Volume 46(1-2):91-94, 2002
Acta Biologica Szegediensis
http://www.sci.u-szeged.hu/ABS

SYMPOSIUM

Human adaptation in the 7th-11th century+

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ABSTRACT This paper is an attempt to reconstruct human adaptability in the case of populations which lived in the central region of the Carpathian Basin between the 7th and 11th century. On drawing a parallel between the ecological zonality and the human anatomical patterns of the three historical periods included, we come to a conclusion that the populations of both the Late Avar period (670-894 A.D.) and the time of the Hungarian conquest (10th century, *i.e.* 895-999 A.D.) adapted themselves to the local ecological zonality fairly well, while, from 1000 A.D. on, *i.e.* at the time of the 11th century when the early Christian Hungarian Kingdom was founded by King St. Stephen, it may have been political intention more than anything else that influenced the structure of population. **Acta Biol Szeged 46(1-2):91-94 (2002)**

KEY WORDS

Late Avar period and early Hungarians
multivariate anatomical analysis
historical human ecology

The 7th–11th century human adaptation in the central region of the Carpathian Basin is especially suitable for examinations since this area was reached by numerous ethnic groups in several migration waves. The population of the Late Avar period (670-894 A.D.) was succeeded by the pagan Hungarians, who immigrated and settled down in the 10th century (895-999), then followed the foundation of the early Christian Hungarian Kingdom by King St. Stephen, which marked the beginning of our third period from 1000 on. For the sake of simplicity, we shall refer to these epochs as Late Avar period, 10th century population and 11th century population.

Little is known about the contemporary environmental factors which were of great importance with a view to human adaptation. This is the reason why we lean on recent sources as essential proof. Former experience makes us assume that a reconstruction of the environmental complex in the Carpathian Basin can primarily rely on the specification of climatic zonal regions reckoned by the distribution of precipitation (Borhidi 1961; Varga 1995; Bihari 2000). Over the past centuries the boundaries of the zones have remained nearly the same even though their characters have been varying. This zonal arrangement involves a central plain area surrounded by concentric zones towards the peripheries (Figs. 1 and 2). Thus, the main question is to what extent this zonality is reflected in the anatomical characteristics of the skeletal remains during the three periods mentioned above.

Materials and Methods

Twelve measurements of the skull were examined in each of the three chronological phases. These, marked by Martin (1928) numbers, are as follows: maximum length (M1), basion-nasion length (M5), maximum breadth (M8), minimum frontal breadth (M9), basion-bregma height (M17), auriculo-bregmatic height (M20), bizygomatic breadth (M45), upper facial height (M48), orbital breadth (M51), orbital height (M52), nasal breadth (M54), nasal height (M55). Missing cranial measurement, supposing at least four original measurements were known, were reconstructed by Dear's (1959) principal component method in each of the three periods separately. The samples completed in this way were examined by using the SPSS 7.5 version of the principal component analysis (SPSS 1996) without applying Kaiser's normalization. The human anatomical regional pattern was reconstructed on the basis of the locality averages of the factor values and by employing the 6.02 version of the Surfer programme packet (Figs. 3, 4 and 5).

The craniological data of 883 males from the Late Avar period, those of 321 10th century males and those of 365 11th century males were analysed. The number of localities in the above chronological order was as follows: 67, 60, 22. The reason why male dimensions were only analysed was that in each of the three chronological phases a principal component (a face factor) in which the same original measurements were concentrated (M48, M52 and M55) could only be evinced with males.

Results and Discussion

The fact that a face factor with the same dimensional background could be pointed out in each of the three chronological phases may refer to the continuity of 7th-11th century population history. This factor represented approximately one fifth of the total variance in each of the three samples (*i.e.* 17.5 % in the Late Avar period, 19.8 % in the 10th century and

Accepted March 1, 2002
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+Dedicated to Professor Gyula Farkas on the occasion of his 70th birthday.

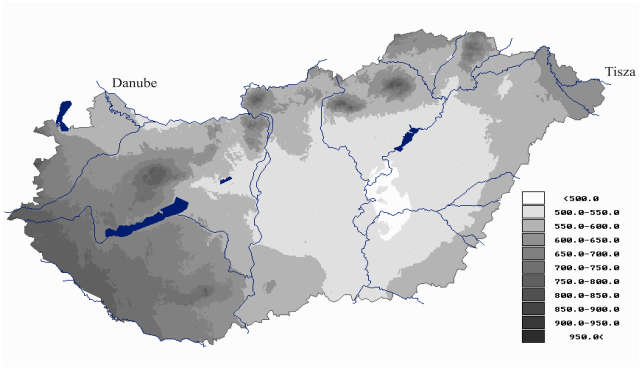

Figure 1. Distribution of precipitation (mm) in Hungary using Aureligh's method (Bihari 2000).

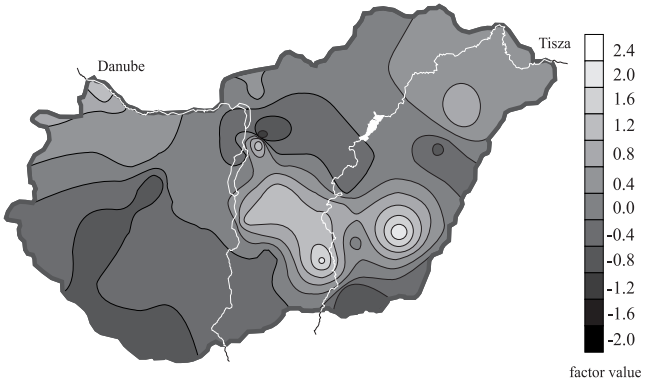

Figure 3. Regional pattern of the face factor of males from the Late Avar period in Hungary (Guba 1999).

18.0 % in the 11th century). Our former analyses had shown that the concentric zonality of ecological zones bore a near resemblance to the regional distribution of the face factor in 10th century populations (Guba and Szathmáry 1999; Szathmáry 2000). That observation, therefore, referred to a well-adapted population. However, we have not yet published our results concerning the populations either in the preceding Late Avar period or in the succeeding 11th century.

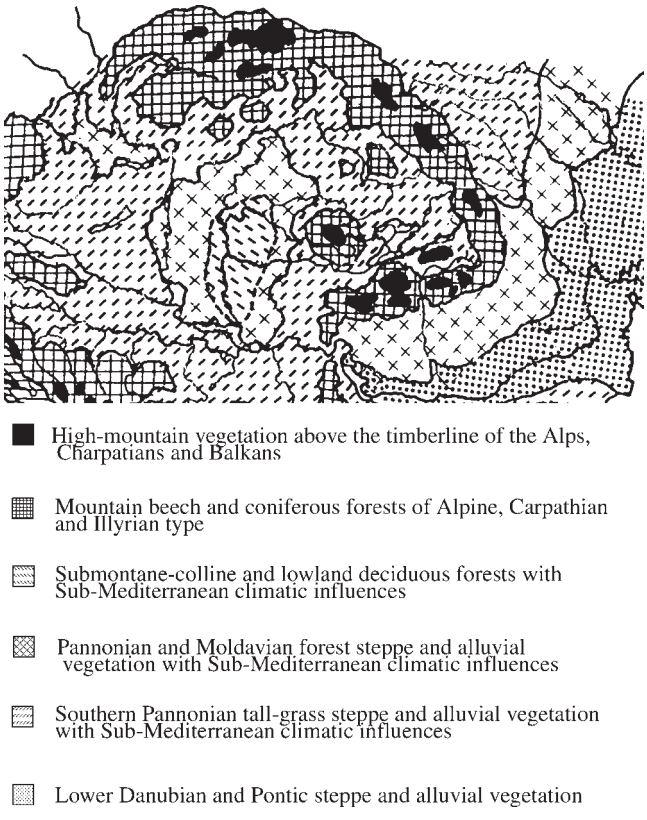

Figure 2. Concentric zonation of bioclimatic regions in the Carpathian Basin (Varga 1995).

We sum up the moments which enable us to assess the population history and the adaptability of 7th-11th century populations in process. In the course of our examinations, the spatial anthropometrical patterns in each of the three periods were estimated in the same respects.

Late Avar period

Conclusions regarding Late Avar populations rely on observations shown in Figure 3.

1) The north-south direction course of the river Danube might have formed a barrier south of Csepel Island. While high-faced people might have lived by far in the greatest number in the east, the western regions might have been inhabited by low-faced populations.

2) North of Csepel Island, however, an anatomical zone of Transdanubian nature characterized by the low face spanned over the river taking a southern direction towards the people of a similar nature living in the northern periphery of the Great Plain.

3) Expanding southwards along the valley of the river Tisza, this low-faced population wedged itself in the masses of the high-faced variants living in the central Great Plain and divided their masses in two.

4) High-faced components appeared exclusively in the middle regions of the Great Plain, both between the two rivers, the Danube and the Tisza, and east of the Tisza. The low-faced group drawing southwards along the river-basin of the Tisza seems to have formed a distinct anatomical boundary zone between the two groups of the high-faced population.

5) The populations which lived in the northwestern and northeastern regions of the territory of present-day Hungary might have been heterogeneous anatomically.

Summing up what was observed, we could say that the anatomical pattern as regards its basic characteristic features bore a resemblance to ecological zonality (cf. Guba 1999).

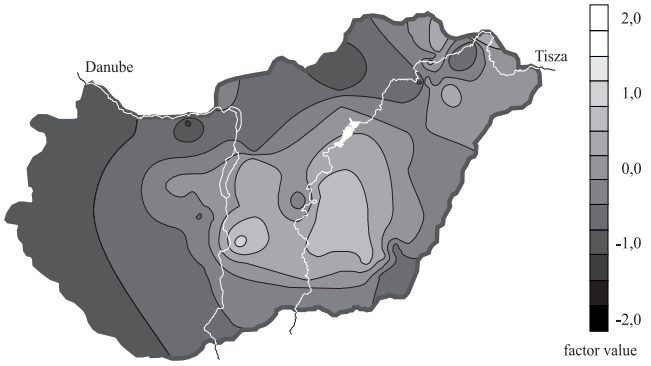

Figure 4. Regional pattern of face factor of 10th century males in Hungary (Guba and Szathmáry 1999).

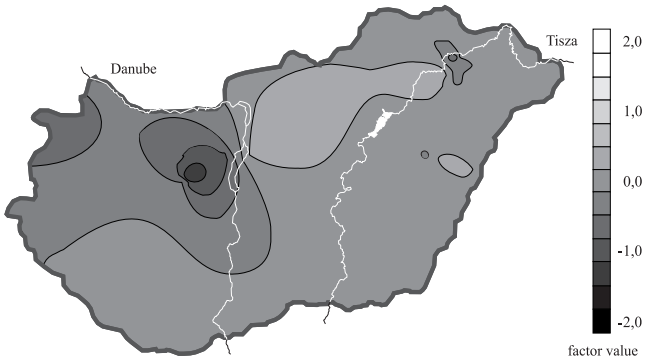

Figure 5. Regional pattern of the face factor of 11th century males in Hungary.

10th century (the age of Hungarian conquest)

On drawing a parallel between the conclusions regarding the Late Avar period and the observations concerning the regional anatomical pattern of 10th century populations given in Figure 4, we can describe 10th century populations as follows (cf. Guba and Szathmáry 1999; 2001):

1) South of Csepel Island, the river Danube continued to form a barrier between the low-faced and high-faced populations even in this period.

2) North of Csepel Island, however, the anatomical zone which had established connections between low-faced people characteristic of the Transdanubian region and the Great Plain populations of similar features narrowed down owing to the expansion of high-faced populations.

3) In the central region of the Great Plain, in the middle reaches of the Tisza, low-faced people lost ground.

4) The two former centres of the high-faced components in the middle region of the Great Plain became merged, therefore the middle reaches of the river Tisza no longer separated populations, on the contrary, brought them into contact.

5) The population in the northeastern region became even more heterogeneous and showed almost all the anatomical variants which could be found in the Carpathian Basin at the time.

To sum it up, we could say that the coincidence of the anthropometrical patterns and ecological zonality looked surprisingly close. Taking this evidence into consideration we could not argue against László's (1970) hypothesis of the so-called "dual conquest". What is more, it seemed that we should lay a great emphasis on the continuity of adaptation from the 7th century up to the end of the 10th century. It is to be noted, however, that the scantiness of 9th century skeletal remains from the Great Plain is a fact of common knowledge. It could be commented on with the following circumstances in mind: the extremely dry climatic conditions (cf. Györffy and Zólyomi 1994) on one hand, and the small number of typically 9th century archaeological finds on the other. The latter makes the majority of archaeologists to date the burials back to the "infallible" 8th century to avoid being exposed to presumable professional criticism.

11th century (early Christian epoch)

Our observations concerning the epoch of early Christianity were as follows (Fig. 5):

1) South of Csepel Island, the river Danube only denoted a lax contingent boundary zone between populations.

2) With a population structure altered in the course of time, a population historical and anatomical zone could be observed north of Csepel Island, along the Danube bend, which, in contrast to the previous periods, separated the populations. Nor this fact neither the insularity of the surviving low-faced population in the surroundings of Székesfehérvár could be explained without referring to civilization intentions.

3-4) The population in the middle region of the Great Plain became definitely homogeneous. No moments from the former population structure could be pointed out. Surprisingly, this observation was in accordance with our earlier results, which showed that, in the 11th century, population history might have been influenced, first of all, by civilization or political factors (Szathmáry et al. 1996; Szathmáry et al. 1997).

5) Even the earlier anatomical heterogeneity in the northeastern and northwestern regions turned into a more homogeneous pattern.

To sum it all up we could state that population structure completely changed in the 11th century. Civilization influences (like urbanization, political intensions, etc.) might have overpowered adaptational potential more adequate to ecological zonality (cf. Szathmáry and Guba 2001).

Acknowledgments

The present study was funded by "Széchenyi Terv" No. 5/081.

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