ± 63.65^{b}	748.89 ± 79.74^{a}	619.49 ± 50.39^{B}
	Daily average (kg)	3.24 ± 0.23^{b}	4.22 ± 0.29^{a}	3.66 ± 0.18^{B}
	Lactation period (day)	113.46 ± 8.06^{b}	141.14 ± 9.87^{a}	125.36 ± 6.31^{B}
Friesian x Baladi	Total milk yield (kg)	2282.28 ± 116.31^{b}	2406.02 ± 118.93^{a}	2342.77 ± 83.01^{A}
	Daily average (kg)	8.54 ± 0.29^{a}	8.48 ± 0.37^{a}	8.51 ± 0.22^{A}
	Lactation period (day)	270.49 ± 11.87^{b}	288.68 ± 12.47^{a}	279.39 ± 8.60^{A}

a,b within rows, means with different superscript letters differ significantly (P<0.05).
A,B within column, means with different superscript letters differ significantly (P<0.05).

On the other hand, the reduction in feed intake, metabolic rate and physiological processes efficiency during hot environmental conditions may cause a decrease in milk yield (quantity and quality of the milk). These results are in agreement with those of Lacetera and Bernabucci (2000) and Bakir and Kaygisiz (2004).

b- Breed effect :

Lactation period was longer in crossbred (291 days) than Baladi cows (167 days) , while it was (279 days) in crossbred and (125 days) in Baladi cows from the records (Table 3a). Milk yield in crossbred was higher than Baladi cows. Means of milk yield / day in crossbred was higher than that of Baladi cows. These results are in agreement with those of Marai et al, (1997) and Marai et al, (1999) in Friesian cows.

Also, Liang et al., (1996) indicated that, in dairy cattle, milk yield increased by 11.0% due to changes in hormone concentrations. Muller and Botha (1998) indicated that high ambient temperature increased the water intake of Holstein by 1.56 liter/°C. Also, the high feed efficiency of this breed to produce milk supports the trend to high milk production.

2- Milk composition:

a- season effect :

Fat percentage showed a slight increase during winter than values recorded during summer in the two breeds (Table 4). The increase at 17.00h was more pronounced during winter. This may be attributed to the fact that, the amount of dietary fat which transferred directly to milk fat is influenced by three factors: ruminal biohydrogenation, absorption (digestibility) and deposition in adipose tissue. These factors and all physiological processes are more efficient during cold conditions. Palmquist and Beaulieu (1993) noted, the trend to lower proportions of short- chain fatty acids and higher proportions of longer chains during warm months .

Protein percentage was non-significant in the two seasons at two times. These results are in non-agreement with Christensen et al., (1994) who recorded low milk protein %, they attributed this to: (1) alternation of ruminal fermentation, leading to inhibition of fiber digestion and decreased microbial protein synthesis, (2) changed hormonal balance, resulting in partitioning of nutrients away from the mammary gland (3) increased milk yield with unchanged protein yield, resulting in dilution of milk protein concentration.

Table 4. Statistical analytical results of milk composition in Baladi and Friesian x Baladi crossbred cows as affected by breed and season.

Breed	Item	Summer *		Winter *	
		5.00 hr	17.00 hr	5.00 hr	17.00 hr
Baladi	Fat %	3.17 ± 0.8 [a]	3.22 ± 0.7 [a]	4.01 ± 0.7 [a]	4.47 ± 0.8 [a]
	Protein %	2.81 ± 0.4 [a]	2.83 ± 0.4 [a]	2.81 ± 0.2 [a]	2.92 ± 0.2 [a]
	Lactose %	4.73 ± 0.3 [a]	4.68 ± 0.4 [a]	4.21 ± 0.4 [a]	4.31 ± 0.4 [a]
	TS %	11.42 ± 1.0 [a]	11.39 ± 1.0 [a]	11.74 ± 0.8 [a]	12.43 ± 0.9 [a]
	SNF %	8.25 ± 0.4 [a]	8.17 ± 0.5 [a]	7.73 ± 0.5 [a]	7.96 ± 0.5 [a]
Friesian x Baladi	Fat %	2.16 ± 0.6 [b]	2.35 ± 0.6 [b]	3.35 ± 0.5 [b]	4.07 ± 0.3 [b]
	Protein %	2.28 ± 0.2 [b]	2.41 ± 0.3 [b]	2.54 ± 0.2 [b]	2.65 ± 0.2 [b]
	Lactose %	4.41 ± 0.2 [b]	4.51± 0.4 [b]	3.99 ± 0.3 [b]	4.04 ± 0.3 [b]
	TS %	9.53 ± 0.7 [b]	10.00 ± 0.9 [b]	10.57 ± 0.5 [b]	11.47 ± 0.5 [b]
	SNF %	7.37 ± 0.3 [b]	7.65 ± 0.8 [b]	7.22 ± 0.5 [b]	7.40 ± 0.4 [b]

a,b within column, means with different superscript letters differ significantly (P<0.05).
* within rows, means with different superscript letters differ significantly (P<0.05).

Also, higher dietary intake of fat and protein, thus the forages contributed a significant amount of fat and protein. Foltys (1996) found that, the protein content in cows milk decreased from 3.25% in January to 3.1% in May and then rose to 3.32% in November. Lacetera and Bernabucci (2000) found that, when the dairy cows maintained at temperature-humidity index above 72, blood level of unsaturated fatty acids increased and milk fat decreased by 0.2 to 0.5% while, milk protein decreased by 0.1 to 0.3%. These results are in agreement with those of Kume et al., (1990) and Mena guerreno et al., (1998).

Milk lactose and milk solid -non- fat (SNF) percentage tended to increase during summer, while the opposite trend was observed in the total solids in the two breeds (Table 4), probably due to the higher rate of food intake from concentrate in the frist and the increase in water intake and decrease in feed intake during summer in the second, Habeeb et al., (1989) indicated that, milk constituents are greatly affected by hyperthermia when Friesian cows maintained under 32°C, they showed reduction in milk lactose and total solids. These results are in agreement with those,of Abdel-Samee et al., (1996); Marai et al., (1997); Casati et al., (1998); Bernabucci et al., (1999); Thompson et al., (1999); and Ueno et al., (1999).

b- breed effect :

Results in Table (4) showed that milk fat, protein, lactose, total solid and solids non fat (SNF) percentage in Baladi cows were higher than those in crossbred cows in both summer and winter seasons. This may be due to the different genotypes effect.Palmquist and Beaulieu (1993) found that,strong positive correlations,both phenotypic

and genetic were found among proportions of various short chain fatty acids (C6 to C14) and similarly among the various unsaturated C18 fatty acids.

Growth of Calves:

a- Season effect :

Data in tables (5 and 5.a) indicated that, differences in both calf birth weight and percentage to dam weight in the two breeds. Calves delivered in winter have the heaviest weight (24.8 and 31.5) and (25.64 and 31.29) in Baladi and crossbred, respectively.

Table 5. Statistical analytical results of dam weight at calving (kg), calf weight at birth (kg), calf weight/dam weight percentage, growth rate (kg) and calf weight at six months (kg) in Baladi and Friesian x Baladi crossbred during summer and winter (experimental data).

Breed	Item	Summer^{NS}	Winter^{NS}	Overall mean
Baladi	Dam weight at calving	369.2 ± 49.7^{b}	382.5 ± 23.8^{b}	375.83 ± 10.92^{b}
	Calf weight at birth	22.2 ± 1.9^{b}	24.8 ± 2.6^{b}	23.60 ± 0.75^{b}
	Calf weight/dam weight	6.04 ± 0.4^{b}	6.48 ± 0.3^{b}	6.26 ± 0.12^{b}
	Average daily gain	0.475 ± 0.042^{b}	0.487 ± 0.024^{b}	0.481 ± 0.010^{b}
	Calf weight at 6 months	109.5 ± 6.4^{b}	113.5 ± 6.7^{b}	111.5 ± 1.91^{b}
Friesian x Baladi	Dam weight at calving	423.3 ± 51.4^{a}	430.0 ± 61.9^{a}	426.67 ± 15.68^{a}
	Calf weight at birth	31.0 ± 4.2^{a}	31.5 ± 6.0^{a}	31.25 ± 1.43^{a}
	Calf weight/dam weight	7.36 ± 0.9^{a}	7.32 ± 0.9^{a}	7.34 ± 0.26^{a}
	Average daily gain	0.515 ± 0.099^{a}	0.563 ± 0.066^{a}	0.539 ± 0.024^{a}
	Calf weight at 6 months	125.7 ± 19.5^{a}	134.0 ± 15.4^{a}	129.83 ± 4.99^{a}

a,b within column, means with different superscript letters differ significantly ($P<0.05$).
NS = non significant.

Table 5.a. Statistical analytical results of dam weight at calving (kg), calf weight at birth (kg), calf weight/dam weight percentage, growth rate (kg) and calf weight at six months (kg) in Baladi and Friesian x Baladi crossbred during summer and winter (records).

Breed	Item	Summer^{NS}	Winter^{NS}	Overall mean
Baladi	Dam weight at calving	367.44 ± 6.61^{b}	393.21 ± 8.24^{b}	377.33 ± 5.24^{b}
	Calf weight at birth	23.54 ± 0.44^{b}	25.64 ± 0.57^{b}	24.35 ± 0.36^{b}
	Calf weight/dam weight	6.47 ± 0.10^{b}	6.59 ± 0.14^{b}	6.52 ± 0.08^{b}
	Average daily gain	0.443 ± 0.044^{b}	0.453 ± 0.027^{b}	0.447 ± 0.039^{b}
	Calf weight at 6 months	80.45 ± 0.26^{b}	80.8 ± 0.48^{b}	80.59 ± 0.25^{b}
Friesian x Baladi	Dam weight at calving	448.5 ± 6.11^{a}	450.0 ± 7.48^{a}	449.08 ± 4.72^{a}
	Calf weight at birth	32.43 ± 0.45^{a}	31.29 ± 0.55^{a}	31.99 ± 0.35^{a}
	Calf weight/dam weight	7.32 ± 0.10^{a}	7.06 ± 0.15^{a}	7.22 ± 0.08^{a}
	Average daily gain	0.499 ± 0.059^{a}	0.517 ± 0.080^{a}	0.506 ± 0.048^{a}
	Calf weight at 6 months	86.78 ± 0.36^{a}	87.56 ± 0.62^{a}	87.09 ± 0.33^{a}

a,b within column, means with different superscript letters differ significantly ($P<0.05$).
NS = non significant.

The average weight of the animals in the two breeds increased as the animal grows with age, the increase in weight during the winter season was greater than during summer season in the two breeds. The growth rate during winter was (0.487 vs. 0.563 kg) and (0.453 vs 0.517 kg) in Baladi and crossbred, respectively while it was (0.475 vs. 0.515 kg) and (0.443 vs 0.499 kg) in Baladi and crossbred, respectively during summer (Tables 5 and 5.a). Habeeb et al., (1991) and El-Masry and Marai (1991) indicated that, growth rate and growth performance were impaired in Friesian calves by elevated ambient temperature. Yousef et al., (1997) found that, daily live body weight gain was lower in calves exposed to direct solar radiation during summer compared to those in calves during winter. Nazir-Ahmed et al., (2003) found that cows calved in summer were more persistent than those calved in fall and winter.

The means of calf weight at six months which born during winter were higher than those born during summer (Tables 5 and 5.a). Marai et al., (1995) and Zelalem et al., (1996) found that, the growth rate and daily gain, feed consumption and feed efficiency in Friesian calves decreased significantly as compared with winter conditions. These results are in agreement with those of Akbas et al., (2006).

(b)- Breed effect :

Body weight at birth and percentage of calf weight to dam weight (kg) in crossbred was higher than that of Baladi during the two seasons. Dam genotype exerted an effect on birth weight, where purebred Baladi calves averaged (22.2 and 23.54 kg) (the lowest), which was lower than crossbred (averaged 31.0 and 32.43 kg) during summer. Also, the average of birth weight was (24.8 and 25.64 kg) and (31.5 and 31.29 kg) during winter in Baladi and crossbred, respectively (Tables 5 and 5.a). These results concerning the effect of breed of dam on birth weight are in complete agreement with those reported by Batra and Touchberry (1974) and Morsy et al., (1984).

The calf / dam weight percentage in crossbred scored the highest percentage (7.36 and 7.32%) and (7.32 and 7.06%) during summer and winter, respectively, the purebred Baladi calves means were (6.04 and 6.47%) and (6.48 and 6.59%), respectively (Tables 5 and 5.a).

Growth rates in Baladi cows were lower than those recorded in crossbred cows during the two seasons. This probably due to genetic effect and high efficiency of feed intake, metabolic process and hormone secretion in crossbred than Baladi cows.

Tables (5 and 5.a) showed that, calves which were heavier at birth (crossbred calves) were also

heavier at six months of age. The results show that the average of the increase rate in body weight of calves was highly correlated with birth weight until the six months of age. This probably due to that the crossbred have high efficiency of feed intake, metabolic processes, growth rate which tended to elevate body weight at six months of age.

In conclusion, the increase in weight of the animals from birth to the end of the six months indicated that, relative growth rates showed that crossbred calves grew faster than baladi calves although, the baladi breed seem to be more adapted to environmental conditions in North Delta region.

Season of the year has a pronounced influence on productive and reproductive performance of dairy cows where the studied traits were much better during winter when compared to those in summer. Furthermore, crossbred cows had the best results concerning milk production and composition and reproductive traits. Therefore, crossing between lockal breeds with Friesian cows is so benifitial and more economic.

REFERENCES

Abdel-Samee, A. M.; Abou-Fandoud, E. L and El-Gendy, K. M. (1996). The role of probiotics in ameliorating heat load in lactating Friesians during summer under North Sinai conditions. Egyp. J. Anim. Prod., 33:277-286.

Afifi, E. A.; Salem, M. A; Arafa, S. A and Gad, M. E (2004). Some correction factors for milk yield and repeatability estimates for productive and reproductive traits of Friesian cattle in three commerical herds raised in Egypt. Annals of Agric. Sci., Moshtohor, 42(2):541-553.

Akbas, Y.; Alccek, A; Onence, A and Gungor, M (2006). Growth curve analysis for body weight and dry matter intake in Friesian, Limousin x Friesian and Piemontese x Friesian cattle. Archiv fur Tierzucht; 49(4): 329-339.

Bakir, G. and Kaygisiz, A (2004). Estimates of trends components of 305 days milk yield of Holstein-Friesian cattle. J. Biol. Sci.; 4(4): 486-488.

Batra, T. R. and Touchberry, R.W (1974). Birth weights and gestation period in purebred and crossbred dairy cattle. J. Dairy Sci., 57:323.

Bernabucci, U; Ronchi, B; Lacetera, N.; Nardone, A.; Piva, G and Bertoni, G (1999). Metabolic status and milk production of Friesian cows during spring and summer periods. Recent Progress in Anim. Prod. Sci., 1. Proceedings of the A.S.P.A. XIII Congress, Piacenza, Itally, 21-24 June, 452-454.

Casati, M. R.; Cappa V.; Calamari, L; Calegaria, F and Folli, G (1998). Seasonal variation in yield and characteristics of cow milk. Scienza Tecnical Lattiero Casearia, 49:7-25.

Christensen, R. A.; Drackley, J. K; Lacount, D. W and Clar, J. H (1994). Infusion of four long-chain fatty acid mixtures into the abomasums of lactating dairy cows. . J. Dairy Sci., 77:1052-1069.

Das, D; Goswami, R. N; Mili, D.C and Deka, D (2006). Monthly and cumulative monthly milk yield of Jersey and Holstein Friesian cattle in Assam. Indian Vet. J.; 83(1): 35-37.

Duncan, D. B. (1955). Multiple range and multiple (F) tests. Biometrics, 11:1.

Dupreez, J. H.; Gisecke, W. H; Hattigh, P. J and Eisenberg, B. E (1990). Heat stress in dairy cattle under southern African conditions. II. Identification of areas of potential heat stress during summer by means of observed true and predicted temperature-humidity index values. Onderstepoort Vet. Res., 57, 183-187.

El-Masry, K. A. and Marai, I. F. M (1991). Comparison between Friesians and water buffaloes in growth rate, milk production and some blood constituents, during winter and summer conditions of Egypt. Anim. Prod., 53, 1:39-43.

Foltys, V. (1996). Objectivity of protein content evaluation in raw milk of cows. J. Farm Anim. Sci., (Slovakia) 29:85-90.

Gader, A. Z.; Ahmed, M.K.A; Musa, L.M.A and Peters, K. J (2007). Milk yield and reproductive performance of Friesian cows under Sudan tropical conditions. Archiv für Tierzucht; 50(2):155-164.

Habeeb, A. A.; Abdel-Samee, A.M. and Kamal, T. H. (1989). Effect of heat stress, feed supplementation and cooling technique on milk yield, milk composition and blood constituents in Friesian cows under Egyptian conditions. Proceeding of Third Egyptian British Conference on Animal, Fish and Poultry Production, Alex. Univ., Alex. Egypt, 2:629-635.

Habeeb, A. A.; Ibrahim, M.K. and Hiekal, A.H. (1991). Environmental heat exposure effect on biosynthesis of milk components and some hormones in Friesian cows. Egypt. J. Dairy Sci., 19, 1:131-143.

Hyder, A. U. and Samee, U. (2002). Effects of month and year of calving on 305-day milk yield in Holstein cattle in NWFP, Pakistan. Pakistan Vet. J.; 22(3): 145-147.

Kume, S.; Takahashi, S; Kurihara, M and Aii, T (1990). The effects of heat stress on milk yield, milk composition and major mineral content in milk of dairy cows during early lactation. Japanese J. Zootechnical Sci., 61:7, 627-632.

Lacetera, N. and Bernabucci, U (2000). The production of dairy cows in a hot climate. Informatore Agrario, 56:31, 39-41.

Liang, S.; Fanping, L; Jiansheng, L; Yanshan, D; Mushi, H; Yugen, C; Lin, F.P and Ding, Y (1996). Effect of heat stress alleviators on blood endocrine level and milk yield of dairy cattle in the hot summer season. Transactions of the Chinese Society of Agricultural Engineering, 12:56-59.

Makgahlela, M. L.; Banga, C. B.; Norris, D.; Dzama, K. and Ngambi, J. W. (2007). Genetic correlations between female fertility and production traits in South African Holstein cattle. South African J. Anim. Sci.; 37 (3): 180-188.

Malacarne, M.; Summer, A; Fomaggioni, P.; Franceschi, P.; Beltrami, A. and Mariani, P. (2005). Seasonal variations of herd milk quality in parmigiano-reggiano cheese manufacture; comparison between Jersey and Italian Friesian cattle breeds. Annali della Facolta di Med. Vet. Univ. di Parma, 25:145-165

Marai, I. F. M.; Habeeb, A.A.M; Daader, A. H and Yousef, H. M (1995). Effects of Egyptian subtropical summer

conditions and heat-stress alleviation technique of water spray and a diaphoretic on the growth and physiological functions of Friesian calves. J. Arid Environments, 30, 2:219-225.

Marai, I. F. M.; Daader, A. H; Abdel-Samee, A. M; Ibrahim, H; El-Gaafary, M. N; Tawfeek, M. I and El-Rajim, M. I. (1997). Winter and summer effects and their amelioration on lactating Friesian and Holstein cows maintained under Egyptian conditions. International Conference on Animal, Poultry, Rabbit Production and Helth, September, 305-312.

Marai, I. F. M.; Habeeb, A.A.M and Farghely, M. H. (1999). Productive, physiological and biochemical changes in imported and locally born Friesian and Holstein lactating cows under hot summer conditions of Egypt. Tropical Anim. Health & Prod., 31:4, 233-243.

Mena-Guerreno, Y.; Gomez-Caberia, A; Serradilla-Manriqu, J. M.; Balch, C.C.; Guerreno, Y. M.; Caberia, A. G. and Manriqu, J. M. S. (1998). Heat stress on milk production and milk protein content in Friesian cows. Indian J. Anim. Sci., 68:9, 985-987.

Morsy, M. A.; Nigm, A.A; Mostageer, A. and Pirchner, F. (1984). Some economic characteristics of the Egyptian Baladi cattle. Egypt. J. Anim. Prod., 24, 1-2: 273-285.

Muasya, T. K.; Magothe, T. M.; Ilatsia, E. D. and Kahi, A. K. (2007). Identification of production systems and assessment of heterogeneity of variance components for Holstein-Friesian cattle in the tropics. Livestock Research for Rural Development; 19(7)

Muller, C. J. C. and Botha, J. A. (1998). The comparative performance of primiparous Holstein Friesland and Jersey cows on complete diets during summer in a temperate climate. South African J. Anim. Sci., 28:3-4, 161-166.

Nazir-Ahmed; Syed, M.; Farooq, M.; Shah, S. I. and Gill, R. A. (2003). Lactation yield, length and persistency of lactation in Holstein cows under the subtropical environment of North West Frontier Province (NWFP). J. Anim.&Vet. Advances; 2(10): 548-553.

Palmquist, D. L. and Beaulieu, A. D. (1993). ADSa Foundation symposium : Milk fat synthesis and modification .J . Dairy Sci., 76: 1753-1771.

SAS: Statistical Analysis System Institute (1997). SAS Userís Guide. SAS Institute. Inc., Cary, NC, USA.

Thompson, J. A.; Brimacombe, M.; Calvin, J. A.; Tomaszewsk, M. A.; Davidson, T. J. and Magee, D. D. (1999). Effects of environmental management on seasonal decrease in milk production in dairy cattle. J. American Vet. Med. Assoc., 214:1, 85-88.

Ueno, T.; Hayasaka, K. and Takusari, N. (1999). Effects of extreme hot summer climate on milk production in lactating Holstein cows at the Hokkido National Agricultural Experiment Station (Hitsujigaoka). Resea. Bull. Hokkido National Agric. Exp. Station, 168, 35-45.

Yousef, H. M.; Habeeb, A. A. and El-Kousey, H. (1997). Body weight gain and some physiological changes in Friesian calves protected with wood or reinforced concrete sheds during hot summer season of Egypt. Egyp. J. Anim. Prod., 34 (2):89-101.

Zelalem, Y.; Sandros, D.; Demise, S. and Alemu, G. (1996). Heifer rearing effect of concentrate supplementation on growth and milk production of crossbred heifers. Ethiopian Society of Animal Production Addis Ababa (Ethiopia). Proceedings of the 4th National Conference of Ethiopian Society of Animal Production Addis Ababa (Ethiopia) p:169-175. (ABS).

إنتاج اللبن وكفاءة النمو في الأبقار البلدية والأبقار الخليط فريزيان بلدي تحت الظروف المناخية في منطقة شمال الدلتا

نعمه عشماوى* - صالح عبدالحميد إبراهيم * - أحمد الجعفراوي **
حسين أحمد الرجلاتي** - ممدوح علي **
* قسم الإنتاج الحيواني - كلية الزراعة - جامعة القاهرة
** معهد بحوث الإنتاج الحيواني - مركز البحوث الزراعية

أجريت هذه الدراسة في محطة التجارب بالسرو، بمنطقة شمال الدلتا بمصر خلال موسمي الصيف والشتاء لدراسة تأثير الظروف المناخية بهذه المنطقة على الكفاءة الإنتاجية للأبقار. وقد إستخدمت في هذه الدراسة مجموعتين من الحيوانات ،المجموعة الأولى : ٢٤ بقرة حلابة وهي تمثل مجموعة الأمهات (١٢ بقرة بلدي ، ١٢ بقرة خليط فريزيان × بلدي) وفي هذه المجموعة تم تقدير كمية اللبن الكلية المنتجة وطول موسم الحليب والنسبة المئوية لمكونات اللبن .

المجموعة الثانية : تشمل العجول المولودة من هذه الأمهات خلال فصلي الصيف والشتاء وهي ٢٤ عجل (١٢ عجل بلدي ، ١٢ عجل خليط فريزيان × بلدي) وفي هذه المجموعة تم تقدير وزن الميلاد ، الوزن عند ستة شهور ، معدل الزيادة اليومية في وزن العجل، النسبة المئوية للعجل / الأم .

كما إشتملت الدراسة على تسجيل نفس القياسات السابقة للأمهات والعجول من خلال بيانات السجلات الموجودة بنفس محطة التجارب خلال الفترة من سنة ١٩٩٨ حتى سنة ٢٠٠٧

وقد أوضحت النتائج :

في المجموعة الأولى كان إنتاج اللبن الكلي أثناء فصل الصيف منخفضاً في النوعين مقارنة بفصل الشتاء ، وقد كان موسم الحليب أطول في الأبقار الخليطة عن الأبقار البلدية . سجل إنتاج اللبن اليومي في الأبقار الخليطة قيم أعلى من الأبقار البلدية ، وكانت النسبة المئوية لمكونات اللبن (الدهن والبروتين والمكونات الصلبة الكلية) مرتفعة خلال فصل الشتاء عن فصل الصيف ، بينما قيم اللكتوز والمكونات الصلبة اللادهنية سجلت إتجاهاً عكسياً وذلك في كلا النوعين من الأبقار.

في المجموعة الثانية كان وزن الميلاد للعجول والنسبة المئوية للعجل / الأم منخفضاً في الأبقار البلدية عن الأبقار الخليطة خلال فصلي الصيف والشتاء ، وقد أوضح الوزن الحي للعجل عند عمر ستة شهور في كلا النوعين أن العجول التي تمتلك أوزان عالية عند الميلاد أو مولودة خلال فصل الشتاءهي التي سجلت أوزان عالية عند عمر ستة شهور.

وقد إتضح إن عجول الأبقار الخليطة تنمو أسرع من الأبقار البلدية رغم أن الأبقار البلدية تبدو أكثر تأقلماً للظروف المناخية في هذه المنطقة ، تأثير الموسم كان أكثر وضوحاً على كفاءة الإنتاج في كلا النوعين، حيث كان إنتاج الأبقار من اللبن ، ومكونات اللبن ،ووزن عجولها أفضل خلال الموسم الشتوي .