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Southeuropoid Specifics in the Dermatological Characteristics of the Bulgarian Population from Central Western Bulgaria.

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The aim of the present study is to make a comparative dermatoglyphic characteristic of eight local populations of Central Western Bulgaria based on five dermatoglyphic traits - Delta index, Index of Cummins, carpal axial triradii (t), images of the hypotenar (Hy), and accessory interdigital triradii (AIT). In the processing and analysis of dermatoglyphic traits, the Cummins and Midlo's method and the Heet's method were used. Based on the analysis of these key traits, the South European and Eastern complexes, the generalized dermatoglyphic distances and the combining polygons were calculated and presented. Results show that in the studied population of Central Western Bulgaria: 1) an increased incidence of t; 2) decreased occurrence of images of Hy and a frequency of AIT and 3) the mean values for some of the dermatoglyphic traits analyzed are in the upper limits of the Eurasian scale, characteristic of the European population with Eastern characteristics.

Key words: South European and Eastern complex, generalized dermatoglyphic distances, combination polygons

Introduction

Dermatoglyphic studies are done in various aspects. The study of the skin relief has its application in both biological and non-biological scientific fields (history, archeology, etc.) [1, 17, 18, 19]. Anthropological studies in dermatoglyphic aspect are successfully applied in the study of individual ethnic, ethnographic and territorial groups of the population [4, 5, 7, 8, 10–14].

The development of the present work was provoked by various historical, archaeological and ethnographic sources that describe the settlement and the subsequent development of the Bulgarian population from the region of Central Western Bulgaria [1, 9, 11, 16].

In addition to the Thracians, Slavs and Proto-Bulgarians, the formation of the Bulgarian nationality also includes smaller ethnic groups such as Pechenegs, Kumans and

others [1]. In the later stages of Bulgarian history, other factors such as the integration, assimilation and amalgamation of separate ethnic groups, mixed marriages in some settlements, as well as the occurrence of settlements, mostly in mountainous areas, with nomadic population, contribute to the development of the Bulgarian nation [1, 3].

The area studied by us is predominantly populated by ethnic Bulgarians. In it, however, many settlements with names of Turkic origin have been described, which gives the researchers the reason to assume that these were settlements of Pechenegs and Yuruks and other nomadic and semi-nomadic communities [1, 6].

With this study of the Bulgarian population of Central Western Bulgaria, we would like to supplement the so-called historical facts about its formation. From an ethnographic point of view, contemporary Bulgarian population is divided into several ethnographic areas. The territory of our research, namely Central Western Bulgaria, is known as the "Shopi" ethnographic area. Anthropological literature reveals dermatoglyphic researches of Bulgarians – Shopi [11], a sample of the Pernik region [16], as well as of Bulgarians from some settlements with Shopish population in the Sofia region [10]. However, the population surveyed in these surveys is concentrated in areas close to Sofia. For this reason, our survey included Bulgarian population from the more extreme regions of the so-called „Big Shopluk", within the territory of Bulgaria.

The aim of the present study is to make a comparative dermatoglyphic characteristic of a local population from different regions of Central Western Bulgaria by analyzing five key ethnic dermatoglyphic traits, whose morphological independence and geographic gradient [4] show territorial differences in the dermatoglyphic picture of different ethnic population groups.

Material and Methods

A Bulgarian population from eight regions of Central Western Bulgaria has been studied (Trudovets, Slivnitsa, Sapareva Banya, Svoge/Iskrets, Kyustendil, Alino, Batanovtsi, Elin Pelin/Buhovo). A total of 1600 individuals of both sexes (800 men and 800 women) – 100 men and 100 women from each area. Dermatoglyphic fingerprints were processed according to the method of Cummins, Midlo [2], modified by Heet, et al widely used in ethnic dermatoglyphics [4]. Five basic dermatoglyphic traits are analyzed – Delta index (DL_{10}), Index of Cummins (Ic), proximal triradii (t), images of the hypotenar (Hy), and accessory interdigital triradii (AIT). The method of Sharma [15] is used to determine proximal triradii. On the basis of the results obtained a comparative-typological analysis was made by Heet's method, with the Eastern (EC) and Southern European complexes (SC) in both sexes [4].

The generalized dermatoglyphical distances (GDD) are calculated and are constructed combining polygons showing the variations of dermatoglyphic traits to the Eurasian scale [4]. Limits of summarized dermatoglyphic distances at territorial level are present in **Table 1**.

Table 1. Limits of generalized dermatoglyphical distances at territorial level (by Heet, 1983).

Category distance	Category limits/men	Category limits/women
very little	0 – 6.4	0 – 5.9
little	6.5 – 10.3	6.0 – 10.1
middle	10.4 – 14.8	10.2 – 15.0
large	14.9 – 18.8	15.1 – 19.4
very large	18.9 – 25.5	19.5 – 26.7

Results and Discussion

Basic dermatoglyphic traits, Eastern and Southern European complexes

In men (**Tabl.2**) from five groups – Trudovets (51,3), Slivnitsa (47,7), Sapareva Banya (52,7) Svoge/Iskrets (52,2) and Batanovtsi (55,2) prevail, although insignificant, Eastern dermatoglyphic features. In the other three groups - Kyustendil (55.5), Alino (52.7) and Elin Pelin/Buhovo (53.7), the Southern dermatoglyphic characteristics are more common.

Table 2. Basic dermatoglyphic traits, Eastern (EC) and Southern European complexes (SC) in men from different regions of Central Western Bulgaria.

Region/sign	**DL_{10}**	**Ic**	**t**	**Hy**	**AIT**	**EC**	**SC**
Trudovets	13,80	8,40	62,00	32,50	17,50	**51,3**	46,2
Slivnitsa	13,00	8,52	64,50	34,00	18,50	**47,7**	47,4
Sapareva banya	13,96	8,45	60,00	31,00	14,50	**52,7**	46,7
Svoge/Iskrets	13,60	8,22	58,00	35,00	11,50	**52,2**	48,4
Kyustendil	12,30	8,61	71,50	30,50	12,50	51,7	**55,5**
Alino	12,50	8,28	58,00	27,00	16,00	50,1	**52,7**
Batanovtsi	13,30	8,74	61,40	23,00	9,00	**55,2**	53,1
Elin Pelin /Buhovo	12,90	8,38	62,20	34,00	6,00	53,4	**53,7**

In women (**Table 3**) there are more pronounced Eastern dermatoglyphic elements in groups of Trudovets (50.6), Sapareva Banya (52.9), Svoge / Iskrets (51.4), Alino (50.4) and Batanovtsi (55.7). The women from Slivnitsa (45.4), Kyustendil (56.0) and Elin Pelin / Buhovo (53.6) have more pronounced Southern elements.

Table 3. Basic dermatoglyphic signs, Eastern (EC) and Southern European complexes (SC) in women from different regions of Central Western Bulgaria.

Region / Traits	**Dl_{10}**	**Ic**	**t**	**Hy**	**AIT**	**EC**	**SC**
Trudovets	13,40	8,60	64,00	28,50	18,50	**50,6**	47,9
Slivnica	12,36	8,74	63,00	36,00	20,50	41,9	**45,4**
Sapareva banya	13,96	8,36	58,50	32,00	13,50	**52,9**	46,9
Svoge/Iskrets	13,80	8,82	57,00	26,00	13,00	**51,4**	46,4
Kyustendil	12,80	8,10	69,00	31,00	14,00	55,2	**56,0**
Alino	13,20	8,38	56,50	28,00	16,00	**50,4**	48,9
Batanovtsi	13,40	8,62	62,00	26,00	8,00	**55,7**	53,0
Elin Pelin/Buhovo	12,60	8,40	60,00	34,00	6,00	51,6	**53,6**

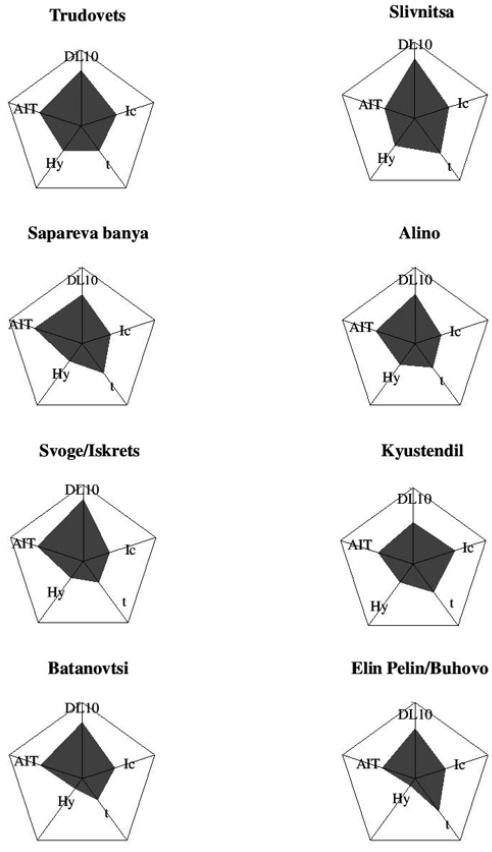

Fig. 1. Combination polygons showing variations in dermatoglyphic signs in males. The radii correspond to the Eurasian scale, assumed to be 100 percent, and their centers show the final Europoide values.

From the tables showing the distribution of Southern European and Eastern traits in men and women from Central West Bulgaria, we can conclude that groups are grouped among the surveyed population as a whole, based on the prevailing dermatoglyphic characteristics. The first group includes the population (men and women) from Trudovets, Sapareva Banya, Svoge/Iskrets and Batanovtsi. This is the group in which for both sexes there is typically a higher frequency of Eastern characteristics. The second group unites the men and women from Kyustendil and Elin Pelin/Buhovo, where the Southern features prevail. However, for Slivnitsa and Alino, there were differences between the two sexes (men and women) regarding the manifestation of the Eastern and Southern dermatoglyphic complexes. The Southern elements (47.7) are characteristic of the Slivnitsa men, while the Eastern ones (45.4) predominate among women. In the Alino population there is a reverse trend – in men have developed Eastern components (52.7), while in women dominate the Southern (50.4). The differences between men and women in these two areas, though insignificant, could be seen as a result of migratory processes.

In order to illustrate the results obtained, combination polygons were constructed, graphically representing the ratios between the five basic dermatoglyphic traits (**Figs 1 and 2**).

From the figures, we see that the men and women examined by us show a tendency for variability in some of the traits, namely axial triradii, hypothenar images, and additional interdigital triradii, which leads to some relatively high South European characteristics in these groups.

When compared to the groups studied by us, with others from Central West Bulgaria, but studied by other authors [10], some regularities were established according to the same methodology (**Fig. 3**).

Among the Bulgarian population, subject of our study, there is a relatively high frequency in proximal triradii and a low frequency incidence of hypotensive imaging. At the same time, in the population surveyed by other authors, there is a reverse trend – low frequency the proximal triradii and high frequency of the images on the hypotenar.

Considering the fact that the survey areas have a different location within the boundaries of an ethnographic area (settlements, around the central city of Sofia and settlements along the periphery), we can conclude that in the outskirts the population is more affected by a number of migration processes, which undoubtedly affect the inheri-

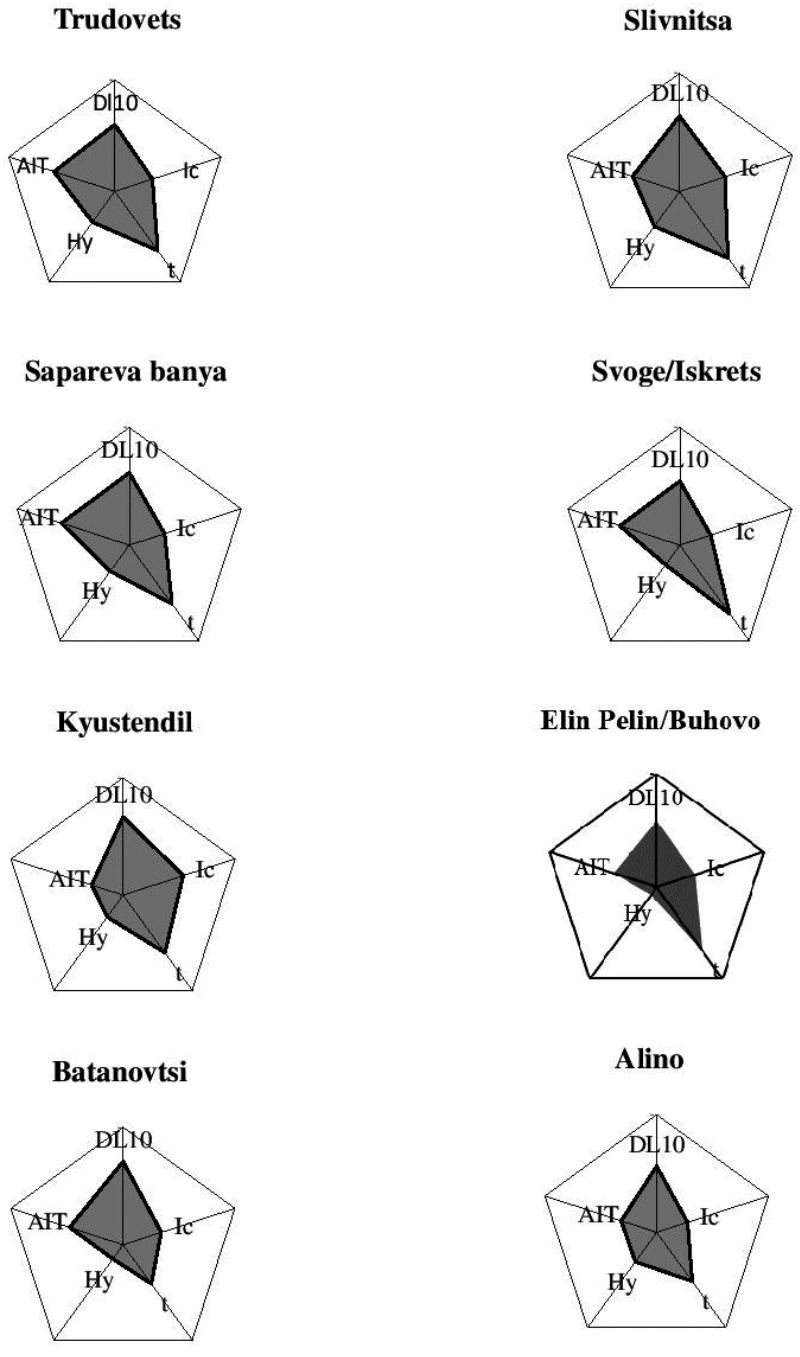

Fig. 2. Combination polygons showing the variations in dermatoglyphic signs in women. The radii correspond to the Eurasian scale, assumed to be 100 percent, and their centers show the final Europoide values.

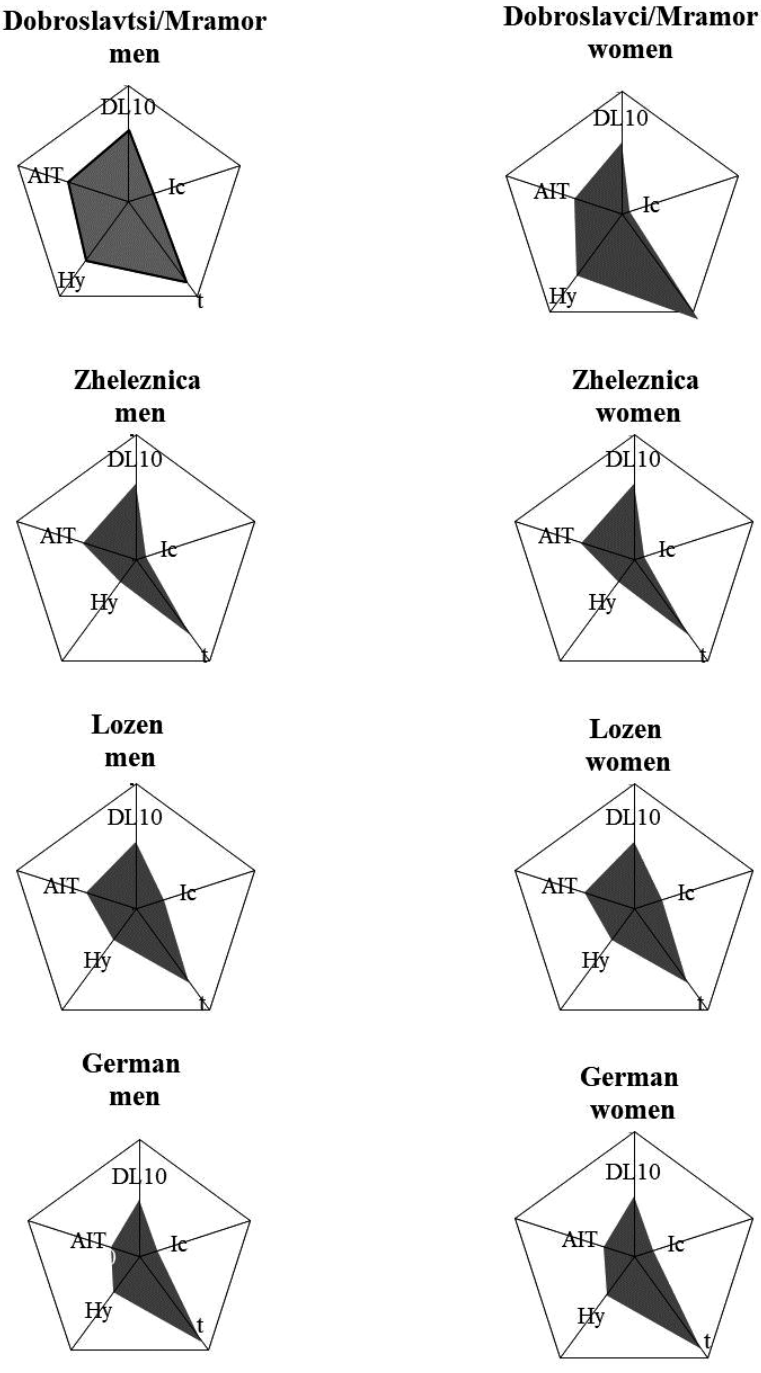

Fig. 3. Combination polygons showing the variations in dermatoglyphic signs in men and women by [10]. The radii correspond to the Eurasian scale, assumed to be 100 percent, and their centers show the final Europoide values.

tance of dermatoglyphic traits. We could say that this combination of dermatoglyphic traits is distinguished as characteristic of the local population.

Generalized dermatoglyphical distances (Tables 4 and 5)

For the studied population of Central West Bulgaria, the generalized dermatoglyphical distances were calculated, showing the mean differences between the five basic dermatoglyphic traits between two groups (limits present in Table 1).

It can be seen that in both genders prevail the average GDD. In male males the aggregate mean GDD ranged from 9.3 to 12.9 (**Table 4**), and in females from 9.0 to 13.6 (**Table 5**).

Table 4. Generalized dermatoglyphical distances (GDD) in the population of Central Western Bulgaria – men: 1 – Trudovets, 2 – Slivnica, 3 – Sapareva banya, 4 – Svoge/Iskrets, 5 – Kyustendil, 6 – Alino, 7 – Batanovtsi, 8 – Elin Pelin/Buhovo.

Region	1	2	3	4	5	6	7	8	GDD
1	–	6,1	3,9	7,5	14,2	10,9	13,1	9,7	**9,3**
2	**6,1**	–	9,3	10,4	10,6	10,8	13,8	7,8	**10,5**
3	**3,9**	9,3	–	7,1	13,1	10,3	11,6	10,9	**10,4**
4	7,5	10,4	7,1	–	15,6	10,9	13,1	8,4	**10,9**
5	14,2	10,6	13,1	**15,6**	–	11,5	14,1	12,2	**12,9**
6	10,9	10,8	10,3	10,9	11,5	–	12,6	12	**11,4**
7	13,1	13,8	11,6	13,1	14,1	12,6	–	11,2	**12,7**
8	9,7	7,8	10,9	8,4	12,2	12	11,2	–	**10,4**

It can be seen also that the group of Trudovets presents the minimal GDD among all groups – with Slivnitsa (6.1) and with Sapareva Banya (3.9) (**Table 4**).

For the men from Kyustendil it was found that they have the maximal GDD from the men of the Svoge/Iskrets region (15.6). In women, however, unlike men, there were no small GDD between the groups (**Table 5**). Among the women from Kyustendil and those from Svoge/Iskrets, there were also large GDD. The same could be explained by the presence of more pronounced Southern features among the Kyustendil population as a whole.

Table 5. Generalized dermatoglyphical distances (GDD) in the population of Central Western Bulgaria – women: 1 – Trudovets, 2 – Slivnica, 3 – Sapareva bania, 4 – Svoge/Iskrets, 5 – Kyustendil, 6 – Alino, 7 – Batanovtsi, 8 – Elin Pelin/Buhovo.

Region	1	2	3	4	5	6	7	8	GDD
1	–	8,7	9,2	8,8	10,3	6,2	6,7	13,4	**9,0**
2	8,7	–	14	14,8	13,3	13	14,5	11,8	**13,6**
3	9,2	14	–	7,3	9,6	6	10	9,1	**9,3**
4	8,8	14,8	7,3	–	15,1	7,4	6,7	14,4	**11,0**
5	10,3	13,3	9,6	**15,1**	–	9,8	13	10,9	**12,0**
6	6,2	13	6	7,4	9,8	–	8,8	10,4	**9,2**
7	6,7	14,5	10	6,7	13	8,8	–	9,2	**10,4**
8	13,4	11,8	9,1	14,4	10,9	10,4	9,2	–	**11,0**

Conclusions

Based on the results obtained, the following conclusions were made:

– In the studied population of Central Western Bulgaria, a characteristic ratio of the traits was found – an increased incidence of carpal axial triradii, decreased occurrence of images of the hypotenar and a frequency of accessory interdigital triradii;

– In the Central Western Bulgaria population, the mean values for some of the dermatoglyphic traits analyzed are in the upper limits of the Eurasian scale, characteristic of the European population with Eastern characteristics.

These results confirm the historical data on population amalgamation and the traces of migration processes in the region.

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