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AGRICULTURAL RESEARCH SERVICE, U. S. DEPARTMENT OF AGRICULTURE

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DHIA AGE ADJUSTMENT FACTORS FOR STANDARDIZING LACTATIONS  
TO A MATURE BASIS

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The new age adjustment factors shown on the following pages were derived by USDA to adjust DHIA lactation records to a mature equivalent basis. These new age adjustment factors are more accurate than those presently in use because they take account of the effects of region, season, milk, and fat as well as those due to breeds. Their use became effective February 1, 1967, to standardize records for age at calving in USDA sire and cow evaluations.

The purpose of these adjustment factors is to remove the variation arising from age differences among cows that calved in the same herds in the same year and season (herdmates).

These factors may not adequately adjust for age differences among records in progress, especially those for cows with less than 120 days in milk (9). 1/

These new age adjustment factors were based on a total of 1,795,895 DHIA lactations initiated between January 1, 1950 and May 1, 1964. Records were used only from cows sired by

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1/ Underlined numerals in parentheses refer to Literature Cited on pages 3 and 4.

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registered bulls and out of dams with valid DHIA identification, and where both parents were of the same breed. Records of 90 days or more in length were extended to a 305-day basis by DHIA projection factors (5) and included in the development of the age factors.

To establish age at maturity and mature yield, all consecutive 2-year moving averages between 5 and 10 years of age were computed. The 2-year period with the highest average yield was chosen as the age of mature yield. Adjustment factors were computed by use of the gross comparison method (7) in which the ratio between mature yield and production of the other ages was determined. The new factors were developed from these ratios after smoothing by use of a 5-month moving average as described by Miller (7).

Research has shown that age adjustment factors vary substantially between breeds, between seasons of calving, between geographical areas of the United States, and between milk and fat yield (1-4, 6-8, 10, 11). These variations are large enough to justify independent sets of factors. Separate sets of factors were developed for Ayrshire, Guernsey, Jersey, Holstein, Brown Swiss, and Milking Shorthorn cows. Factors for Mixed Breeds were obtained by averaging factors for all the breeds.

Because of the small number of records available, the factors for Red Dane cows were erratic but resembled those for Brown Swiss. Red Poll factors were also erratic but resembled those for Milking Shorthorn. For this reason it was deemed advisable to use the Brown Swiss factors for Red Dane cows and the Milking Shorthorn factors for Red Poll.

Factors were derived independently for cows calving in the period from November 1 through June 30 (Season I) and from July through October 31 (Season II). Separate factors for milk and fat yields were also computed in each season.

Different sets of factors were also developed for the various geographical areas in the United States. Initially, approximate factors were computed for a large number of regions consisting of individual or a small group of States. Analyses were conducted (6) and regions were consolidated as much as possible, consistent with removing the majority of the regional variation. The final stratification of the new factors also considered the number of records that were available from a breed in an area. Efforts were made to reduce sets of factors in situations where a very small number

of cows were available. The States used in the final regional stratification for each breed are shown in table 1.

Percentage distribution of cows by age group, breed, region, and season is shown in table 2. The numbers of DHIA lactations used in developing sets of factors for each breed, region, and season are shown in table 3. The age at which mature (maximum) production was reached and the average yields in the 2-year period of maturity are shown in table 4 for each breed, region, season, and for yields of milk and fat.

Trends in milk and fat production with increasing age for Ayrshire, Guernsey, Holstein, Jersey, and Brown Swiss cows are illustrated by season in figures 1 and 2. The averages presented include all data used for these breeds from all areas of the United States. Variation in age adjustment factors for the two seasons reflects the differences between winter and summer calvings in the slopes of the age-yield curves.

The variation that exists between age adjustment factors for regions, seasons, and yields of milk and fat is illustrated by the graphic presentation of sets of factors in figures 3, 4, and 5. An example of differences between adjustment factors for milk and fat production is shown in figure 3. Regional differences are illustrated in figure 5 and seasonal diversity in figure 4.

The age adjustment factors are presented in tables 5 through 26. Factors for the two seasons, and for milk and fat yields for a breed-region class are shown in the individual tables.

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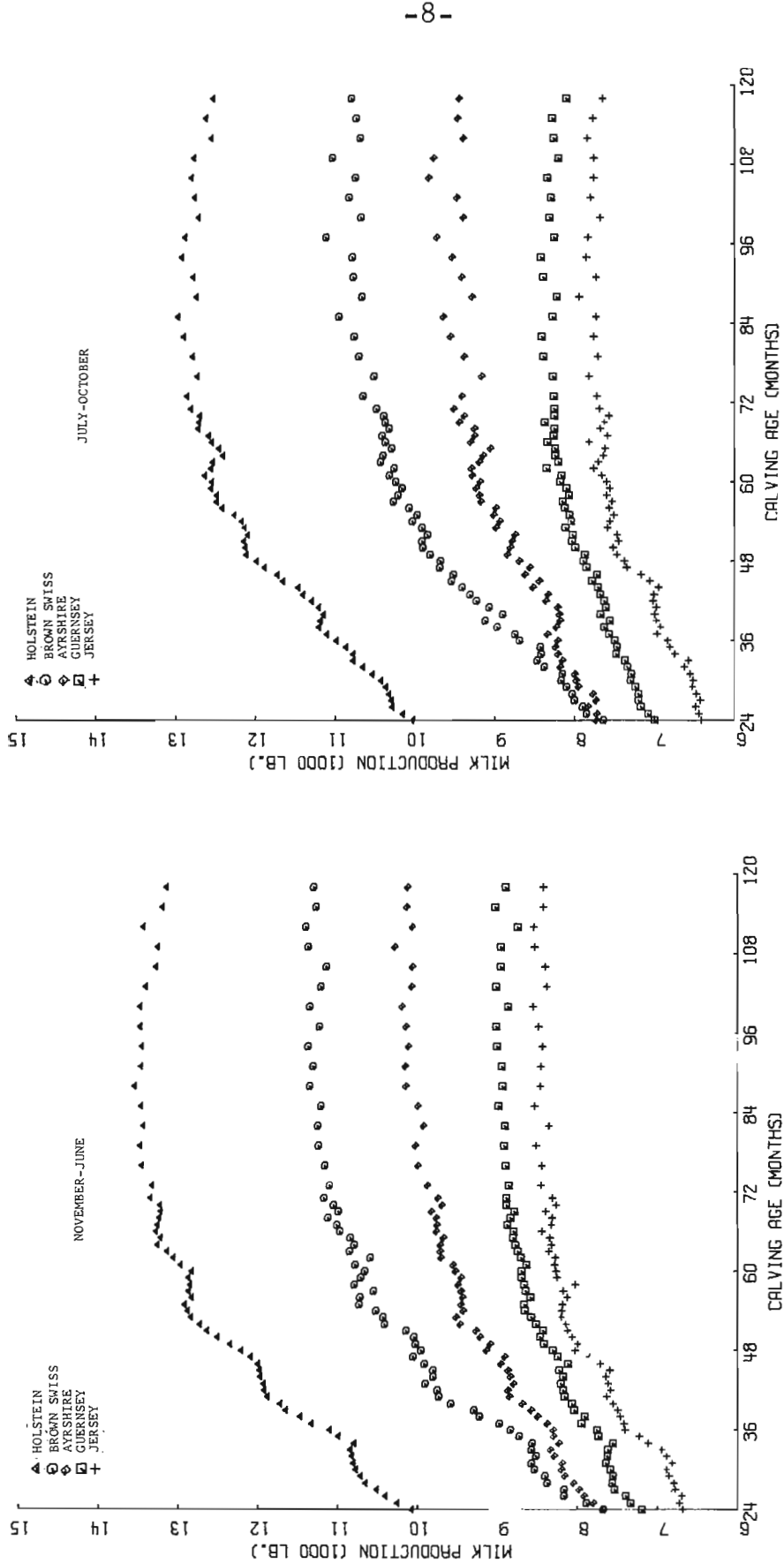


Figure 1.--Relationship between age and milk yield by breed and season.

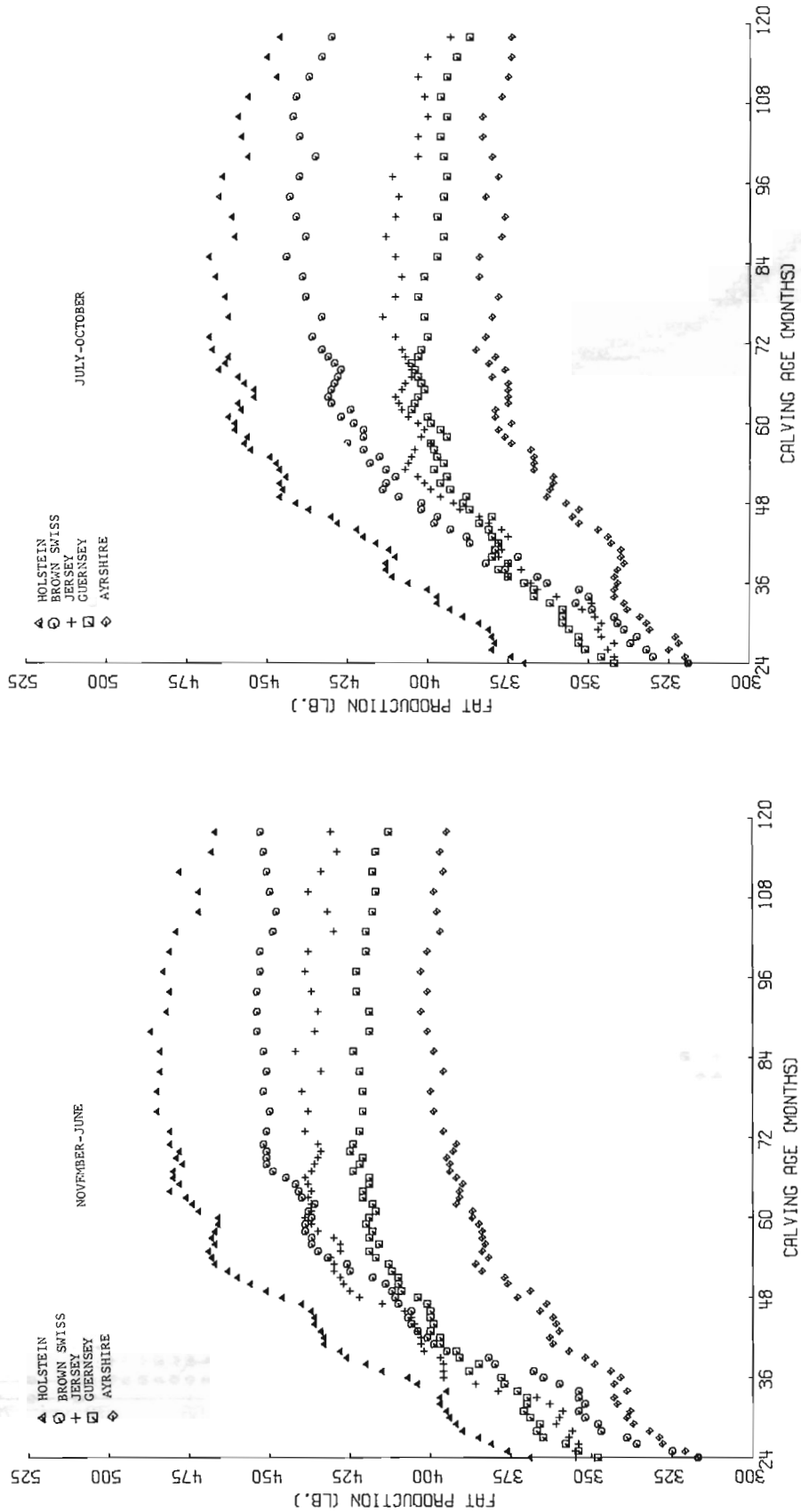


Figure 2.--Relationship between age and fat yield by breed and season.

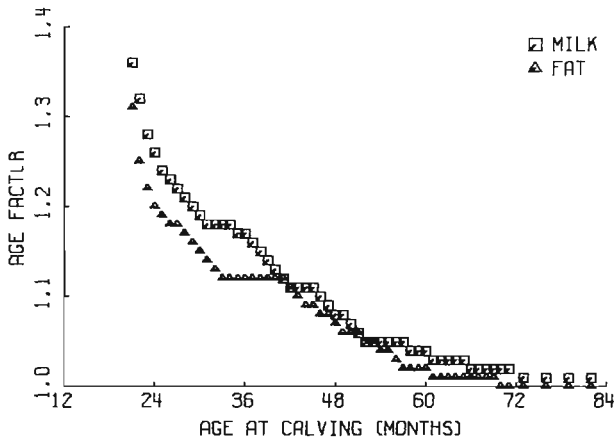


Figure 3.--Age adjustment factors for milk and fat yields of Ayrshire cows calving in July-October.

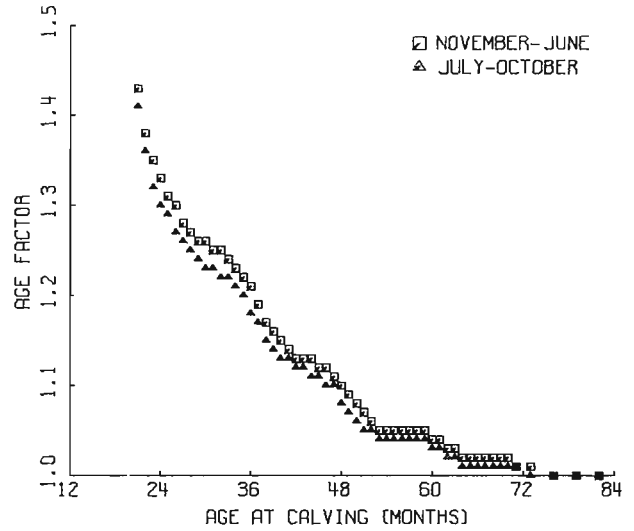


Figure 4.--Age adjustment factors for the milk yields of Holstein cows calving in different seasons.

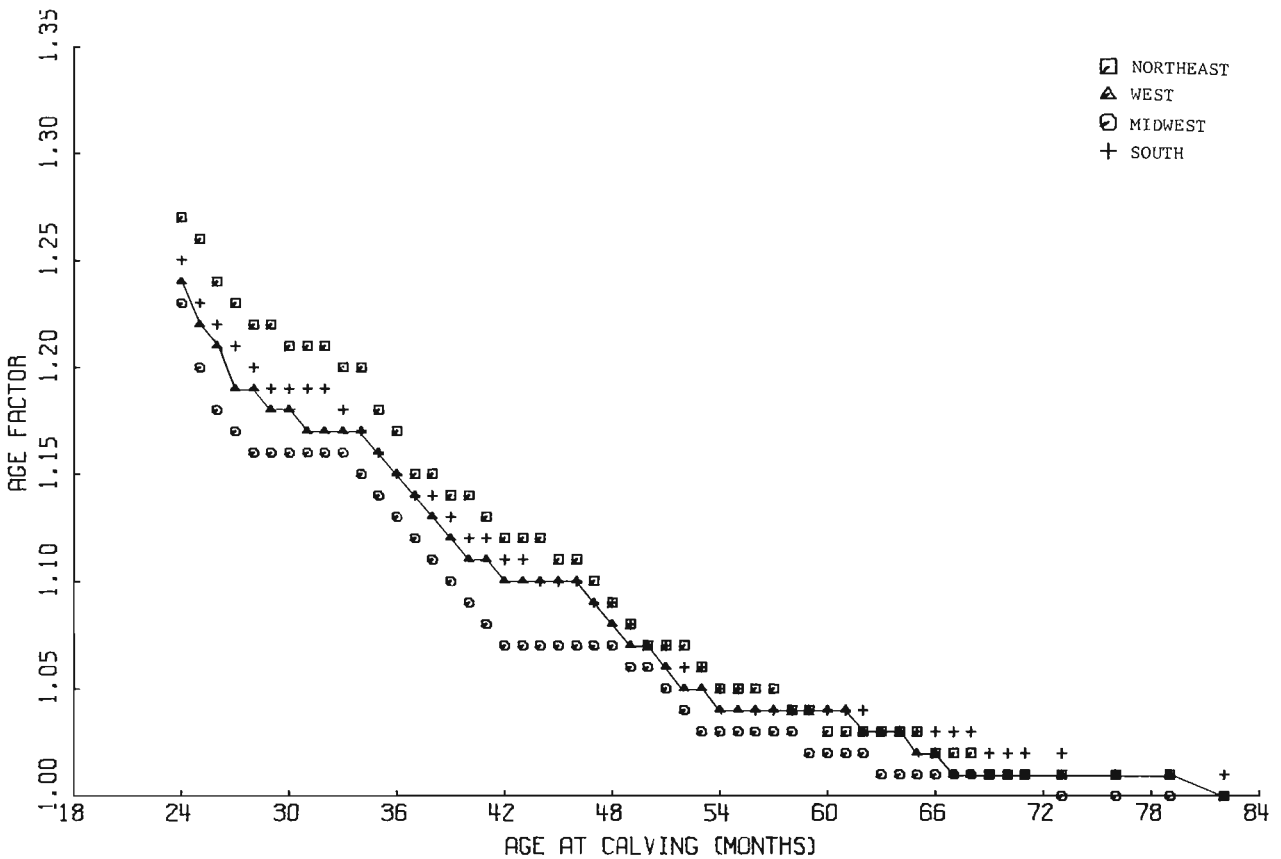


Figure 5.--Age adjustment factors for the milk yields of Guernsey cows calving in different regions of the United States.