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RESEARCH REGARDING THE EXISTENCE OF A PHENOTYPIC CORRELATION BETWEEN STERN LENGTH AND THE ARRIVAL TIME AT GROSSE-FOND PIGEON STOCK *JAN AARDEN*

CERCETĂRI PRIVIND EXISTENŢA UNOR CORELAŢII FENOTIPICE ÎNTRE LUNGIMEA CARENEI STERNALE ŞI TIMPUL DE SOSIRE ÎNTR-UN EFECTIV DE PORUMBEI CĂLĂTORI DE MARE FOND *JAN AARDEN*

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Specialty literature is presenting few data about the estimation of the phenotypic correlations at voyager pigeon. The present study is aiming to present a classic and simple method, accessible to any pigeon ameliorator. The method was used to estimate the phenotypic correlation between the length of the stern and the arrival time in an 18 individuals GROSSE-FOND pigeon stock Jan Aarden breed for a distance of 976 Km. The analyze demonstrate that at the effective studied there is a positive correlation between the two studied characters, the correlation value is was 0,885, reason for which we recommend that the breeders of Jan Aarden stock from this breed should take into the consideration the correlation when performing selection in order to obtain a greater selection effect.
Keywords*:* Grosse-FND *pigeon*, phenotypic correlation, Jan Aarden stock

Introduction

The pigeon, symbol of purity, kindness and fidelity, was considered, from the oldest times, a true friend of the humans. The fidelity and the calm inspired by the pigeon have determined many ancient peoples like Chaldeans, Syrians and Egyptians to appreciate them as sacred birds. The flight with pigeon was practiced from the oldest times, so an Egyptian mural picture from 3000 BC is illustrating the launch of 4 pigeon for an important royal event.

Later the idea of communicating through pigeon started to be popular. The information carried by pigeon for Mars ancient god had become current problems of some military services. Presently the breeding of the pigeon for pleasure have

become the main purpose of breeding. The genetic improvement and breeding the voyager pigeon is not an easy task.

The aim of this paper was to try to estimate the existence of some phenotypic correlations between the length of the stern and the arrival time at GROSSE-FOND pigeon stock *Jan Aarden,* motivated by the lack of information from the specialty literature regarding the subject. The method proposed by us is a simple, classic and easily applicable, accessible to most of the sport breeders interested in genetic improvement of their voyager pigeon stocks.

Materials and Methods

It is well known that the selection effect is decreasing with the number of character taken into consideration. This is the reason why the knowledge of the correlations between characters have a great importance in genetic improvement.

In our estimations we permanently taken into account the following properties of the correlations: they are specific to each character studied, they are specific to each population and each generation, they are specific for the environment where the analyzed population is performing.

Because of the pigeon capacity to modify the morphological characteristics like exterior aspect, physiological traits and organism performances, presently there are known 800 breeds of pigeon (I. Severeanu, 2000).

The group of voyager pigeon resulted from the crossing of many breeds. Presently there are pigeon breeds that can travel short distances 100-200 Km, medium distances 300-500 Km and long distances 700-1200 Km. GROSSE-FOND breeds are part of the long distances breeds and they are used in races of 900-1200 Km.

Anker Alfons (2000), one of the most known pigeon breeders from Europe, says that GROSSE-FOND pigeon designated for 900-1200 Km are not chosen from the birds with long or short tail but from the birds that have narrow chest, light and with few muscles at first sight.

In pigeon the chest muscles is formed by the great pectoral muscle, which is covering the stern bone at exterior, and the small pectoral, situated under it. The small pectoral is lifting during the flight the wing, and the great pectoral pulls it down, so the flight is achieved. The length of these muscles is depending of the length of the stern bone.

Our research was accomplished on an 18 voyager pigeon, from male sex, belonging to the *Jan Aarden* breed. The sternal length was measured between the cranial and caudal extremities. The measurements were performed with an electric device.

The 18th pigeon participated in three races of 976 Km each. They were lunched from Nürnberg-Germany and arrived in Deva-Romania; the races occurred in 2007-2008. The candidates were prepared by removing the females. *Jan Aarden* breed is the most powerful breed of GROSSE-FOND pigeon and it was formed in Holland-Steenbergen.

Results and Discussion

In order to estimate the phenotypic correlation that displays the sense and degree of interdependency between the phenotypic values of the two characters, we used a classic method for variance and covariance analyze. The length of the stern is X character and the arrival time is Y character.

The measurements performed and the calculations necessary are presented in Table 1.

Table 1

The phenotypic variance and covariance analyze of the two characters in order to estimate the correlation

The length of the stern x [mm]	**Arrival time y [min.sec]**	$x-\bar{x}$	$x-\bar{y}$	$(x-\bar{x})^2$	$(x-\bar{y})^2$	$(x-\bar{x})$ $(y-\bar{y})$
68.13	875.18	-3.16	-82.26	9.98	6766.70	259.94
68.22	863.42	-3.07	-94.02	9.42	8839.76	288.64
68.64	887.12	-2.65	-70.32	7.02	4944.90	186.34
68.69	863.42	-2.6	-94.02	6.76	8839.76	244.45
68.72	863.52	-2.48	-93.92	6.15	8820.96	232.92
68.94	857.36	-2.35	-100.08	5.52	10016.00	235.19
69.25	929.30	-2.04	-28.14	4.16	791.85	57.40
69.80	997.12	-1.49	39.68	2.22	1574.50	-59.12
69.73	903.42	-1.56	-54.02	2.43	2918.16	84.27
69.99	966.18	-1.30	8.74	1.69	76.38	-11.36
70.82	976.0	-0.47	18.56	0.22	344.47	-8.72
70.87	977.12	-0.42	19.68	0.18	387.30	-8.26
71.20	995.54	-0.09	38.1	0.01	1451.61	-3.43
71.30	996.14	0.01	38.7	0.00	1497.69	0.387
76.70	1053.54	5.41	96.1	29.27	9235.21	519.90
76.80	1060.14	5.51	102.7	30.36	10547.29	565.87
77.73	1084.40	6.44	126.96	41.21	16118.84	717.62
77.85	1085.12	6.56	127.68	43.03	16302.18	837.58
$\Sigma x = 1283.38$ $\bar{x} = 71.29$	$\Sigma y = 17234.04$ $\bar{y} = 957.44$			$\Sigma(x-\bar{x})^2 =$ $= 199.63$	$\Sigma(y-\bar{y})^2 = 109473.56$	$S\,\mathrm{Pr}\,A =$ $= 4139.61$

In this phase we have all the necessary data for estimating the phenotypic correlation coefficient applying the next formula.

$$r_{p_{xy}} = \frac{\mathrm{cov}_{p_{xy}}}{\sqrt{V_{p_x} \cdot V_{p_y}}} = \frac{\Sigma(x-\bar{x})\cdot(y-\bar{y})}{\sqrt{\Sigma(x-\bar{x})^2 \cdot \Sigma(y-\bar{y})^2}} = \frac{4139\ ,61}{\sqrt{199\ ,63 \cdot 109473\ \ ,56}} =$$

$$= \frac{4139\ ,61}{\sqrt{21854206\ \ ,78}} = \frac{4139\ ,61}{4674\ ,84} = 0,885$$

The coefficient value (0.885) resulted is demonstrating that between the two characters there is a strong and positive phenotypic correlation.

In order to extrapolate with a mean probability the value of the correlation coefficient from the lot to the population, we calculated the standard error using the next formula:

$$r_m = \pm \frac{1 - r_{p_{xy}}^2}{\sqrt{n}} = \frac{1 - (0,885)^2}{\sqrt{18}} = \frac{1 - 0,783}{4,24} = 0,051$$

$$r_{p_{xy}} = 0,885 \pm 0,051$$

Conclusions

After analyzing the data we can conclude that between the two characters studied, the length of the stern and the arrival time, there is a strong positive correlation at the studied lot of *Jan Aarden* pigeon. This means that, selecting after only one of the character we ameliorate the other, in the same direction.

It is noticeable the mean flight speed, 61,16 Km/hour, estimated for the 976 Km distance. Maximum speed was 68,34 Km/hour.

Based on the fact that the selection effect is greater when a small number of character is taken into consideration and taken into account the simplicity of the method described, accessible to any pigeon breeder, we recommend that the starting of the genetic improvement procedure ought to be preceded of establishing the correlation between the characters that will be the objective of the selection.

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