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The morphometric variation of three Sulawesi ungulates

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The morphometric variation found in Babirusa (*Babyrousa* spp.), Sulawesi warty pig (*Sus celebensis*) and anoa (*Bubalus* spp.), the endemic ungulates of the island of Sulawesi and the neighbouring Buru, Sula and Togian islands, Indonesia, has been incompletely described. Therefore, studies were undertaken on cranial specimens of all three animal types. Skulls from wild animals were collected from the forest, or sourced in private and institutional museums throughout the world. Comparable studies on skulls from animals raised in zoological collections were also carried out. Two and three-dimensional indices were prepared for linear discriminant and principal component statistical analyses. Different levels of morphometric diversity were found between wild populations, and between wild and captive populations; there was significant population structure according to geographical location. Linear discriminant analyses permitted Babirusa skulls of unknown origin to be allocated to particular geographical regions of Sulawesi. These morphometric data, together with the integrated genetic studies of the same material, will be valuable both for understanding the history of distribution of these taxa as well as guiding the management of breeding programs and the further development of Conservation Action Plans.