

Summary of Early Calving Studies¹

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Objectives of work just completed were to estimate effects of age at first exposure to breeding and age at first calving on reproductive and production traits. Population surveyed was the University of Florida dairy research herd at Hague. Time interval was 1959 through 1978. More than 80% of all records represented Holstein and Jersey cattle; limited numbers of Ayrshire, Brown Swiss and Guernsey records also were included.

Beginning in 1959, heifers were bred artificially at first normal estrus following 14 months of age, or 13 months in 1960 and thereafter; heifers were maintained generally without breeding from March 31 through October 15. Commercially available A.I. bulls selected for high P.D. milk were used except in experimental matings. Heifers were kept on pasture with supplements from 3 months of age through birth of their first calf; they then joined the regular milking herd.

For the 20 year period, normal parturitions numbered 1144; normal parturition records were defined to exclude gestation lengths less than 251 days and all twin births. Occurrence of calving difficulty did not constitute an abnormal record. There were 1023 normal lactation records available for study. For analysis of some responses, further restrictions were imposed; smallest group investigated was 504 heifers. Up to 47 measures of production and reproduction were used for each heifer. Total of 261 heifers, or 18% of all heifers born, died before 13 months or exposure to breeding. Of these, 37% died at or within 24 hours of birth, 27% died between 24 hours and 30 days, 28% died from 31 days through 6 months, and only 8% died between 6 months and exposure. Holstein and Jersey frequencies of losses generally did not differ.

Age at first estrus was not monitored in this population; however, 54% of all heifers which survived to exposure exhibited estrus within 30 days of initial surveillance. Following exposure, Jersey heifers experienced higher losses to infertility (nonpregnant following 10 services) than other breeds.

Of those heifers which ultimately calved, Jersey heifers exhibited estrus more quickly than Holstein heifers (see Table 1, 24 versus 30 days); however, Jersey heifers required more services for conception and experienced longer intervals from first service to conception. Interval from first service to conception and number of services for conception apparently were not affected by age at first exposure. Breed influences appeared to be primary cause of differences in conception rate for dairy heifers in the DRU herd.

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Age at first parturition was 25.8 months overall. Overall, 40% of all heifers calved at 23 months or less; intermediate ages, 24 to 27 months, comprised 34% of all heifers, 26% calved at 28 months or greater. Gestation length of cow and birth weight of calf increased with age at parturition.

Frequencies of problems at parturition are in Table 2. These are simple averages. Detailed statistical analyses indicated that stillbirth and retained placenta were not affected by dam age in the range 18 to 40 months. Metritis increased with age. Incidence of dystocia was high in young heifers, low in intermediate aged heifers and highest in the oldest group. There was no detectable difference in incidence between oldest group and combined incidence of two younger groups. Holstein heifers experienced higher incidence of all problems than Jersey heifers; retained placenta, 4.9 versus 1.0%; dystocia, 6.6 versus 1.8; metritis, 14.2 versus 4.2; and stillbirth, 16.0 versus 9.1. Incidence of stillbirth was highest in young Holstein and old Jersey heifers, 17.9 and 12.9%, respectively.

There were no significant effects of age detected for postpartum reproductive traits. Days to first estrus were longer following birth of light or extremely heavy calves; heifers 23 months or younger which delivered calves greater than 40 kg at birth experienced very long intervals to first postpartum estrus when compared to older heifers with comparable weight calves. Heifers 27 months or less showed fewer days open, days to successful service and shorter calving intervals following abnormally short or long gestations. In contrast, heifers 28 months or older at parturition experienced lengthened calving intervals and more days open and days to successful service than younger heifers. Retained placenta extended days to first postpartum estrus an average of 9 days. Other problems exhibited no apparent effects on postpartum estrus. Stillbirth had no apparent effects on postpartum reproductive performance. Retained placenta, dystocia, or metritis extended calving interval 33, 45 or 27 days.

Age at parturition effects were not detectable for protein to fat and solid not fat to fat percentage ratios, total solids, solids not fat, protein and fat percentages. All yield traits and chloride percentage increased with heifer age at parturition. Milk yield increased 67 lb/mo. Lactose mineral percentage declined with age. Titratable acidity was highest in very young and very old heifers. Milk yield increased 20 lb following birth of a male calf compared with birth of a female. Effects of stillbirth, retained placenta, dystocia and metritis on milk yield were large and variable; they averaged -399, -526, -382, and -216 lb, respectively. Generally, losses in constituent yields were proportional to effects of problems on milk yield overall. Length of record was apparently not affected by problems at parturition.

Results of genetic investigations indicated that reproductive traits were low to moderately heritable: interval from exposure to first service, .22; interval from first service to conception, .11; number of services for conception, .05; age at first parturition, .43; body weight of calf, .31; gestation length, .24; and days to first

postpartum estrus, .14.

Some reproductive trait heritabilities apparently were approximately zero. These included heritability of calf survival for 24 hours, retained placenta, dystocia, metritis, and postpartum measures, days from first to successful service, days pregnant during first lactation, and calving interval. Heritabilities of and correlations between milk production traits closely resembled most of published literature concerning dairy cattle genetics.

No evidences of culling differences between age groups were detectable during the first lactation. Culling frequencies within the three age groups were 33.6, 30.9 and 35.4%. By planned policy, significantly fewer Holstein (18.0%), than Guernsey (39.4%) or Jersey (34.0%) cattle were removed during first lactation.

In conclusion, policy of early freshening did not appear contradictory to other goals of DRU dairy management. Problems at parturition were at the low end of the range reported in herds with older freshening ages. This study indicated that dairymen with selection programs emphasizing P.D. milk yield may wish to alter reproductive management to monitor estrus in relatively young heifers and to breed at younger ages if present practice is to breed at ages greater than 13 months. From DRU experience, breeding restrictions based upon weight appeared unnecessary. Estrus in heifers appears to be the surest indication of appropriate physiological development for breeding.

Table 1. Mean reproductive performance of DRU yearling heifers (1959-1978).

Response ^a	Jersey	Holsteins	All
Age 1st exposure	416	410	414
Exp. to 1st service	24	30	28
Age 1st service	439	439	441
Number of services (#)	2.6	2.1	2.4
Gestation length	280	278	280
Calf birth weight (lb)	51	36	34
Age at parturition (mo)	26.0	25.0	25.8
Days to 1st heat	31	36	34
Days to 1st service	74	70	73
Days open	112	115	116
Calving interval	391	394	395

^aIn days except where noted; represents 297-450 Jerseys, 338-473 Holsteins, 766-1144 total.

Table 2. Frequency of problems at parturition by age group (%).

Age	Stillbirth	Ret. Placenta	Metritis	Dystocia
≤23 mo	12	4	9	5
24 to 27	10	3	10	2
≥28 mo	13	5	14	4
Overall	12	4	10	4