

DERMATOGLYPHIC IN BULGARIAN MEN – FINGER AND PALM RIDGE COUNT

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ABSTRACT. The aim of the present study is to investigate the finger and palm ridge counts on both hands in a representative group of healthy Bulgarian men. Object of the study are the dermatoglyphic prints from both hands of 1161 healthy men from 116 settlements in the country. The analysis includes: ridge counts on each finger, summary finger ridge count for both hands separately, total finger ridge count; ridge count on each interdigital area, summary palm ridge count for both hands separately, total palm ridge count. The descendent formula of finger ridge count is identical for both hands – I>IV>V>III>II. Considerably higher is the mean summary finger ridge count in right. The distribution of individuals according to summary ridge count in right and left, as well as the total finger ridge count is asymmetrical, moved in left. The palm ridge count is biggest between digital triradii *a-b*, followed by *c-d* and *b-c*. The summary palm ridge count *a-d* is higher on right hand. The distribution of the individuals after summary palm ridge count *a-d* in right and left, as well as the total palm ridge count is almost symmetrical, slightly moved in left.

KEY WORDS: dermatoglyphics, finger ridge count, palm ridge count, Bulgarian men.

INTRODUCTION

The dermatoglyphic characterization of men is a part of his complete anthropological characteristics. Conditionally the dermatoglyphic investigations may be differentiated in two sections: the first covers the studies of variability in dermatoglyphic patterns for healthy populations, and the next exams the genetic aspects of dermatoglyphics and its application in the clinical practice. It is taken for granted that dermatoglyphic features are polygenic determined but during the early stages of embryo genesis the influence of environmental factors couldn't be neglected.

The finger and palmar ridge counts is quantitative dermatoglyphic feature used more rarely than the papillary patterns themselves. In Bulgaria are available data only about finger and palmar ridge counts of healthy persons from Northeast Bulgaria [1] and some ones for control groups in dermatoglyphic investigations of different diseases [2, 3]. That's why when the National program "Anthropological characterization of the Bulgarian population" was elaborated in the Department of Anthropology in the Institute of Experimental Morphology and Anthropology, a dermatoglyphic investigation was carried out, as well.

The **aim** of the present study is to investigate the finger and palm ridge counts on both hands in a representative group healthy Bulgarian men.

MATERIAL AND METHODS

Object of the study are the dermatoglyphic prints from both hands of 1161 healthy men from 116 settlements in the country. The digital and palm ridge counts are elaborated after the Penrose [5] and Holt [4] methods. The analysis includes: the digital ridge counts on each finger, the summary finger ridge count for both hands separately, the total finger ridge count; the palm ridge count on each interdigital area, the summary palm ridge count for both hands separately and the total palmar ridge count for both hands. The bilateral differences are evaluated by the t-criterion of Student at $P < 0.05$.

RESULTS

Finger ridge count

The mean ridge count is highest on I-st digit in right ($18,44 \pm 0,17$), and lowest – on II-nd digit in left ($10,60 \pm 0,20$) (Table 1, Fig. 1). The descendent formula is identical for both hands – $I > IV > V > III > II$. The average ridge count is higher on every finger in right, with the only exception for the III-rd digit by which the difference is 0,11 in favor of left. Statistically significant is the bilateral difference for I-st and II-nd digits ($t = 8,58$ and $t = 4,11$ respectively), while for the rest three fingers the difference is very small. Considerably higher is the mean summary ridge count in right ($71,12 \pm 0,72$) compared with its values in left ($67,44 \pm 0,71$) ($t = 3,64$) (Table 1, Fig. 2). We calculated also the percent distribution of summary ridge count for both hands separately, the identical ridge count on both hands, higher ridge count in favor for right or in favor for left. Identical is the summary ridge count in right and in left for 4,67% of the individuals. At 61,22% of the men the summary ridge count is higher in right, and at 34,11% of them it is higher in left. These data are in unison with the ones published by Holt in 1954 for 254 English males – 3,9%, 63,4% 32,7% respectively [after 4].

The distribution of the individuals according to summary ridge count from I-st to V-th digits shows that most of the males come into the interval 71-80 ridges in right, which coincide with the calculated mean value ($x - 71,12 \pm 0,72$). Again most are the individuals having ridges on I-st to V-th digits within the interval 71-80 in left, but the average value falls into the former interval 61-70 ridges ($x - 67,44 \pm 0,71$). The

frequency distribution of summary ridge count is moved in left, or negatively skewed for both hands. The non-normality is better expressed in left hand compared with the right one (Fig. 3).

The total finger ridge count (TFRC) obtained for both hands in the investigated males is $137,84 \pm 1,49$ (Table 1). The distribution of the individuals according to their TFRC is asymmetrical, moved in left (Fig. 4). This result is probably determined by the distribution of summary ridge count in left hand. Analogical are the results in the investigations of Holt, 1955 for 825 English males [after 4] and Karev, 1979 for 1065 Bulgarian males [1]. The negative skewness in the frequency distribution is accepted by Holt as an indicator for the influence of comparatively small number of genes over TFRC determination. In case when a big number of genes have an appreciable effect on the TFRC determination, the curve of frequency distribution had to be similar to the Gaussian one.

Palmar ridge count

The results about palmar ridge count show that biggest is the number of papillary ridges found in II Interdigital Area (IA) (between digital triradii *a-b*) on both hands, followed in a descendent order by IV IA (*c-d*) and III IA (*b-c*). The *a-b* ridge count have higher mean values on the left hand in comparison to the right one – on which the number of *c-d* ridges is higher. Both differences are statistical significant ($t = 3,16$ and $t = 5,88$ respectively) (Table 2, Fig. 5).

The summary ridge count *a-d* is higher on the right hand ($97,03 \pm 0,42$) than it is on the left one ($95,74 \pm 0,43$) ($t = 2,15$) (Table 2, Fig. 6). The values of summary ridge count range from 55 ridges to 154 ridges on the right hand and from 45 to 141 ridges on the left one. Like for the finger ridge count we calculated also the percent distribution of equal ridge count on both hands, higher ridge count in favor for right or in favor for left. Again the summary palmar ridge count is higher on the right hand (54,01%) for most of the males, but a little bit more frequent is the identical ridge count on both hands (6,33%) compared to those one for the finger ridge count, and for 39,66% of the males it is in favor of the left hand.

The distribution of the individuals after summary palmar ridge count *a-d* shows that most of them have ridges within the interval 91-100 on both hands. These results coincide with the established mean values for both hands. The frequency distribution of summary palmar ridge count is practically symmetrical in contrast to the frequency distribution of summary finger ridge count (Fig. 7).

The mean value of total palmar ridge count (TPRC) for both hands is $193,37 \pm 0,86$ (Table 2). The established minimal total ridge count is 100, and the maximal is 295. The frequency distribution of the individuals according to their TPRC is almost symmetrical but slightly moved in left (Fig. 8).

CONCLUSION

The results in this representative investigation together with the elaborated and published by us data for another dermatoglyphic features give notion about the entire morphological characterization of hands' skin relief in Bulgarian males. The data could be used as a norm in the clinical and anthropological investigations with theoretical and scientific applied purpose.

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Table 1. Statistical parameters of the ridge count on separate fingers and Total ridge count in Bulgarian males

Statistics	Right hand						Left hand						Total both hands
	I	II	III	IV	V	I-V	I	II	III	IV	V	I-V	
n	1091	1081	1104	1098	1112	960	1114	1085	1109	1104	1121	990	858
x	18.44	11.75	11.98	16.03	13.35	71.12	16.38	10.60	12.09	15.69	13.09	67.44	137.84
S	5.60	6.69	5.85	5.50	4.83	22.38	5.79	6.63	5.96	5.54	4.48	22.37	43.55
Sx	0.17	0.20	0.18	0.17	0.15	0.72	0.17	0.20	0.18	0.17	0.13	0.71	1.49
v	30.36	56.95	48.86	34.30	36.17	31.47	35.37	62.54	49.31	35.30	34.26	33.16	31.60
min	0	0	0	0	0	0	0	0	0	0	0	2	4
max	35	30	31	30	25	127	44	29	29	32	27	139	260

Table 2. Statistical parameters of the palmar interdigital ridge count and Total ridge count in Bulgarian males

Statistics	Right hand				Left hand				Total both hands
	a-b	b-c	c-d	a-d	a-b	b-c	c-d	a-d	a-d
n	1088	1030	1023	978	1111	1025	995	972	885
x	37.29	24.88	34.55	97.03	38.05	24.48	33.02	95.74	193.37
S	5.94	5.55	5.78	13.13	5.62	5.42	6.23	13.28	25.45
Sx	0.18	0.17	0.18	0.42	0.17	0.17	0.20	0.43	0.86
v	15.93	22.30	16.72	13.54	14.77	22.14	18.86	13.87	13.16
min	20	8	13	55	9	8	8	45	100
max	66	46	58	154	60	40	51	141	295

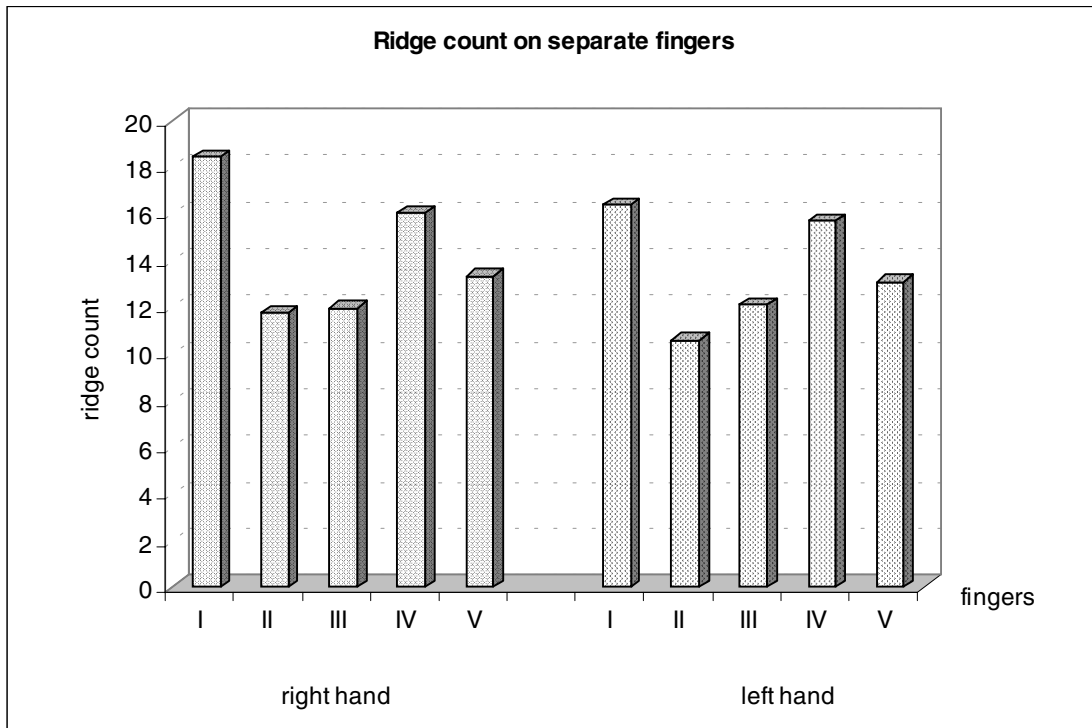


Fig. 1.

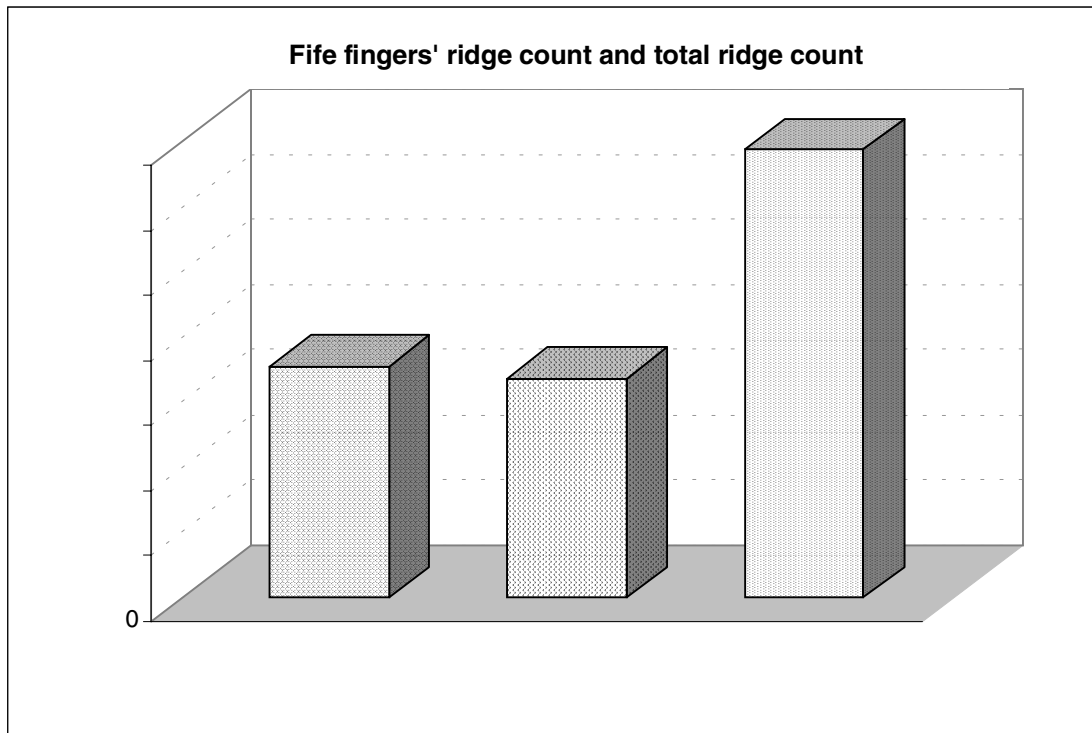


Fig. 2.

Distribution of the individuals according to their summary finger ridge count

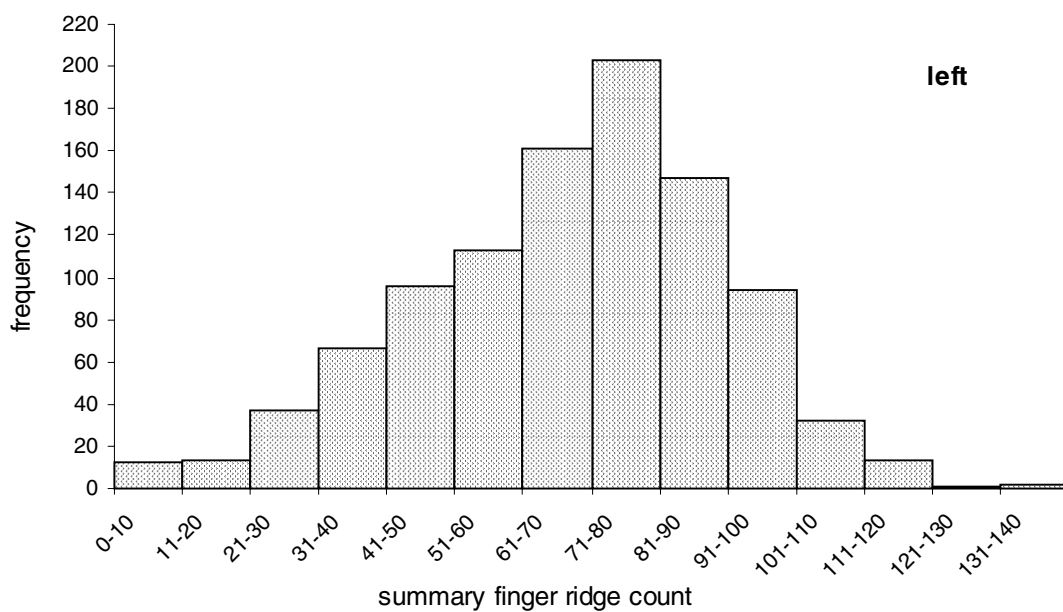
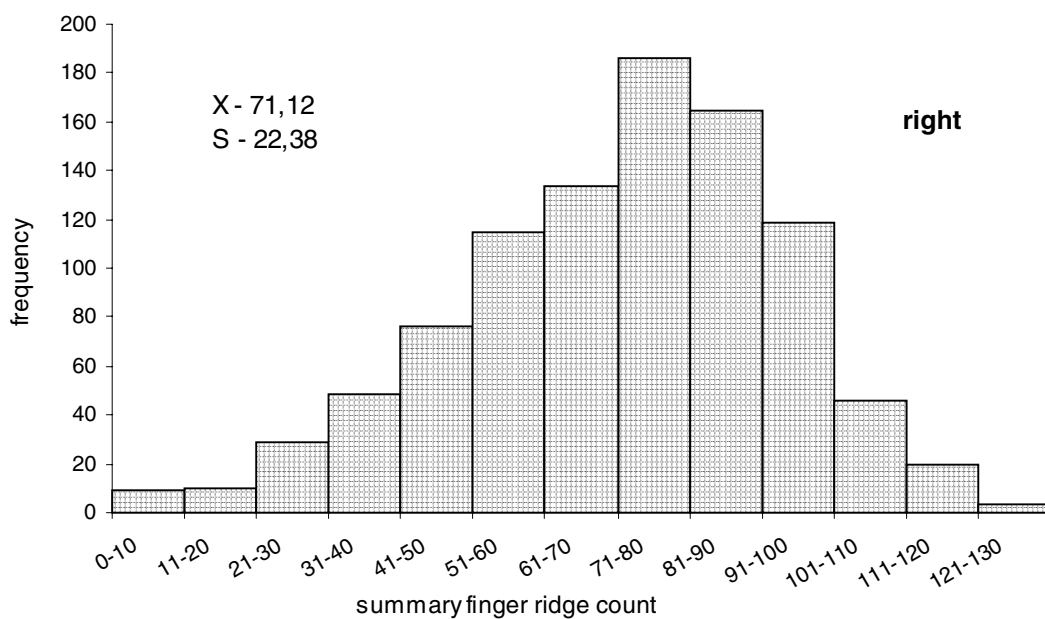


Fig. 3.

Distribution of the individuals according to their total finger ridge count

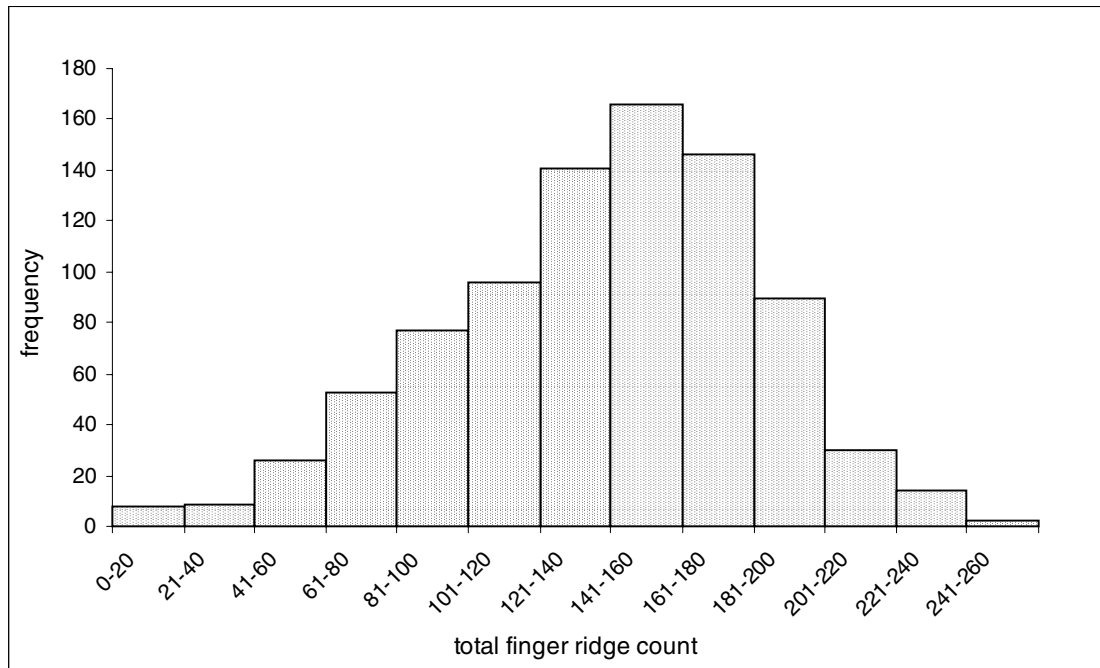


Fig. 4.

Palmar ridge count on separate interdigital areas

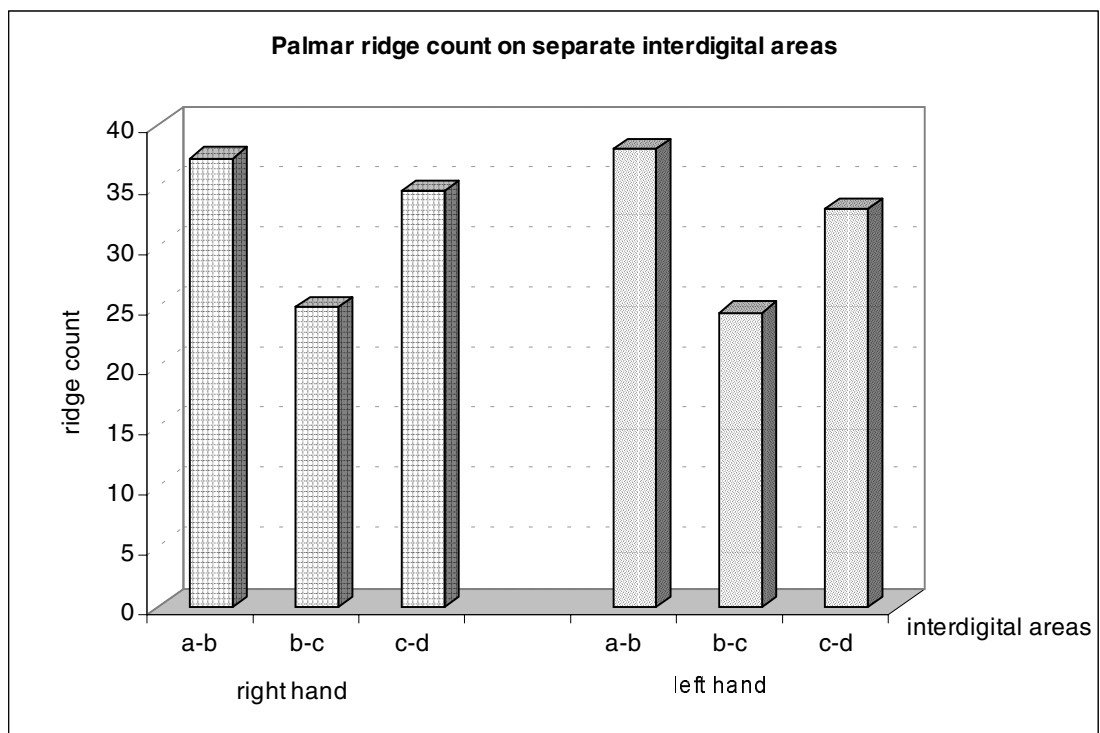


Fig. 5.

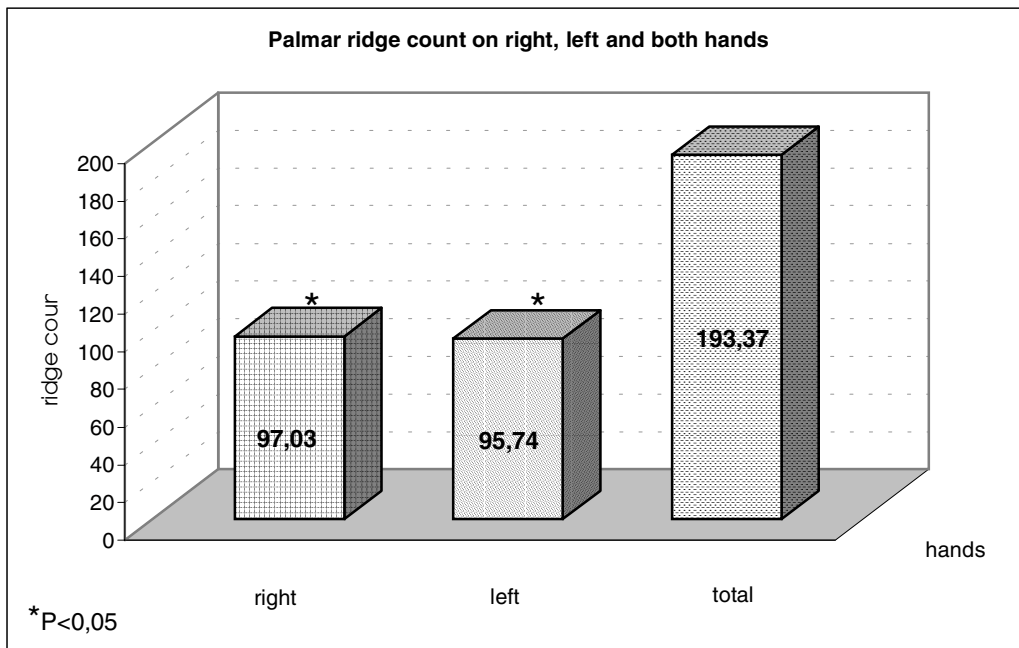


Fig. 6.

Distribution of the individuals according to their summary palmar ridge count

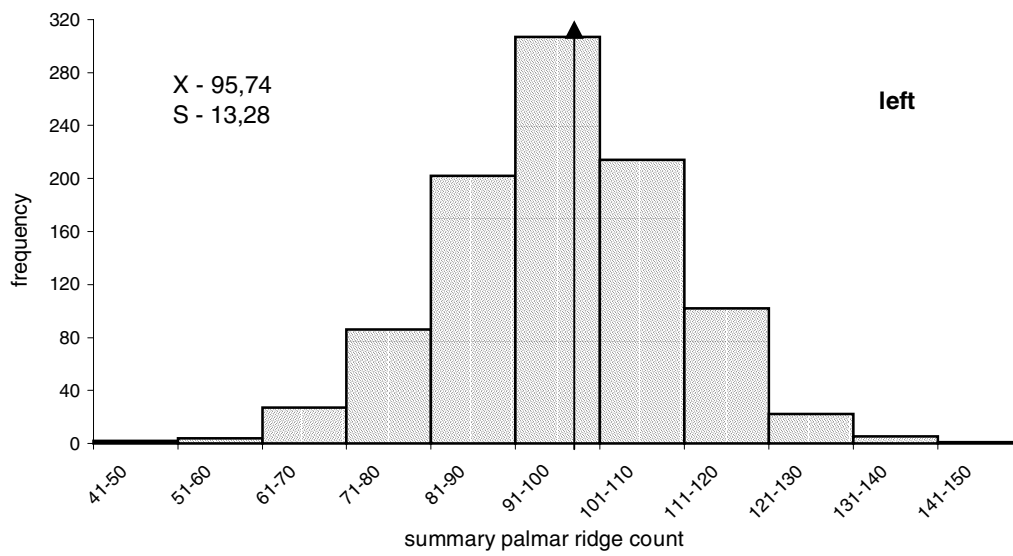
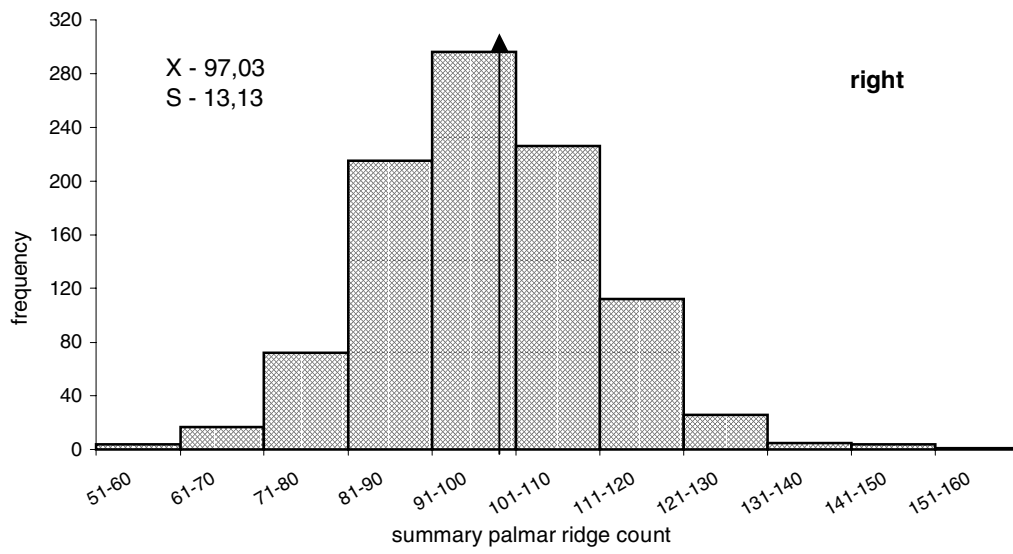


Fig. 7.

Distribution of the individuals according to their total palmar ridge count

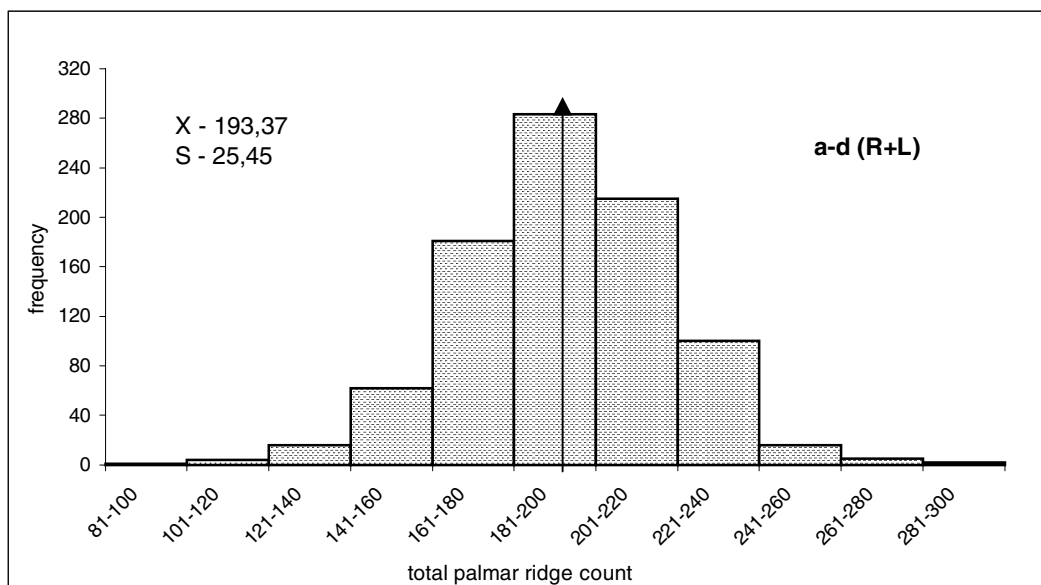


Fig. 8.