

THE "POST-NATAL" CHECK IN THE DEVELOPMENT OF THE WOOL FOLLICLES

By

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SUMMARY

It was found that the external and internal-diameters of primary and secondary wool follicles decreased gradually after three months of age in the Merino sheep. These changes were associated with an increase in the number of secondary follicles. In the Merino X Barki crossbreds, the internal-diameter of wool follicles only decreased gradually after six months of age until the end of the experiment and this change was associated with an increase in the number of secondary follicles intermediate to the Merino and Barki. On the contrary, the external and internal-diameters of primary and secondary wool follicles in the Barki, Ossimi and Texel sheep increased with age.

The normal post-natal growth of the wool follicles and fibres was checked or arrested at three months of age in the Merino sheep, while in the Merino X Barki crosses the fibres only, were checked at six months of age.

INTRODUCTION

The competition between the early developing wool follicles and the late ones has been previously demonstrated by Fraser (1951, 1952 and 1953) and Fraser and Short (1952). They postulated a theory that the characters of the birthcoat in sheep are determined as a result of this competition.

Dry (1933, 1934) stated that the formation of the late fibres decreased relatively the growth of the earlier ones, while Fraser (1911) mentioned that the relative depths to which early and late follicles grow into the skin may be determined as a result of the effect of competition between follicles;

The previous theories depended mainly on the pre-natal development of the wool follicles. The present work was carried out to study the post-natal developmental forces acting in the different types of sheep fleeces.

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MATERIALS AND METHODS

Skin samples were obtained from the mid-side position of five females of each of the Barki, Precocé Merino, Ossimi and Texel groups at six months interval from the day of birth till the age of twelve months.

The samples were pinned out flat by stainless steel needles on pieces of indian rubber as described by Burns (1949), fixed in formol saline for three days, thenafter, the wool fibres were thoroughly cut and the skin samples were trimmed. Sections were obtained by the use of a freezing microtome at a thickness of 15 microns following the procedure of Nay et al (1959). The sections were stained by haematin and counterstained by eosin. The different skin structures were studied by means of a microprojector.

Follicle population counts and measurements were estimated as described by Clarke (1960). Statistical analysis were carried out after Snedecor (1952).

RESULTS AND DISCUSSION

The external-and internal-diameters of primary and secondary wool follicles in the Texel X Ossimi and Merino X Barki halfbreeds surpassed those of their parental breeds at birth, while they showed intermediate values at the older ages (Tables 1, 2, 3 and 4). This could be explained on the basis that hybrid vigour which showed its influence prominently at birth faded away

TABLE 1.—External-diameter of primary wool follicles in some pure-bred and crossbred sheep (Micron).

Age (Months)	Groups					
	Texel	Texel X Ossimi	Ossimi	Merino	Merino X Barki	Barki
Birth	63.8	106.2	69.3	56.3	90.4	73.0
3	92.6	117.9	101.0	67.7	99.9	122.4
6	94.8	118.1	127.7	62.2	105.6	123.8
9	98.7	118.8	136.0	61.8	105.6	123.8
12	99.9	119.2	145.0	53.1	106.2	136.1

TABLE 2.—External-diameter of secondary wool follicles in some pure bred and crossbred sheep (Micron).

Groups						
Age (Months)	Texel	Texel x Ossimi	Ossimi	Merino	Merino x Barki	Barki
Birth	54.7	61.6	42.6	39.4	54.4	41.3
3	64.3	70.0	62.5	54.2	59.5	63.8
6	66.1	69.1	73.2	48.6	60.9	68.2
9	64.8	72.5	79.6	48.6	60.9	71.1
12	69.7	75.5	79.8	43.5	60.6	86.4

TABLE 3.—Internal-diameter of primary wool follicles in some pure bred and crossbred sheep (Micron).

Age (Months)	Texel	Texel x Ossimi	Ossimi	Merino	Merino x Barki	Barki
Birth	37.8	67.5	38.5	32.8	43.4	39.7
3	51.5	67.7	66.1	34.9	58.4	81.2
6	53.8	67.7	92.1	31.9	68.4	81.4
9	54.0	67.7	94.2	28.5	62.5	81.4
12	54.7	70.0	95.1	23.5	59.3	94.2

TABLE 4.—Internal-diameter of secondary wool follicles in some pure bred and crossbred sheep (Micron).

Groups						
Age (Months)	Texel	Texel x Ossimi	Ossimi	Merino	Merino x Barki	Barki
Birth	31.5	36.7	27.4	18.5	34.4	20.5
3	34.2	36.5	36.0	24.4	29.0	37.2
6	34.2	36.5	44.2	23.5	32.8	40.4
9	35.8	45.6	44.0	22.8	31.7	40.4
12	35.6	47.2	48.1	22.1	31.2	43.3

As the animals grew older, the external-and the internal-diameters of primary and secondary wool follicles increased with highly significant values in the Barki and Ossimi sheep, while in the Texels the increase with age was highly significant only in the external-diameter of both primary and secondary follicles (Table 5). The contrary occurred in the Merino sheep, the follicles diameters decreased gradually after three months of age, while.

TABLE 5.—Test of significance ("t" value) for the effect of age (between birth and twelve months) on diameters (Dp, Ds, dp and ds) of wool follicles.

Items	Groups					
	Texel	Texel x Ossimi	Ossimi	Merino	Merino x Barki	Barki
Dp	23.544	1.209	10.240	0.735	1.296	5.796
Ds	9.010	1.638	6.660	1.850	1.071	0.990
dp	3.008	0.210	10.248	4.077	1.536	5.508
ds	1.168	1.660	6.006	2.079	0.366	4.576

Dp — Average external-diameter of primary follicles.

Ds — Average external-diameter of secondary follicles.

dp — Average internal-diameter of primary follicles.

ds — Average internal-diameter of secondary follicles.

In the Merino X Barki crossbreds, the internal-diameter of wool follicles only decreased gradually after six months of age until the end of the experiment (Tables 1, 2, 3 and 4) probably due to the initiation of post-natal secondaries in great numbers. This decrease in the external- and internal-diameters of the wool follicles in the Merino sheep and that in the internal-diameter of Merino X Barki crossbreed may be due to a reduction in the amount of the available substrate for both follicles and fibres in the Merino sheep and for the fibres only in the Merino X Barki crosses. This reduction in available substrate might be explained by the increase in the late developing secondary follicles in these breed groups (Table 6).

TABLE 6.—The S-P ratio in some pure bred and crossbred sheep.

Age (Months)	Groups					
	Texel	Texel x Ossimi	Ossimi	Merino	Merino x Barki	Barki
Birth	3.2	2.5	1.0	2.2	2.4	1.6
3	3.7	3.2	2.2	4.7	4.8	2.7
6	3.8	3.6	3.2	6.7	5.6	3.2
9	3.8	3.8	3.2	9.7	6.2	3.2
12	4.0	4.0	3.2	9.7	6.2	3.2

Therefore, the development of the late secondaries may be considered as a factor responsible of determining the relative size of each of the follicles and that of the fibres.

This factor may be called « post-natal check » as it is analogous to the « pre-natal check factor » which was proposed by Dry (1933, 1934).

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« المانع » في نمو جيوب الصوف أثناء حياة الحملان بعد الولادة

الملخص

وجد أن متوسط السمك الخارجى والداخلى لكل من جيوب الصوف الأولية والثانوية قد نقصت تدريجيا بعد عمر ثلاثة شهور في أغنام المرينو أما في خليط المرينو والبرقى فان النقص حدث في السمك الداخلى بعد عمر ستة شهور ، وعلى العكس من ذلك زاد السمك الخارجى والداخلى لجيوب الصوف الأولية والثانوية في أغنام البرقى والأوسيمى والتكسل بتقديم الحيوانات في العمر .

ومما تقدم يتبين أن النمو بعد الولادة لجيوب والياف الصوف قد أوقف عند عمر ثلاثة شهور في أغنام المرينو ، أما في حالة الأغنام الخليطة من المرينو والبرقى فقد توقف نمو الالياف فقط عند عمر ستة شهور .