

The Effect of Nutrition on Skin and Skinfold Thickness in Cattle

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Interest in skin thickness of cattle has been concerned mainly with its physiological significance in relation to the adaptation of animals to tropical and subtropical environments. However, as the skin of an animal represents its most accessible tissue, it is also worthy of study in relation to the effect of nutrition on body composition in more temperate environments. The object of this experiment was to determine the effect of plane of nutrition on skin and skinfold thickness in Melbourne, Victoria (Lat. 37° 50' S.)

Eight Hereford steers aged 18 months were housed in individual stalls in March 1959. Three weeks later on April 15th the experiment started when three animals were placed on a high plane of nutrition (group A), two on maintenance rations (group B) and three on a low plane of nutrition (group C). Ten weeks later (June 23rd) the planes of nutrition were reversed, group A being placed on a low plane, group B remaining on a maintenance ration, and group C on a high plane. Six weeks later (August 4th) the experiment ended. The cattle were weighed weekly. Skinfold measurements were made every fortnight on the left midside, on an area prepared by surgical clipping, using dial gauge callipers.

Two adjacent biopsy skin samples were taken from the mid-side of each animal, using the method described by Dowling (1955) on each of the following occasions:-April 15, June 23, August 4. Samples were placed in 1 per cent. formol-saline and, after trimming to remove subcutaneous fat and muscle, skin thickness was measured using a Mercer dial micrometer model 131. To minimise errors due to shrinkage all samples were measured at the same age.

The results are given in Table I. The live weight changes obtained were substantial, and were regarded as satisfactory. During the first part of the experiment group A (high plane) showed an increase in skinfold thickness (1.1 mm.), but all other changes in skinfold thickness were small. Groups A (high plane) and C (low plane) both showed increases in skin thickness (1.8 mm and 1.0 mm. respectively during the first part of the experiment, and as with skinfold thickness all other changes in skin thickness were small.

The animals were in store condition when the experiment started and the increase in skinfold thickness of group A (high plane) compared with group B (maintenance) and C (low plane) during the first part of the experiment could be attributed to the deposition of subcutaneous fat by group A during this period. However, some work by Tulloh (in press) shows that mid-side skinfold thickness is not related to depth of subcutaneous fat in cattle. It is more likely that this increase in skinfold thickness was due to the deposition of fat and protein in the skin. It may seem surprising that groups A (high plane) and C (low plane) both showed increases in skin thickness during the first part of the experiment. It is postulated that the increase in thickness obtained in the low plane group was due to the development of a nutritional oedema. In the second part of the experiment no important changes in skin or skinfold thickness were obtained, which suggests that for animals of the type used in the present work, changes in thickness are not particularly susceptible to changes in live weight.

TABLE 1.
The Effect of Nutrition on Liveweight, Skinfold Thickness and Skin Thickness.

Group	Measurements (Means)	Plane of Nutrition	April 15	June 23	Mean Change in Measurements	Plane of Nutrition	June 23	Aug. 4	Mean Change in Measurements
A	Liveweight (kg)		292	338	+46		338	314	-24
	Skinfold thickness (mm)	High	8.9	10.0	+1.1	Low	10.0	10.1	+0.1
	Skin thickness (mm)		6.1	7.9	+1.8		7.9	7.6	-0.3
B	Liveweight (kg)		285	294	+9		294	285	-9
	Skinfold thickness (mm)	Maintenance	9.5	9.2	-0.3	Maintenance	9.2	9.1	-0.1
	Skin thickness (mm)		7.0	7.2	+0.2		7.2	7.3	+0.1
C	Liveweight (kg)		290	258	-32		258	287	+29
	Skinfold thickness (mm)	Low	9.6	9.4	-0.2	High	9.4	9.5	+0.1
	Skin thickness (mm)		6.6	7.6	+1.0		7.6	7.5	-0.1

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REFERENCE

Dowling, D. F. (1955).—*Aust. J. Agric. Res.* 6: 645-654.

DISCUSSION

W. Stephens (Tas.) asked whether temperature had any effect on skin thickness.

Answer.—This may be so. A clipped area showed a greater thickness than an unclipped area. The variability between different sites of the biopsy operation was extremely low.