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THESES OF Ph.D. DISSERTATION

The Issue of the appearance and
development of the Hungarian Grey Cattle
in the Carpathian Basin based on
archeozoological artifacts

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INTRODUCTION

The Hungarian Grey Cattle was once of basic economic importance in Hungary. The undomesticated, stately Grey Cattle were kept for the purposes of butchery in the 18th and 19th centuries; furthermore, by the 20th century, the physical uses of the cattle in agriculture was discontinued with the introduction of machinery. In the 1960's, the stock of the cattle had reached a critical level, but as a result of conscious breeding, the species has successfully been removed from the endangered species' list.

To counter the rapidly decreasing environment possibilities of the cattle, intense and environment friendly measures have been taken. Those types of animal and plant types are needed, that have a strong survival rate, are easily produced and nurtured, are able to adapt to new and different environments, and, naturally, those that have a high rate of output.

The Hungarian Grey Cattle is an ideal species to build on the framework previously mentioned. Next to its frugality and its high survival rate, it can survive without the need for nurturing and domestication and is therefore

ideal for a strong bio-centered economy. It can survive in even those situations, where only grazing can be provided and are unsuited for the production of grain. In addition to its breathtaking long-upward-curving horns, strong presence, and the hidden outstanding qualities that lie in the species, the scientific and economic importances that are connected to it gives plenty of reason to study and preserve the species for future generations.

The separate parameters concerning the different appearances of the bovine only appeared in the late 19th century. The descriptions of the cattle were described at different places and at different times in that period; this means there is currently a rich source of materials concerning this information. Information on appearance markings can be found not only in economic sources, but also in registered sources and notes made during cattle judging. Although information on the cattles' horn shapes is widespread, information on the skulls' craniological, osteological and osteometrical aspects are to this day nonexistent. Currently, the number of examinations has grown especially through the environmental and climate affects on the species;

unfortunately, however no summary of the findings has been assembled.

This, too, played a role in my choice of osteological research on the Hungarian Grey Cattle. Furthermore, I based my 2004 research paper at ELTE (Kőrösi 2004c) on this topic, in addition to many other publications soon thereafter (Kőrösi 2004a, 2004b). This research was concluded based on a skull found in the Museum of Agriculture (MMM). The results of later research conducted on the skulls have been published in a separate volume in 2008 (Kőrösi 2008).

SETTING OF OBJECTIVES

One of the most important issues that this essay deals with is the periodical impoundment of the development of the Hungarian Grey Cattle bones, so that I may - through a set of defined periods by zooarchaeological data - be able to investigate the different theories, hypotheses, and ideas concerning the conception and evolution of the Hungarian Grey Cattle; and by doing this, I will attempt to reconstruct the birth

of the species and the environments through which it developed.

Only after these questions have been answered can we begin to unfold the results of human selection (anthropological factors) and of the environment (natural factor) in reference to European and global bio-breeding, with regards to the over-production of grey cattle; this is particularly important to the strikingly disease-immune cases of the Hungarian Grey Cattle. To reach these goals, I both completed studies on the bone remains of the Hungarian Grey Cattle, and – in order to recreate the current and previous habitats of the species (Hortobagy, Koros-Maros territory, Duna-Tisza territory) – I completed a set of environmental studies as well. I compared the contemporary craniometrical data with skulls from the archeological habitat. In order to diagnosticate /specify results, I made statistic analyses from different aspects.

Examination goals:

1. The collection and examination of verified statistics concerning the hypotheses around the assumed

origination and evolution of the Hungarian Grey Cattle.

2. Through my examination of the environmental habitats, I researched for answers surrounding - in addition to obviously present human selection – the evidence of environmental effects determining the development of the cattle's body amplitude
3. Research into the ecological and plant life of the Hungarian Grey Cattle habitats.
4. The craniological, osteological description of the Hungarian Grey cattle skull and jawbone.
5. Observation and description of the constant chronological changes in the structure of the Hungarian Grey cattle skull.
6. The comparison of Grey Cattle skulls with the primigenius and the other three main skull types and with different archaeological artefacts.
7. The determination of gender by skull.
8. Observation of the change in the skull sizes, with respect to age.

MATERIALS

The research is based on 108 Grey cattle skulls (as parts of the Ontological Collection at the Museum of Hungarian Agriculture) dating from the turn of the 20th century, and the 1960s and 1970s, mostly from the territory of Hortobágy, in addition to the examination of Ukrainian Grey Cattle samples and Red Steppe Cattle samples collected from the Matolcsi and Szleszareva Podolian Uplands.

To observe the constant structural changes, I was required to use evidence from three separate time periods.

- 1.** Those Grey Cattle skull measurements gathered by Béla Tormay in the 19th century, and from that same period, the horn measurements gathered by a István Vörös.
- 2.** Those pieces of evidence, ranging back to the 1960's and 1970's that can be found in the bone repository at the Museum of Hungarian Agriculture.
- 3.** Finally, those measurements that were based on a herd of Grey Cattle in the 1980's; the findings were published by András K Remény.

METHOD

In order to measure the Grey cattle craniums and mandibles - the method reworked by A. von den Driesch (Driesch 1976), originally introduced by J. U. Duerst (Duerst 1926) - was employed. I used his serial numbers for the sizes. In the case of the craniums 53, of the mandibles 23, ontological and so called 'non-measurable' anatomic characteristics were compared. I demonstrated my findings in figures, diagrams, and in many cases, with with variant analysis and linear regression.

The paleoecological environmental evolutionary statistics that I created through profile were previously defined through carbon dating, and processed by pollen analysis and macrobotanic angles. The pollen profiles that were processed through spore tables which were discovered by drilling into the undisturbed Hungarian Plains were use through comparison when examining—through a paleobotanic viewpoint – the drillings in the plateau regions. With this drilling data I could reconstruct the earlier habitual ecological evolution that took place around the Hungarian Grey Cattle, and by doing so redraw the effects of the vegetation on the species.

The most important pollen analysis data was the pollen samples dating back from the late Middle Ages to the Renaissance found in Szenkiralý; this was discovered through a swelled watering hole in the 1990's. Therefore this series of pollen samples allowed for a direct basis for comparison with the nearby archeozoological samples.

I compared the craniometrical characteristics of the skulls of the aurochs and the Hungarian Grey in order to confirm the theory of the aurochs as the immediate progenitor of the Hungarian Grey Cattle.

With the analysis of archeological animal bones from the Árpád and the Turkish period, I made an attempt to establish the first appearance of the Hungarian Grey Cattle in the Medieval period.

With the help of the statistical examination, I separated dimensions of the skulls according to gender. The Principal component analysis (PCA) made it possible to identify differences and variations in measurements and morphology and Multiclass Linear discriminant analysis (LDA) distinguished gender and age.

SUMMARY OF THE RESULTS

1. The hypotheses about the Hungarian Grey Cattle origins has come to be clarified and summarized. The examination of animals bones from Szentkiraly Middle Ages and Renaissance has presented to us the finding the existence of both smaller and larger breadth cattle were simultaneous; but recently the primigenius auroch skulls have become available, which prove that - even if only in small quantities – the primigenius cattle characteristics are present in the stock from Szentkiraly, which probably played a significant role in the medieval cattle trade at the settlement in the area of Kecskemét.

2. The results of the measurements and description of Hungarian Grey Cattle skulls originating from the 20th century have been concluded. This data compensates for the absent information in zoological specialist writings, and they supply immaculate information for the study of such zoological, archaeozoological topics. Also, these craniological findings enable the distinction of archaeological material on cattle breed and determining the features of the Hungarian Grey Cattle.

3. After having concluded the above mentioned examination, it can be stated that the Grey cattle skulls have got a primigenius character, and although they differentiate from the other three skull types, they still show certain qualities such as short-horned (brachyceros) and wide-front (frontosus). An explanation for this can be the ever-altering biological changes that occur in a species, but it can also be accounted for by the remnants of old cross-breeding. However, these qualities can only be observed in certain specimens dispersed throughout.

4. A conclusion can be brought about the mandible of the Hungarian Grey, that according to size and scale, the Hungarian Grey Cattle relates more to small headed (brachycephalus) breed than to the primigenius breed.

5. The researches from the three periods shows the constant structural changes from three separate time periods verifies that the shape of the skull is a continuous process, and that the growth is gradual. Although the process is not fast, it is noticeable, even in a short 30 year period there are visible alterations in the skull measurements. I juxtaposed the previously mentioned results with those of the Ukrainian Grey and Red Steppe

Cattle examination from Szleszareva and Matolcsi (Matolcsi 1982, Szleszareva 1960).

6. These examinations proved the observations on the grey cattle skulls: The Ukrainian Grey and Red Steppe Cattle remained undersized because of the backward habitual surroundings and scarcity of hay fodder. However, these effects did not alter the primigenius character of their skull types (Szleszareva 1960).

7. There is a substantial difference in skull size and characteristic between the aurochs and Hungarian Grey Cattle, which makes me conclude that the aurochs cannot be the immediate progenitor of the Hungarian Grey Cattle.

8. Based on archaeozoological evidence from the medieval period it is impossible to determine the exact time of the appearance of the Hungarian Grey Cattle in the Carpathian Basin.

9. On the basis of the skull sizes and characteristics, the genders can be distinguished from each other. On the thick section of the bone, near the base, crustation, a crown, and deep, longitudinal grooves are observable. This was supported by various statistical examinations.

10. Focusing on the lifespan, it can be doubtlessly stated, that characteristics alter along with the rise of the lifespan. In the case of 23 skull cases there was no alteration, in 3 cases there was a decrease in size, and in 20 cases there was a varying alteration of the increase in skull size.

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