Why sex alone does not explain the shape variation in mediaeval cattle metapodials from Bern, Switzerland. A multivariate approach.

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The Kramgasse is part of the main axis in Bern. It connects two world-famous landmarks, the Bear Pit and the Clock Tower. In 2004 and 2005 in the course of maintenance work archaeological excavations provided us with thousands of animal bones from the 13 and 14 century. These were mainly remains from domestic animals documenting not only consumption but also small trade (tanners, horn and bone manufacture). We were lucky to retrieve 108 complete metapodials from adult cattle, an opportunity we wanted to catch. Our aim was to focus on body size and sex dimorphism in order to ultimately gain insight into the cultural background of local mediaeval cattle breeding.

Withers heights were calculated based on the greatest length (GL) of 65 metacarpals and 43 metatarsals. Each dot in the graph refers to one metapodial. Typically for those days, cattle tended to be relatively small, ranging from 99 cm to 118 cm (avg = 107.3 cm, std = 3.9 cm) The flattened curve progression does not allow a clear assignment of the metapodials to one specific sex except maybe for the few very short and the very long ones. These are usually assigned to cows and bulls / oxen respectively.

Metacarpals: A cluster analysis using the seven well-established measurements has lead to a three-cluster hypothesis. The graph on the left shows the individual bones on the discriminant dimensions. Main within-groups correlations between discriminating variables and standardized canonical discriminant functions are: Dp (depth of the proximal end, 0.85), Bd (breadth of the distal end, 0.67) and SD (smallest breadth of the diaphysis, 0.65). The photo on the far left shows three typical metacarpals from clusters one to three.

Metatarsals: Main within-groups correlations between discriminating variables and standardized canonical discriminant functions in the four-cluster model in the graph on the left are: GL (greatest length, 0.88), Bd (breadth of the distal end, 0.73), Bp (breadth of the proximal end, 0.55), and Dp (depth of the proximal end, 0.43). The metatarsus on the far right of the photograph is from cluster 4 and does not have a counterpart in the metacarpals.

Conclusion: Mediaeval Bern was too large a town to be self-sufficient in cattle meat. Cattle had therefore to be driven from the rural hinterland to Bern’s slaughterhouses. Main regions of cattle breeding were the villages and pastures in the alpine foothills. In the light of our results, we assume either that breeders from other regions (Swiss Midlands?) with different strains of cattle were involved in supplying Bern, or that various strains existed in said alpine and sub-alpine regions. On all accounts, we may state that diverse phenotypes of cattle existed in the 13 / 14 century. They were rather small and showed little sexual dimorphism. To what extent this was a result of different rearing conditions or intentional breeding must be left open for the moment.