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العوامل التي تؤثر على صفات الجلد والشعر في أبقار الفريزيان والجيرس
وعلاقتها بالانتاج

راوية الحلواني ، محمد الفاتح ، ابراهيم سالم

أجرى البحث لفرض ايضاح تأثير العمر ونصول السنة وأختلاف سلالة الحيوان على سمك الجلد
ووزن الشعر وقطرة وعلاقتها بانتاج اللبن وكذلك نسبة الدهن . وقد أوضحت النتائج وجود فرق في
سمك الجلد بين كل من السلالتين حيث كان جلد الجرسى اسماك من الفريزيان وكان الفرق معنويًا
في سمك منطقة الكتف خاصة في العجول النامية وكان تأثير فصل السنة بسيطًا ولو أنه السمك زاد نوعًا
في فصل الهستا .

كما أوضح البحث وجود علاقة سالبة غير معنوية بين سمك الجلد وأد رار اللبن وعلاقة موجبة بين
سمك الجلد ونسبة الدهن في كل من السلالتين .

كما اتضح أيضا وجود تأثير معنوي لوزن الشعر وقطره حيث كان معامل الارتباط موجب مع نسبة
الدهن وسالب مع أد رار اللبن .

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SKIN AND HAIR CHARACTERS OF FRIESIAN AND JERSEY COWS AS AFFECTED BY AGE, SEASON OF THE YEAR AND THEIR RELATION WITH MILK PRODUCTION

(With 5 Tables)

By

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SUMMARY

This work was carried at the experimental station of Animal Production, Dept. of Animal Production, Faculty of Agriculture, Assiut University on 60 selected Friesian and Jersey animals of different ages. The aim of the present investigation is to study the effect of age, season, breed difference on skin thickness and some hair characters and their relation with milk yield. The results could be summarized as follows:

- Jersey animals had thicker skin compared with Friesian ones. Significance differences were detected between the two breeds at the shoulder region.
- There was a significant effect of age on skin thickness in both breeds. The skin thickness increased as age advanced.
- Seasonal variations were noticed in skin thickness which reached maximum influence at winter and minimum at autumn.
- Skin thickness at the shoulder region was relatively higher than the last rib region in both breeds. Insignificant negative correlation was also noticed between skin thickness and milk yield, while insignificant positive correlation was detected between skin thickness and fat percentage of milk from both breeds.
- Hair weight per standard unit area from Jersey breed is heavier compared with Friesian, although the latter is characterized by thin hair diameter.
- There are significant positive correlations between hair diameter, hair weight per unit area and fat percent of milk from Jersey cows, while insignificant correlations were found in Friesian cows.
- A significant negative correlation was detected between milk yield and hair diameter of Jersey cows and milk yield and hair weight of Friesian cows.

INTRODUCTION

The relationship between the histological structure of the skin and milk production of dairy cattle and buffaloes has been thoroughly investigated FINDLY and YANG (1950), SHAFIE (1954), HAFEZ *et al.* (1955), BAGIROF (1966), SALEM (1966), EL-HALAWANY (1977), however few studies were done regarding the morphological character of cattle skin and hair coat. VERNISHINKA (1970) reported that dual-purpose cattle were characterized by thick skin compared with single purpose dairy cattle. The same author also mentioned that Ayrshire cows skin was much thicker than that of Holland breed at the shoulder and last rib regions.

VESOLOVSKI (1972) mentioned that the relationship between skin characters and milk production was positively correlated. BERCHINA (1974) demonstrated that cattle which give milk with high fat content characterized by thicker skin than Friesian cows, a negative relationship between skin thickness and milk production was also observed by ARZUMANIAN (1957).

The effect of season on the hair characters was observed by many workers DOWLING (1959), DOWLING and NAY (1960), IKRAMOV (1964), KASSAB and STEGENA (1965 b) and BIANCA *et al.* (1974).

Differences due to sex in the number of hair in the coat of cattle skin was reported by HAFEZ *et al.* (1955), KASSAB and STEGENA (1965). Breed differences in hair weight was observed by SCHLEGER and TURNER (1960), PETERS and SLEN (1964), KASSAB (1964).

The aim of the present investigation is to study the effect of age, breed and season on skin thickness, some of hair characters of two cattle breeds and their relationship with milk production.

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MATERIAL and METHODS

The work was carried at the experimental station of Animal Production, Faculty of Agriculture, Assiut University on 60 Friesian and Jersey cattle (10 in each subgroup) of different ages. The animals of both breeds were divided into three groups according to birth date. The first, second and third group which include suckling, growing and adult lactating animals. The average milk yield throughout the lactation period for Friesian and Jersey cows in the third group was 2496.5, 1878 Kg. respectively with average fat percentage of milk within the lactation period was 3.36 and 5.04 for Friesian and Jersey cows, respectively.

Skin, thickness was measured at the shoulder and mid of the last rib region at the right side of the experimental animal according to the method described by ARZUMANIAN (1957).

Hair samples were taken from standard unit area of the skin (3 x 3 square centimeter). Every hair sample from each individual animal was collected carefully in envelopes, prepared and used to determine weight of the hair per one square centimeter. Diameter of the hair also measured according to the method described by ARZUMANIAN (1957). Statistical analysis of the data was carried according to SNEDOCOR (1955).

RESULT and DISCUSSION

The coat of the animal is one of the important factors affecting the rate of heat dispersal of the body and consequently the production performance of the dairy animal.

Table 1, shows the variation in the skin thickness at different ages and body regions. It was evident that Jersey cows had a relatively thicker skin thickness than Friesian. The difference at the shoulder in growing animals was significant ($P \leq 0.05$). Breed difference in skin thickness was observed previously by VERNISHINKA (1970), BERCHINA (1974).

The average skin thickness of Friesian and Jersey suckling calves at the mid of the last rib and shoulder regions was 4.0 and 4.25 for Friesian and 4.15, 4.38 mm. for Jersey breed, respectively. The value for growing animal on the same regions and breeds was 5.92, 6.13, 6.4 and 7.6 mm, respectively, however the skin thickness of lactating cows of the two breeds is more than the other groups. There is great effect of age on skin thickness which is similar to the results obtained by ARZUMANIAN (1957), SALEM (1966).

Variations in skin thickness at different seasons of the year are illustrated in Table 2. It is evident from the data that variation in skin thickness of Jersey and Friesian cows between the different seasons is very slight although higher values were determined in the skin thickness of both breeds in winter, which could be due to adaptation of the animals to the surrounding environment. However the mean value of skin thickness in the whole year was practically similar in both breeds.

Data presented in Table 3 revealed the correlation between skin thickness at both regions studied and milk production and fat percentage.

A negative correlation coefficient was found between skin thickness and milk production in both breeds ($P \leq 0.05$). On the other hand positive correlation coefficient was obtained between fat percentage and skin thickness in Jersey cows. These correlation coefficients were not significant, except in Friesian breed where a significant positive correlation obtained between skin thickness and fat percentage at half of the last rib ($P \leq 0.05$). The same results were obtained by BROZROF (1973), VESOLOVSKI *et al.* (1972) and EL-HALAWANY (1977).

The mean value of hair weight per standard unit area and hair diameter from the coat of the two breeds at different ages are given in Table 4. It could be noticed that the hair weight per standard unit area of Jersey cows was heavier than that of Friesian cows at all ages. The highest weight was observed in the coat of suckling calves. It is of interest to mention here that breed differences in hair weight were markedly appear in suckling and lactating animals, while hair weight of growing animals was practically similar. Statistical analysis revealed significant differences in hair weight between suckling and lactating animals in both breeds. It can be concluded from present results that age and breed of the dairy animal, has a substantial effect on hair weight. This results were in harmony with

FACTORS AFFECTING SKIN AND HAIR CHARACTERS OF DAIRY COWS

those obtained by SCHLEGER and TURNER (1960), PETERS and SLEN (1964).

Variations in hair diameter between the two breeds were also detected (Table 4). Friesian cows were characterized by thicker hair diameter than Jersey ones. Variations in hair diameter from month to month in the coat of different breeds was observed by BERMAN and VOLCAN (1961); KASSAB and STEGENGA (1965 a).

Table 5 summarize the correlation between hair weight and hair diameter with milk production and fat percentage of milk in both breeds. The table reveals a positive significant correlation between hair weight and diameter and fat percentage in Jersey cows milk, whereas in Friesians the correlation was low and insignificant. A significant negative correlation was detected between milk yield and hair diameter of Jersey cows ($P < 0.01$) and also between milk yield and hair weight in Friesian cows ($P < 0.05$).

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Table 1. Variations in skin thickness at different regions(mm).

Breeds	Friesian				Jersey				$M_3 - M_1$	$M_2 - M_1$
	At the mid of the last rib		At the shoulder		At the mid of the last rib		At the shoulder			
	$M_1 + m$	CV	$M_2 + m$	CV	$M_3 + m$	CV	$M_4 + m$	CV		
Suckling calves	4.0 ± 0.127	9.57	4.25 ± 0.15	6.23	4.15 ± 0.14	7.58	4.38 ± 0.2	10.54	0.15	0.13
Growing animal	5.92 ± 0.46	22.19	6.13 ± 0.49	22.28	6.4 ± 0.55	24.37	7.6 ± 0.49	18.79	0.48	1.467
Lactating cows	9.81 ± 0.27	10.18	8.97 ± 0.38	14.52	9.125 ± 0.24	11.53	9.71 ± 0.22	10.60	0.315	0.24

Data represents values from ten individuals from each group.

* = Significant at 5 % level

Table 2. Seasonal variations in skin thickness(mm).

Breeds	Friesian				Jersey				
	Regions	At the mid of the last rib		At shoulder		At the mid of the last rib		At shoulder	
		M	± m	M	± m	M	± m	M	± m
Winter	8.81	± 0.27	8.97	± 0.38	9.12	± 0.24	9.21	± 0.22	
Spring	9.72	± 0.06	8.75	± 0.09	9.04	± 0.13	9.1	± 0.16	
Summer	8.79	± 0.07	8.78	± 0.08	9.01	± 0.18	9.17	± 0.13	
Autumn	9.67	± 0.11	8.68	± 0.12	8.77	± 0.1	8.93	± 0.07	
Mean	8.75		8.80		8.99		9.08		

FACTORS AFFECTING SKIN AND HAIR CHARACTERS OF DAIRY COWS

Table 3. Correlation between skin thickness and milk production and fat percentage of milk.

Regions	Breeds			
	Friesian		Jersey	
	Milk production	Fat %	Milk production	Fat %
At the mid of the last rib	-0.365 * 0.22	+0.65 * 0.315*	-0.092 * 0.28	+0.256 * 0.27
At shoulder	-0.31 * 0.335	+0.105* 0.35	-0.002 * 0.28	+0.249 * 0.27

* Significant at 5% level.

Table 4. Some of hair character of Friesian and Jersey cows at different ages.

Age of the animal	Friesian				Jersey				$M_1 - M_1$	$M_2 - M_2$
	Weight of hair Mg / cm ²		Hair diameter μ		Weight of hair Mg / cm ²		Hair diameter μ			
	$M_1 \pm m$	CV	$M_2 \pm m$	CV	$M_1 \pm m$	CV	$M_2 \pm m$	CV		
Suckling	16.94*1.34	20.95	32.7 * 1.83	14.84	24.15* 4.11	45.01	29.67* 1.12	10.0	-7.21**	3.03*
Growing	17.92*1.28	28.1	29.75* 0.69	6.55	13.77* 2.0	41.16	26.31* 0.79	8.59	-0.95	3.44*
Lactating	9.53*1.51	47.67	29.11* 0.94	9.74	14.14* 1.25	26.59	27.65* 1.19	12.91	-4.61**	1.46

* $P > 0.01$
** $P > 0.001$

Table 5. Correlation between hair weight, hair diameter and milk production.

Character	Breeds			
	Friesian		Jersey	
	Milk production	Fat %	Milk production	Fat %
Hair weight (Mg / cm)	-0.513 * 0.35*	+0.105 * 0.405	-0.036 * 0.44	+0.52 * 0.38*
Hair diameter (μ)	-0.02 * 0.40	+0.04 * 0.47	-0.593 * 0.36**	+0.61 * 0.35**

* P > 0.1

** P > 0.05