



A Million Reasons Why Conformation Matters Study

Relationships Between
Lifetime Energy
Corrected Milk and
Conformation



Data



Holstein Association USA official classification scores were used for linear classification data



The first classification score for a cow assigned in her first lactation was used for analyses



Official DHIA records were used for production and culling data



Only cows born after 1/1/90 were included in analyses



Only test dates after 1/1/00 were included in test day analyses



Data



Lactations starting between 1/1/00 and 8/27/21 were included in analyses



For lifetime production analyses only first 6 lactations were included



Only cows calving for first time before 1/1/16 were included in lifetime analyses



Only animals with complete 305-day lactations were included in 305-day milk analyses



All DHIA data was edited to remove biologically unlikely test day results

Data



Only 1st lactation records with age at first calving between 18 to 35 months were included



Lactation records with milking frequencies >3 were removed



After edits, 937,603 cows were available for analyses



5,496 unique herds were represented in the data set



Cows were only included in the final analysis if there were at least 5 herdmates in their herd, year, and season of calving

Analyses



Cows were categorized into quartiles for each trait with approximately the same number of cows categorized into each category



The CORR Procedure of SAS 9.4[®] was used to calculate correlations between type and production traits



The FREQ Procedure of SAS 9.4[®] was used for the percent of cows surviving to 6 years old analyses

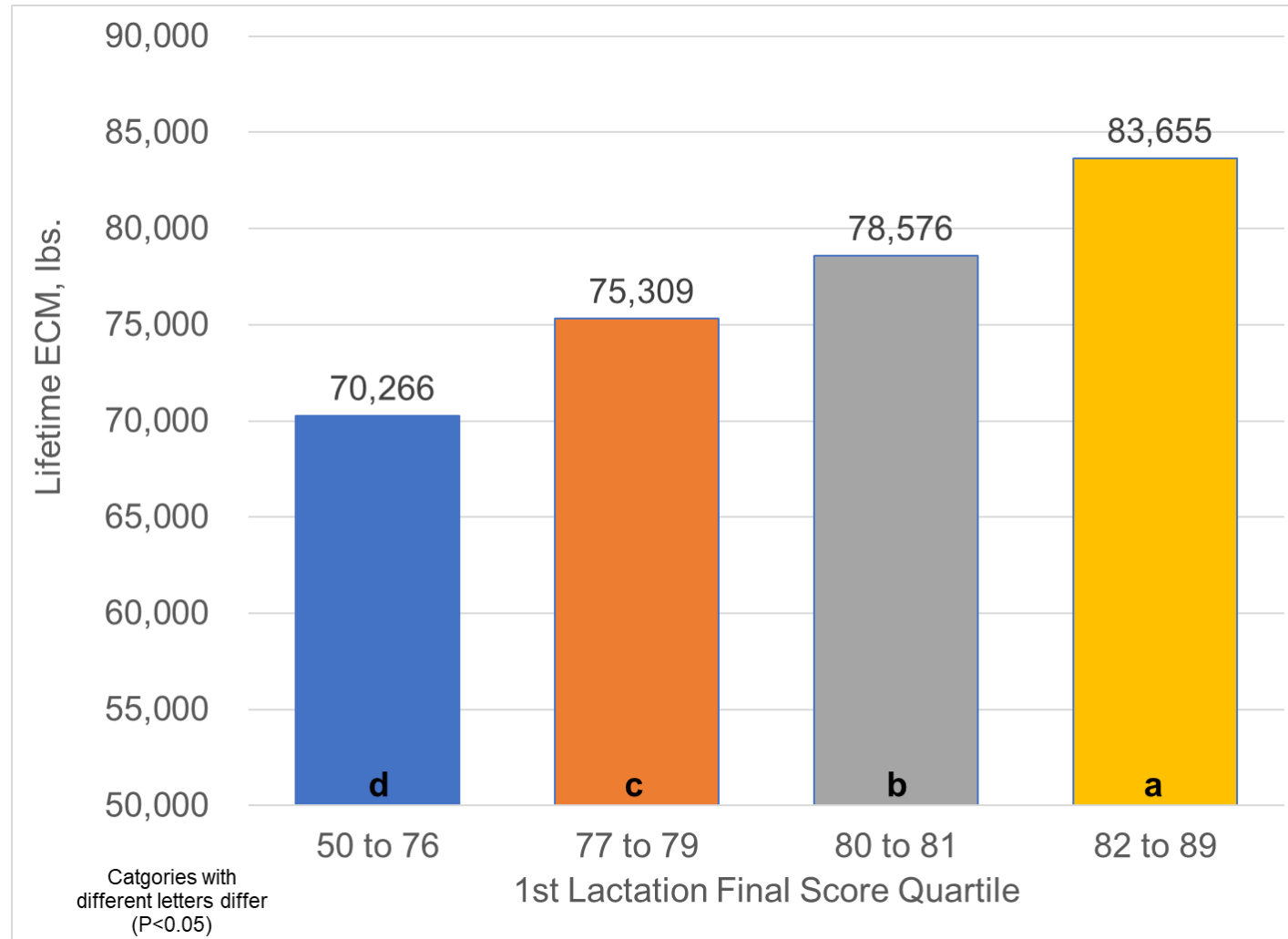


The MIXED Procedure of SAS 9.4[®] was used for modeling 1st lactation ECM, SCS, lifetime DIM, and lifetime ECM using a compound symmetry covariance structure. Subject was herd-year-season. Milking frequency was a covariate in the 1st lactation ECM model

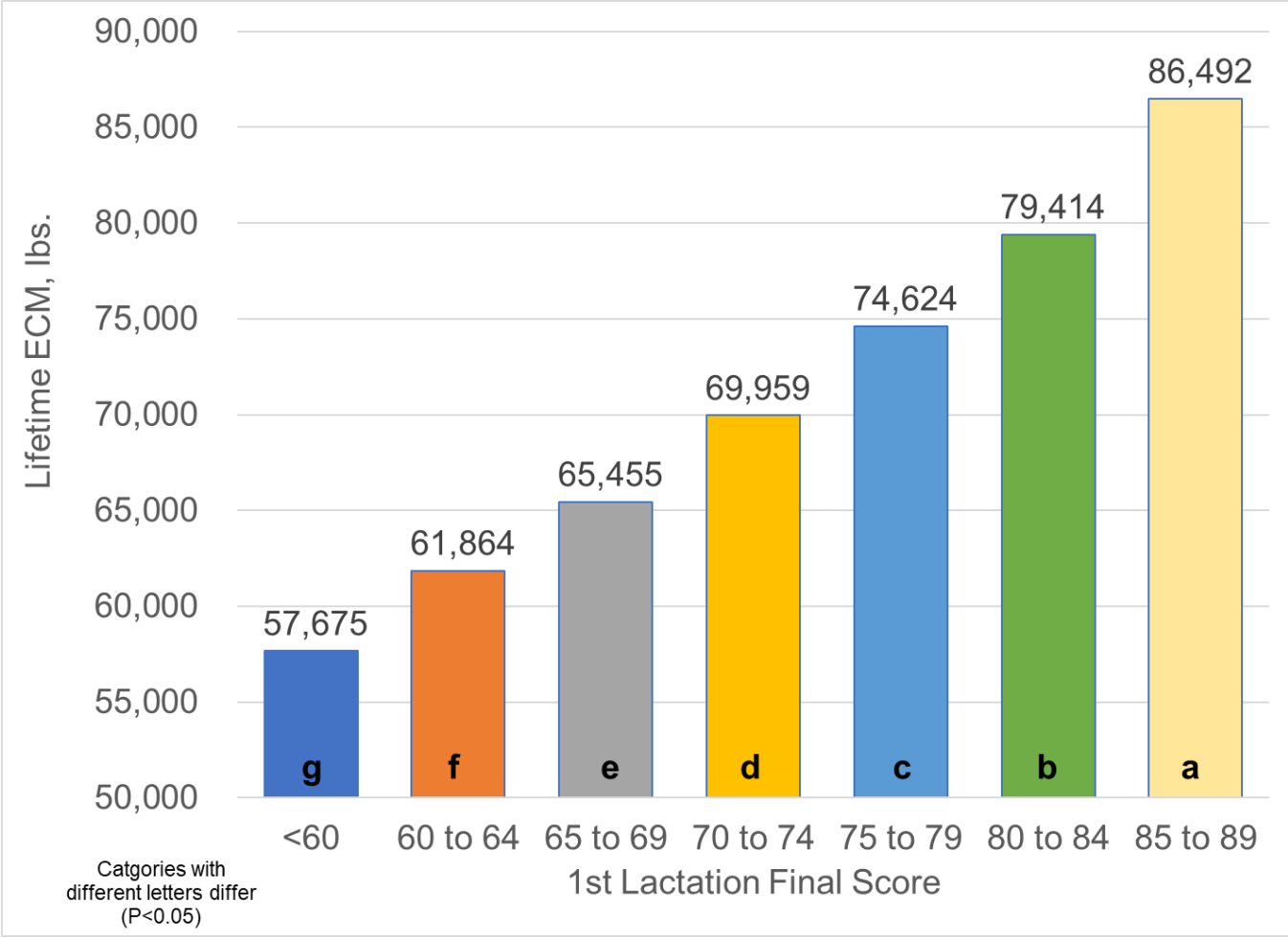


LSMeans are presented with statistical significance presented at $p < 0.05$

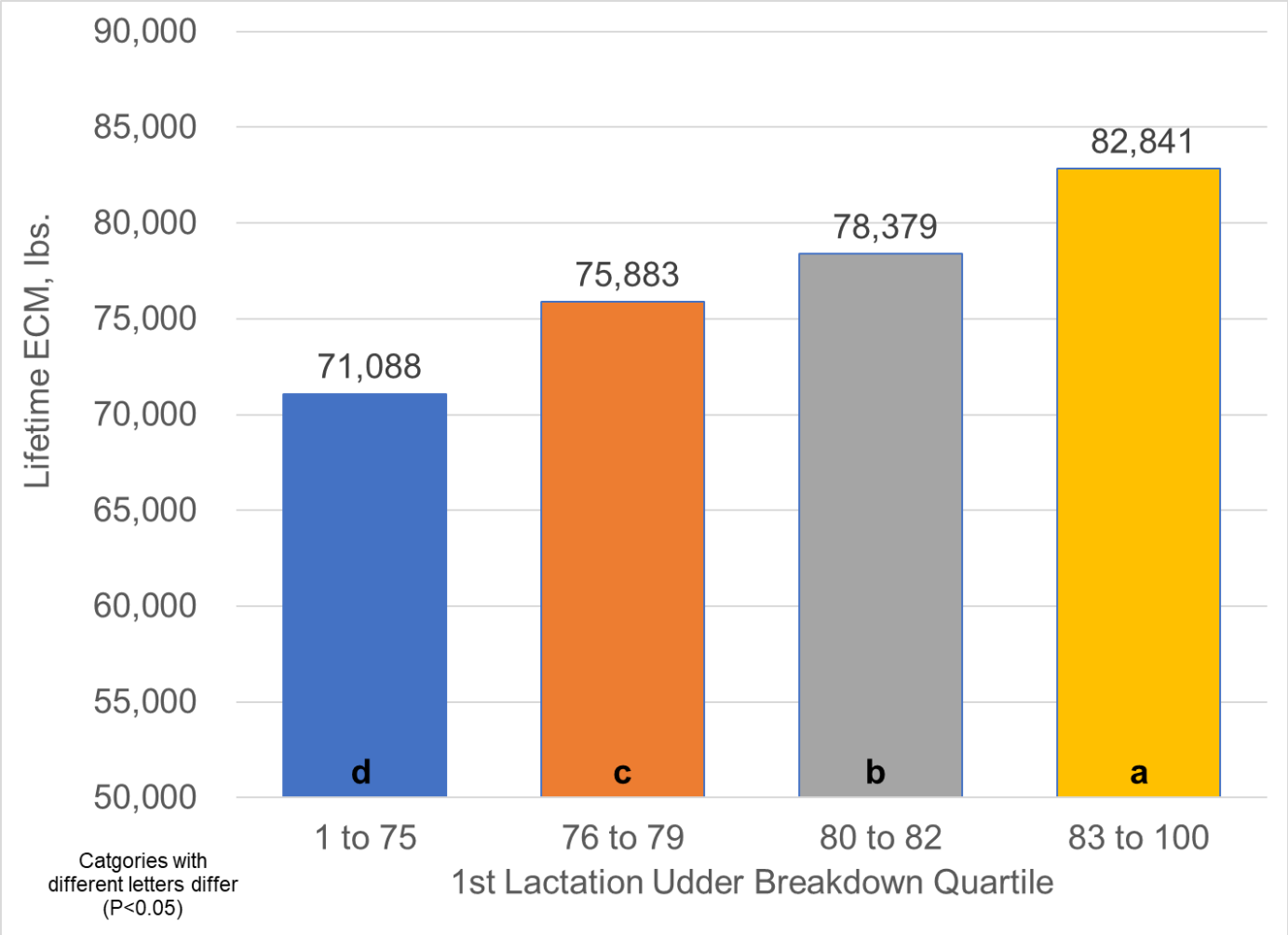
Lifetime Energy Corrected Milk by 1st Lactation Final Score Quartile



Lifetime Energy Corrected Milk by 1st Lactation Score Category



Lifetime Energy Corrected Milk by 1st Lactation Udder Breakdown Quartile



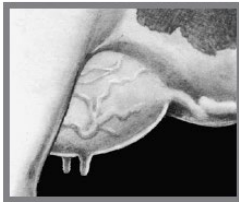
Lifetime Energy Corrected Milk by 1st Lactation Fore Udder Attachment Quartile

FORE UDDER ATTACHMENT - FU

Primary Trait



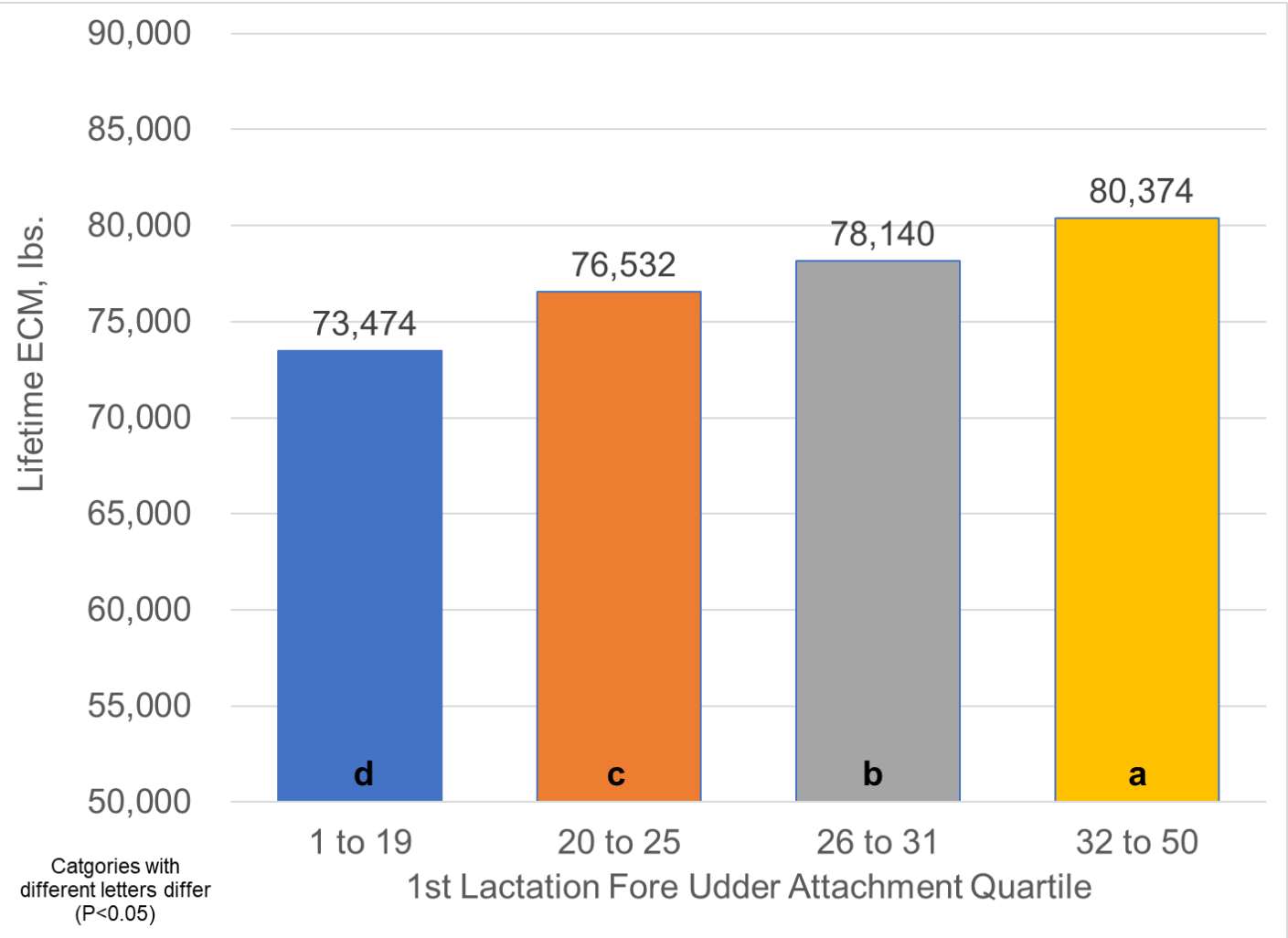
1-5 pts.
Extremely loose



25 pts.
Intermediate strength



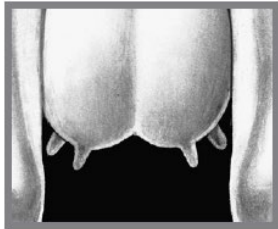
45-50 pts.
Extremely snug & strong



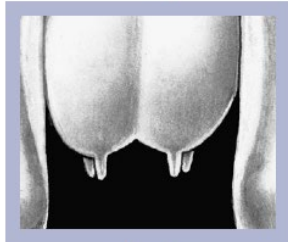
Lifetime Energy Corrected Milk by 1st Lactation Front Teat Placement Quartile

FRONT TEAT PLACEMENT - TP

Primary Trait



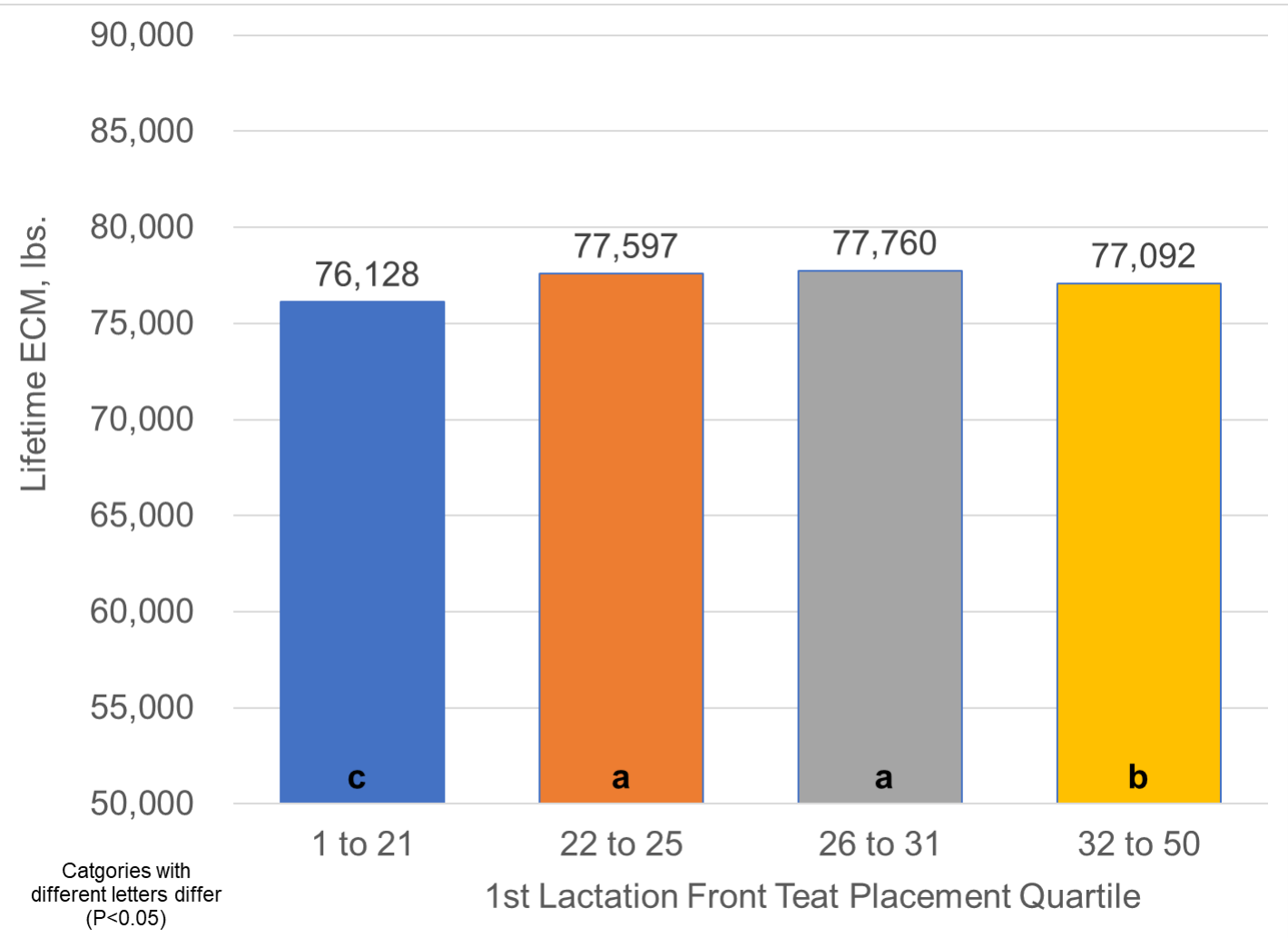
1-5 pts.
Extremely wide placement
on outside of quarter



25 pts.
Centrally placed
on quarter



45-50 pts.
Base of teats on
extreme inside of quarter



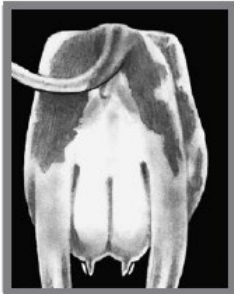
Lifetime Energy Corrected Milk by 1st Lactation Rear Udder Height Quartile

REAR UDDER, HEIGHT - UH

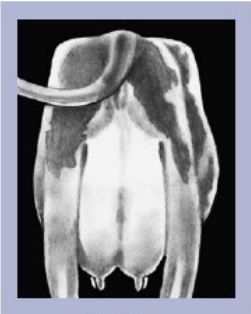
Primary Trait



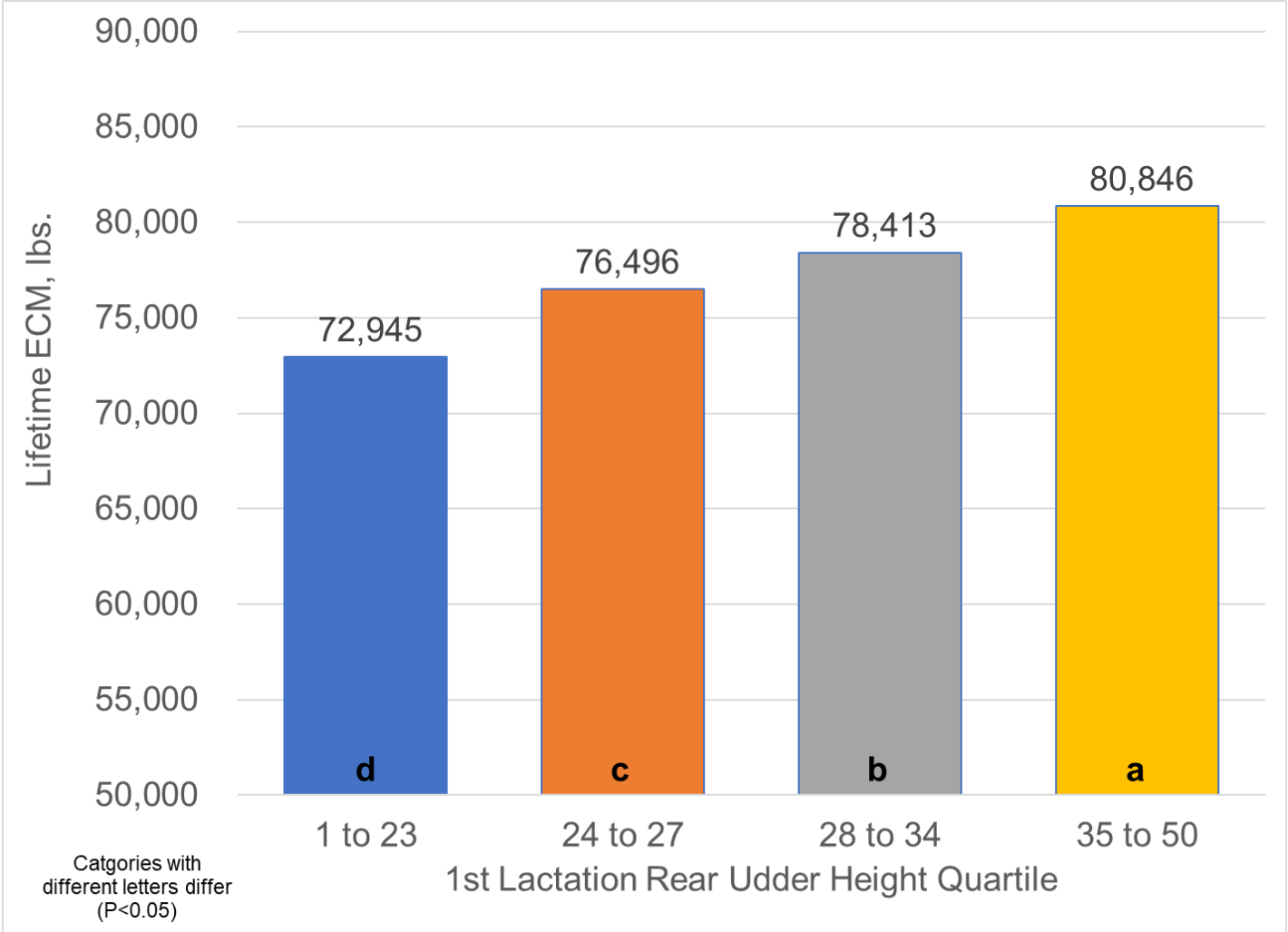
1-5 pts.
Extremely low



25 pts.
Intermediate height



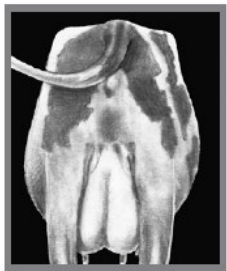
45-50 pts.
Extremely high



Lifetime Energy Corrected Milk by 1st Lactation Rear Udder Width Quartile

REAR UDDER, WIDTH - UW

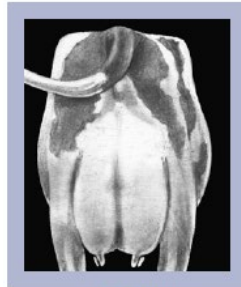
Primary Trait



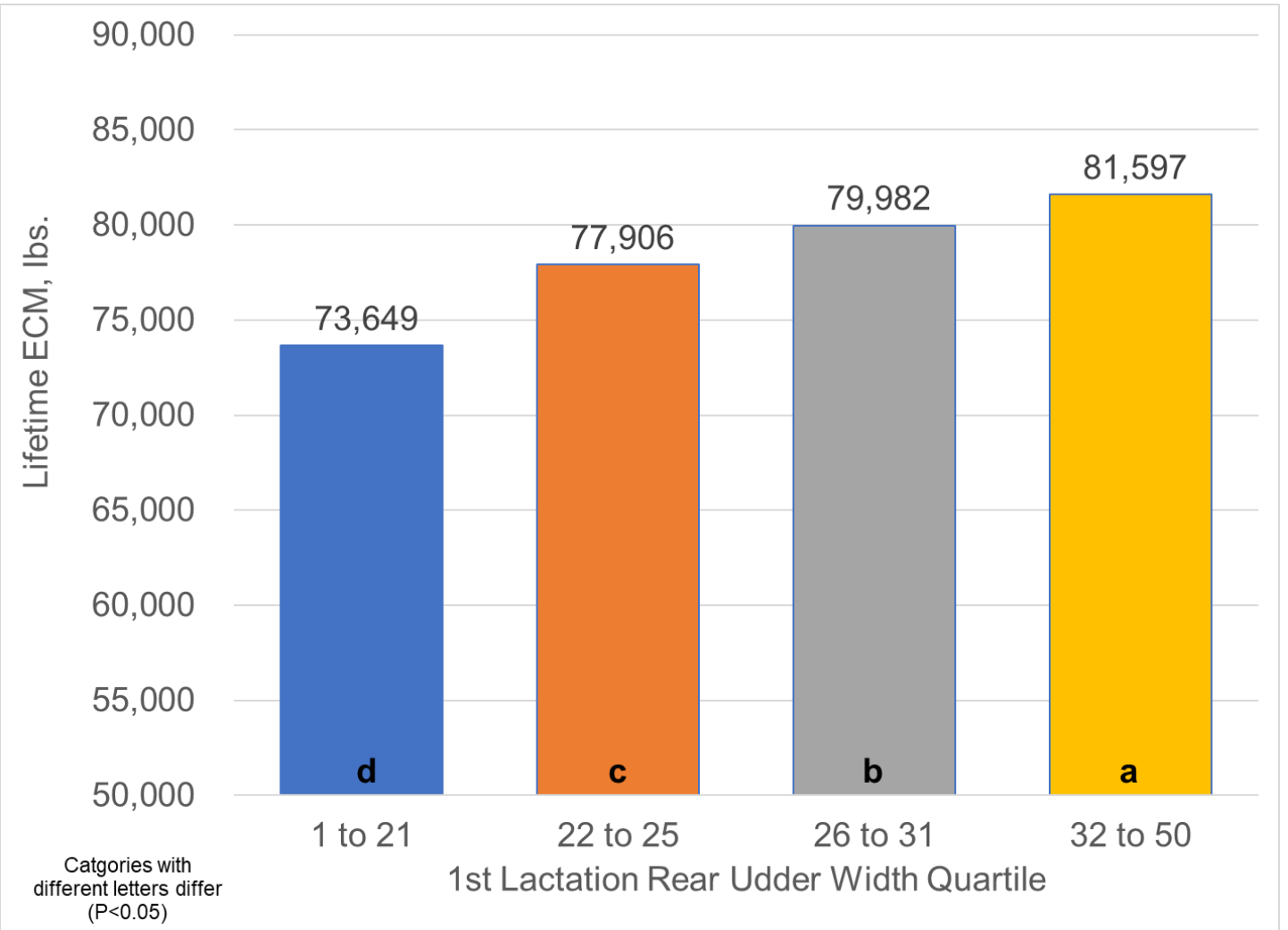
1-5 pts.
Narrow rear udder



25 pts.
Intermediate width



45-50 pts.
Extremely wide rear udder



Lifetime Energy Corrected Milk by 1st Lactation Teat Length Quartile

FRONT TEAT LENGTH - TL

Primary Trait



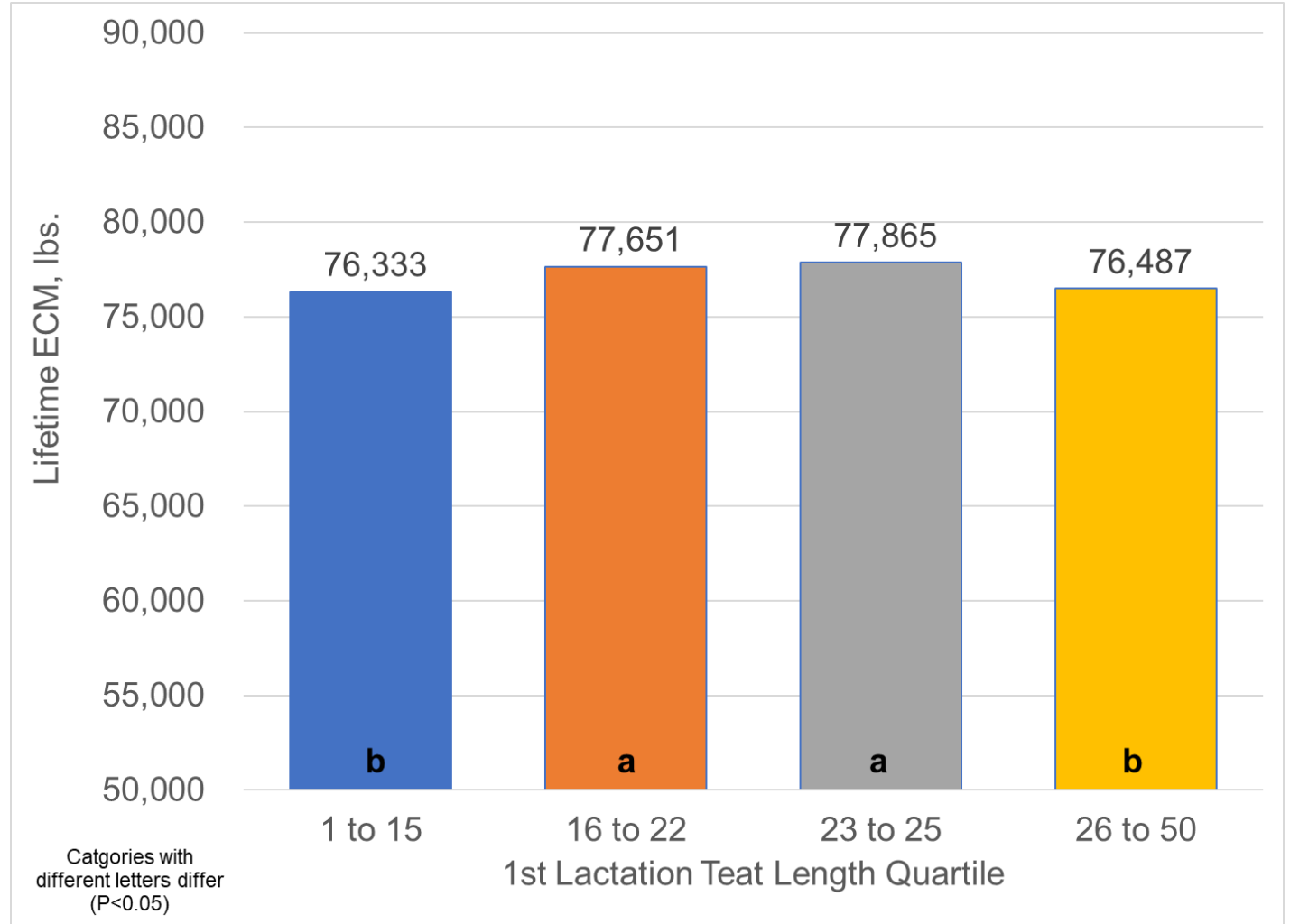
1-5 pts.
1-1/4 inches or smaller



25 pts.
2-1/4 inches



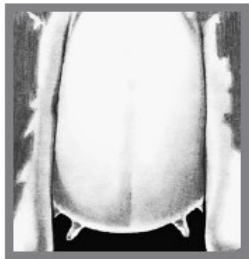
45-50 pts.
3-1/4 inches or longer



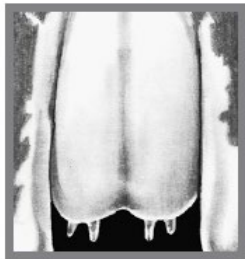
Lifetime Energy Corrected Milk by 1st Lactation Udder Cleft Quartile

UDDER CLEFT - UC

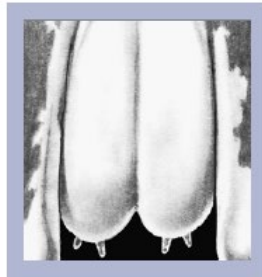
Primary Trait



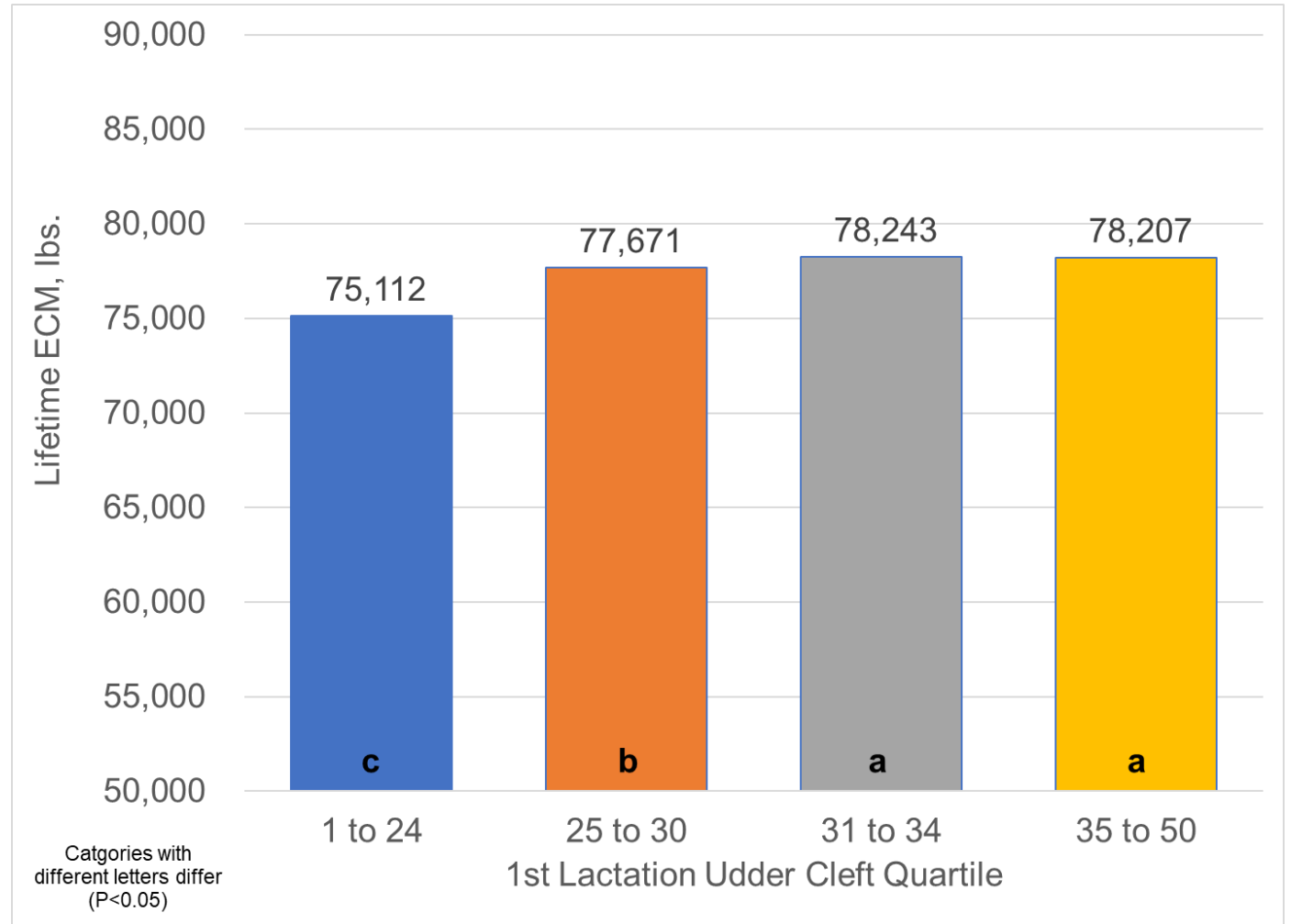
1-5 pts.
Weak cleft



25 pts.
Intermediate



45-50 pts.
Extremely strong cleft



Lifetime Energy Corrected Milk by 1st Lactation Udder Depth Quartile

UDDER DEPTH - UD

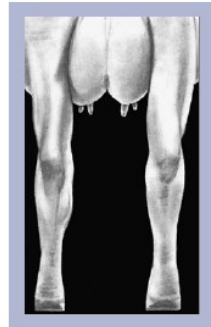
Primary Trait



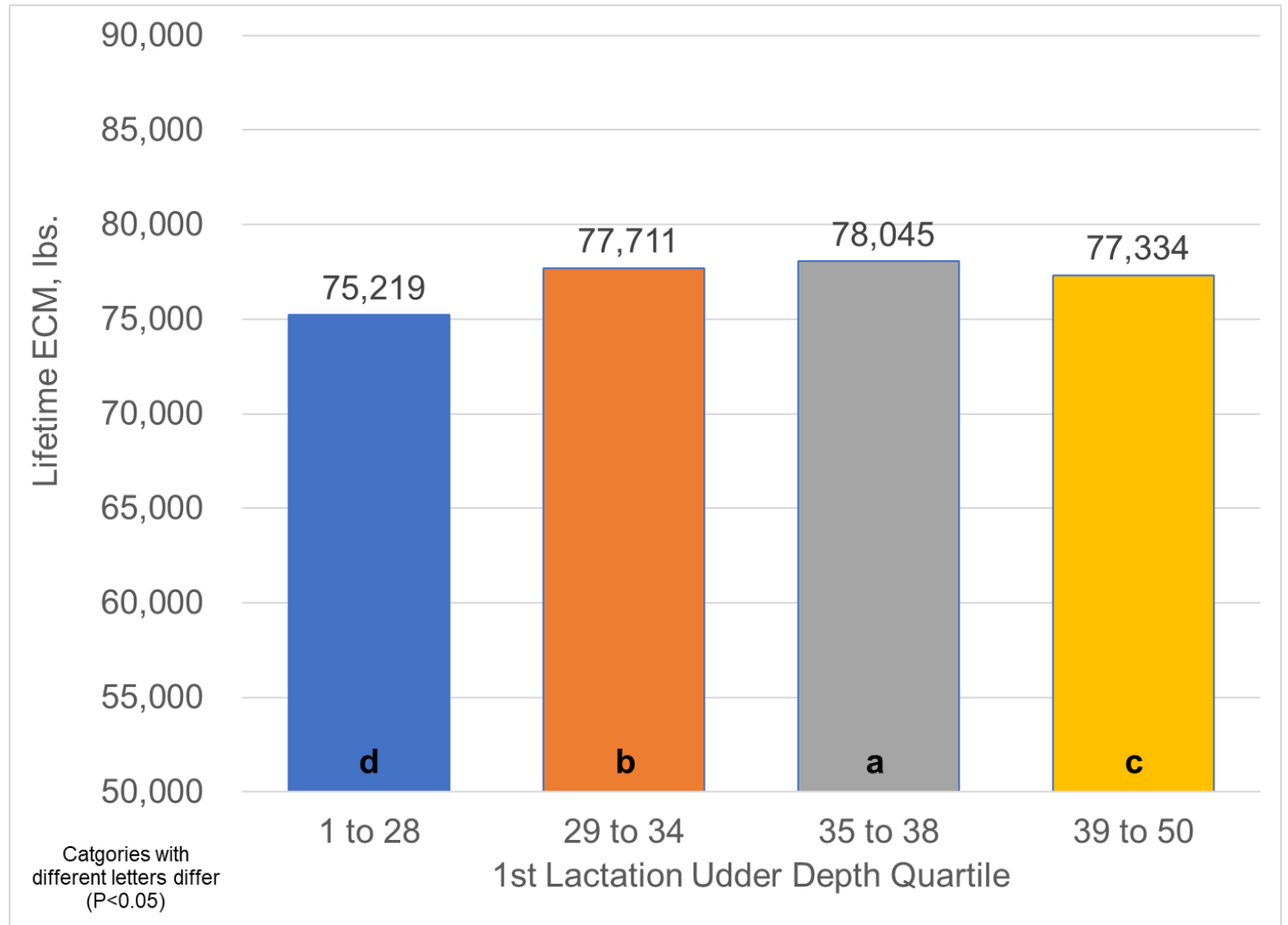
1-5 pts.
Very deep udder floor
well below hocks



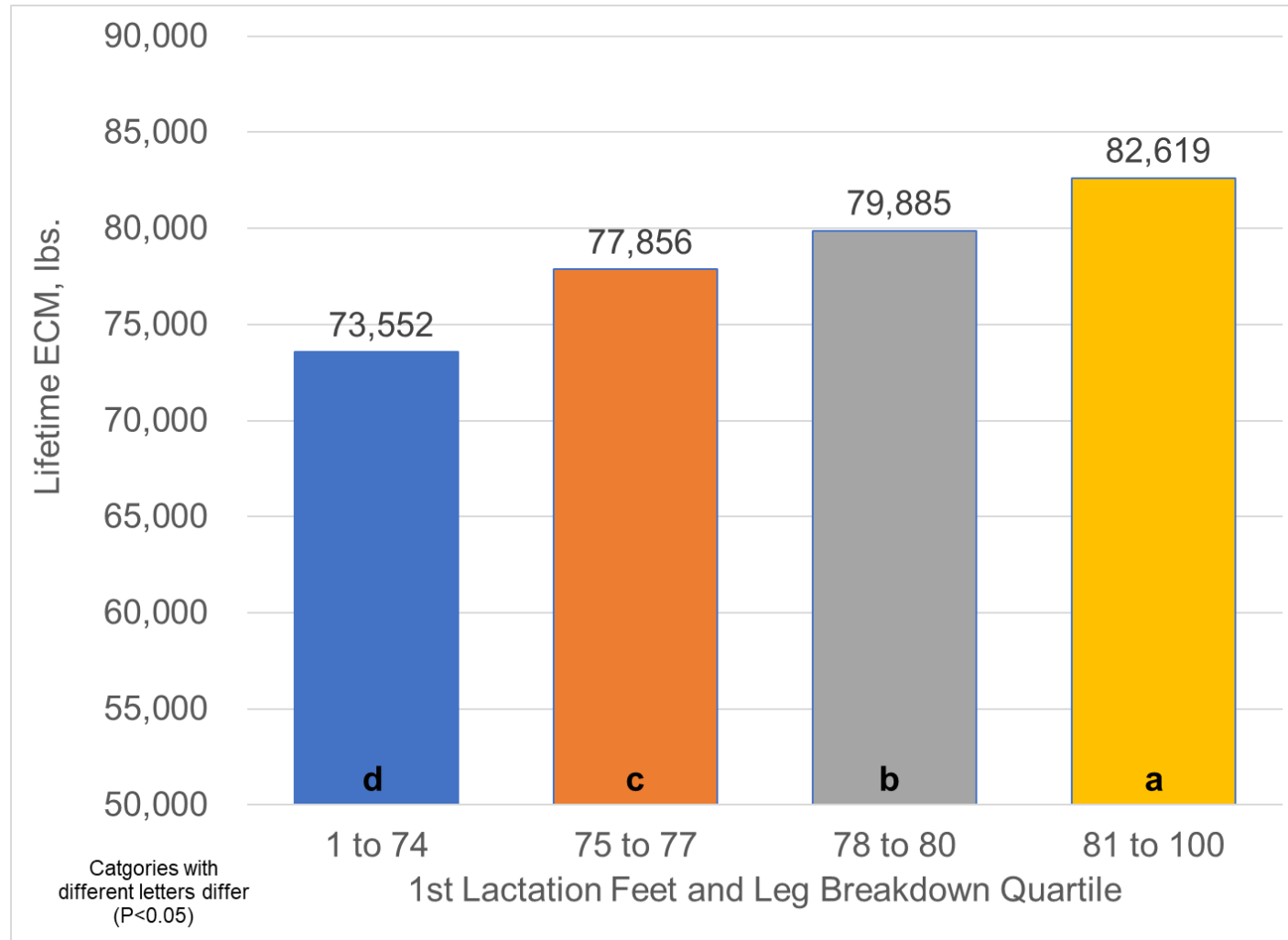
25 pts.
Udder floor
above hocks



45-50 pts.
Extreme height of udder
floor above hocks



Lifetime Energy Corrected Milk by 1st Lactation Feet and Leg Breakdown Quartile



Lifetime Energy Corrected Milk by 1st Lactation Foot Angle Quartile

FOOT ANGLE - FA

Primary Trait



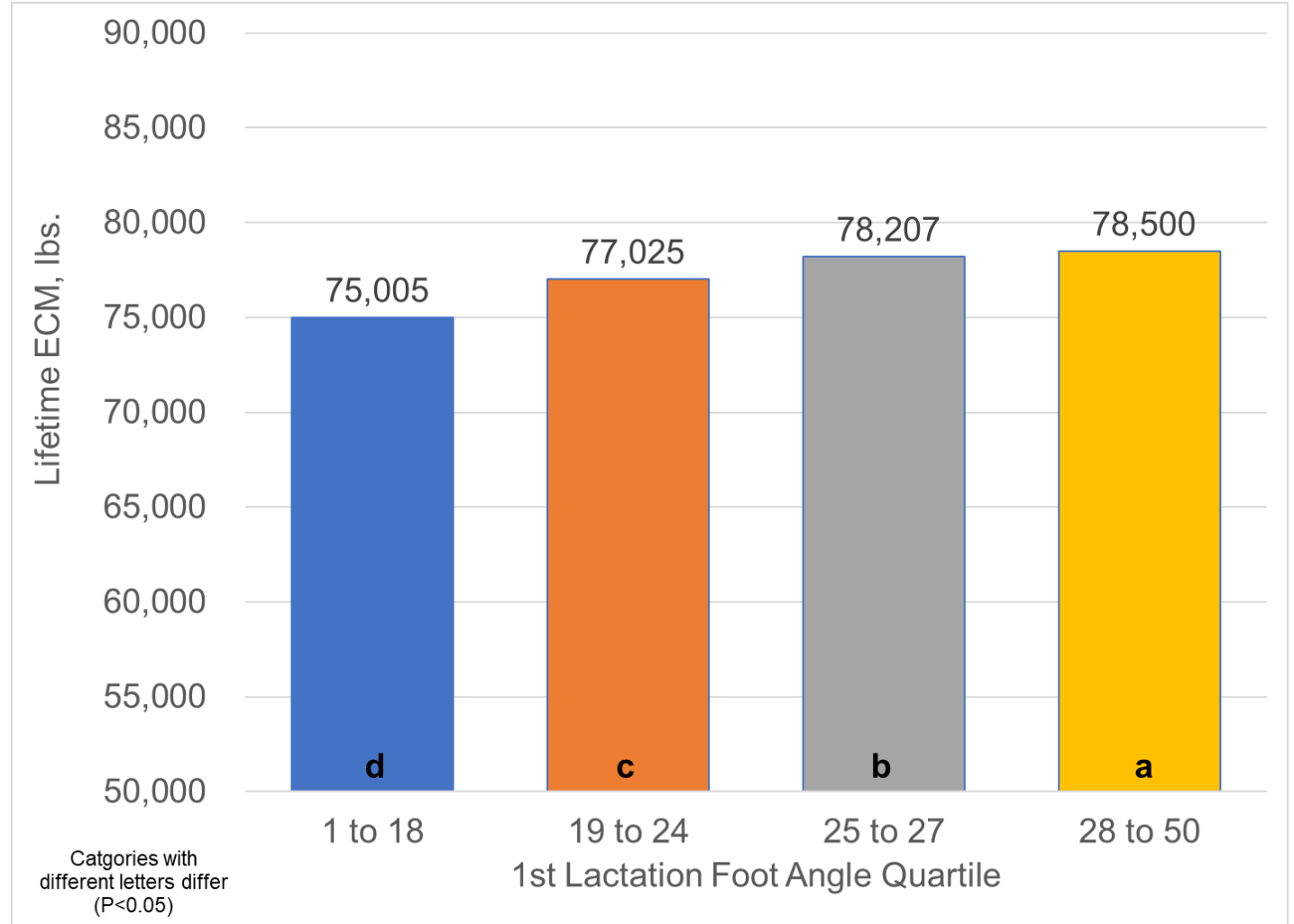
1-5 pts.
Extreme low angle



25 pts.
Intermediate angle



45-50 pts.
Extremely steep angle



Lifetime Energy Corrected Milk by 1st Lactation Rear Legs Side View Quartile

REAR LEGS, SIDE VIEW - LS

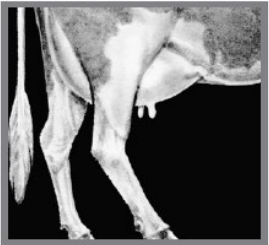
Primary Trait



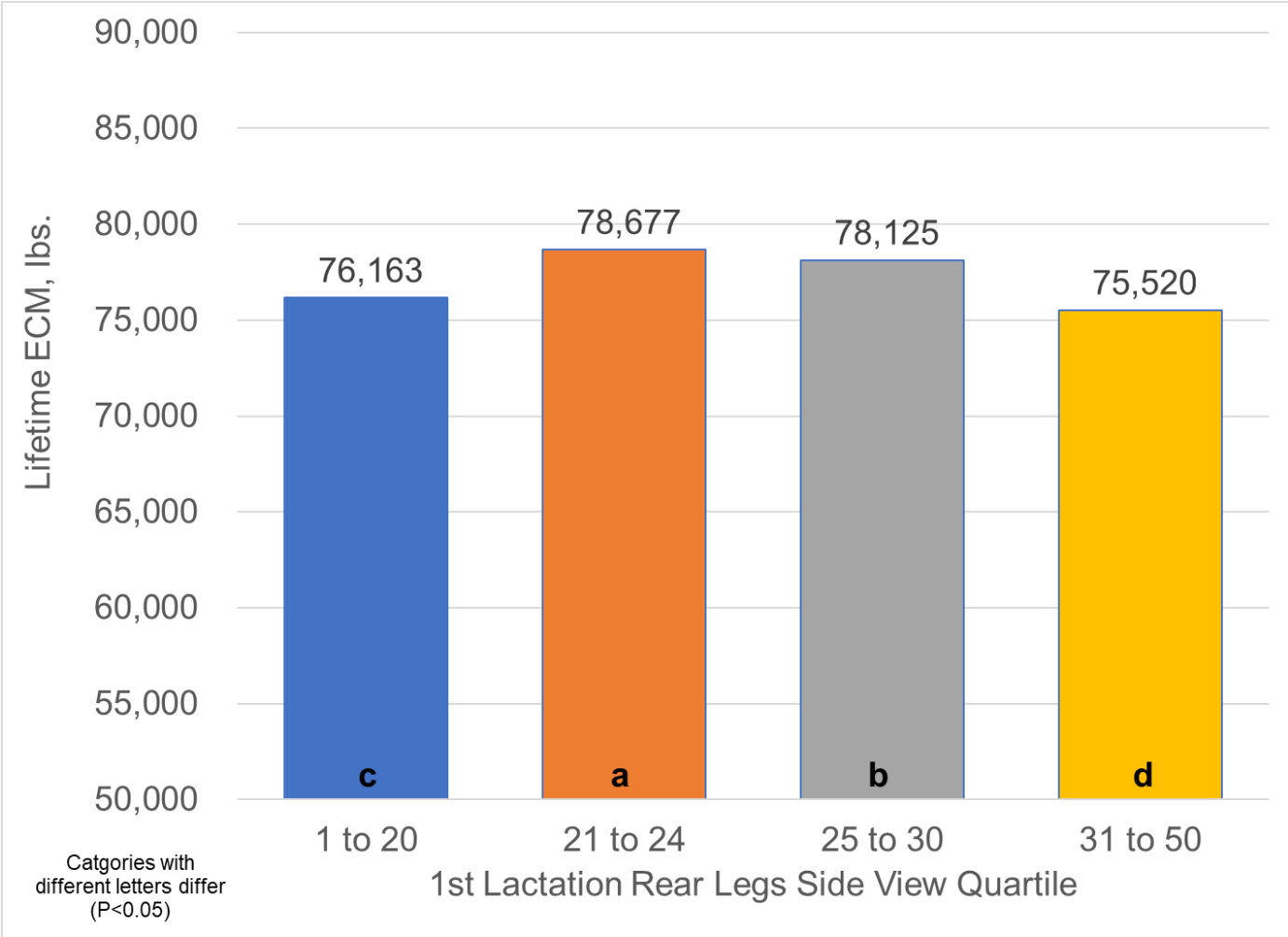
1-5 pts.
Posty and straight



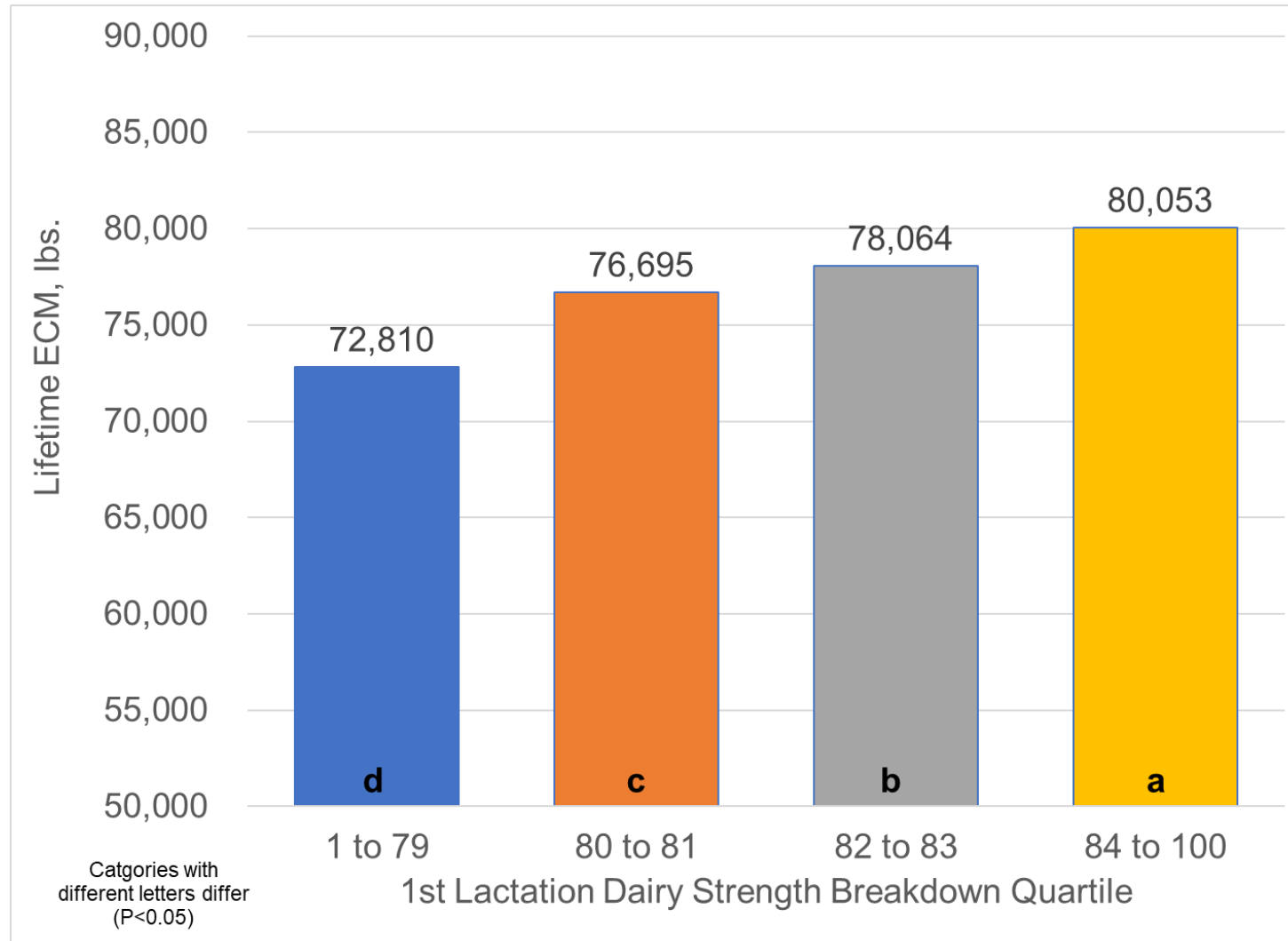
25 pts.
Intermediate set in hock



45-50 pts.
Extremely sickled



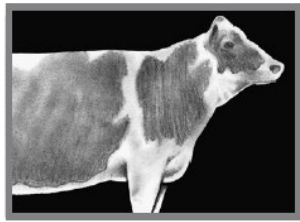
Lifetime Energy Corrected Milk by 1st Lactation Dairy Strength Breakdown Quartile



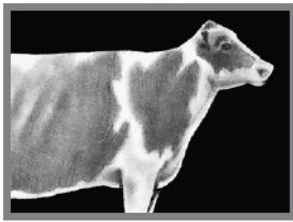
Lifetime Energy Corrected Milk by 1st Lactation Dairy Form Quartile

DAIRY FORM - DF

Primary Trait



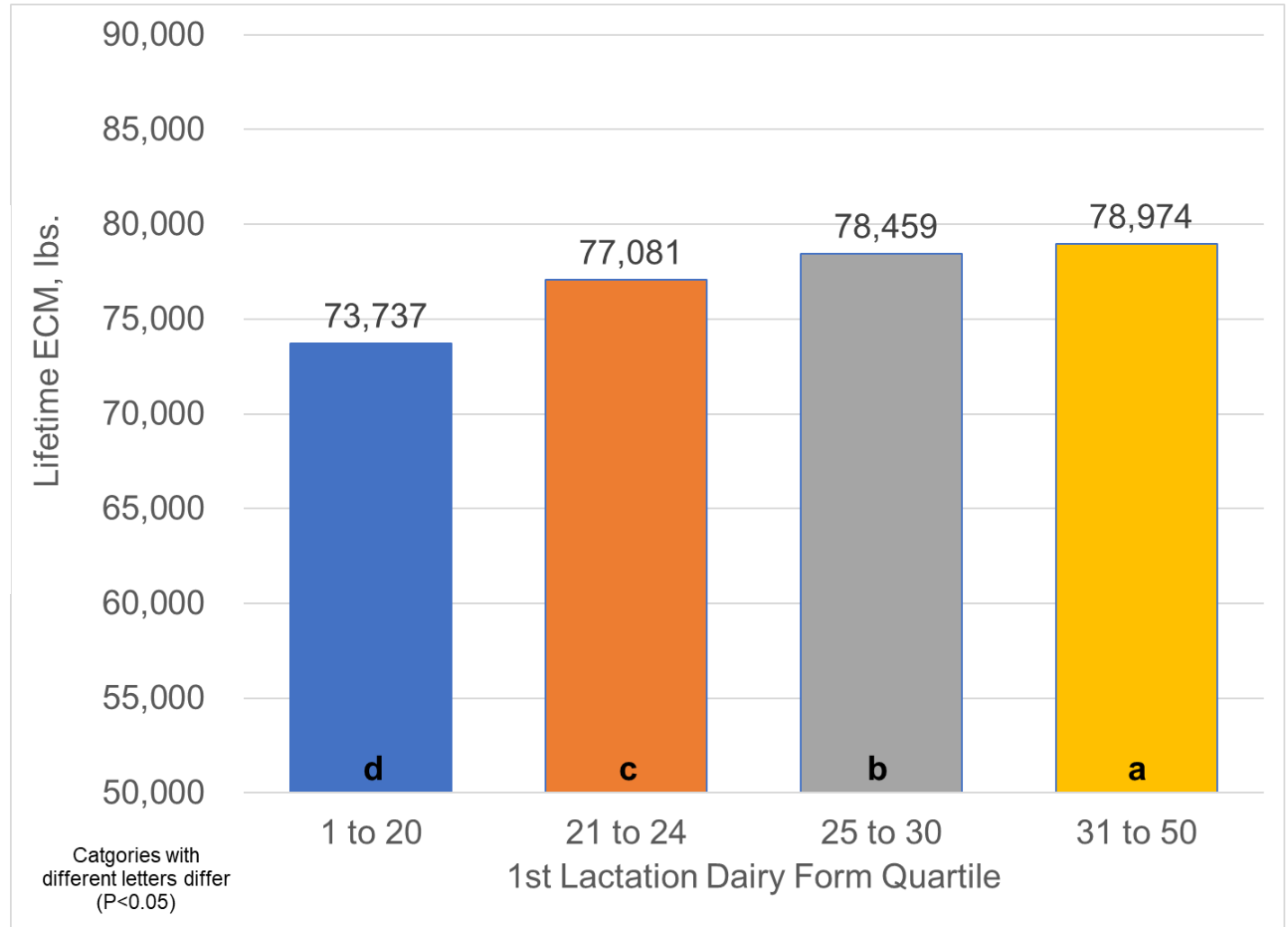
1-5 pts.
Extremely tight



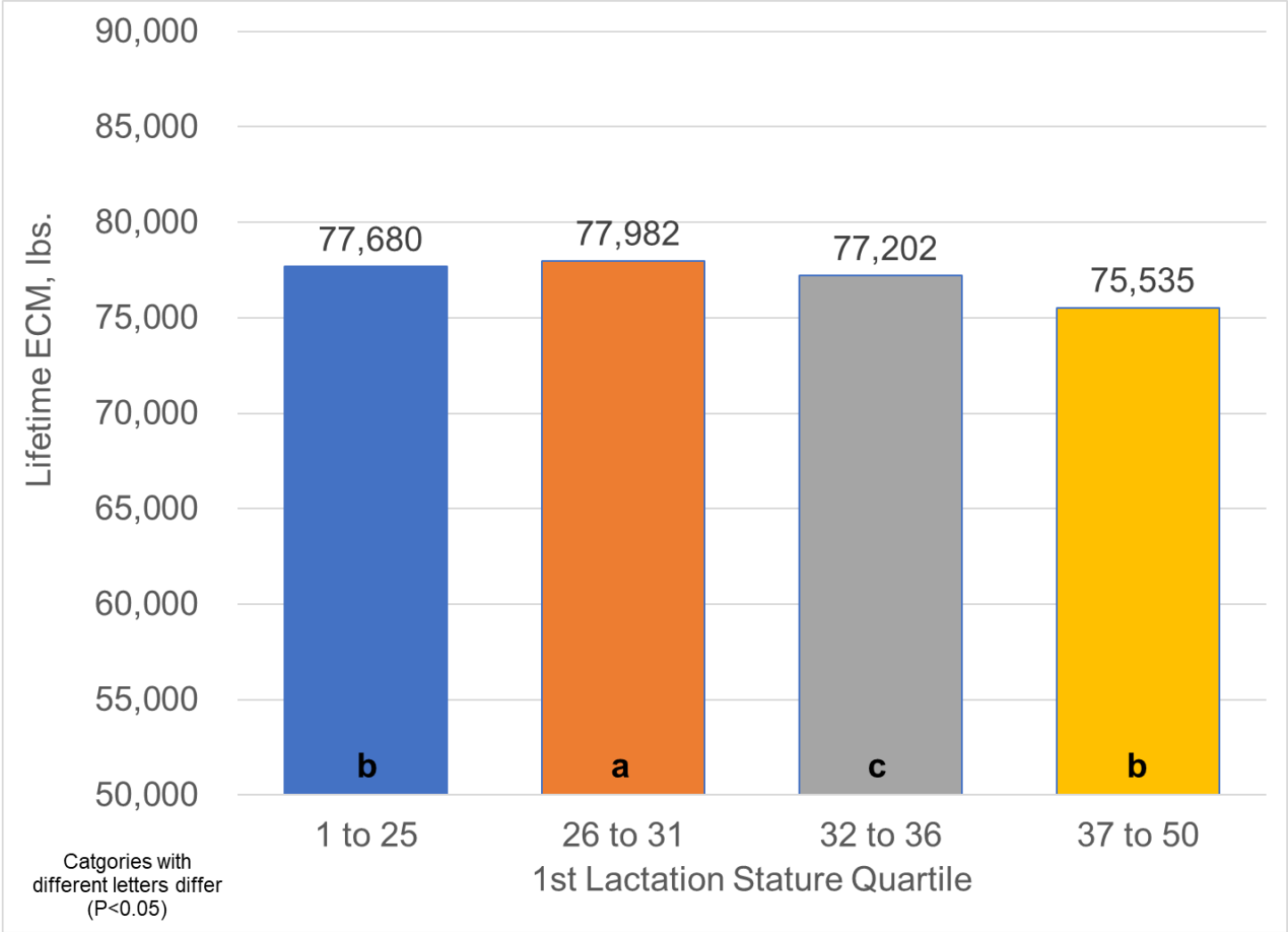
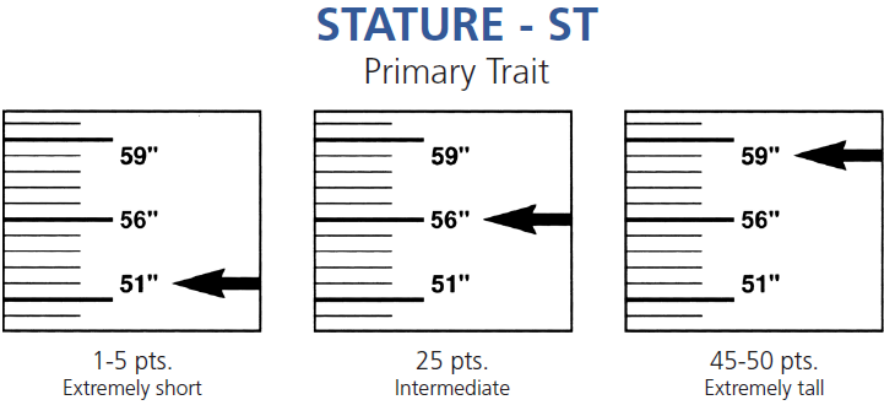
25 pts.
Intermediate



45-50 pts.
Extremely open

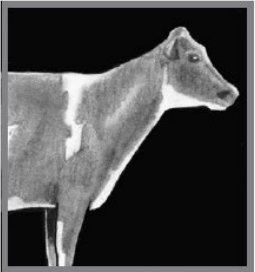


Lifetime Energy Corrected Milk by 1st Lactation Stature Quartile



Lifetime Energy Corrected Milk by 1st Lactation Strength Quartile

STRENGTH - SR Primary Trait



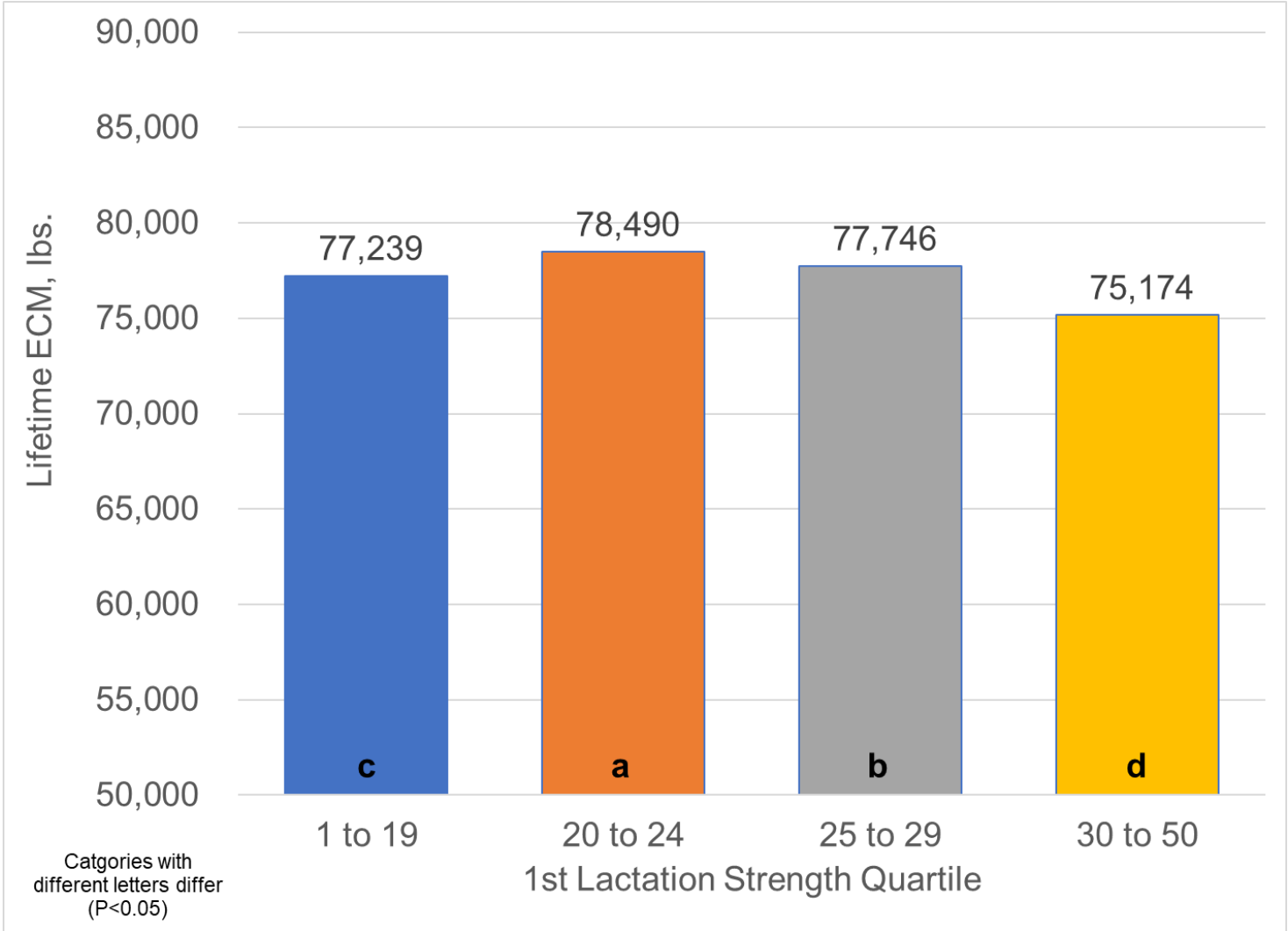
1-5 pts.
Extremely narrow and frail



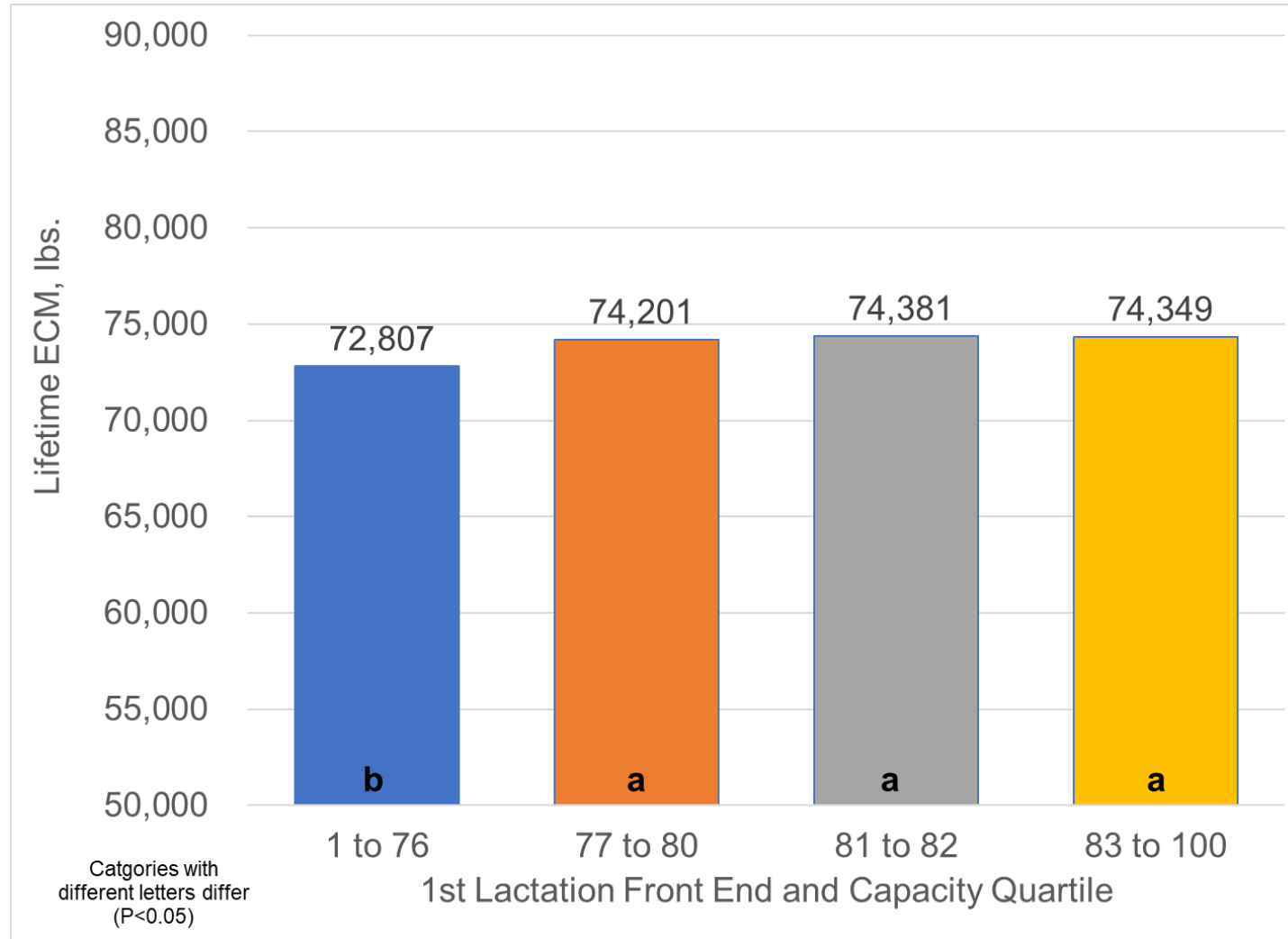
25 pts.
Intermediate



45-50 pts.
Extremely strong & wide



Lifetime Energy Corrected Milk by 1st Lactation Front End and Capacity Breakdown Quartile



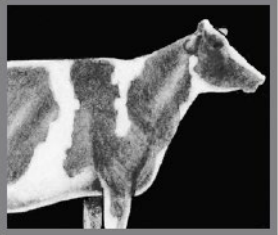
Lifetime Energy Corrected Milk by 1st Lactation Body Depth Quartile

BODY DEPTH - BD

Primary Trait



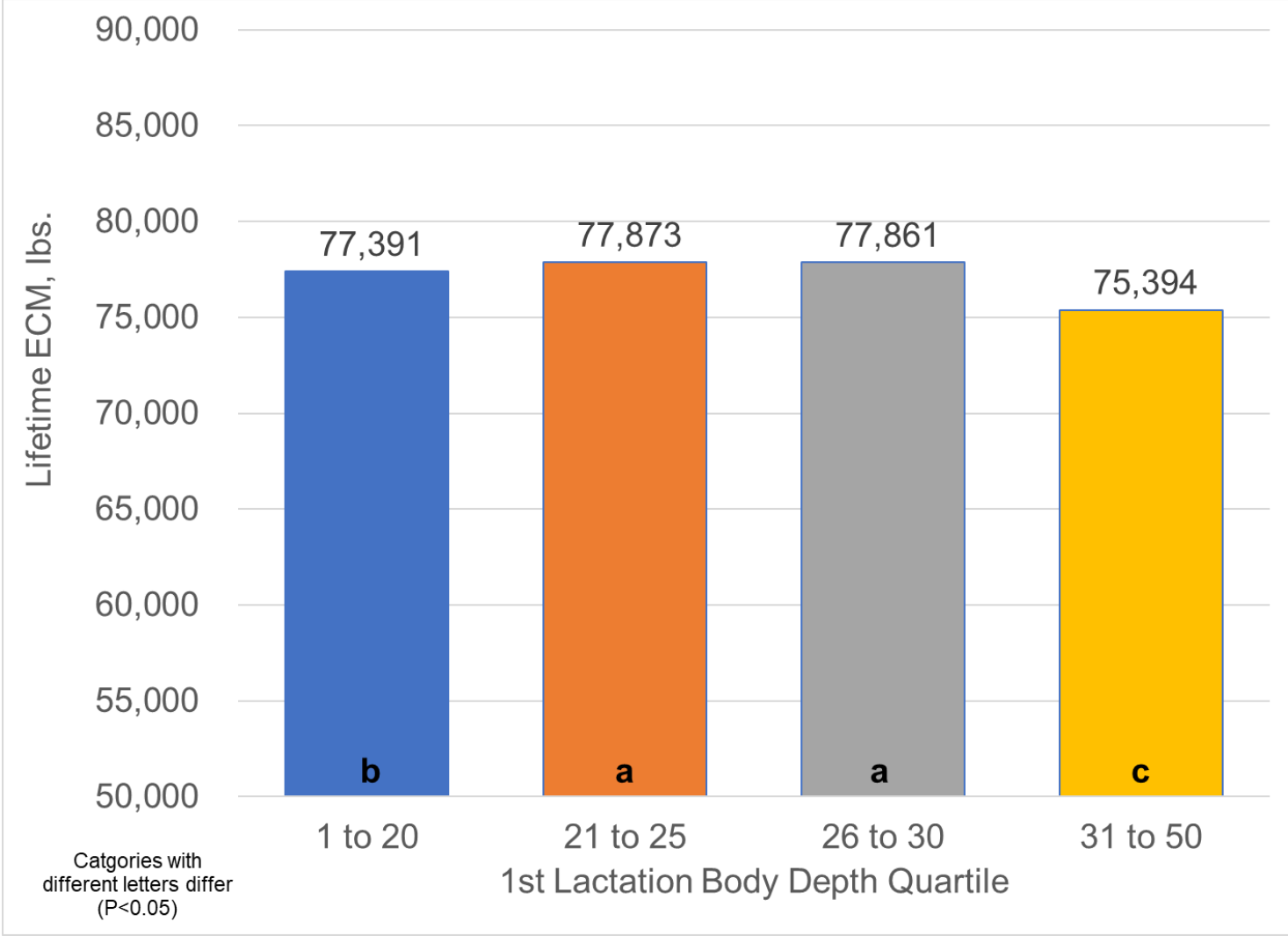
1-5 pts.
Extremely shallow body



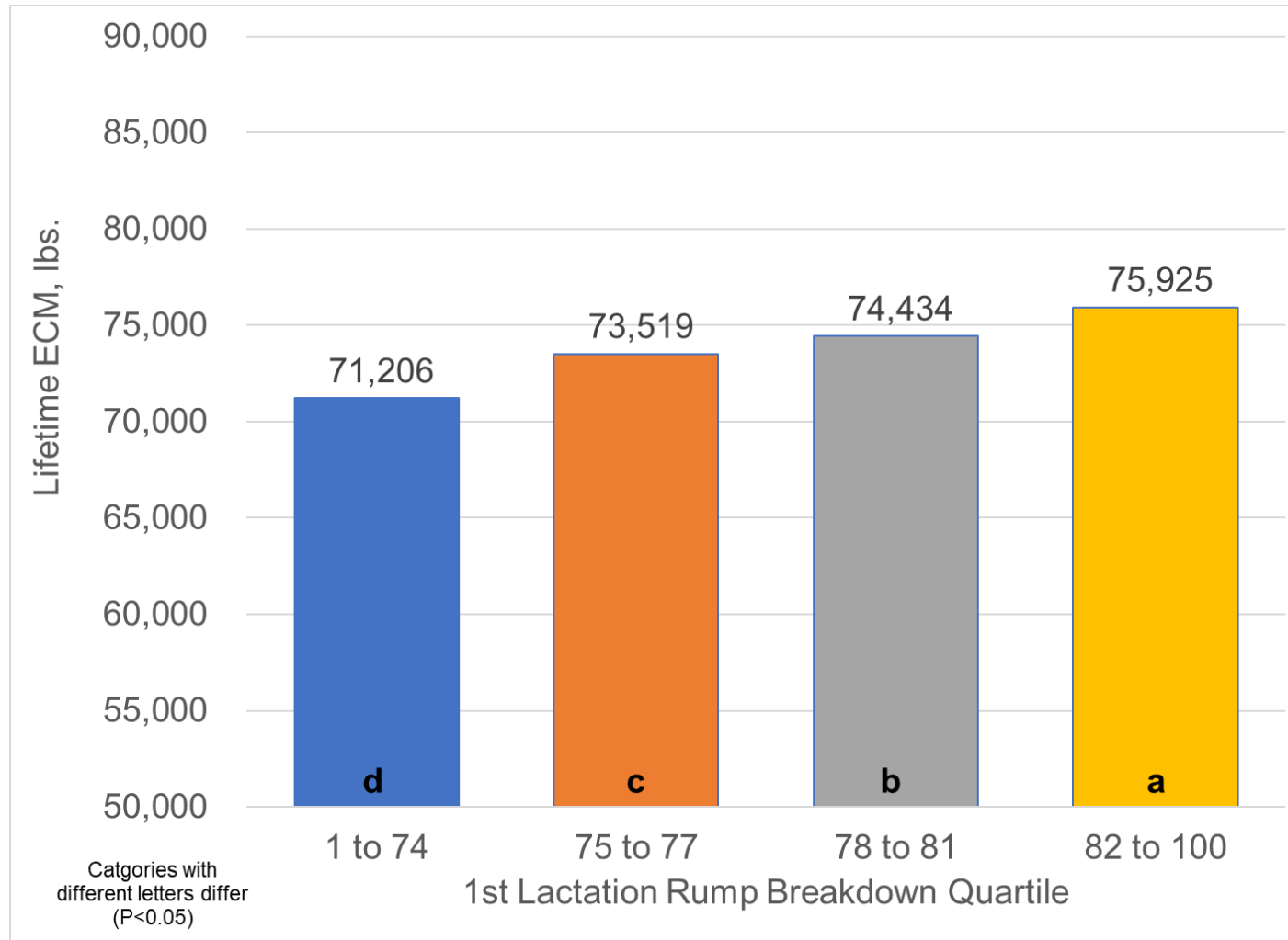
25 pts.
Intermediate



45-50 pts.
Extremely deep body



Lifetime Energy Corrected Milk by 1st Lactation Rump Breakdown Quartile



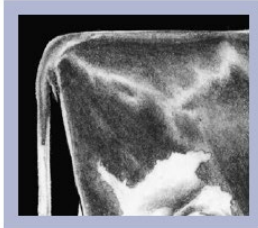
Lifetime Energy Corrected Milk by 1st Lactation Rump Angle Quartile

RUMP ANGLE - RA

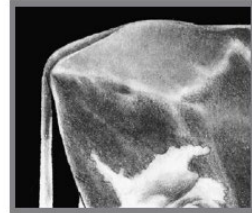
Primary Trait



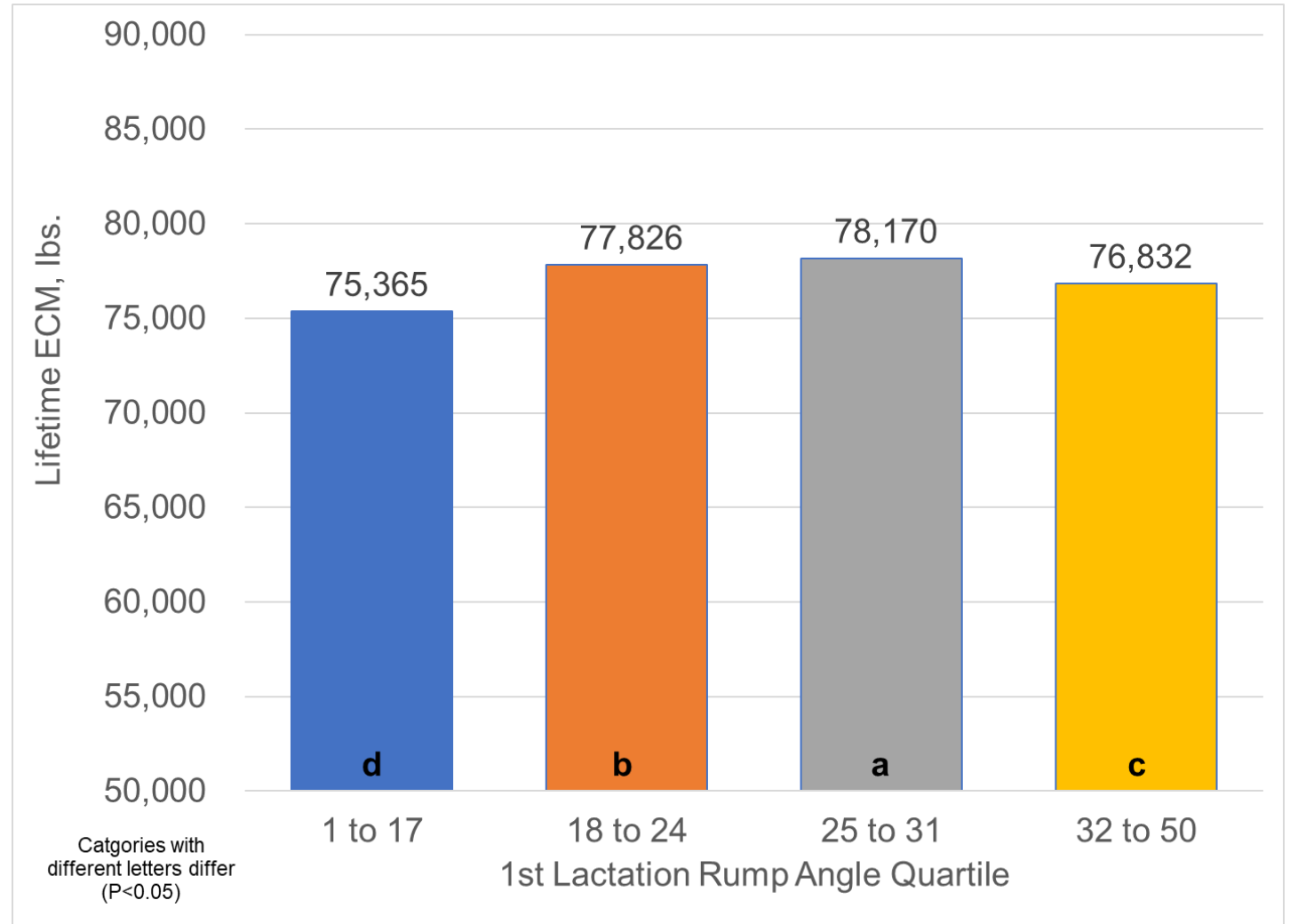
1-5 pts.
Pins clearly higher than hooks



25 pts.
Slight slope from hooks to pins



45-50 pts.
Extremely sloped from hooks to pins



Lifetime Energy Corrected Milk by 1st Lactation Thurl Width Quartile

RUMP WIDTH - RW

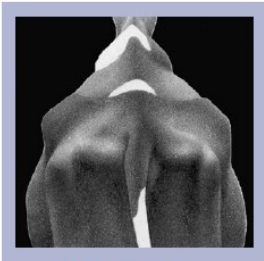
Primary Trait



1 pt. = 2"
Extremely narrow



25 pts. = 4-1/2"
Intermediate width



50 pts. = 7"
Extremely open

