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التغيرات فى بعض مكونات الدم وعلاقتها بظاهرة تساقط الصوف فى النعاج الصعيدى

فيصل الحمصى ، ابراهيم سالم

استخدم فى هذا البحث ٢٢ نعجه تامة النمو من الاغنام الصعيدى فى عمر يتراوح بين ٤ ـ ٦ سنوات وطبقا لحدوث ظاهرة تساقط الصوف فى شهر ابريل عام ١٩٨٠ قسمت النعاج الى مجموعتين الأولى متساقطة الصوف والثانية عادية واخذت عينات الصوف والدم من كلا المجموعتين ودرست فى محاولة لالقاء بعض الضوء على التغييرات المصاحبة لحدوث وتساقط الألياف.

ويمكن تلخيص نتائج هذه الدراسة فيما يلى :ـ

١ـ كمية الصوف النظيف فى الأغنام العادية تفوق الاغنام المتساقطة بحوالى ٢٤٣٪ .

٢ـ الالياف فى الأغنام المتساقطة الصوف أكبر قطرا ـ كما وان نسبة الالياف النخاعية اعلى ايضا وان كان الفرق بين المجموعتين غير معنوى.

٣ـ كان متوسط طول الخصله ٧ر١٧ ، ١٣ر٢٦ سم فى صوف الاغنام المتساقطة والعادية على الترتيب وكان الفرق بينهما معنويا .

٤ـ لا يوجد فرق معنوى بين المجموعتين فى عدد كرات الدم الحمراء . بينما نسبة الهيموجلوبين اعلى بصورة مؤكدة فى الأغنام العادية بالمقارنة بالاغنام المتساقطة الصوف.

٥ـ نسبة الجلوكوز والفوسفاتيز القلوى والحامض اعلى فى دم الحيوانات العادية عنه فى النعاج المتساقطة الصوف.

٦ـ كان مستوى S-GOT ، S-GPT عاليا فى سيرم دم الاغنام العادية عنه فى الاغنام المتساقطة الصوف.

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CHANGES IN SOME BLOOD CONSTITUENTS IN RELATION TO SHEDDING IN SAIDI EWES
(WITH 2 TABLES)

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SUMMARY

Twenty two adult Saidi ewes of 4-6 years old were used in this experiment. According to the occurrence of shedding in April, 1980 ewes divided into two groups, shedder and non - shedder ewes. Detailed analysis, using fleece and blood samples from the shedder and the non-shedder ewes were done in an attempt to through some light on the biochemical changes related to fleece shedding. Results obtained could be summarized in the following:

1- The non-shedder ewes produced 243.09% clean wool as much as the corresponding shedder ones.

2- Shedders had the higher averages of fibre diameter and high percentage of medullated fibres, but differences were not statistically significant.

3- Average staple length was found to be 7.17 cm and 13.26 cm for shedder and non-shedder ewes, respectively. The difference was highly significant ($P < 0.01$).

4- There is no significant difference between shedder and non-shedder ewes in the concentration of RBCs. While hemoglobin content was significantly higher in non-shedder ewes than in sheeder ones.

5- Non-shedders had the higher value of serum glucose concentration than the shedders. Also the highest values of the serum alkaline and acid phosphatase enzymes activities were recorded in the non-shedders group.

6- The levels of both S-GOT and S-GPT were found to be higher in the non-shedders than in shedders.

INTRODUCTION

Hair and wool growth occur in cycles in which periods of active growth alternate with periods of rest. The shedding process is, therefore, the point in the growth cycle at which the follicle enters the resting phase (RYDER and STEPHENSON, 1968).

The low level of nutrition was regarded as a probale cause of shedding (YEATS 1958), but the work of RYDER (1956) presented evidence, although not conclusively against this view. Moreover, YEATS (1958) working with cattle indicated that low levels of nutrition actually impeded shedding. However; it has been known that glycogen is stored in the outer sheath of the follicle, and that this store disappers when the fibre moults (RYDER, 1958).

Fleece loss thorugh shedding is a serious problem in Saidi sheep. There was a strong tendency for shedding existnce for many individuals in April and May months. Since the life process occurring in a single body cell consists of a series of complex reactions and the necessary control of these highly complicated mechanisms is exerted by means of enzymes, therefore, detailed analysis were performed, using fleece, and blood semples from shedder and non-shedder ewes in an attempt to through some light on the biochemical changes related to fleece shedding.

MATERIALS AND METHODS

This study was carried out at the Animal Production Experimental Farm, Faculty of Agriculture, Assiut University, Assiut Egypt.

Twenty two adult Saidid ewes, 4-6 year of age, were used throughout the experiment. The ewes were divided into two groups, shedders and non-shedders groups (11 ewes in each group) equal in average body weight and age. The experiment started 1st of April, 1980 and terminated June 15, 1980.

Both groups were under similar managerial conditions which are normally applied to the flock of the experimental farm. The usual feeding system of the farm flock is grazing on Egyptian clover during winter, while in summer animals were fed green maize fodder (Darawa). Additional supplementations of concentrates as well as clover hay and wheat straw were offered according to requirements (GHONEIM, 1950).

Wool Measurements:

Total greasy wool production was measured as the total amount of wool per ewe at shearing (after 12 months of wool growth). The clean wool yield was estimated from scoured samples in the manner described by TURNER ET AL. (1953). Small samples were taken from the mid-side region (or near the mid - side for shedders) of each ewe to determine fibre diameter and staple length as described by CHAPMAN (1960). Along with measuring the fibre diameter the percentage of medulated fibres was estimated according to the method adopted by the International Wool Textile Organization (1958).

Blood Analysis:

Blood samples from the jugular vein was taken from each ewe early in the morning and before feeding. The sample was dividded into two test tubes, the first was allowed to clot at room temperature and the separated serum was centrifuged to obtain clear serum. The second one was mixed with an anticoagulant (heparin) and used for determining the red blood cells (RBC's) and haemoglobin content. Glucose was determined by the method of KESTON (1956).

Total serum proteins were determined using the Abe refractometer (MAKFATE, 1972). The serum protein fractions were also determined by using paper electrophoresis (BLACK ET AL, 1958), The absolute concentration of protein fractions were estimated from their relative percent concentration and the total serum proteins concentration.

Total lipids were estimated by the method of FARSTAD (1966). Serum inorganic phosphorus was done by the method of POWER (1953). Serum alkaline phosphatase and acid phosphatase activities were estimated by the methods of BELFIELD and GOLDBERG (1971) and AMADOR ET AL, (1969), respectively. The serum glutamic-oxal acetic transaminase (S-GOT), and serum glutamic pyruvic transaminase (S-GPT) were determined according to the methods of REITMAN and FRANKEL (1957).

The blood sampling dates were at the 15th of April, May and June, 1980. Statistical analysis was carried out according to procedures outlined by SNEDECOR and COCHRAN (1967).

RESULTS

Results are presented in Tables 1 and 2.

DISCUSSION

From Table (1) it is clear that non-shedder ewes were much higher in greasy and clean wool production than shedder ones. The non-shedder ewes produced 243.09% clean wool as much as the corresponding shedder group. The difference between the two groups was highly significant ($P < 0.01$). Present results illustrate that the effect of shedding on fleece weight at shearing time (May) was serious. This result might be due to the spring shedding in adult ewes which occurred near the end of pre-clipping growth period of the fleece. SLEE (1959) found that the loss of wool in shedding animals occurs mostly before clipping.

Accordingly, it may be suggested that clipping twice per year would decrease the loss of wool in shedder animals.

Shedder ewes had the higher averages of fibre diameter and high percentage of medullated fibres than non-shedder ones. However, the difference between the two groups was non-significant. In general, there is a tendency for the incidence of medullation to increase with increasing fibre diameter. This is in accordance with the conclusion of YEATS ET AL, (1975).

Average staple length was found to be 7.17 cm and 13.26 cm for shedder and non-shedder ewes, respectively. It is quite clear that shedding had a considerable effect in reducing mid - side staple length. Similar results were found by SLEE (1959) who suggested that staple length could be affected by fleece and fibre shedding in two ways: (1) The gross physical effects of high-grade fleece shedding, caussing loss of wool at the mid-side, (2) The loss by sporadic shedding, of individual fibres which migh potentially have become long enough to influence staple length.

Blood Composition:

Results in Table (2) show that there is no significant d fference between shedder and non-shedder ewes in the concentration of RBC's. while hemoglobin concentration was significantly higher (P/ 0.01) in non-shedder ewes than in shedder ones. This means that the non-shedder ewes had higher corpuscular hemoglobin value than the shedder ones. The increase in corpuscular hemoglobin value would beneficially increase the blood oxygen carrying capacity and releif the respiratory efforts (HOWS ET AL, 1963).

It is quite clear from Table (2) that non-shedders had higher value of glucose concentration than the shedders, since one function of glucose is to provide energy for cell division in the bulb (RYDER and STEPHENSON 1968). Therefore, it may be suggested that the cessation of fibre proliferation in shedders is partially due to decrease in the main source of energy (glucose). RYDER (1958) found that glycogen in the outer sheath of the follicle disappeared when fiber moults.

Table (1): Fleece characteristics in shedder and non-shedder Saidi ewes.

Item	Shedders	Non-shedders	Significance
No. of Animals	11	11	
Body weight (kg)	45.05±1.59	45.05±2.01	N.S.
Greasy fleece wt (gm)	507±90	1239±140	**
Clean fleece wt (gm)	420±40	1021±121	**
Fibre diameter (u)	31.52±1.96	28.78±0.68	N.S.
Medullated fibre %	9.37±1.82	5.76±1.60	N.S.
Staple length (cm)	7.17±0.54	13.26±0.19	**

N.S. = Not significant ** = P / 0.01

Table (2): Some blood parameters of shedders and non-shedders Saidi ewes.

Item	Shedders	Non-shedders	Significance
RBC's mill./mm^3	3.80±0.12	4.07±0.08	N.S.
Hb gm%	10.05±0.21	11.07±0.15	**
Glucose mg%	38.03±1.37	47.21±1.79	**
Total protein gm%	7.19±0.16	6.99±0.05	N.S.
Albumin gm%	3.56±0.07	3.48±0.04	N.S.
Alpha-globulin gm%	1.18±0.04	0.97±0.03	**
Beta-globulin gm%	1.07±0.03	1.37±0.04	**
Gamma-globulin gm%	1.31±0.03	1.17±0.03	**
Total lipids mg%	357.3 ±9.95	352.4 ±5.49	N.S.
Phosphorus mg%	7.67±0.39	6.99±0.42	N.S.
Alkaline phosphatase I.U.	13.37±2.11	16.60±2.34	N.S.
Acid phosphatase I.U.	0.22±0.02	0.53±0.07	**
S-GOT I.U.	50.58±1.04	52.12±0.91	N.S.
S-GPT I.U.	6.13±0.23	9.08±0.59	**

N.S. = Not significant
* = P / 0.05
** = P / 0.01.

As it can be seen from Table (2), there are no significant differences between the two groups of ewes in the total proteins and albumin concentration in blood serum. However, results illustrate that shedders had slightly higher value than non - shedders. Since the albumin fraction of the serum is responsible for most of the effective osmotic pressure (BIANCA, 1965), and that the loss of wool fibres from large area of the skin of shedders would result in increasing evaporation from skin. Therefore, the high level of albumin in blood serum of shedders increases their body water retaining capacity. In shedders the average values of Alfa and Gamma-globulin fractions of serum were significanctly higher ($P < 0.01$) than in non-shedders. On the other hand the non-shedder ewes had the highest average of Beta-globulin fraction.

Total serum lipids average values were found to be 357 and 352.4 mg% for shedder and non-shedder ewes, respectively. The difference between the two groups was not significant (Table 2).

The concentration of serum inorganic phosphorus was found to be slightly higher, but not significant, in shedder ewes than in non-shedder ones. In dairy cattle, ROWLANDS ET AL, (1975) found that the concentration of blood serum inorganic phosphorus was not significantly correlated with the productive stage of the animal.

Concerning the alkaline and acid phosphatase enzymes activity, it is interesting to note that the higher values were in the non-shedders group. However, the significant difference was found only for the acid phosphatase (Table 2). RYDER and STEPHENSON (1968) indicated that phsophatase enzymes function in the last stage of glycogen breakdown, releasing of glucose from glucose-6-phosphate or glucose - 1-phosphate. Also LENG and STEPHENSON (1965) reported that follicles produce labelled lactate from labelled glucose in vitro-, showing that glycolysis takes place in the follicle. They added that depletion of the follicles glycogen store takes place during incubation.

As shown in Table (2) the level of S-Got and S-GPT was found to be higher in the non-shedders than in shedders. This suggests that the increasing of these enzymes activity is necessary for accelerating the rate of metabolism and protein biosynthesis needed for wool formation. BOSTEDT (1974) believed that in cattle the increase of S-GOT during the last period of gestation is a result of increasing the foetus requirement to synthesize new tissues.

CONCLUSION

The results of this study indicated that loss by shedding accounted for about 60% decrease in clean wool yield. This result might be due to the spring shedding in adult ewes. Also shedding has a considerable effect in reducing staple length. Therefore, it may be advicable to do spring shearing in March, before the peak of fibre loss, insteed of the usual shearing time in April - May. March shearing may be more suitable in in Upper Egypt, since the weather is usually warm during this month.

The present investigation demonstrated a link between fleece shedding in Saidi ewes and some blood parameters. Since enzymes activities are subjected to the influence of many variables, including the temperature and pH of their environment, the supply of their reacting materials, the removal of reaction products and the presence of activators and inhibitors, therefore, one can believe that studies on these factors as well as the histochemical studies on wool follicle and other skin components such as sweat gland would be of great importance to clarify mode and type of different changes during shedding process.

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