FINAL REPORT

INTA PROTOCOL – ARGENTINE JERSEY BREEDERS ASSOCIATION

"COMPARISON BETWEEN TWO GENETIC GROUPS IN A DAIRY FARM ON THE EASTERN MILK SUPPLY AREA OF THE PROVINCE OF ENTRE RIOS"

Abstract

The Jersey genetic incorporation to a dairy herd in Entre Rios, with a predominant Holstein base, raised some concern regarding its consequent influence in the dairy systems. This investigation is based on the above, and its main objective is to provide information about the behavior of rodeos with Hostein genetics and its crossbreeds with Jersey in a commercial dairy system in the province of Entre Rios, with direct grazing system of forage with concentrate supply.

The investigation took place in the dairy farm "*La Reserva*", placed in Colonia San Miguel, Colón, province of Entre Rios, Argentina. It involved two genetic groups: Holando Argentino (Holstein) and Holstein x Canadian Jersey crossbred (Crossbred), of a 2003 Spring calving, including an average of 120 crossbred animals and 110 Holstein, among which 20 Holstein cows and 20 Crossbred cows were identified. The investigation took 240 days between October 2003 and June 2004, and included two experimental periods: Period I (120 days), during which the general management for both rodeos was similar, both were offered the same pasture in strip cropping depending on the total live weight of each herd. This resulted in the same amount of forage supply per kg of live weight. During the whole evaluation period, a concentrate supply was given in the milking parlor, which differed in amount (related to the average live weight at the beginning of the period of each rodeo) but not in the type of food, hence the Holstein cows were given 9,600 kg per day, whereas the Crossbred cows were given 8,000 kg per day. Period II (120 days). The purpose of this period was to complete lactation of the same group of cows from both biotypes (Holstein and Crossbred), defined in the Period I, which were evaluated for as long as they were together, with equal nutritional management and within the main herd, defined upon the company's criteria.

Period I was characterized for having medium temperatures a bit higher than usual, with extreme temperatures in a wide range. Precipitations reached 264 mm, which is 47% of the normal in this time of the year (558 mm) and the relative humidity was minor than expected in all months. These conditions affected the mixed pastures (grass and leguminous), where the production and nutritional quality was less than expected, and caused a delay in the planting of soybean for pasture.

During the essay, supply and rejection of fresh forage and concentrates was estimated (concentrates supply only in Period I), partial and total forage intake and corporal score, milk production and composition was measured as well as live weight (Period I) an the reproductive activity of both groups was evaluated. Besides, grazing behavior of rodeos was evaluated in group and individually (5 individual animals per biotype), in two periods of three days each during Spring and Summer.

The total intake per animal was estimated to be higher in Holsteins, even though such estimation was not reflected in the intake per kg of live weight, which was similar in both biotypes. Both herds had similar proportions of pastures and concentrates consumption, being concentrates a 30% higher of total dry matter intake. Regarding grazing behavior, the Crossbred rodeo remained longer time in pasture and less time resting and/or on ruminating.

The average live weight of animals was 535 kg for Holsteins and 490 kg for crossbreds, with a weight gain of 14% of the live weight during the period for both biotypes. The initial and final corporal score of cows was similar in both groups, as well as the evolution during the essay.

The milk production per day was higher in Holstein than in crossbreeds, but the crossbreds reached higher contents of butter fat and protein in milk. There was no difference in milk fat kg per animal between the groups. The content of protein per cow in the Holstein group was 8% higher than in the Crossbred group.

There was a better reproductive behavior in crossbreds characterized by fewer days between calving and first service with more confirmed pregnancies.

If applied to the commercial herd under investigation, the lower corporal weight of Crossbred animals would allow the number of cows per surface unit without modifying the stocking rate in kg. In that way, having one Holstein cow and 1,09 Crossbred cow per ha, 10 g more of protein would be obtained per day and hectare using a Crossbred cow (0.853 and 0.863 kg of protein per day per ha of Holstein and Crossbred respectively)

Introduction

Argentina and Uruguay are characterized for having grazing systems, with seasonal supply of conserved forage and concentrate food strategy. Such supply is based on: the need to cover possible deficiencies in pasture supply, the availability, and the price relation between concentrates and milk. (Elizalde, J. Rearte D. y Santini, F. 1993). In general, the supply is higher in some Argentine dairies than in Uruguay, where low cost pasture production prevails, since Uruguay is essentially an exporting country. Almost all the herds in both countries are composed of Holstein breed, most of them descending from American-Canadian genetic, with animals of more than 500 kg (Laborde, D. 2002. Personal communication).

At the beginning of the 90´s, some commercial dairies began to include Jersey genetic to their Holstein-based rodeos (Maiztegui, J. and contributors, 2004). The purpose of this technique was to reach higher solid contents in milk, more rusticity, fertility and higher easy calving (Andreo N. and contributors. 2002). In the Province of Entre Rios, the use of Jersey semen was particularly related to preventing calving problems in Holstein heifers (Garat, F. 2003. Personal communication). When observing some desirable traits crossbred animals that cohabitate with Holstein, there were dairies where the intention was to get absorption of Holstein breed by Jersey, trying to keep some level of crossbreed between them. (Bustelo L. 2004. Personal communication). This tendency became more evident as from 1999, when a series of weather problems damaged pastures and affected the reproductive activity of many regional herds.

Among the traits that dairy producers and technicians consider important in crossbreds, we can mention: the ability to maintain acceptable production levels without loosing corporal condition, even in a restricted-pasture-supply situation; longer stay in pasture lots, especially during summer; short intervals between calvings, higher price per liter of milk due to its high protein and solid content. The disadvantages of this type of crossbreds are: meat price lower than Holstein, shorter milking periods (comparing to the ideal 10 month period), inappropriate milking parlors design in relation to the animal's size, among others. (Ceriani, R and Guerra, S. 2004 and Luna, J. C. 2003. Personal communication).

Since there was an interest in the study of the behavior in crossbreed cattle in both countries and the background on this issue in other Argentine regions and other countries, and also, the precedents on the subject in New Zealand (Lopez-Villalobos, N., Garrick, D., 2004), regional technicians (Krall E. and others, 2003; Krall, E. y Marini P., 2003) evaluated the argentine production and reproduction records in herds from companies where Hostein and Crossbed animals cohabitate. In such studies shown similar milk production in both genetic groups and better reproductive efficiency in the crossbred; this raised expectations both in the higher solid production –considering more solid concentration in crossbreed cattle, and in the better adaptability of this biotype to the regional systems.

In order to explore "in situ" the results of the previous essay, Mancuso, W. A., Krall, E. P. and Casado E., made, in Fall 2003, a field study in a commercial dairy located in the east side of the province of Entre Rios, where there are Holstein and crossbred animals. 20 Holstein cows and 20 Crossbred cows from Fall calving were identified and a productive follow-up of 120 days was made with each of them (milk, butter fat and protein production) and a reproductive follow up as well. The general management for both herds was similar. There was mixed pasture (grams and leguminous) alternated with ray grass for pasture. All of them were of good quality. During the whole evaluation period, a concentrate supply was offered during milking, similar in both biotypes (7-8 kg/day). The initial and final live weight, as well as the corporal score was registered. Animals from both groups were together during pasture. It is estimated that they had a daily dry matter intake of 12,300 kg/cow. They had the same amount of concentrate supply (7,300 kg DM/cow day). The diet was complemented with pasture hylage (1,500 kg DM/cow day). The average weight of Holstein and Crossbred cows was 528 and 464 kg respectively and the corporal score was higher in Crossbreds (2.59 versus 2.49). there were differences in milk production, protein percentage, and butter fat and protein production per live weight kg (26,2 vs. 23,1; 2,84 vs. 3,06; 1,57 vs. 1,68; 1,39 vs. 1,50; all of them Holstein vs. Crossbred respectively). With respect to reproduction, both groups had an efficient performance (calving interval – conception in less than 3,5 months), without any difference between the groups. These results suggest that when the genetic groups are managed in the same herd, under template weather conditions and in systems where the food is based in pastures (2/3 voluminous forages and 1/3 concentrates), the productive efficiency with respect to the live weight of the Crossbred could be higher than the Holstein, without changing the reproductive traits.

Considering the above mentioned, there is a strong concern from teams of technicians from Entre Rios and dairy producers related to the Argentine Jersey Breeders Association, *CREA* Groups from the South Coastal Area and governmental entities from Argentina and Uruguay., to evaluate in an integral and contrastive manner (independent managements) Holstein commercial rodeos with other that include some grade of crossbred with Jersey. This investigation, financed by the AACJ, formed by a team of technicians from the INTA (Agro Technology National Institute) from Argentina, The School of Veterinary from the University of the Republic (Uruguay), the CREA South Coastal and the company "Los Menchos S.A.", implemented an investigation aimed at providing information about the contrastive behavior of Holstein and Holstein x Jersey, in a commercial dairy system in the province of Entre Rios, under forage direct pasture supply with concentrates, hay and haylage.

Methodology

The investigation took place in the farm "La Reserva", owned by "Los Menchos" Corporation, placed between parallel 32 and 33 south and the meridian 58 and 59 west, in the center-east of the province of Entre Ríos, Argentina.

The following genetic groups were used: Holando Argentino breed ("Holstein") versus Crossbreeds of Holstein with Canadian Jersey ("Crossbred"). The herds included an average of 120 crossbred animals and 110 Holstein, among which 20 cows of each genetic group belonging to the 2003 Spring calving were identified. These identified cows had a individual follow up. 1/3 of the crossbred were half blood and the rest between ¼ and ¾ blood.

This avoids the predominance of heterosis proportion, and reproduce a herd with stabilized backcrosses, as it would occur in commercial situations.

The evaluation took 270 days between October 2003 and June 2004, and includes two experimental periods:

1. Period I: October 2003 – February 2004 (early and medium lactation)

During this first period, the general management of animals for both rodeos was similar, with the same pastures supply in strip cropping proportional to the total live weight of each rodeo. This resulted in an equal forage supply per kg of live weight. Pastures were **ley** (grass and leguminous), rotated with soy during the last week of January through the end of February. During the whole evaluation period, there was concentrate supply inside the milking parlor, with a difference in amount between the two groups (related with the average live weight of each rodeo at the beginning of the investigation). Holstein cows has a 9,600 kg/day supply and Crossbreds has a 8,000 kg/day supply. The type of food was the same for both groups.

Partial and total forage intake during pasture was estimated (difference between supply and rejection in each parcel, in 11 moments) as well as concentrate intake (difference between supply and rejection in each feeding trough during milking, in three moments).

Milk production and composition was evaluated by means of 7 individual samples and the contents of butter fat and Gross Protein was determined on compound samples.

All the cows were individually weighted three times: at the beginning of the essay, and 80 and 130 days afterwards. The corporal condition of each cow was estimated in a scale of 1 (too thin) to 5 (too fat), completed with nine measures.

Behavior during pasture was evaluated in group and individually with 5 identified animals in two periods of three days each during the end of Spring and Summer.

2. Period II: March 2004 – June 2004 (medium and late lactation)

This period intended to complete the lactations of the same group of cows in both biotypes (Holstein and Crossbred) defined in Period I. These were evaluated while they were in the main rodeo, defined upon the company's criteria.

The cows from both genetic groups kept together within the farm's "main rodeo", with ley pastures (grams and leguminous), alternated with soy for pasture during March and annual Ray grass in May and June.

The partial and total monthly forage intake was estimated (difference between supply and rejection in each parcel). During the milking there was a commercial concentrate supply of 9,600 kg/day.

Milk production and composition was evaluated by means of 4 individual samples and the content of Butter Fat and Gross Protein was determined over compound samples.

The corporal condition of each cow was estimated with a scale of 1 (too thin) to 5 (too fat), completed with four measures.

By the end of the two periods, the following reproduction efficiency indicators were determined and evaluated: calving – first service interval, calving day – conception, pregnancy %, total number of inseminations and number of inseminations per pregnant cow for identified cows.

Results and discussion

Period I

Intakes

In Chart 1 there is an estimated pasture intake for both herds during the first evaluation period (October 2003-February 2004), which had a similar average but with important variations among dates due to the variation in the type and volume of forage resources. There were not relevant differences in the pastures consumption efficiency, which was, in general, low.

Even if the total intake per animal appears to be higher in Holsteins (between 6% and 10% higher), this was not reflected in the intake per kg of live weight, which was similar in both genetic groups. There is a remarkable variation between dates and moments presented by both groups in the intakes and pasture efficiencies, due to the change in the pasture type and availability, plus the effect of extreme temperatures, which were particularly high during January and February.

Chart 1: Pasture intake in relation to dates and moments of the day.

DATE	Moment of the day	INTAKE					
		Kg DM/cow		G DM/kg live		Efficiency (%)	
		CROSS	HOLSTEIN	CROSS	HOLSTEIN	CROSS	HOLSTEIN
27/oct	Morning	12.33	8.58	29.44	18.67	54	50
27/oct	Afternoon	5.82	10.87	13.89	23.65	28	48
21/nov	Morning	11.74	10.38	28.04	22.58	43	58
21/nov	Afternoon	8.06	16.33	19.25	35.55	18	30
17-dic	Morning	1.49	6.05	3.46	12.64	18	29
17-dic	Afternoon	3.52	2.65	8.19	5.53	18	30
06-jan	Morning	3.26	5.05	7.59	10.54	18	23
06-jan	Afternoon	3.82	3.34	8.89	6.97	18	22
28-jan	Morning	9.41	7.23	21.32	14.51	81	61
28-jan	Afternoon	8.20	7.98	18.58	16.01	54	67
11-feb	Morning	3.54	9.86	7.72	19.33	18	52
11-feb	Afternoon	8.74	5.05	19.06	9.90	49	22
12-feb	Morning	10.90	5.56	23.77	10.89	64	22
12-feb	Afternoon	8.22	10.00	17.92	19.60	35	62
26-feb	Morning	5.49	4.95	11.53	9.49	57	81
26-feb	Afternoon	3.50	3.54	7.35	6.78	57	63
Average		**6.75**	**7.34**	**15.37**	**15.17**	**39**	**45**

The forage supply from October through January, was based in pastures of more than two years, with high proportion of low quality forage grasses, in a supply of 150 m2 / cow, replace by soybean pastures (90 m2/cow), combined with pastures of scarce availability due to low precipitations during this period. These conditions, the estimation method used (only one possible for the work team), presented limitations to evaluate pastures.

In Chart 2 there appears the portion's total intake, estimate through supply and rejection. Both herds had similar intake proportions of pastures and concentrates, in an average relation of 65:35 in Holstein and 66:34 in Crossbred.,considering these systems higher we call grazing, where the concentrates should not exceed 25% of the whole portion. It is remarkable that Holstein animals had only a 10% more concentrate, eventhough they has a 20% supply during the milking.

Chart 2: Diet's intake and quality, average of the periods in which concentrate rejection during milking was measured.

CROSSBRED HERD (JERSEY X HOLSTEIN)								
DATE	Intake (kg DM/milking cow. Day)			Concentrate participation	**Portion weighted quality**			
	Pastures	Concentrates*	Total		DM (%)	GP (%)	NDF (%)	Mcal/kg DM
DECEMBER	12.408	7.037	19.444	36%	59.7	14.6	43.9	2.312
JANUARY	12.346	7.066	19.412	36%	64.5	13.4	44.4	2.243
FEBRUARY	13.458	5.886	19.343	30%	53.2	19.8	37.4	2.381

DM: Dry Matter
GP: Gross Protein
NDF: Neutral Detergent Fiber

HOLSTEIN HERD								
DATE	Intake (kg DM/m cow Day)			Concentrate participation	**Portion weighted quality**			
	Pastures	Concentrates*	Total		DM (%)	GP (%)	NDF (%)	Mcal/kg DM
DECEMBER	14.162	7.818	21.980	31%	54.8	14.7	43.9	2.128
JANUARY	11.794	7.430	19.224	39%	63.8	13.7	45.1	2.082
FEBRUARY	12.986	7.131	20.117	35%	53.0	20.2	36.8	2.427

In order to contrast this intake estimation method, possibly based regarding pasture intake due to the presentation in three scales of the pastures offers, an intakes calculation was made based on the "Dairy" Program from the National Institute of Investigation of Uruguay. To do that, it was estimated that the commercial concentrate intake was the real one, and the following data from both herds was

considered: live weight, milk daily average production, butter fat concentration and pastures supply quality. In the end, the maintenance requirement increased a 20% for walking and pasture picking (Chart 3).

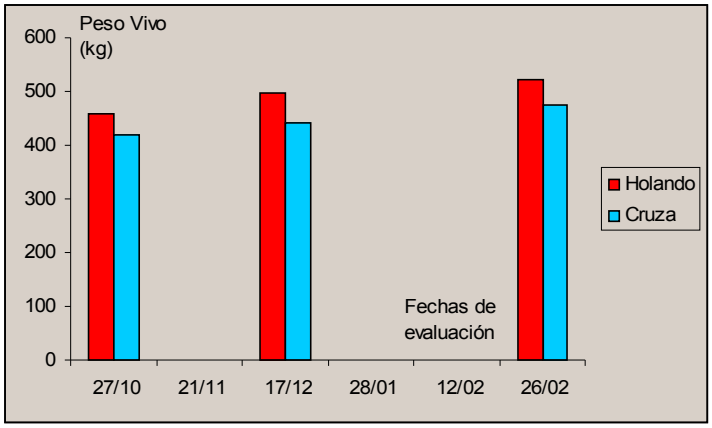
Chart 3: Intakes estimations according to INIA's "Dairy" Program (Uruguay).

GENETIC GROUP	HOLSTEIN	CROSSBRED
Pastures intake (Kg Dry Matter/Milking Cow day)	9.5	8.9
Concentrates intake (Kg Dry Matter/ Milking Cow day)	7.1	6.7
Total intake (Kg Dry Matter/ Milking Cow day)	16.6	15.6
Concentrate's dry matter proportion / Total Dry Matter	46	44

We can see that the Program estimates less total amount of total dry matter consumption, which is an over estimation in pasture intake with the "supply and rejection" method, therefore the concentrate proportion would be higher in the total diet. Nevertheless, the effect is similar to both genetic groups and it would be the reason for the low contents of butter fat found in the investigation, as stated in the production results.

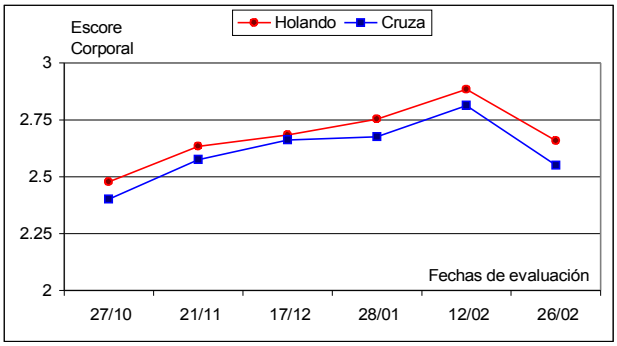
Live weight and corporal score

In Graph 1 there is an evolution of live weight of animals, which was different in both biotypes ($p<0,008$), with 535 kg average for Holstein and 490 kg for Crossbreds. Holstein cows tended to gain more weight during this period than Crossbreds ($p<0,098$), with a gain weight of 63 kg versus 57 kg respectively. Nevertheless, these gains had no difference if the weight of the cow is considered. The numbers represented 14 % of the initial live weight in both biotypes.



Graph 1: live weight evolution in both biotypes

The initial and final corporal score of animals (Graph 2), as well as its evolution along the investigation was similar ($p<0,282$) in both biotypes, which would make us conclude that, under this specific conditions, there is no different response between them regarding corporal reserve recovery.



Graph 2: Evolution of corporal score in both biotypes.

Production and milk quality

In chart 4 there appears the milk production in both groups, being differences in the amounts: 24,3 kg per day per cow for Holstein and 20,7 kg for Crossbreds, as well as the content of butter fat and protein. In both components, the crossbred had higher percentage than Holstein, with a 19% more fat and an 8% more total protein in milk.

When production is calculated in kilograms of fat per animal, there are no differences between the groups and in the case of proteins, inverted results are obtained, since Holstein is 8% higher than crossbreds.

One aspect to take into account is the relation “milk components production / cows live weight”: there appeared no difference in protein production, but there was a difference in fat production, in favor of the Crossbred.

The small superiority in percentage of fat with respect to protein (3,26% vs. 3.21%) in the Crossbreds, the inversion of contents of fat and protein in Holstein (2.74% vs. 2.98%) and the low contents of fat in both cases, could be caused by the high proportion of concentrates in the diet, as mentioned before. The non-inversion in fat versus protein of the Crossbred herd can be related to its’ longer pasture activity and a relatively higher pasture pick with respect to the Holstein, besides the breeds fenotype.

Chart 4: Milk composition

PARAMETER		BIOTYPE		Difference bet. media
		HOLSTEIN	CROSS	
Milk production (kg/cow/day)		24,3	20,7	0,001
BUTTER FAT	%	2,74	3,26	0,0001
	Kg/cow/day	0,787	0,795	0
	Kg/kg Live weight	1,495	1,648	0,011
PROTEIN IN MILK	%	2,98	3,21	0,0001
	Kg/cow/day	0,853	0,792	0,040
	Kg/kg Live weight	1,595	1,604	0

If we relate food intake to milk production, we can see that there is a proper relation or they exceeded the cows requirements, regarding the production levels reached by both herds: around 19 kg of dry matter (DM) in crossbreds produced 20,7 liters/day and from 21 kg DM in Holstein reached 24,3 liters. This gives concentrate intakes per produced liters, similar ($p<0,215$) between biotypes, reaching 330 g/l in Holstein and 350 g/l in Crossbreds.

Grazing behavior

In order to evaluate the grazing behavior in both groups during high temperatures period, two observations were made: Spring and Summer. In Chart 5 there appears the proportion of time dedicated to the pasture activity on 12 available hours, excluding the night and milking periods, for both observation periods. Crossbreds had a longer pasture activity in both evaluation periods, which represented an 8% more in November (one additional hour) and a 5% in February (36 more minutes).

The herd was not observed during the night, although the employee’s observations agree in that the Crossbred rodeo kept longer periods of time in lots under pasture activity during the mentioned time points.

In other similar works, Valtorta and contributors (2003) did not find any difference in time between the same genetic groups herein evaluated, although management conditions in this work were stricter due to the lack of shadow and water for cows.

Chart 5: Time percentage in grazing in both biotypes, on 12 available hours during the day.

	HOLSTEIN	CROSSBREDS
NOVEMBER 2003	40.3	48.2
FEBRUARY 2004	32.4	37.5

It is important to consider the influence of weather variables on animals’ grazing behavior, since during the whole evaluation period, medium temperatures went from normal to a bit above the normal, but extreme temperatures had a range wider than expected. Precipitations during October 2003 to February 2004 reached a total of 264 mm; a 47% of the normal for this period of the year (558 mm). Relative humidity was less than expected in all the months under evaluation (Chart 6).

Chart 6: Weather variables for the period from October 2003 to February 2004.

VARIABLE	MONTHS				
	October	November	December	January	February
Medium Temp (ºC)	18.7	20.3	21.3	24.8	22.8
Medium Max. Temp. (ºC)	25.6	26.5	28.4	31.3	29.9
Medium Min. Temp. (ºC)	11.9	14.1	14.7	18.5	16.1
Precipitations (mm)	0	69	120	50	25
Medium	63	61	64	75	76

Information given by INTA´s Weather Station in Concepción del Uruguay.

In order to get a more precise data on the possible thermal stress suffered by the animals during the observation days, Chart 7 was prepared with the "Thermal Stress Index" or "Temperature and Humidity Index" (Cruz and Saravia, 2001) for those days.

Animals are in thermal comfort when the index does not exceed 72 and they get into thermal stress when THI values exceed 74. This indicates that during Spring, they reached levels of stress only with the higher daily temperatures (between 11:00 AM and 4:00 PM), and only on November 22 there was a THI of stress with the daily average values. Instead, during the observations in February, the animals overcame the thermal stress with the daily average temperature and humidity values.

Chart 7: Temperature and Humidity Index (ITH) on the observation days.

DAY	THI		
	MIN	MAX	AVERAGE
SPRING OBSERVATION			
19/11/03	57	80	65
20/11/03	53	72	61
21/11/03	55	82	67
22/11/03	62	91	74
SUMMER OBSERVATION			
10/02/04	64	91	75
11/02/04	64	92	76
12/02/04	65	93	77
13/02/04	69	77	73

Information given by INTA´s Weather Station in Concepción del Uruguay.

The animals can recover from this kind of stress if it does not last long and if the temperature and levels of humidity decrease afterwards, but in cases where the daily medium value is over 72 or 74 (as in February 2004), cows are unlikely to recover from the stress if they are not provided with proper shadow and fresh water. Now, whether this affects the groups in a different way, Leva and contributors in Esperanza, Santa Fe, (2004) have not found differences in rectal temperature and breathing rhythm between Holstein cows and Crossbred cows. Comerón and contributors (2003) and (2004) and Cravero and contributors (2001) gave similar conclusions in their essays, and they state that both Holstein and Jersey, as well as their crosses, react similarly regarding production and milk quality under heat stress situation.

Period II

During this period, the two genetic groups were joined under the same nutritional management, and therefore all cows were integrated in the farm's main herd.

Intake

In Chart 8 there appear the estimated intakes of commercial pastures and concentrates, as well as the weighted quality of said diets, with a remarkable increase in concentrates participation with respect to Period I.

Chart 8: Diet's intake and quality, monthly average.

DATE	Intake (kg DM/MC. Day)				Portion weighted quality			
	Pastures	Concentrates*	Total		DM (%)	PB (%)	FDN (%)	Mcal/kg DM
MARCH	12.400	7.680	20.080	38%	50.0	13.9	35.7	2.236
APRIL	8.700	7.680	16.380	47%	52.4	15.0	43.8	2.260
MAY	8.200	7.680	15.880	48%	51.1	15.8	43.0	2.327
JUNE	9.300	7.680	16.980	45%	51.8	18.1	36.2	2.394

Production and milk quality

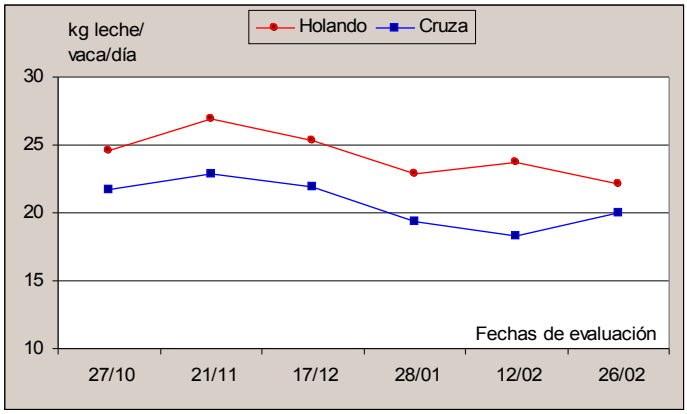
In Chart 9 there appears the milk production, where differences in period I are maintained between the genetic groups, with a tendency to decrease milk production and increase fat and protein contents in both groups.

In Graph 4 there is milk production evolution for both biotypes in both periods (I and II), and there appears a similar tendency in both groups to decrease liters production between October and April, which stops and even reverses at the beginning of grazing of winter pastures in May. This occurs in spite of the advanced lactations in the cows under study.

Chart 9: Milk production and composition

PARAMETER		BIOTYPE	
		HOLSTEIN	CROSS
Milk production (kg/cow/day)		21,04	**17,77**
BUTTER FAT	%	3,35	3,89
	Kg/cow/day	0,699	0,690
	Kg/kg Live weight	1,446	1,550
PROTEIN IN MILK	%	3,27	3,61
	Kg/cow/day	0,691	0,640
	Kg/kg Live weight	1,419	1,440

When analyzing the evolution of milk production (Graph 3), there appears a remarkable fall during the first month of evaluation, related to the pastures' low availability and quality, which affected similarly in both biotypes. Later, the tendency reverts, with a small increase during December. The rest of the curve presents a normal downwards rhythm for both groups, until there is a union of biotypes by the end of February, and from then onwards there is a tendency in both groups to keep production.



Graph 3: Milk production evolution in both evaluation periods.

Regarding the evolution of useful solids concentration (fat and protein) in milk from both groups (Graph 4), during the whole evaluation period, differences were maintained in favor of Crossbreds, both in fat and in protein.

It is remarkable how the relation fat : protein was inverse in Holstein during the first 5 months, with low values with respect to the breeds standards. A possible cause for this would be linked to the high concentrate proportion on the diet, plus a very low availability of quality pastures, which did not allow the herd to consume sufficient effective fiber. Only when they had winter pastures, by the end of March 2004, the tendency reverts and both herds substantially have better solid concentration, specially butter fat.

Corporal Score

The corporal score recovery was similar in both biotypes during the two evaluation periods, with a positive tendency that reverts only during the period between the end of January and the end of February, when the pastures' poor availability and quality, plus the strong heat stress of cows caused a fall in the corporal score (Graph 5).

Reproduction

With respect to reproduction, there are evaluated parameters in Chart 10, where all indicators show a better performance in Crossbreds during Spring-Summer. In the case of the number of days from calving to first service, as an indicator of the cow's ovarian activity return, the Holstein herd lasted 12 more days average to begin to cycle. The period between calving and conception is also longer in Holstein cows, and it had a 18,5% more total services and a 42% more services per pregnant cows. Finally, there is a better pregnancy rate in the Crossbred. This would represent more lactations in its useful life.

The results may show a greater effect on thermal stress on reproductive parameters in Holsteins when inseminations are performed during Summer.

Chart 10: Reproductive parameters

PARAMETER	GROUP	
	HOLSTEIN	CROSS
Calving days – 1st service	107	95
Calving days - Conception	160	121
Pregnancy percentage	52	83
Total Number of inseminations	3.2	2.7
Nº of services per pregnant cow	2.7	1.9

Final Comments

This essay offers preliminary results related to the inclusion of Jersey blood in regional herds.

The difference in size between the genetic groups makes it necessary to do further analysis in relation to solid production per surface unit, considering that the use of breeds smaller than Holstein allows the allocation of one animal and a part of another one in the same surface needed for one Holstein. So, if we consider the 45 kg of Holstein over the Crossbred, and we level each group's animal weight, where one Holstein pastures, 1.09 Crossbreds do it as well. In this way, the protein grams produced per day would be similar: 853 and 863 for Holstein and Crossbred respectively. Therefore, there would be no difference between the groups. Regarding the butter fat grams produced per day, if we take the g / kg of weight and we make the weight of each group equal, the fat production difference would be of almost 46 g more in Crossbreds; this could be important in markets like Uruguay, where fat has a value.

There would be more differences if Comerón and contributors (2002´s results would have been considered, in which it was found that average load capacity on improved pastures is 1 cow per ha for Holsteins and 1.4 cows per ha for Jerseys.

The fat percentage in Crossbreds is a bit higher with respect to protein (3.26 vs. 3.21), plus the higher proportion of grazing activity. This reinforces the hypothesis that grazing harvest with Crossbreds is relatively higher than with Holstein's.

There are interesting tendencies regarding a better reproductive performance, specially in Crossbreds pregnancy rate, which would offer a higher productive life in that genetic group.

This kind of studies, where not all variables have been measured with the necessary precision (e.g.: animal intake) suggest explanatory hypotheses of the biologic phenomena found, and proves the need to perform further experimental studies with more control of variables. It would be desirable to make more adjusted investigations, during experimental stages, in order to get better explanations of the results obtained, especially in pasture-intake related issues. At the same time, considering the high concentrates supply during the affected period, there is a pending similar evaluation with more fresh forage supply in the diet.

Finally, we should take into account that these essays arise from specific demands from regional dairy producers and technicians, and therefore it would be convenient to analyze economic variables, not only regarding milk production and sale, but also meat production in these systems.

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