THE PHENOTYPIC CORRELATION FOR PRODUCTION TRAITS IN MERINO OF PALAS SHEEP

Die phänotypische Korrelation zwischen leistungsfähigen Eigenschaften den Palas Merino-Schafen

La corrélation phénothypique entre les principaux caractères productifs des ovins de la race mérinos Palas

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This werk as conducted on the Merino of Palas sheep breed, that has been formed in Rumania beginning with the year 1924 by crossing the native Tzigaia and Merino half-bred ewes with Rambouillet and German Merino rams.

Up to date the correlation for productive traits in the world existing breeds of sheep were reported by many authors, thus for greasy wool weight and clean wool weight $r = 0.94$ in the Merino-Landschaf sheep and $r = 0.93$ in the German Black Headed Meat sheep as stated by WASSMUTH (1962).

The data on the Australian Merino reported by MORLEY (1955), SCHNICKEL (1958), YOUNG *et al.* (1963), KENNEDY (1967), BROWN and TURNER (1968), showed a close values of phenotypic correlation coefficients between greasy wool weight with body weight and wrinkle score ($r = 0.24$ to 0.36), than for clean wool weight and body weight ($r = 0.23$ to 0.69).

In the Tzigaia sheep TAFTA *et al.* (1962) found $r = 0.085$ for greasy wool weight and body weight, but ALEXOIU *et el.* (1970) for the same characterstics found $r = 0.385$.

The purpose of this work is to find out the phenotypic correlation coefficients for productive traits in the Merino of Palas sheep, aimed to establish the breeding plan and selection methods for improving the wool production in this breed.

MATERIAL AND METHODS

The study was carried out on the Merino of Palas sheep from 1966 to 1973 on data recorded in Parents Stud by S. C. C. C. O., Palas, involving about 17,000 ewes and 10,000 lambs.

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The Table 1 show the average of the most important productive traits performed by the Merino of Palas sheep in the studied period.

The data were obtained on animals ranking within the same group as age, physiological conditions and the scoring of productive traits in sheep have been performed by the same operators. In the end aiming to increase the data values for each characteristics a large number of individuals were involved.

TABLE 1

THE AVERAGE PRODUCTIVE TRAITS PERFORMED BY THE MERINO OF PALAS SHEEP BETWEEN 1966 TO 1973

Characteristics measured	Category of sheep	n	$\bar{X} \pm s\bar{x}$	% $V.C.$
Birth body weight of lambs (Kg)	Single lambs m.	691	5.61 ± 0.030	18.00
	Twins lambs m.	617	4.76 ± 0.040	15.96
	Single lambs f.	793	5.37 ± 0.040	17.69
	Twins lambs f.	713	4.52 ± 0.030	15.70
Weaning body weight of lambs (Kg)	Single lambs m.	632	23.81 ± 0.240	24.61
	Twins lambs m.	597	21.71 ± 0.320	24.73
	Single lambs f.	712	22.40 ± 0.220	22.94
	Twins lambs f.	628	20.19 ± 0.250	22.88
Shearing body weight (Kg)	Rams	81	107.60 ± 0.249	9.69
	Ewes	3.109	65.94 ± 0.266	17.45
	1st shearing m.	1.050	61.17 ± 0.349	14.23
	1st shearing f.	1.180	48.58 ± 0.349	10.70
Greasy wool weight (Kg).	Rams	81	13.58 ± 0.238	15.39
	Ewes	3.109	8.14 ± 0.030	16.41
	1st shearing m.	1.050	10.72 ± 0.084	21.37
	1st shearing f.	1.180	9.89 ± 0.060	16.54
Staple length (cm)...	Rams	81	9.52 ± 0.133	11.33
	Ewes	3.109	7.34 ± 0.006	8.90
	1st shearing m.	1.050	10.65 ± 0.005	12.69
	1st shearing f.	1.180	11.43 ± 0.051	10.85

m = males; f = females.

Results and discussion

The data from Table 1 showing a positive correlation between weaning body weight of lambs and 1st shearing greasy wool weight ($r = 0.430$), and a lower one for birth body weight and greasy wool weight ($r = 0.203$). The same close report was found at 1st shearing between greasy wool weight and body weight ($r = 0.456$) ($b = 0.071$ Kg) and in 2nd to 6th shearing ewes ($r = 0.179$ to 0.325).

The Table 2 show that in ewes at 4th to 6th shearing the regression coefficients values are higher in ewes ranged 51 to 60 Kg body weight ($b = 0.69$ Kg); medium values in sheep ranged 61 to 70 Kg body weight ($b = 0.046$ Kg) and the lowest values in the ewes ranged over 71 Kg body weight ($b = 0.001$ to 0.005 Kg). The total regression coefficient values being $b = 0.048$ Kg.

TABLE 2

The regression coefficients for wool weight and body weight in 4-th to 6-th shearing ewes

Body weight at shearing (Kg)	n	$\bar{X}$	$\bar{Y}$	$b \pm sb$	Wool (g)/ weight (Kg)
51 - 60...	596	56.3	7.7	0.069 ± 0.009 ***	69
61 - 70...	1,004	65.4	8.3	0.046 ± 0.001 ***	46
71 - 80...	584	74.7	8.7	0.001 ± 0.000 *N. S.*	1
Up to 81	141	83.9	8.9	0.005 ± 0.000 *N. S.*	5
In all	2,325	65.7	8.4	0.048 ± 0.002 ***	48

*** = $P < 0.1$ %; * = $P < 5$ %; *N. S.* = $P > 5$ %.

Based en this data should be concluded that the selection for greasy wool weight is efficient applyed on body weight as weaning and 1st shearing. In the same time in ewes from 2nd to 6th shearing the body weight could be maintained at a level ranged from 60 to 65 Kg.

The phenotypic correlation between birth, weaning and 1st shearing body weight with 1st shearing staple length has a non-existing or slight positive correlation ($r = 0.016$ to $+ 0.146$), which emphasize the necessity to apply the selection for each of the characteristics.

The phenotypic correlation coefficients between ewes body weight and lambs body weight at birth has a positive correlation ($r = 0.273$) in 1st lambing ewes and $r = 0.209$ in 3rd to 6th lambing ewes. The regression coefficient values were $b = 0.026$ Kg (single + twins) in 1st lambing ewes and $b = 0.017$ Kg (single + twins) in 3rd to 6th lambing ewes. In the same time we found that the birth body weight of singles lambs increased much more ($b = 0.020$ Kg) than in lambs born as twins ($b = 0.012$ Kg) with the body weight of 3rd to 6th lambing ewes.

The correlation between birth and weaning body weight of lambs has been $r = 0.313$ and $b = 3.160$ Kg in male lambs, and $r = 0.247$ and $b = 2.210$ Kg in female lambs. Between birth and 1st shearing body weight $r = 0.216$ and $b = 4.110$ Kg respectively. A large one report was wound between weaning and 1st shearing body weight ($r = 0.395$; $b = 0.610$ Kg) in males and $r = 0.377$, $b = 0.560$ Kg in females) (Table 3).

TABLE 3

ESTIMATES OF PHENOTYPIC CORRELATION BETWEEN THE BODY WEIGHT AND PRODUCTIVE TRAITS IN MERINO OF PALAS SHEEP

Characteristcs measured	n	$r \pm sr$
Birth body weight (Kg) - Greasy wool weight in 1st shearing ewes	1,040	0.203 ± 0.029 ***
Weaning body weight (Kg) - Greasy wool weight in 1st shearing ewes	1,040	0.430 ± 0.025 ***
Body weight (Kg) - Greasy wool weight Kg in:		
1st shearing ewes	1,203	0.456 ± 0.023 ***
2nd shearing ewes	1,063	0.325 ± 0.027 ***
3rd shearing wes	877	0.208 ± 0.019 ***
4th shearing wes	1,089	0.179 ± 0.026 ***
5th shearing ewes	798	0.220 ± 0.043 ***
6th shearing ewes	438	0.301 ± 0.047 ***
Birth body weight (Kg) - Staple length (cm) in 1st shearing ewes	1,040	— 0.016 ± 0.003 *N. S.*
Weaning body weight (Kg) - Staple length (cm) in 1st shearing ewes	1,040	0.146 ± 0.030 *
Body weight (Kg) - Staple length (cm) in 1st shearing ewes	1,040	0.057 ± 0.031 *N. S.*
Birth body weight of lambs - Body weight of mother ewes:		
1st lambing	1,117	0.273 ± 0.028 ***
3rd to 6th lambings	1,855	0.209 ± 0.022 ***
Birth body weight (Kg) - Weaning body weight (Kg) in:		
Males	1,994	0.313 ± 0.020 ***
Females	1,861	0.247 ± 0.021 ***
Birth body weight (Kg) - 1st shearing body weight (Kg) in ewes	1,040	0.216 ± 0.029 ***
Weaning body weight (Kg) - 1st shearing body weight in:		
Males	1,116	0.395 ± 0.027 ***
Females	1,040	0.377 ± 0.018 ***

*** = $P < 0.1$ %; * = $P < 5$ %; *N. S.* = $P > 5$ %.

TABLE 4

ESTIMATES OF THE PHENOTYPIC CORRELATION BETWEEN THE MAIN CHARACTERISTCS OF WOOL PRODUCTION IN MERINO OF PALAS SHEEP

Characteristics measured	*n*	$r \pm sr$
1. Greasy wool weight (Kg) at 1sh shearing (+) with:		
Wool weight (Kg) amount at 4th to 6th shearing ewes	1,125	0.637 ± 0.018 ***
Wool weight (Kg) amount at 2nd + 3rd + 4th + 5th + 6th shearing ewes	3,317	0.786 ± 0.010 ***
Clean wool weight (Kg) in:		
1st shearing rams	147	0.842 ± 0.024 ***
2nd to 4th shearing rams	132	0.931 ± 0.012 ***
1st shearing ewes	151	0.918 ± 0.013 ***
2nd to 4th shearing ewes	174	0.885 ± 0.016 ***
Fibre diameters (microns) in:		
1st shearing ewes	1,040	0.287 ± 0.030 ***
3rd to 6th shear ewes	1,775	0.233 ± 0.022 ***
Staple lenth (cm) in:		
1st shearing ewes	1,040	0.262 ± 0.029 ***
3rd to 6th shearing ewes	1,775	0.221 ± 0.027 ***
Fibre density score in:		
1st shearing ewes	1,040	0.134 ± 0.029 ***
3rd to 6th shearing ewes	1,775	0.274 ± 0.022 ***
2. Staple length (cm) (+) at 1st shearing ewes with:		
Staple length (cm) (+) in 3rd to 6th shearing ewes	2,316	0.340 ± 0.014 ***
Fibre density score in:		
1st shearing ewes	2,126	−0.206 ± 0.020 ***
3rd to 6th shearing ewes	2,824	−0.068 ± 0.018 *
Fibre diameter (microns) in 1st shearing ewes	1,040	0.243 ± 0.029 ***
3. Fibre diameter (microns) - Fibre density score (1 to 5 notes) in 1st shearing ewes	1,040	−0.160 ± 0.029 ***

*** = $P < 0.1$ %; * = $P > 5$ %; + = corrected to 12 months.

This data suggest that the selection for increasing the body weight at 1st shearing should be efficient on the body weight at weaning and birth of lambs.

The data from Table 4 show a strong correlation between 1st shearing greasy wool weight with the sum of greasy wool weight at 4th to 5th shearing ($r = 0.637$) and with the sum of greasy wool weight at 2nd + 3rd + 4th + 5th + 6th shearing ($r = 0.786$).

The highest coefficient was found to be $r = 0.842$ to 0.931 between greasy wool weight and clean wool weight in 1 to 4 old rams and ewes. These data suggest that the selection will be applied in Merino of Palas sheep upon a single character only.

The greasy wool weight has positive correlation with fibre diameter in microns ($r = 0.287$, $b = 0.273$ Kg/micron) at 1st shearing; $r = 0.233$, $b = 0.208$ Kg/micron at 3rd to 6th shearing, with staple length $r = 0.262$, $b = 0.211$ Kg/cm at 1st shearing; $r = 0.221$, $b = 0.178$/cm at 3rd to 6th shearing, with fibre density score 1 to 5 notes): $r = 0.134$, $b = 0.175$ Kg at 1st shearing ewes and $r = 0.247$, $b = 0.154$ Kg at 3rd to 6th shearing ewes (Table 4).

The staple legth at 1st shearing has a positive correlation with staple length at 3rd to 6th shearing ($r = 0.340$, b = 0.291 cm).

Finally the Table 4 data show a negative correlation between staple length-fibre density score and fibre diameter-fibre density score, and the staple length has a positive correlation with the fibre diameter ($r = 0.243$). These data must be essential in applying selection aim to increase the wool production and its qualities in Merino of Palas sheep.

Conclusion

The data from this work show that the greasy wool weight has a positive correlation with birth body weight, 1st to 6th shearing ewes body weight, the greasy wool amount from 2nd to 6th shearing ewes, clean wool weight, fibre diameter, staple length and fibre density score.

The body weight in 1st to 6th lambing ewes has a positive correlation with birth and weaning lambs body weight.

The staple length at 1st shearing has a positive correlation with staple length in 3rd to 6th shearing ewes, and negative one with fibre density score.

The results of this work should be used to find out the selection norms aimed to improve the wool production and its qualities in the Merino of Palas sheep.

SUMMARY

On the data recorded in Parents Stud of Palas Merino sheep from S. C. C. C. O., Palas, covering eight years (1966 to 1973) and involving about 17,000 ewes and 10,000 lambs, was established the phenotypic correlation coefficients for productive traits in this breed. Therefore the work show that the greasy wool weight has a positive correlation with birth body weight of lambs ($r = 0.203$); weaning body weight of lambs (($r = 0.430$); 1st to 6th shearing ewes body weight

($r = 0.179$ to 0.456); the greasy wool weight amount in 2nd to 6th shearing ewes ($r = 0.786$); clean wool weight ($r = 0.842$ to 0.931); fibre diameter, staple length and fibre density score.

The body weight at 1st to 6th shearing ewes has a positive correlation with birth and weaning lambs body weight ($r = 0.209$ to 0.273).

The staple length at 1st shearing has a positive correlation with staple length at 3rd to 6th shearing ewes ($r = 0.340$) and a negative one with fibre density score ($r = 0.206$).

The results of this work should be used to find out the selection norms aimed to improve the wool production and its qualities in the Merino of Palas sheep.

ZUSAMMENFASSUNG

Auf Grund des registrierten Daten über die Zuchtherde den Palas Merino-Schafen von S. C. C. C. O.-Palas, während 8 Jahren (1966-1973) und ungefähr 17,000 Schafe und 10,000 Lämmer, die phenotypischen Korrelationskoeffizienten zwischen die grundsätzlichen Leistungsfähige Eigenschaften bei dieser Rasse festgestellt sind. Aus dieser Arbeit geht hervor dass die Rohwolle Leistung mit das Geburtsgewicht der Lämmer ($r = 0.203$); mit die Absatzkörpergewicht der Lämmer (0,430); mit den Schafeskörpergewicht von die 1ste bis zum 6ten Schur ($r = 0.179$-0.465); mit der Reinwolleleistung ($r = 0.842$-0.931); mit den Faserdiameter, mit den natürlichen Wollstapelslänge und mit der Note für die Wollfaserdichte positiv korreliert sind.

Das Körpersgewicht der Schafe von die 1ste bis die 6te Lämmern mit den Geburts- und Absatz-Gewicht der Lämmer positiv korreliert ist ($r = 0.209$-0.273).

Die Stapellänge am 1ste Schur ist mit den Stapellänge von die 3te bis 6ten Schur des Schafes positiv korreliert ($r = 0.340$) und negativ mit der Note für das Wollfaserdichte ($r = 0.206$).

Die Ergebnisse dieser Arbeit werden für die Zuchtungsmethoden Feststellung benützt, um die Wolleleistung und dessen Qualität an die Palas Merino-Schafe zu verbessern.

RESUME

Les coefficients de la corrélation phenotypique entre les principaux caractéristiques productives sont établis à la race Merinos Palas, sur 17.000 brebis et 10.000 agneaux du troupeau de sélection, élevé a S. C. C. C. O. Palas.

La production brute de la laine obtenue à la 1ère tonte est corrélationnée positivement avec le poids vif à la naissance, au sevrage, à la Ière-VIème tonte; avec la quantité de la laine lavée; avec le diamètre et la longueur des fibres et avec l'épaisseur du toisson.

Le poids vif des brebis au Ière-Vème augnelage est corrélationnée positivement avec le poids vif des agneaux à la naissance et au sevrage.

La longueur des fibres de la 1ère tonte a corrélation possitive avec la longueur des fibres de la IIIème-VIème tonte et negative avec l'épaisseur des fibres.

Les résultats obtenus seront utilisés pour établir les méthodes de sélection, dans le but de l'amélioration de la production et de la qualité de la laine chez la race Merinos Palas.

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