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EL TORO!
EL VACO?

BOĞA MI!
İNEK Mİ?

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Keywords: Figurine, 'Fertile Crescent', bovid, aurochs, cattle
Anahtar sözcükler: Heykelcik, 'Bereketli Hilal', sığırgiller, yabani sığır, sığır

Yabani ve evcilleştirilmiş hayvanlar olarak betimlenen, sığırgillere ait iki tür kilden heykelcik Ön Asya Neolitik'inden yaygın olarak bilinmektedir. Yabani sığır kemiklerinde izlediğimiz gibi iri/yabani sığır türü, tüm 'Bereketli Hilal' bölgesinden bilinmektedir, oysa daha küçük/evcilleşmiş türler genellikle, evcil sığır kemiklerinde görüldüğü gibi, 'Bereketli Hilal'in daha batı bölgelerinde ortaya çıkmaktadır. Bütün bu veriler sığırgillerin evcilleşmesinin nerede ve ne zaman başladığını açıklamaktadır.

Introduction

While collecting and charting Neolithic materials from the Fertile Crescent region, O. Aurenche and S. K. Kozlowski (in press) noticed that clay figurines of bovids represent morphologically different animals, dividing generally into massive, humped individuals (Fig. 1) and those with a straight and horizontal back line (Fig. 2). Both bovid forms were contemporaneous (Middle/Late PPNB and later times) but their territorial range differed markedly: the former occurred throughout the Fertile crescent while the latter were confined mostly to the Western Wing of the Fertile crescent, the upper valleys of the Euphrates and Tigris Rivers, and Jezirah (Figs. 3 and 4).

Assuming that the figurines accurately reflected an actual morphological differentiation of Middle Eastern bovids, we came up with two possible explanations of this phenomenon. Namely, we believe this could either be a case of sexual dimorphism or we could be seeing differences between wild and domesticated animals. The latter hypothesis would be easier to correlate with the aforementioned differences in territorial range.

Since it was advisable to test both our hypothesis with non-archaeological methods, we invited archaeozoologist A. Lasota-Moskalewska of Warsaw University to work with us on the problem. We present her expert opinion, followed by our own archaeological comments.

Morphological Features of Aurochs and Domesticated cattle

The *Bos primigenius* species comes in two forms: the wild (that is aurochs) and the domes-

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ticated (domestic cattle). Each form displays its own characteristic features and is identifiable in figural representations. The features of domestic cattle are those of present-day animals, while in the case of aurochs only its horns were described based on fossil finds. The aurochs now being extinct, its body shape is being described relying on iconography and written sources, confronting the emerging picture with skeletal dimensions. Iconographic and written sources are plentiful, dating back to times from the Upper Palaeolithic to the Late Middle Ages. The following description of the appearance of the aurochs includes features which have been repeatedly appearing in sources from various periods and which agree with reconstructed skeletons.

The following features are being listed as identifying the aurochs (Fig. 5)

1. Viewed laterally, the body (minus the neck but with the legs) may be inscribed into a roughly square shape;
2. Legs are long.
3. The body trunk is rather short.
4. The fore part of the body is more developed and rising higher that the hind part, resulting in a downward sloping back line.
5. The animal has a prominent withers.
6. Horns are thick and large, curving outwards and forwards from the head, forming a lyre shape.

In contrast, domestic cattle have the following identifying features (Fig. 6)

1. Viewed laterally, the body (minus the neck but with the legs) may be inscribed in a roughly rectangular shape.
2. Legs are moderately long, decreasing in length the more the animals have been bred as beef or dairy cattle.
3. The body trunk is elongated, with its length increasing as breeding progressed.
4. The front and rear parts of the body are equally developed, causing the back line to be straight and horizontal.
5. There is no prominent withers.
6. Horns are thin and rather short, curving away from the head in a variety of directions. Some regional forms of domestic cattle (as for example in Africa) have long horns, but the lyre-shaped arrangement is extremely rare. There are also hornless cattle forms.

Features such as shorter legs, more elongated body and smaller horns are typical for domestication and are also found in other species. They are seen as a result of selections carried out by breeders or the result of different modes of life of domesticated animals.

The pronounced withers and more robust development of the front part of the aurochs body is a bit of a mystery. Anatomy specialists of the early years of the 20th century seeking to unravel it noted that the bones of the forelimbs of the aurochs and domestic cattle differ more than bones of the hind legs (Bogolubski 1968). This would indicate a change of body proportions in domestic cattle, brought about by a shortening of the fore legs. One index often considered by morphologists is height at the rump expressed as a percentage of the height at the withers. In aurochs this figure is 90% (calculated from reconstructed skeletons), compared to 100-103% in domestic cattle (calculated in the same manner).

In addition to longer forelimbs, the aurochs also featured a more powerful development of the body at the withers. Scholars describing the animal's morphology believed that the latter feature was due to the enormous weight of its head. In the 1930's Duerst calculated that a male aurochs head with horns weighed around 50 kilograms. The forward-curving horns were an additional burden on the spine and head-supporting muscles. The head is kept in position by the nuchal ligament, a muscle attached to the occipital bone and spinous processes on the cervical and thoracic vertebrae. With the head being so heavy, this muscle must have been robust, possibly giving the impression of a "humped" back.

Differences in iconographic representations may also be due to sexual dimorphism, having to do with morphological differences between male and female individuals of the given species.

Male and female aurochs differ from one another much more than male and female domestic cattle do. The aurochs females are visibly shorter and smaller than the males, and also have smaller horns. However, the overall female shape is diminished proportionally, and is not qualitatively different from the male form. In domestic cattle both males and females are equally tall, with the male body trunk being shorter. Males have thicker horns which are not arched but more or less conical instead. In iconographic representations it is impossible to tell apart the male and female individuals of both aurochs and domestic cattle unless external sexual attributes have been depicted, which happened fairly often.

Analysis of Figurines from the Middle East

Identifications were carried out based on drawings or photographs of lateral views of the figurines. Twenty-one determinable figurines were selected from a rather large collection of bovid-like forms, all having outlines of horn bases and the entire head and trunk preserved. Sadly, even the selected figurines displayed a severely limited range of diagnostic features, all of them being incomplete (damaged) and most lacking legs, tails and horns. Publication authors who added horns to their depictions, extrapolating from the survived figurine fragments, could recreate neither the shape nor the length of the horns. Also used for identification purposes were a further four figurines which strongly resembled cattle despite damage to their heads and trunks.

In attempting to distinguish between the wild and domesticated bovid forms we considered only some of the identifying features listed above, namely body shape, back line, withers region outline and differences in withers and rump heights. Our analysis had to rely on the assumption that the Neolithic makers of the figurines accurately rendered the principal morphological features and proportions of the animals. We adopted this assumption and went about our analyses accordingly.

To add precision to our criteria, we added metric characteristics to descriptive features. We measured the following (Fig. 7), (a) body length, (b) withers height in trunk, and (c) rump height in trunk, and using the obtained figures calculated the following two indices (Table 1):

I - index of body length = (withers height ÷ body length) x 100;
II - index of front-to-rear proportion (rump height ÷ withers height) x 100.

We also compiled metrical data for reference animals - aurochs and domestic cattle (Table 2). The data for aurochs came from the so called Augsburg Aurochs oil painting (Fig. 5), executed in Poland in the 16th century. After dropping out of sight for some time, the painting was discovered in an antiques shop in Augsburg, and hence its name. It is the world's best and most credible image of an aurochs. The data for domestic cattle were gathered from illustrations in Sambraus (1998) describing present-day cattle breeds (Fig. 6). We measured specimens of the black-and-white breed originating from Holland and northern Germany, the gray Tyrolian cattle, the white steppe cattle from Hungary and Jersey cattle, calculating also the body shape indices for them all (Table 2).

Basing on the variability ranges of the two considered indices, we plotted a correlation field, with index II plotted on the X axis, and index I plotted on the Y axis. Each figurine was represented by a point in the field (see Table 1 for explanation of numbers), described with two coordinates and labeled with the number assigned to the figurine in question (Fig. 8). Also plotted in the field were points representing the

Augsburg Aurochs (a) and the present-day domestic cattle breeds (b, c, d and e).

We obtained the following points distribution. A concentration of 12 points with very similar values of both indices appeared in the central area of the top part of the field. All the figurines represented by these points have a relatively short trunk (index I ranging from 65 to 80) and the fore part of the body stood clearly higher than the hind part (index II of 65-83). These figurines also had downward sloping back lines and distinct protrusions at the withers. Given that the point representing the Augsburg Aurochs was also in this concentration, there can be no doubt that these figurines all represent aurochs.

The 13 points outside the just mentioned concentration represent figurines with more widely ranging proportions. The animals they depict had relatively longer trunks (index I = 48-62) and much more varied differences between the fore and hind heights (index II anywhere between 62 and 110). The bovids ranged from those with a high fore part of the body, through those with equal fore and hind heights, to individuals with higher rumps. Two of the figurines had exceptionally long trunks, equal withers and rump heights, a horizontal back line and no pronounced withers. The points representing them in the correlation field fell in the area taken up by all the points representing present-day cattle. We can thus be certain that these two figurines represent domesticated cattle specimens being not only the result of long-lasting domestication but also of selection aimed at obtaining animals for beef and milk.

Another distinct group of finds comprises ten figurines with rump heights lower than withers heights and trunks longer than in aurochs. Three of these animals had downward sloping back lines and pronounced withers, with the remaining seven having horizontal or almost horizontal backs and no protruding withers. The latter can be identified as domesticated cattle in early stages of domestication, with the domestication characteristics including longer trunk and horizontal back line. The former three figurines represent mixtures of aurochs and cattle features, with aurochs features being more visible. The animals represented here could have been transition forms which stand out in osteological materials with their "patchwork" mixture of various morphological features of the skeleton (Lasota-Moskalewska A., 1994; Lasota - Moskalewska A., N. Kobry., 1989).

The only figurine to remain outside the mentioned points concentrations in the correlation field (No. 12) displays mostly aurochs features: rather short trunk, very high front part of the body, sloping back and prominent withers. It differs from the aurochs described above in having a slightly longer trunk, and could have been either an aurochs or a transition form not far removed from the aurochs.

Our analysis thus shows that the most numerous category among the 25 figurines of *Bos primigenius* specimens were wild forms (12 + 1 aurochs), followed by a small group of transition forms (three specimens) and a group of domesticated forms (nine specimens). Most of the latter forms represent early stages of domestication (seven cases), with just two figurines depicting cattle at a very advanced stage of domestication.

The aurochs figurines were recovered from Ain Ghazal, Çayönü, Abdul Hossein, Aswad and possibly Ghoraife. Figurines of the transition forms were discovered in Kashkashok, Çayönü and Chaga Sefid, which could have been sites where aurochs were being domesticated on a local scale. Figurines of cattle in the early stages of domestication were present in Jericho - PPNB, Ganj Dareh, Çayönü, Gritille and Ramad, while those of cattle in advanced stages of domestication come from Ain Ghazal and Kashkashok.

Our analysis also shows that wild and newly domesticated bovid forms can be reliably distin-

guished basing on relative trunk length expressed as a ratio of withers height to trunk length. The withers height is reduced to the level of rump height only after an extended domestication process.

Remarks on Geographic Distribution

In view of the above archeozoological analysis, we can confidently assume that the figurines with prominent withers represent aurochs while those with horizontal back lines are in all likelihood representations of domestic cattle. The best preserved and most characteristic specimens examined by the archaeozoologist also prompt us to believe that the more poorly preserved figurines and those displaying only primary and no secondary morphological features (body proportions) may likewise be suitably classified. Accordingly, we performed a classification of this kind, thereby augmenting the previous cartographic findings. The new data did not alter the originally obtained picture, there being just minor discrepancies between it and the archeaozoologist's propositions.

We then plotted the bone finds from the period in question on two maps, finding that:

- The range of Neolithic aurochs bone finds (Fig. 9) coincided well with the range of its figural representations (Fig. 1), extending throughout the Fertile Crescent (albeit with some exceptions). The earliest sites (PPNA-EPPNB) date to earlier periods than the aurochs figurines, while some of the younger sites (such as Jarmo) failed to yield figural representations of the aurochs although the animal was part of the local fauna and figural representations were sometimes quite plentiful. On the other hand the archaeozoologist mentions figurines of transitional bovid forms from Jericho, Ganj Dareh and Chaga Sefid where domestic cattle (and in Ganj Dareh even bovids in general) is not in evidence in the recovered bone material.

- The range of occurrence of domestic cattle in the Neolithic (Fig. 10) also coincides roughly with the range of figurative representations (Fig. 2). No undisputed bones or representations of domestic cattle were discovered in the east (Zagros and Mesopotamian Plain).

Conclusion

Our findings have consequences for some interpretations of the relevant phenomena.

First, we can say that the presence of domestic cattle has been "documented" figurally, which means that the first animal breeders started executing "portraits" of their first cows almost from the day these appeared.

Second, both the territorial distribution of Neolithic figurines of domestic cattle and of bones of these animals in the Neolithic indicate the region where early domestication took place. It appears that starting from the MPPNB period domestication was practiced in Jezirah (Halula 19, Abu Hureira 2A? and Nemrik IV). A second wave of domestic cattle apparently made its appearance in the central and southern Levant (Ramad III and South Levantine-PPNC respectively). The two figurines of transitional bovid forms from Jericho could perhaps push the latter period a bit further back, but the site failed to yield any bones of domestic cattle. Mesopotamia and Zagros are way behind in the cattle domestication process: "transitional" figurines make their appearance there only in the Late PPNB/PB period. However, the presence of domestic cattle there is not documented by faunal remains.

Third, our findings cast doubts on Jacques Cauvin's theory about the Middle Eastern "religion of the aurochs and the woman". The morphological and territorial dualism revealed by our study seems to corrupt the "purity" of the French author's theory : therefore ideal "married couple" of EL TORO and THE LADY is suddenly confronted with some EL VACO.... A threesome now seems to emerge...

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No	Site	a	b	c	Ind. I	Ind. II	Back	Withers	Recognition
1	Ain Ghazal	15	11	9	73	83	Oblique	Present	Aurochs
2	Ain Ghazal	18	14	10	78	71	Oblique	Present	Aurochs
3	Ain Ghazal	16	12	9	75	75	Oblique	Present	Aurochs
4	Ain Ghazal	20	15	12	75	80	Oblique	Present	Aurochs
5	Ain Ghazal	17	12	10	71	83	Oblique	Present	Aurochs
6	Ain Ghazal	20	13	10	65	77	Oblique	Present	Aurochs
7	Ain Ghazal	20	16	13	80	81	Oblique	Present	Aurochs
8	Ain Ghazal	60	42	32	70	76	Oblique	Present	Aurochs
9	Çayönü	45	32	21	71	66	Oblique	Present	Aurochs
10	Ramad	44	35	28	80	80	Oblique	Present	Aurochs
11	Abdul Hossein	35	25	20	71	80	Oblique	Present	Aurochs
12	Ghoraife	22	13	8	59	62	Oblique	Present	Aurochs ?
13	Aswad*	21	16	14	76	88	Oblique	Present	Aurochs
14	Çayönü	34	20	16	59	80	Oblique	Present	Aur/Cattle
15	Kashkashok	43	25	20	60	77	Oblique	Present	Aur/Cattle
16	Chaga Sefid	38	20	16	53	80	Oblique	Present	Aur/Cattle
17	Ain Ghazal**	41	20	20	49	100	Horizontal	Absent	Cattle
18	Ramad	32	20	18	62	90	Horizontal	Absent	Cattle
19	Ramad*	22	13	11	59	85	Horizontal	Absent	Cattle
20	Jericho	26	16	14	62	88	Horizontal	Absent	Cattle
21	Ganj Dareh	55	33	28	60	85	Horizontal	Absent	Cattle
22	Kashkashok**	45	23	25	51	109	Horizontal	Absent	Cattle
23	Gritille	45	25	20	56	80	Horizontal	Absent	Cattle
24	Aswad*	24	14	12	58	86	Horizontal	Absent	Cattle
25	Aswad*	21	13	11	62	85	Horizontal	Absent	Cattle

Remarks: - a, b and c mesurements in milimeters, made of published figures in different scale numbers cf. Figures 1,2, and 8.

*Table 1: Figurines of aurochs and cattle: metrical and descriptive data. Abbreviations: *=greatly damaged; xx=advanced domestication (cf. Fig. 8)*

No	Type	a	b	c	Ind. I	Ind .II	Back	Withers
a.	Augsburg aurochs	47	34	24	72	70	Oblique	Present
b.	Black-white cattle	55	28	28	51	100	Horizontal	Absent
c.	Jersey cattle	61	30	30	49	100	Horizontal	Absent
d.	Hungarian cattle	52	26	26	50	100	Horizontal	Absent
e.	Tyrol cattle	60	27	27	45	100	Horizontal	Absent

Table 2: Comparative measurements (cf. Fig. 8)

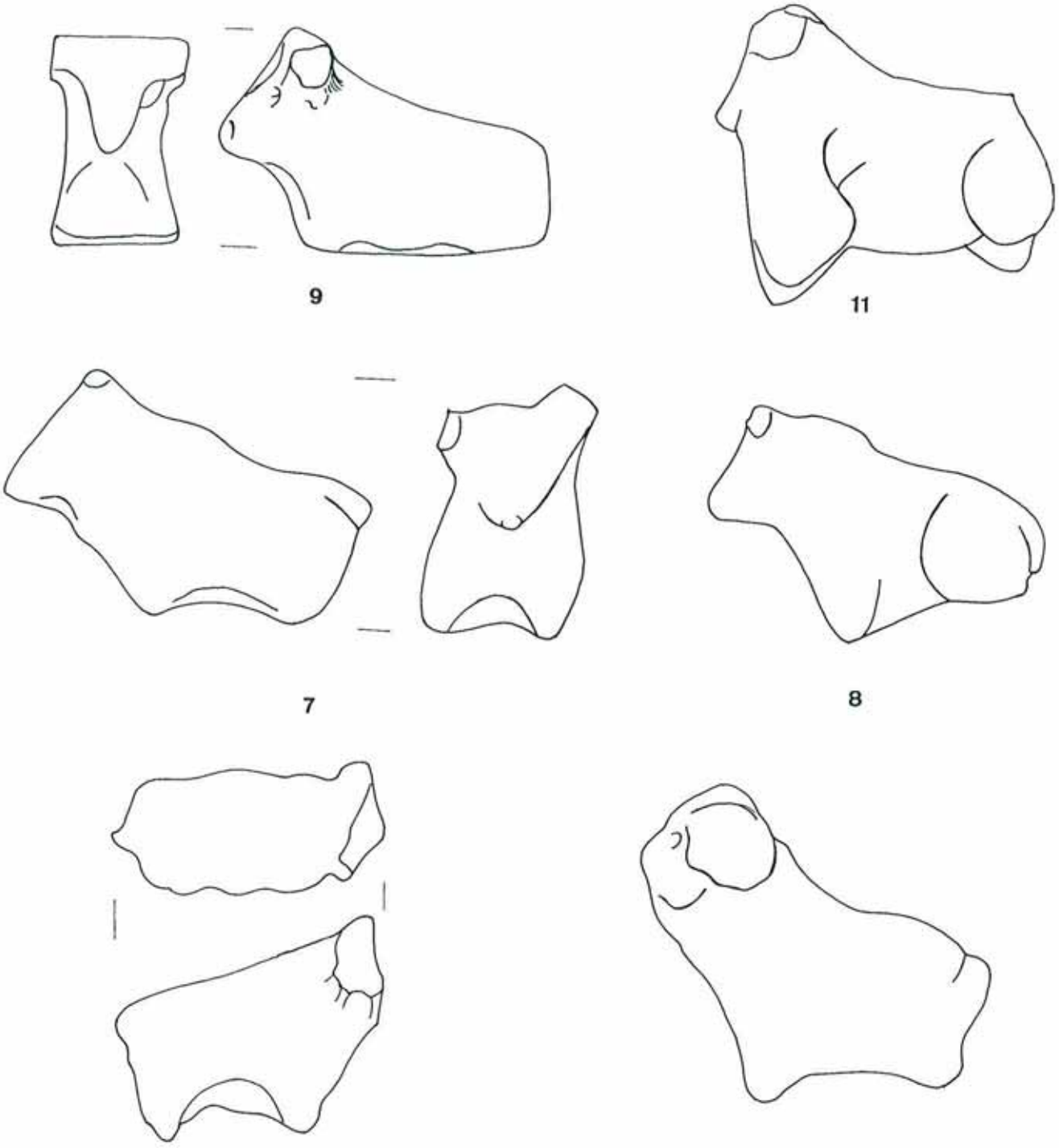

Fig. 1: Figures of aurochs, according to V. Broman-Morales, J. Pullar, D. Schmandt-Besserat and H. de Contenson; numbers cf. Table 1. Different scale.

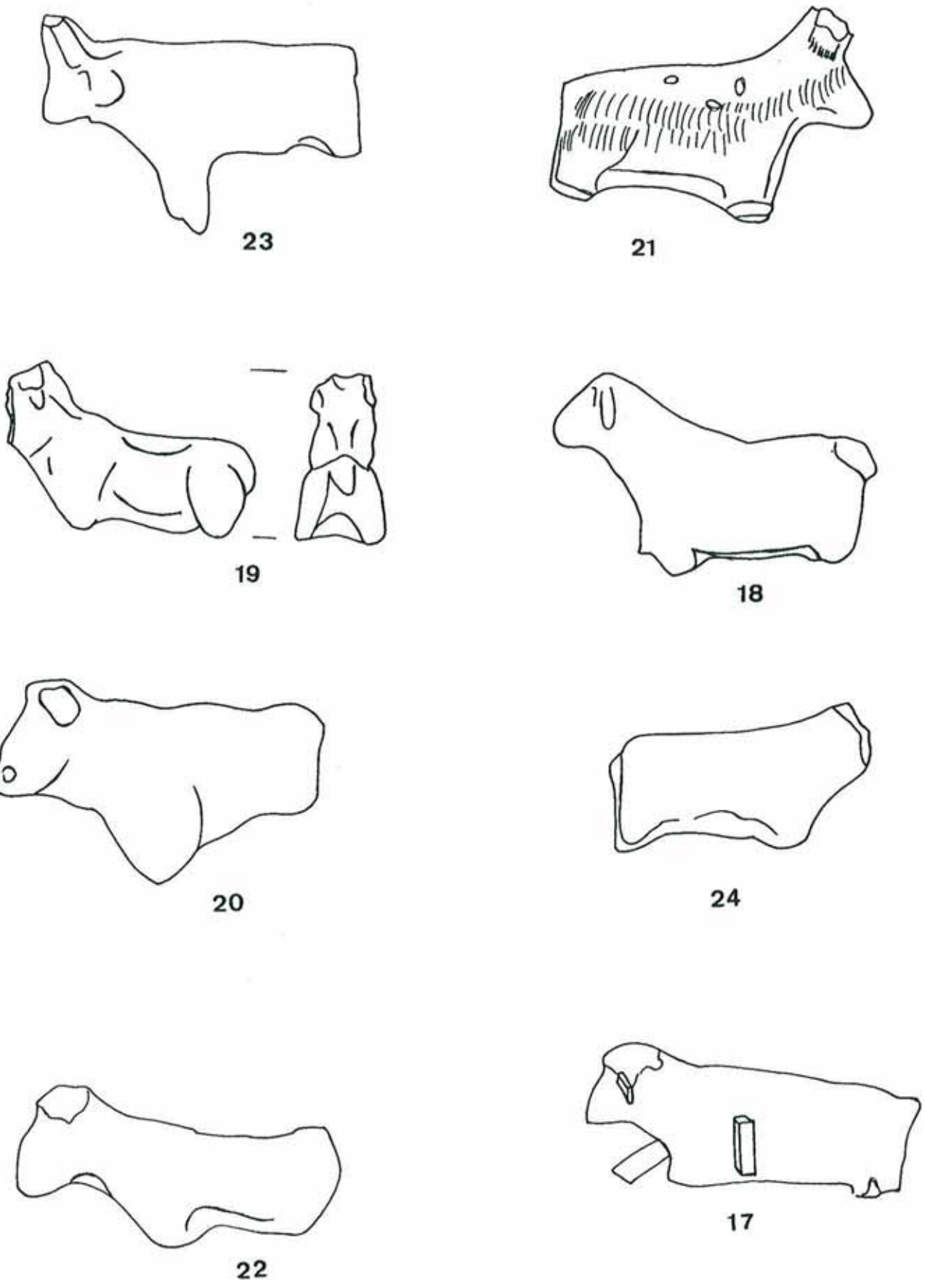

Fig. 2: Figurines of domestic cattle according to M. Voigt, H. de Contenson, I. Holland, T. Matsutani and D. Schmandt-Besserat; numbers cf. Table 1. Different scale.

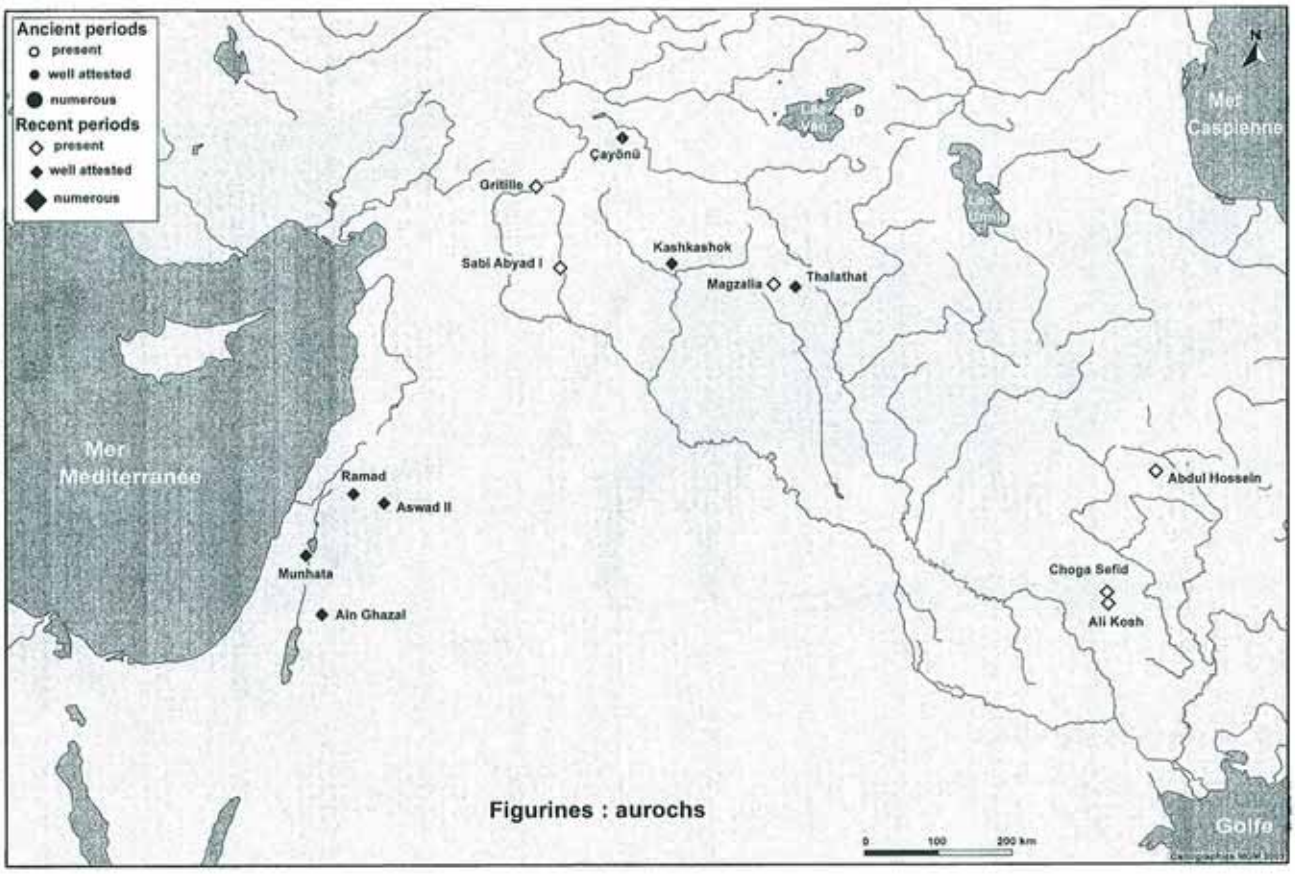

Fig. 3: Spatial distribution of Neolithc figurines of aurochs (Recent periods = after 8 000 BC. cal.).

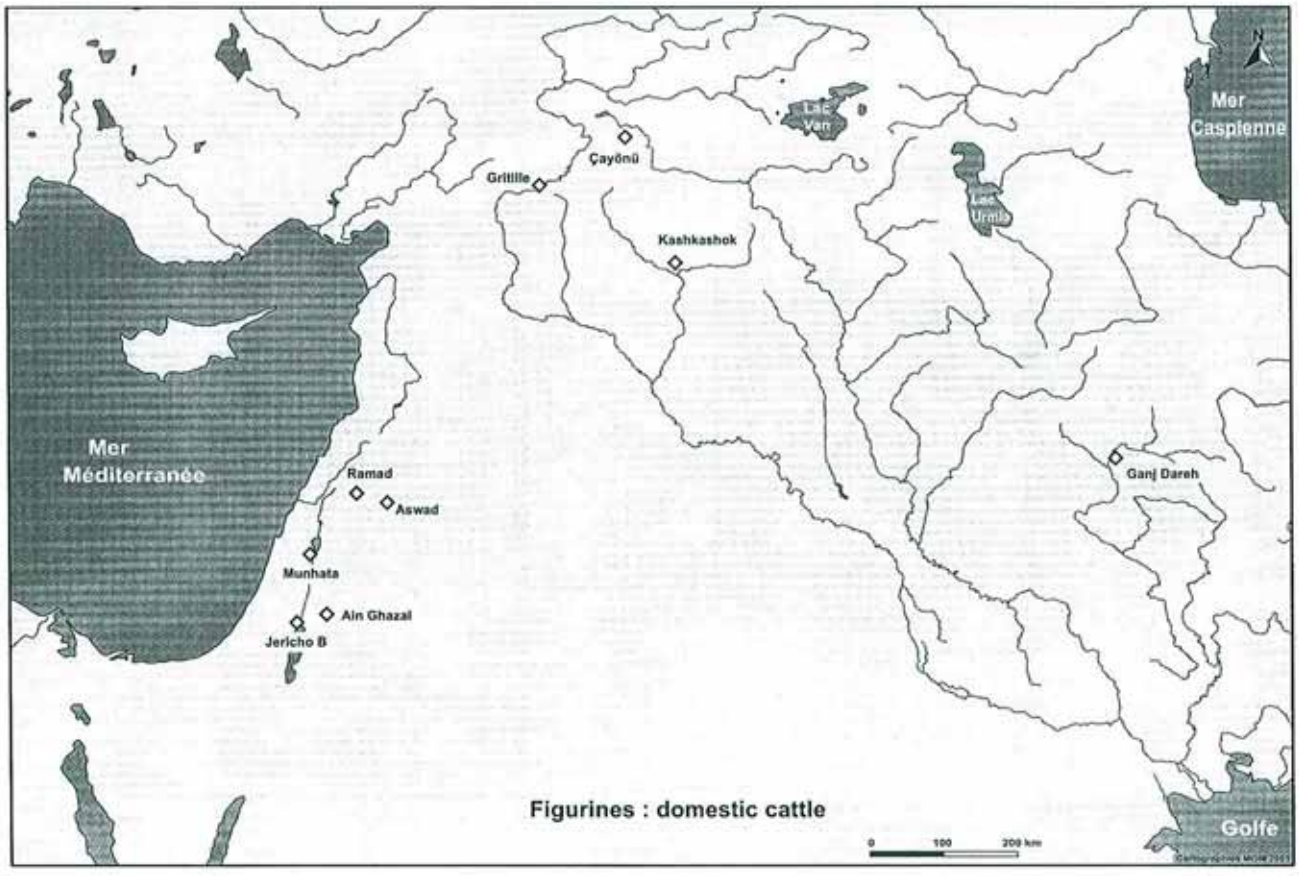

Fig. 4: Spatial distribution of Neolithc figurines of domestic cattle (Recent periods = after 8 000 BC. cal.).

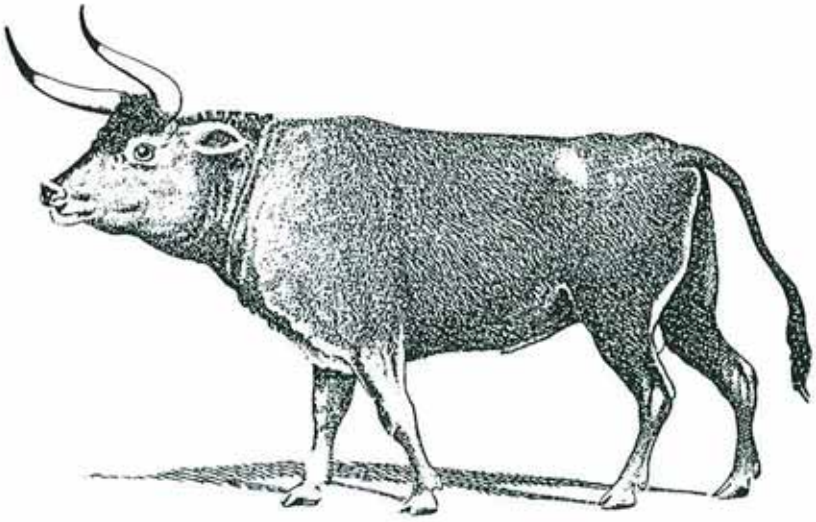

Fig. 5: The "Augsburg Aurochs".

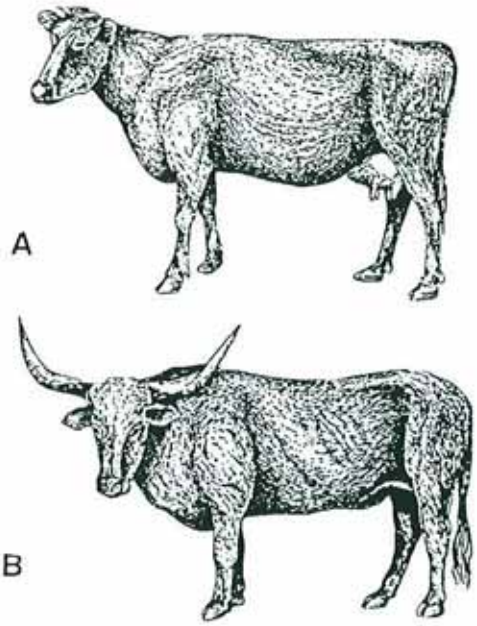

Fig. 6: Two basic types of domestic cattle: A ñ short-legged; B ñ long legged.

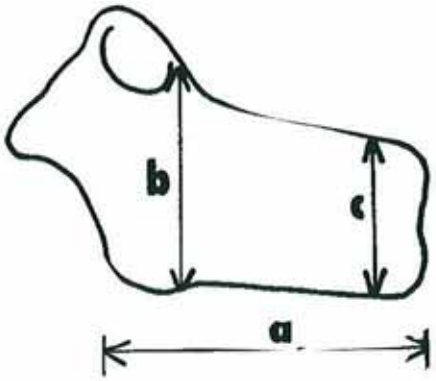

Fig. 7: Figurine measurements (cf. Table 1).

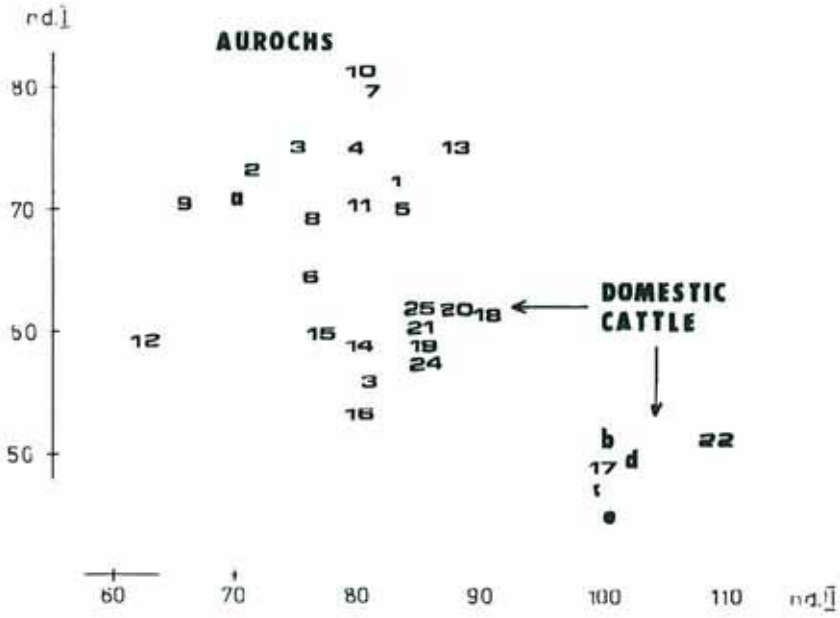

Fig. 8: Correlation field of indices I and II (numbers cf. Tables 1-2).

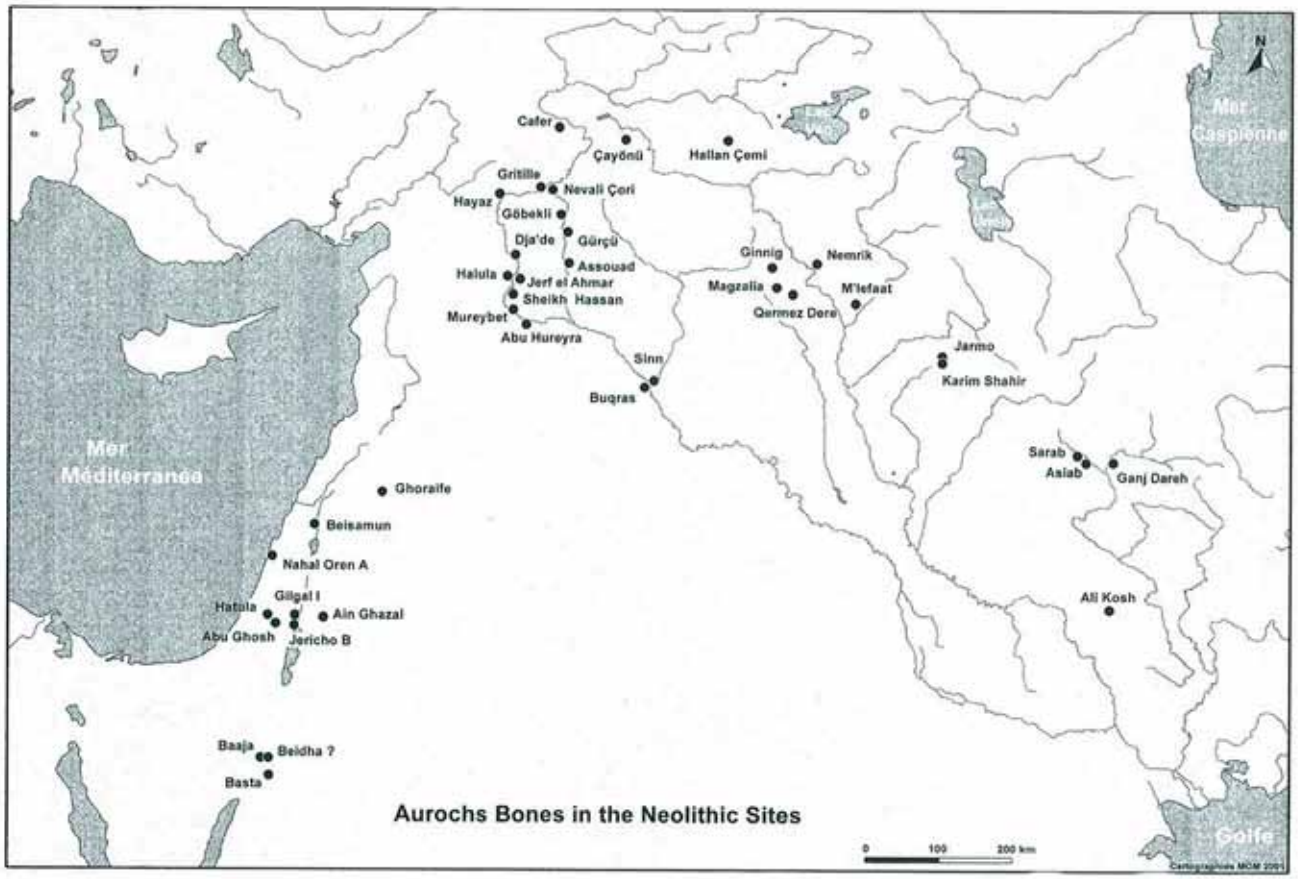

Fig. 9: Neolithic sites containg bones of aurochs, according to different sources, with a help of D. Helmer.

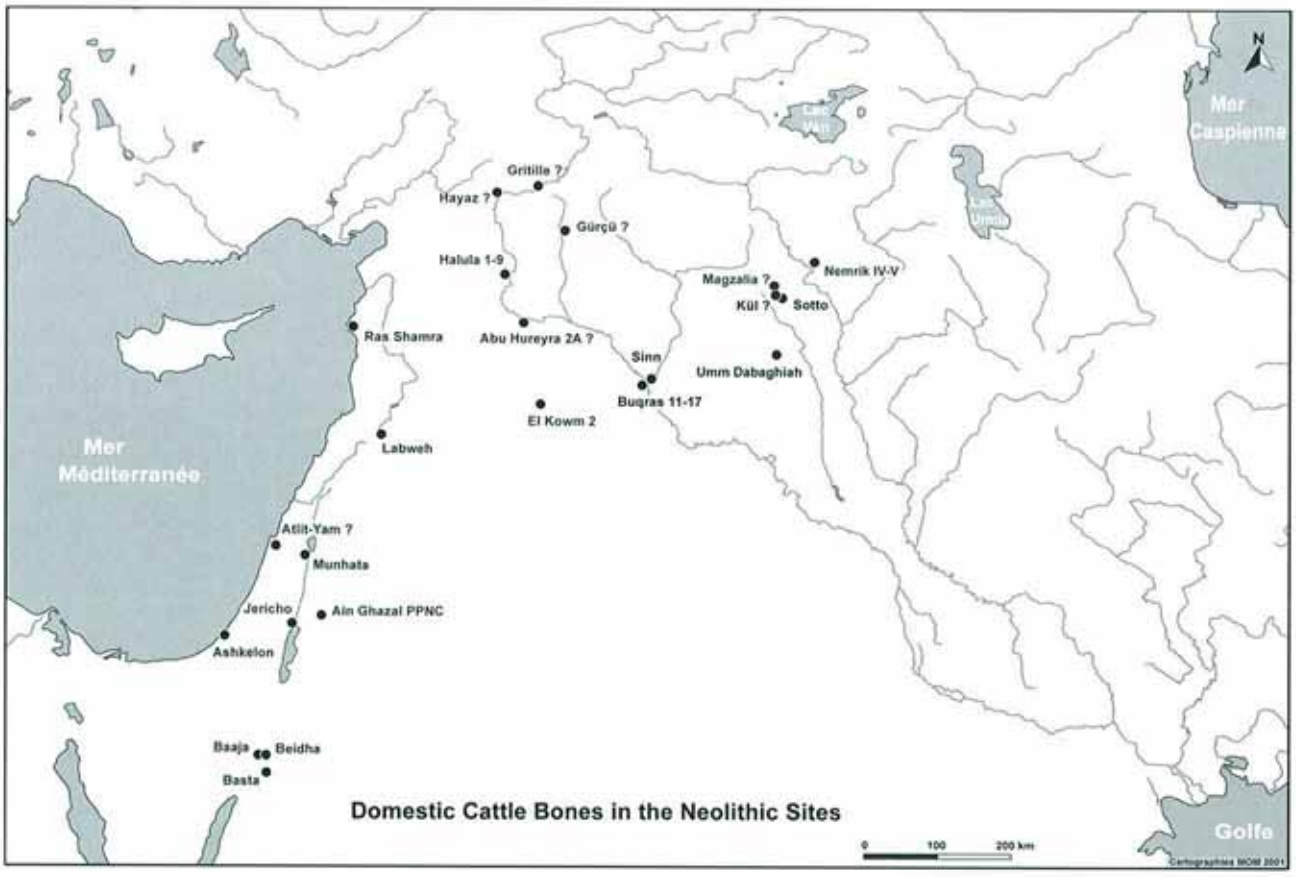

Fig. 10. Neolithic sites containing bones of domestic cattle, according to different sources, with a help of D. Helmer.