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Turrialba, Costa Rica

ANALYSIS OF DAIRY COW RECORDS IN A HUMID TROPICAL ENVIRONMENT

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The early history of the herd at Turrialba involved the introduction of Holstein, Jersey, and Brown Swiss heifers. Losses of adults and calf mortality were so high that the herds could not be maintained. The Jersey having shown higher fertility was kept and crosses that would be more adapted sought through the Central American Milking Criollo.

The data analyzed comes from herd records kept for all cows that were milked in Turrialba from 1952 to 1982.

After screening the data for minimum requirements of 30 days in the milking line, 3902 lactation records were considered. Of these 1124 represented first lactations. A further screening was carried out to represent normal lactations. These were so considered if they lasted at least 150 days and produced at least 450 kg of milk. These decisions were based on the conviction that though some of the foundation criollo cows had been raised at the foot of the dam or handled as beef animals no calf-suckled cow would produce less than that amount. All records were made on twice a day milking without the calf and under an all pasture feeding regime, Molasses was fed at the time of milking. Quantities of this supplement were not constant throughout the years. Data examined here includes parameters pertaining to first lactations only. Twenty one breed groups could be defined based on the existence of at least 10 records that met the minimum requirements for first lactations. Most of the data is comprised by the Central American Milking Criollo Breed, with 264 first lactation normal records; the Jersey with 115 and their reciprocal crosses with 90 lactations. Some other numerous important groups include a three breed cross of the above to Ayrshire and an outcross to the Durham (A Costa Rican relic of old time Shortlorns that was not selected for milk production). Some of the more important parameters corrected for year effect and means derived by least squares and maximum likelihood procedures is presented in Table 1.

Table 1. Results on traits pertaining to first lactations records of selected breed groups at Turrialba, Costa Rica. Normal records only.

Breed Sire breed first	Age at first calving days	Fat %	Weight at first calving kg	Unadjusted milk yields 305 or less d	Age Adjusted milk yields	Age and FCM yield
CC = Purebred Criollo	1111 ± 11	4.63	320 ± 3	1.298 ± 31	1.282 ± 31	1.383 ± 83
JJ = Purebred Jersey	1016 ± 14	4.56	268 ± 4	1.836 ± 40	1.851 ± 40	1.989 ± 42
CC x JJ F ₁	1035 ± 22	4.45	308 ± 7	1.802 ± 73	1.813 ± 73	1.963 ± 77
JJ x CC F ₁	958 ± 24	4.66	290 ± 6	1.931 ± 66	1.966 ± 67	2.114 ±
CC x (CJ or JC)	1051 ± 29	4.51	307 ± 8	1.596 ± 87	1.598 ± 86	1.704 ± 91
JJ x (CJ or JC)	970 ± 36	4.75	283 ± 9	1.844 ± 104	1.874 ± 104	2.129 ± 90
DD (Doran x Cross or CC)	1082 ± 24	4.56	328 ± 7	1.582 ± 80	1.581 ± 79	1.689 ± 85
AAX (1/4 C x other)	1066 ± 47	4.60	320 ± 13	2.219 ± 138	2.197 ± 137	2.314 ± 144
AAX (JC or CJ Cross)	1046 ± 24	4.38	340 ± 6	2.198 ± 71	2.195 ± 71	2.263 ± 75
AAX (1/4 J x other)	985 ± 42	4.45	290 ± 11	2.270 ± 121	2.270 ± 121	2.372 ± 128
CCX (J x C) X A)=9/16 or 5/8 CC	1106 ± 32	4.38	321 ± 9	1.772 ± 95	1.754 ± 95	1.866 ± 100

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The data so far analyzed is partial and does not constitute all evidence available to reach conclusions relating to future policies. Since they comprise only first lactations they would be viewed in connection with calf mortality which has a heavy impact on the dairy business. Attempts to include that parameter have been difficult because they are so intimately tied with management. In an earlier analysis (Maltos, Cartwright and de Alba ALPA Mem. 50:35-47) showed an average mortality for all breeds of 17% of all females born, but no breed comparisons were possible. In one section of the herd accurate records were kept of the mortality of calves out of the three way cross cows, Ayrshire X (F_1 crosses) and it was found to range, in a group of 22 cows, from 33% to 0 in a period of five years. Whether adaptability to the environment is expressed by breed groups as a factor of calf mortality cannot be answered. Since calves are grown from the time they reach 120 kg to first breeding on a second rate pastures, adaptability may be judged by age at first calving. In this respect the lower age and higher weight of the Criollo x Jersey crosses can be interpreted as showing a greater degree of adaptability to the environment.

Judged at first calving the introduction of the Doran was not fortunate, and particularly so if compared to the Ayrshire x F_1 Jersey Criollo (reciprocal cross). The fact that these hybrids could out produce and outgrow the purebred Jersey speaks again in favor of adaptability. But the use of Ayrshire sires on these F_1 dams produce a productive and growthy first calver with equal life in the milk herd as the Criollo and Jersey. The continued use of a three way cross might be too complicated for a farmer, even if he can use artificial insemination.

The Ayrshire introduces also unpigmented skin; but, with limited resources available the main argument against the three way cross is that, it forces a reduction of the criollo herd that can be kept.

The success of crossing the criollo with the Jersey and the fact that it surpasses the Jersey in milk production, growth and longevity (as judged by average life in the milking herd of 4 lactation for the Jerseys and 5.8 for the Criollo x Jerseys) raises the question of defining this line of breeding for future dairying in the humid tropics. The source of superior Jersey semen is assured through progeny testing being carried out in many parts of the World. But the recurrent use of the Milking Criollo

is threatened by the lack of testing facilities and the reduction of the truly criollo numbers throughout Central America. The stabilization of a high producing line of Milking Criollos at Turrialba, that are easier to milk than the original population, has been realized. The results obtained by a backcross to pure Criollo bulls (last line in Table 1) are fairly satisfactory and evidence of success in selection of a higher producing line of criollos.

The herd needs to increase in numbers if it is going to keep free of the pitfalls of excessive inbreeding. Some outstanding criollo herds remain in Nicaragua and Guatemala. But they are milked with the calf at side. Fear of going back on selection gained for easier milking makes such a decision difficult. The policy of incorporating high grade criollos into the purebred criollo herd is being proposed. This would allow expansion of numbers and incorporation of productive tropically tested dams though the purity of the original criollo will be traded for a more homogeneously productive population. The characteristics of pigmented skin, short hair and tough thick hide are being kept, and required more on bulls than on dams. A small population of purebred Jersey that would incorporate numerous progeny tested bulls (through semen imports) would be kept, a criss-crossing study with Jersey and Criollo will be started and this line of breeding recommended for demonstration milking units and farm programs.

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