

## Skull-changes due to captivity in certain Equidae

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A well-known study by HOLLISTER (1917) describes changes in the skull and skin of lions consequent upon captivity, and concludes that captive specimens — certainly of lions, and by inference of other mammals also — are therefore worthless for taxonomic study.

The present author, in studying the skulls of certain Equidae (the “species”, or more correctly Superspecies, *Equus hemionus* and *Equus africanus*, both known as Wild Asses), has measured sufficient skulls of captive specimens of these forms to make it worthwhile placing on record the differences between wild and captive skulls found here. In an earlier paper (GROVES, 1963) it was found that Zoo specimens of the Indian Wild Ass differed statistically from wild-killed ones; it was suggested that the disturbance of the normal processes of tooth-wear was the ultimate cause, and the dental condition in a typical captive specimen was recorded.

For this study, captive specimens' skulls were grouped as follows:

*Equus hemionus onager* (Persian wild ass): male 3, female 2.

*Equus hemionus khur* (Indian wild ass): male 3, female 1.

*Equus africanus africanus* (Nubian wild ass): male 5, female 3.

However, not all these could be used, because no females of *onager*, wildshot, were available to compare with the captive ones; and although there were three good wild skulls of *khur* female, one captive skull is insufficient basis for comparison. In the case of male *onager*, one wild-shot skull only was measured by this author, but measurements of two others are supplied by GOODWIN (1939).

The teeth of most of the captive specimens showed more or less advanced degeneration. The molars show abnormal wear, flattening of the occlusal surfaces, and unusually large growth, pushing the upper and lower jaws apart in front, so that the incisors no longer meet. In the worst cases (Fig. 1) periodontoclasia has taken place, and teeth have been lost because of the destruction of their sockets.

In the above-mentioned list, only two specimens fail to show these tooth-changes. These are both Nubian wild ass males: Berlin Museum No. 15716 (from Gizeh Zoo)

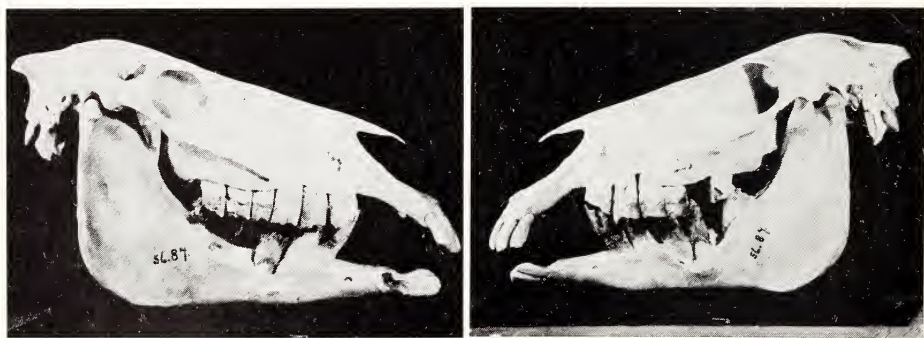


Fig. 1 a und b. A skull affected by captivity. BM 56.87, female *Equus hemionus khur* (Indian Wild Ass), from Regents Park Zoo. From both sides. (Photo: U. WELSCH)

Table 1

Mean skull measurements in series of wild and captive Equid skulls

	Total length	Basal length	Diastema breadth	Facial breadth	Anterior face breadth	Palatal breadth
<i>Equus hemionus onager</i> , ♂						
Wild	491	(427)	(42)	—	—	(52)
Captive	473	422	40	—	(113)	51
<i>Equus hemionus khur</i> , ♂						
Wild	505	445	49	106	147	49
Captive	491	438	46	101	139	49
<i>Equus africanus</i> <i>africanus</i> , ♂						
Wild etc.	516	453	47	106	147	55
Captive	488	430	43	95	133	53
<i>Equus africanus</i> <i>africanus</i> , ♀						
Wild	ca. 505	442	42	110	153	49
Captive	479	425	40	105	137	53

Figures in brackets indicate that the figure is based on one specimen only.

Table 2

Percentage size of captive specimens, compared to wild ones

	Total length	Basal length	Diastema breadth	Facial breadth	Anterior face breadth	Palatal breadth
<i>Equus hemionus onager</i> , ♂	96.3	—	—	—	—	—
<i>Equus hemionus khur</i> , ♂	97.2	98.4	92.8	95.3	94.6	100.0
<i>Equus africanus</i> <i>africanus</i> , ♂	94.6	94.9	91.5	89.6	90.5	96.4
<i>Equus africanus</i> <i>africanus</i> , ♀	ca. 94.8	96.2	97.7	95.5	89.5	108.2
Mean values	95.7	96.5	94.0	93.5	91.5	101.5

## Catalogue of specimens

	Wild	Captive
<i>E. h. onager</i> ♂	Stockholm Mus. 801 (measured in Munich) 2 in GOODWIN (1939)	Vienna, N. H. Mus. 7795. Paris, Mus. d'H. N. 1893.509. Tring Mus. (no number).
<i>E. h. khur</i> ♂	BM 40.358 BM 46.591 BM 46.592	BM 1957.7.18.1 BM 46.1.10.5 Paris, Mus. d'H. N., A. 549.
<i>E. a. africanus</i> ♂	BM 4.6.12.1 Tring Mus. G. 1380 (Rome, Mus. Civ. Zool., 6488) (Berlin, Zool. Mus., 15716)	Vienna, N. H. Mus. 5568 Munich, Zool. Staats. 1963.133 Munich, Zool. Staats. 1963.134
<i>E. a. africanus</i> ♀	BM 35.5.7.1 POWELL-COTTON, S. II. 54 MICHAEL MASON's collection	Munich, Zool. Staats. 1952.9 Leiden, Zool. Mus., 750 Berlin, Zool. Mus., ZG. 20.VI.10

and Rome Museum No. 6488 (from Rome Zoo). Unfortunately the histories of these two animals are unknown, so it is not certain whether the perfect state of their teeth is due to a relatively short period of captivity, or to a better environment. The latter possibility is perfectly feasible if, as is likely, they were "put out to grass" in the dry climates of Egypt and Central Italy respectively, giving their cheekteeth the proper degree of abrasion. Moreover, the measurements of these two skulls agree perfectly with those of the two wild-shot male *africanus*, and not at all with those of the other three captive ones; they have accordingly been united with the wild specimens in the table.

With this exception, therefore, the tables may be studied as they stand. It will be seen that in five of the measurements, the captive skulls are smaller than the respective wild ones. In the sixth measurement, Palatal breadth, the wild and captive series are approximately equal. It will also be seen that the breadth measurements are relatively smaller than the length measurements, particularly the Anterior Face breadth (the distance between the front angles of the Crista facialis). Other measurements taken were less consistent.

These data can only be presented as they are; no explanation can be offered beyond the simple observation of the state of the teeth; nor, in the absence of a series of young specimens, can statements be made about the relation of these facts to growth processes. Likewise, since the Zoo specimens cannot be said to constitute a population, being of different origins and having spent varying amounts of time in an unsuitable environment, it would be meaningless to work out standard deviations. It can be pointed out only that the results are consistent for four groups of Equids, with the admittedly small number of 3–4 specimens in each.

### Summary

Comparison of the skulls of wild and captive Wild Asses shows that the captive ones are regularly smaller in size, although the Palate breadth is the same in both. Tooth damage is held to be responsible, especially since two skulls from zoos apparently able to provide the correct food are of normal size.

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