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NEWS RELEASE
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Predictors of age at puberty and conception in beef heifer genotypes

Morphological and physiological measures that possibly predict age at puberty and conception in replacement beef heifers are studied in a new article in Applied Animal Science

Champaign, IL, January 31, 2022—The success and sustainability of a beef herd result from a combination of many factors. One primary factor is the timing of puberty in relation to the breeding season. Replacement heifers that reach puberty before the start of their first breading season are more likely to conceive and, therefore, have increased lifetime productivity. Predicting age at puberty and conception was studied by a team of researchers from University College Dublin and Teagasc in Ireland, and their findings from analyzing data from 309 heifers are reported in a new article in *Applied Animal Science*.

"Puberty onset is controlled by an intricate network of biochemical processes and involves interaction among many key metabolic, neuroendocrine, and reproductive tissues," said lead author Alan Kelly, PhD, College of Health and Agricultural Sciences, University College Dublin, Belfield, Ireland, and Teagasc. The inability to routinely measure the trait of age at puberty on the farm has made progress in this area difficult. "The researchers examined morphological and physiological measurements as possible postweaning predictors of age at puberty and conception," said David K. Beede, PhD, Editor in Chief of *Applied Animal Science*. By looking at numerous possible predictors of puberty, the scientists were able to make some helpful observations.

The traditional management practice for rearing replacement beef heifers to reach puberty before breeding involves developing heifers to reach a target body weight by the time of breeding. So, the researchers investigated the relationships among puberty and live weight, growth, and body composition traits. They found that body weight gain from weaning to breeding did indeed influence age at puberty but not consistently across time and particularly not during the time immediately before breeding. The article also discusses how deciding on a target weight is challenging because there is significant variation in pubertal weight targets. In the study, "the conventional rearing principle of target weight at the onset of breeding was a poor predictor of pubertal age in well-developed beef heifers representative of high-performing commercial farms," said Kelly.
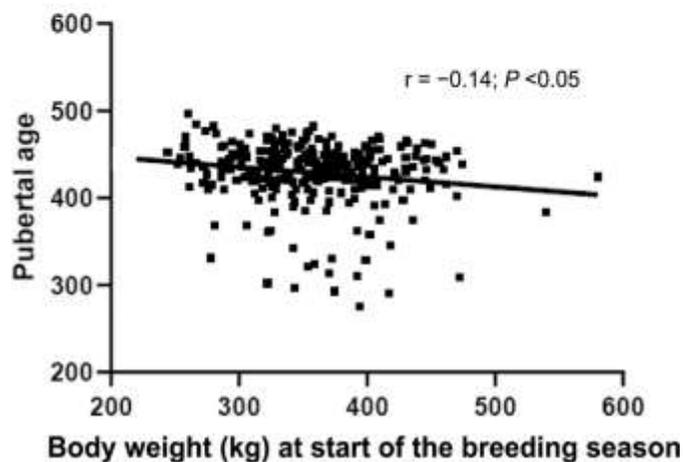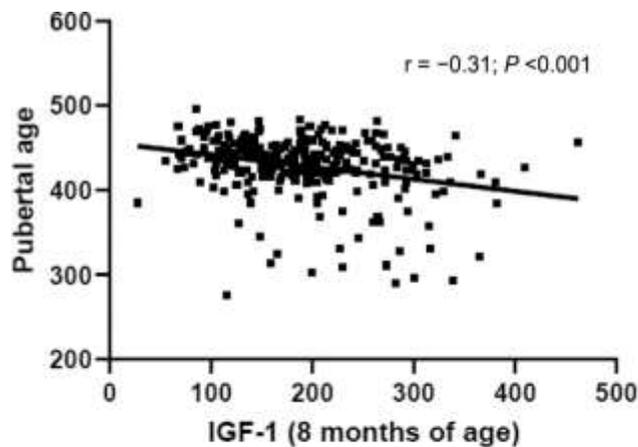
Caption: The associations between pubertal age and (1) postweaning insulin-like growth factor 1 (IGF-1) concentrations (8 months of age) and (2) body weight at start of the breeding season (14 months of age) in replacement beef heifers (Credit: A. K. Kelly).

In addition to morphological measures of weight and composition, puberty and maturation are also influenced by several metabolic hormones and metabolites. The scientist studied concentrations of insulin, glucose, insulin-like growth factor 1, leptin, and adiponectin at various ages. The varying findings are presented in the article, but one hormone stood out. "Insulin-like growth factor 1 status in prepubertal heifers is a useful physiological predictor of puberty and future reproductive success," stated Kelly.

He added, "These data would indicate that the underlying biological mechanisms at play during pubertal development are related to early postweaning metabolic status (insulin-like growth factor 1 and the somatotropic axis) and to body fat accretion rather than body weight *per se.*" This finding will be of assistance as researchers try to fine tune the prediction of age at puberty in replacement beef heifers.

The article appears in the February issue of *Applied Animal Science*.

Notes for editors

"Morphological and physiological measures as predictors of age at puberty and conception in beef heifer genotypes," by A. K. Kelly, D. A. Kenny, M. McGee, and J. Heslin (https://doi.org/10.15232/aas.2021-02205), *Applied Animal Science*, volume 38, issue 1 (February 2022), published by Fass Inc. and Elsevier.

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Full text of the article is also available to credentialed journalists upon request; contact Brittany Morstatter at +1-217-356-3182 ext. 143 or ARPAS@assochq.org to obtain copies. To schedule an interview with the author(s), please contact Alan K. Kelly at alan.kelly@ucd.ie.

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