

RELATIONSHIP BETWEEN HIP AND WITHERS HEIGHT IN SLICK AND WILD TYPE-HAIRED PUERTO RICAN FEMALE HOLSTEIN CALVES

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INTRODUCTION

Body size measurements, including body weight (BW), can help define the optimal skeletal size in dairy heifers. However, monitoring BW in a dairy herd may require considerable effort and, obviously, the availability of a weighing scale in the farm (Pérez et al., 2017). Thus, body dimensions limited by the skeletal structure of the heifer, like hip height (HH) and withers height (WH), may be used as alternative indicators of body development in cattle. In this regard, there are multiple studies in the literature that have evaluated the WH in relation with health, lactation performance, and BW (Ballent et al., 2003; Heinrichs et al., 1992; Hoffman et al., 1996; Markusfeld and Ezra, 1993; Pérez et al., 2017). Nevertheless, to the authors' understanding, there are limited published studies about the relationship between HH and other already proven estimators of BW in cattle such as WH.

The accuracy of estimating BW from other body measurements may vary according to the breed, type, age and animal condition (Heinrichs et al., 1992; Hoffman et al., 1997). Therefore, the commercially available instruments for estimating BW in cattle (e.g., weighing tapes), which were developed on Holstein cows from temperate countries, may not successfully predict BW in Puerto Rican dairy cattle. Moreover, the Holstein breed in Puerto Rico presents two possible hair coat phenotypes, the slick and the wild type (Sánchez, 2019). Slick-haired animals seem to be better adapted to tropical weather, which is important in terms of BW prediction because cattle's growth may be limited under tropical conditions. From this, the curiosity arises to know if HH is associated with WH (which is a reliable predictor of BW in cattle). If so, HH may represent a viable option to predict BW when a weighing scale is not available.

OBJECTIVE

The present study aimed to evaluate the relationship between WH and HH in 10 slick and 9 wild type-haired Puerto Rican female Holstein calves.

MATERIALS AND METHODS

Animals- 10 slick and 9 wild type-haired Puerto Rican female Holstein calves:

- From the Agricultural Experiment Station Dairy herd at Lajas (Puerto Rico)
- Calves' hair coat groups (balanced by sire) were visually selected at birth
- Data (HH and WH) were recorded weekly during the first 8 weeks of age (pre-weaning period) and then monthly, during 10 consecutive months (post-weaning period)
- During the pre-weaning stage, whole milk (6 L/calf/day; 26% CP and 28% fat; DM basis), starter (22% CP and 3% fat; DM basis) and water were provided. Starter (2 kg/heifer/day) and *ad libitum* access to hay and water were provided during the post-weaning period.
- HH and WH measurements were taken by using the Nasco Measuring Stick for dairy cattle (Figure 1)



Figure 1. Technician using the Nasco Measuring Stick to measure hip height.

Statistical Analysis- Data were analyzed by GLIMMIX, CORR and REG CORR procedures of the SAS program.

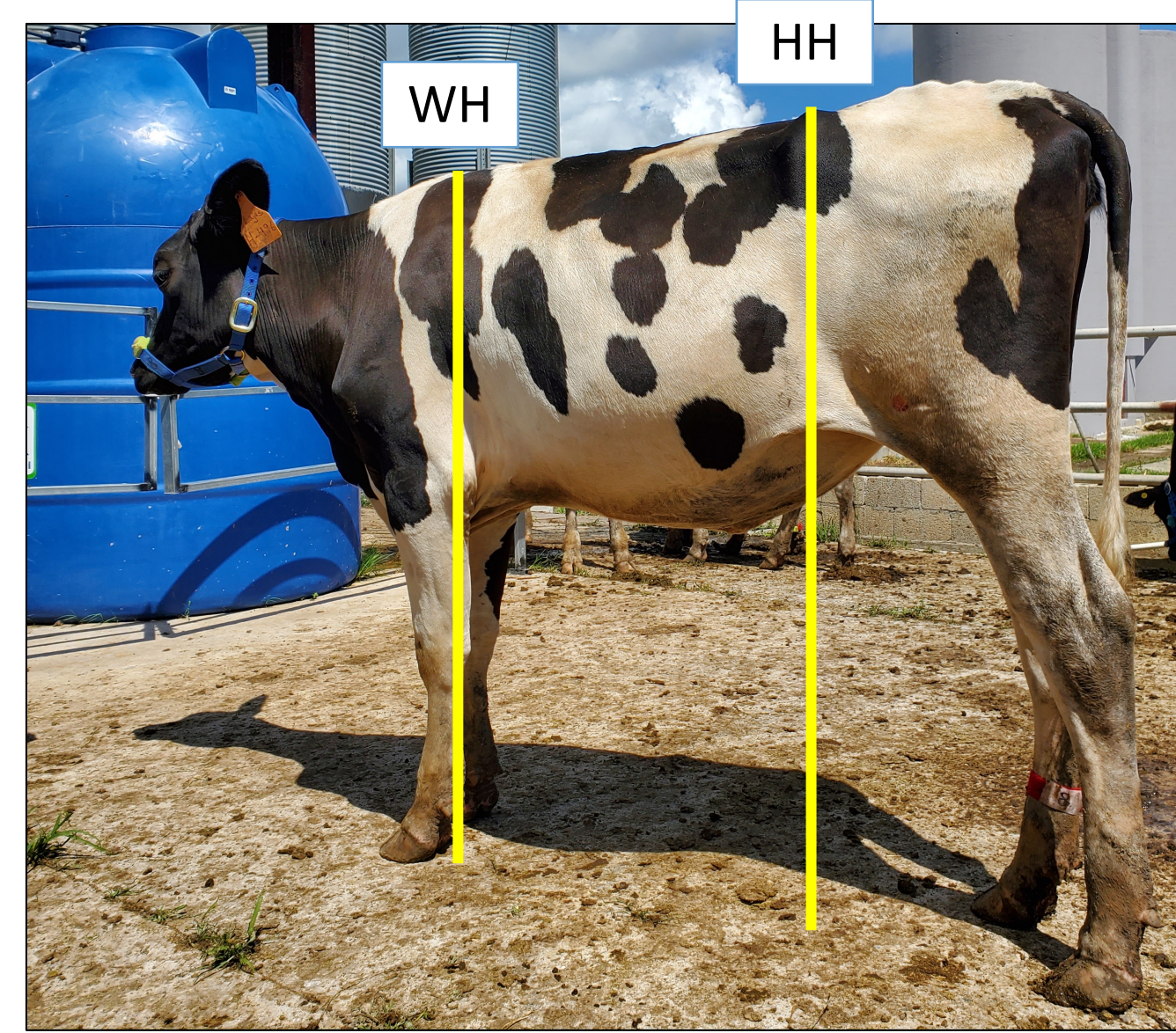


Figure 2. Yellow vertical lines illustrate the anatomical regions where the Measuring Stick was placed to measure withers height (WH) and hip height (HH).

RESULTS

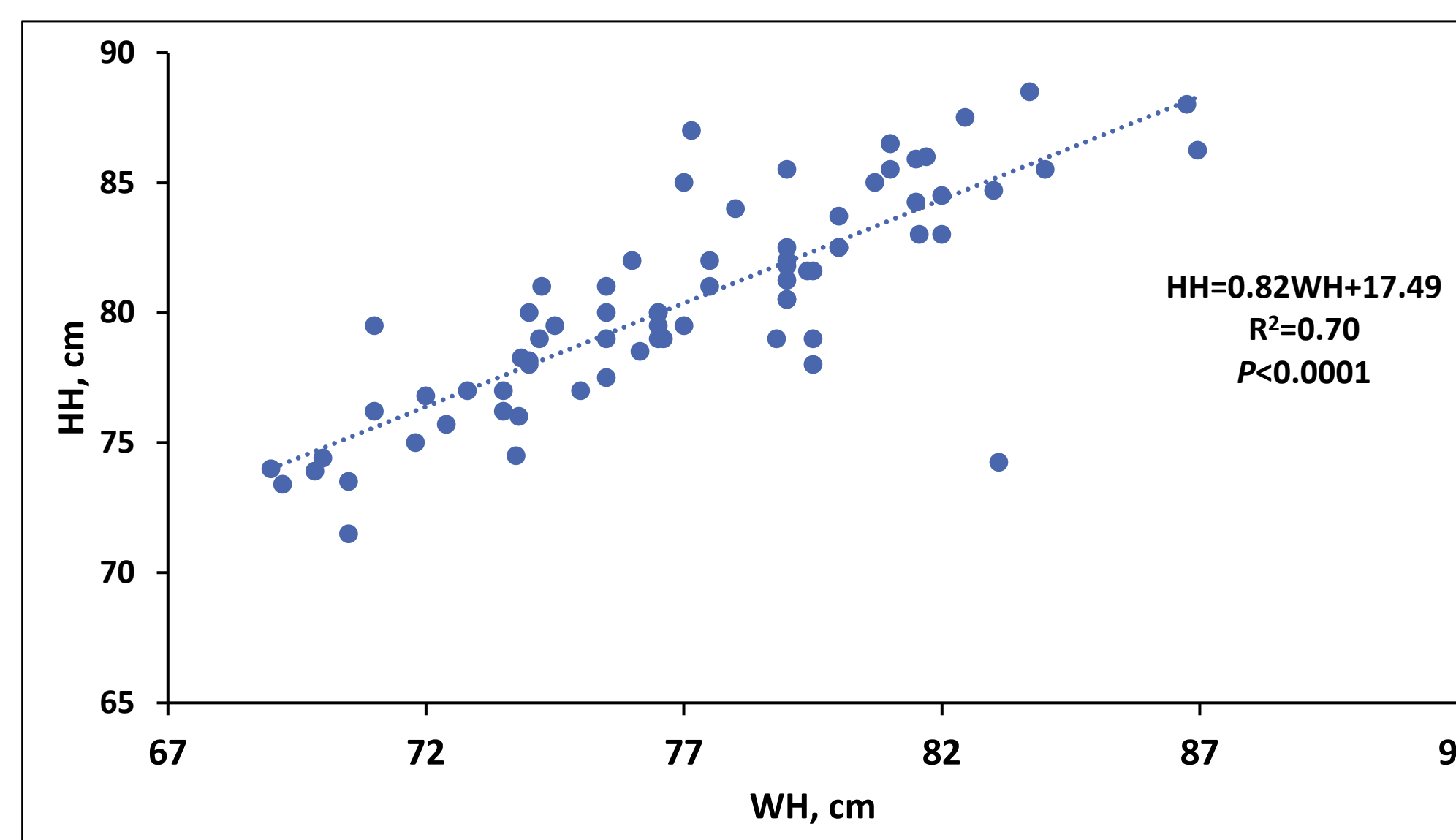


Figure 3. Linear relation between hip height (HH) and withers height (WH) during the pre-weaning period in the slick-haired Holstein calves.

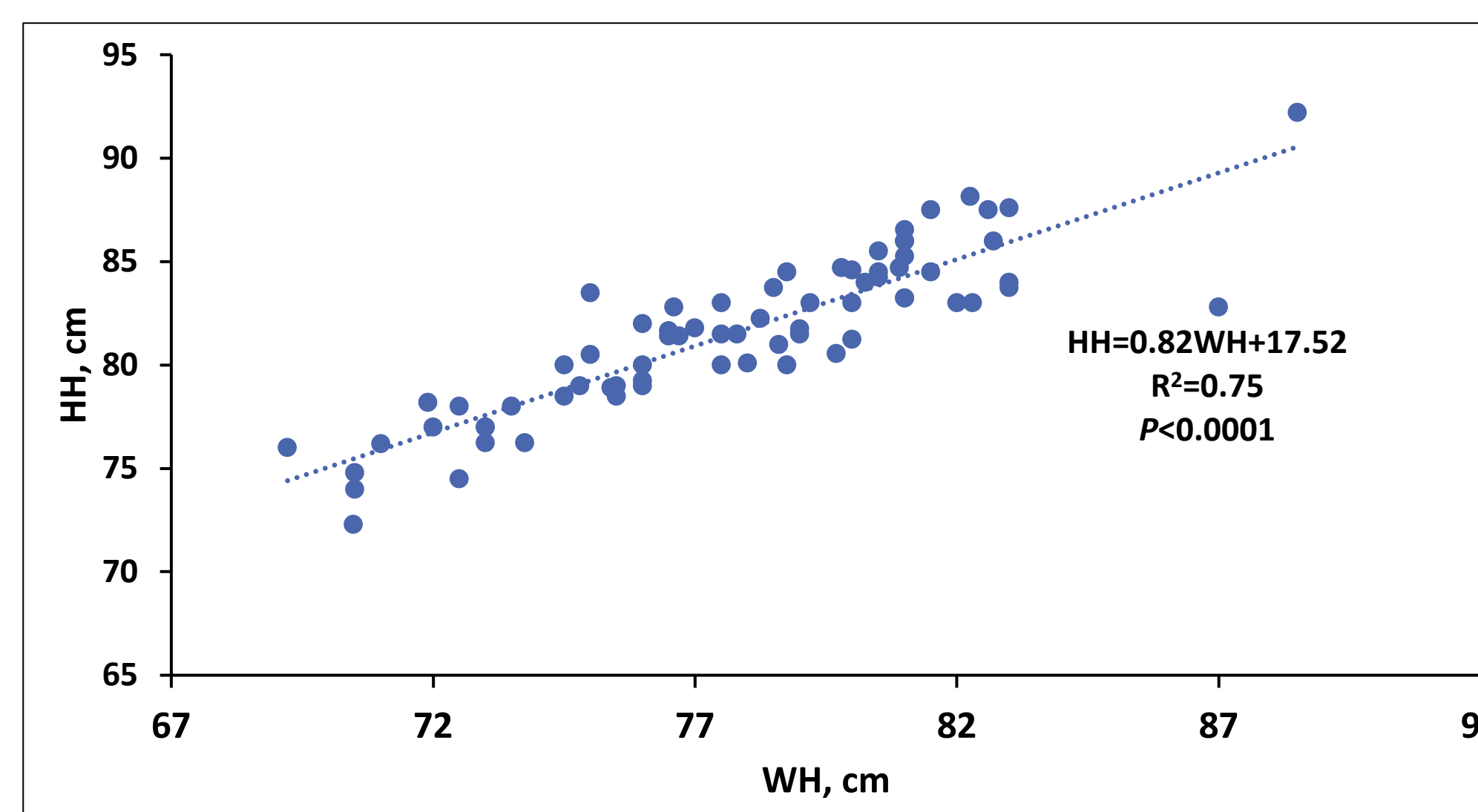


Figure 4. Linear relation between hip height (HH) and withers height (WH) during the pre-weaning period in the wild type-haired Holstein calves.

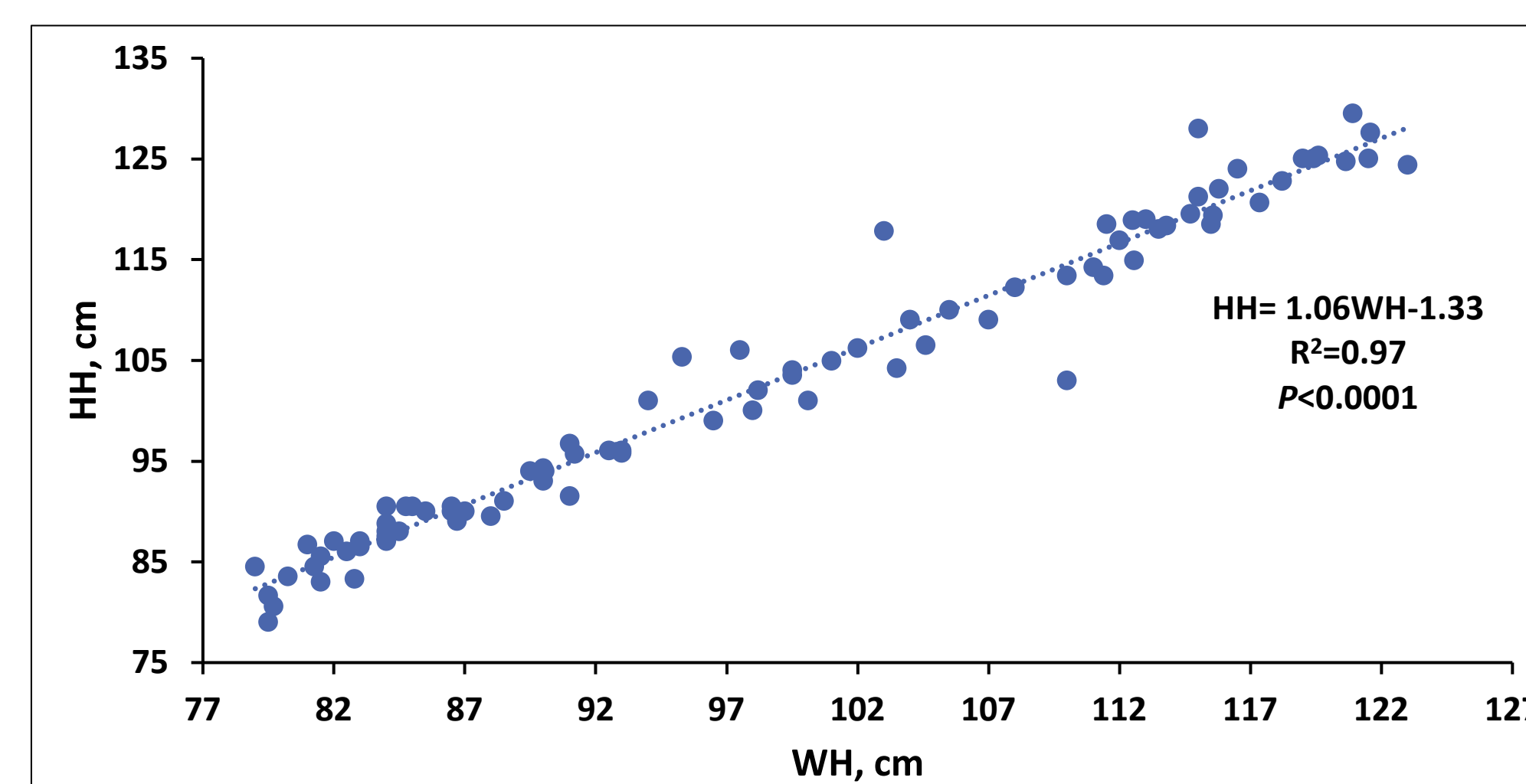


Figure 5. Linear relation between hip height (HH) and withers height (WH) during the post-weaning period in the slick-haired Holstein heifers.

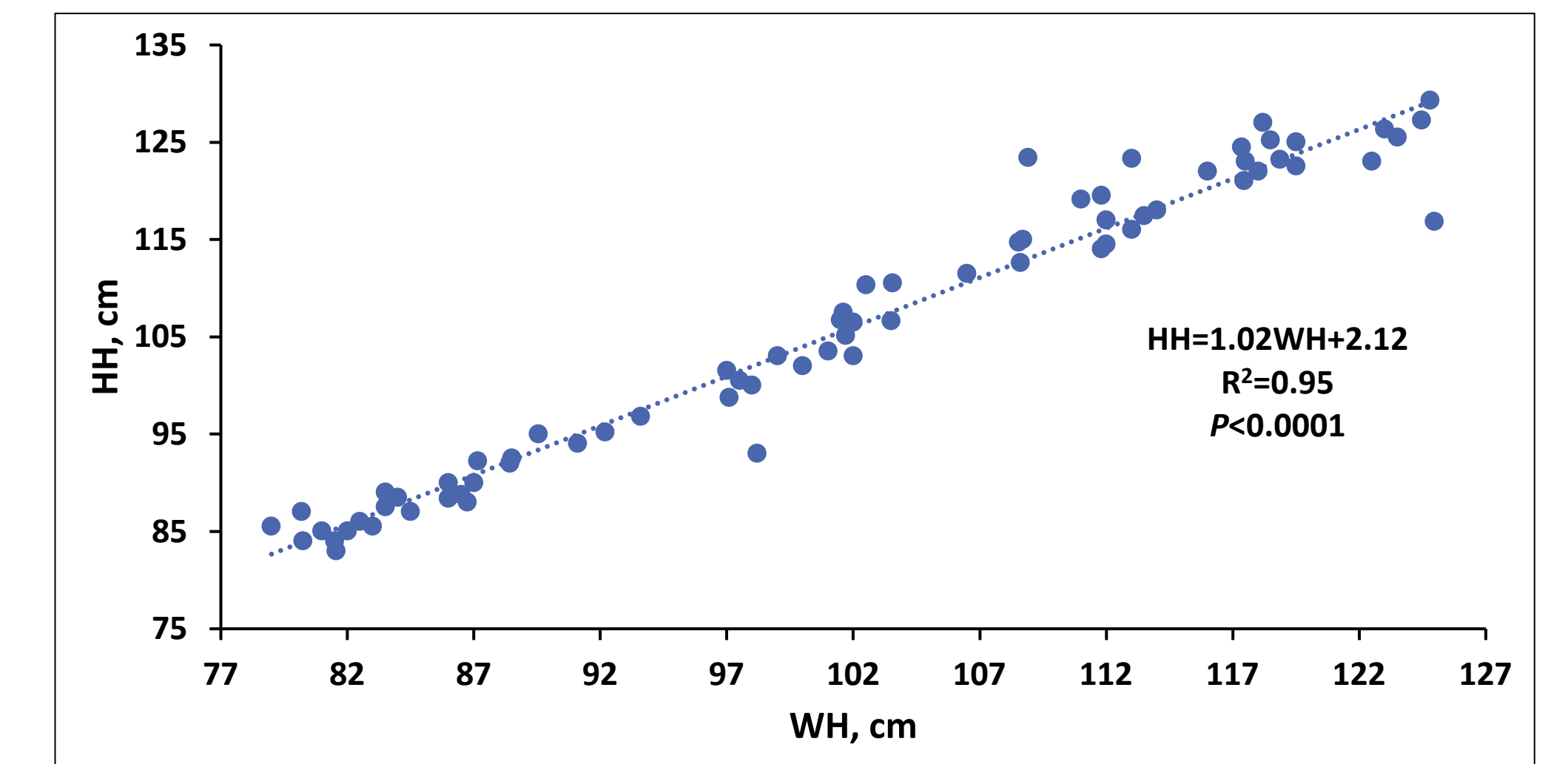


Figure 6. Linear relation between hip height (HH) and withers height (WH) during the post-weaning period in the wild type-haired Holstein heifers.

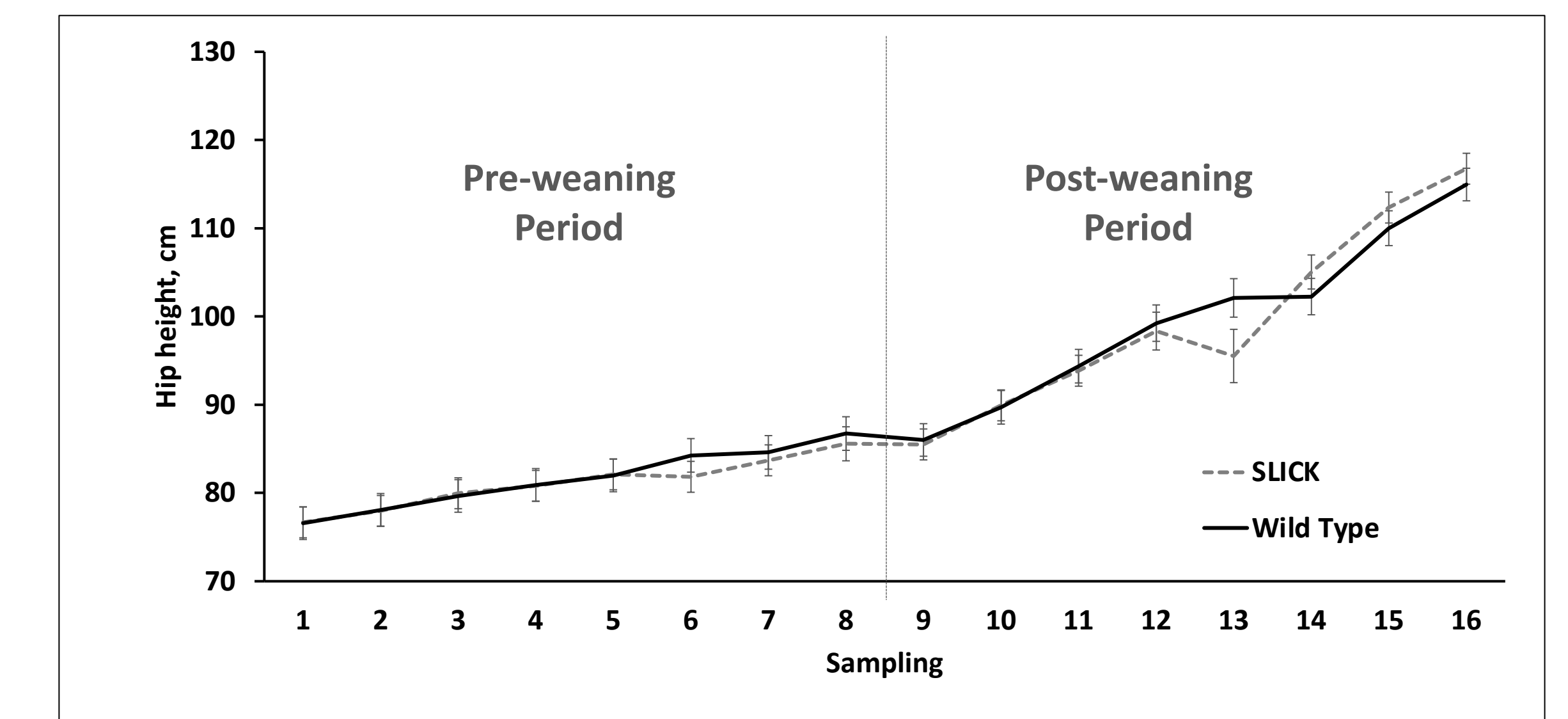


Figure 7. Hip height (HH) trends during samplings in slick and wild type-haired Holstein calves.

CONCLUSION

The HH and WH are highly associated body dimensions. Therefore, hip height may represent a reliable option to estimate body weight in Puerto Rican slick and wild type-haired Holstein calves and heifers when a weighing scale is not available.

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