

Body Condition Scoring Grid for Sheep (Sahel and Savannah areas)

Eric VALL¹

(1) CIRAD, UMR SELMET, F-34398 Montpellier, France.
SELMET, Univ Montpellier, CIRAD, INRAE, Institut Agro, Montpellier, France.

October 2023

Contents

1	INTRODUCTION	2
2	METHODOLOGY.....	3
2.1	Principles of construction of the BCS grid	3
2.2	Source of BCS grid drawings.....	3
3	PRESENTATION OF THE BCS GRID	4
3.1	Anatomical landmarks used to rate the BCS	4
3.2	BCS grid for sheep	5
4	REFERENCES	8
5	ANNEXES.....	9

1 INTRODUCTION

In tropical countries subject to significant quantitative and qualitative variations in the availability of fodder during the year, the dissatisfaction of feed needs is a frequent situation for animals reared in grazing systems without a sufficient supplementation with feed concentrates.

The Body Condition Scoring (BCS) is a useful way to assess the state of body reserves (subcutaneous fat, muscle mass) which reflects the animal's production (growth, milk, work) and reproduction capacities. The evaluation of the body reserves of an animal through the scoring of their body condition is important to adjust their diet and appreciate their general state of health, as well as their reproductive and production capacity (meat, milk, work, etc.). Managing body reserves is one way of responding to variability in quality and access to feed resources. In females, reserves play an important buffer role during lactation. They can make up for insufficient intakes from the ration. Indeed, the level of production depends on the nutrients provided by the feeds, but also on the animal's body reserves when the feed-based supplies do not fully cover their needs, especially during the dry season. The BCS impacts the interval between two lambing. Overly lean females show a delay in the return of heat after lambing, the direct consequence of which is the increase in the parturition interval and consequently a decrease in herd productivity.

The assessment of these reserves through Body Condition Scoring (BCS) represents a management tool for livestock farmers, agricultural advisors and livestock development stakeholders. BCS is a simple, inexpensive and fast method. Several animals can be scored in one session. It allows to compare the BCS of individuals or herds: 1) raised in different production systems or environments, 2) or, during different seasons (dry season and rainy season). BCS can be used as a tool for monitoring and alerting the nutritional level of domestic animal populations. To do this, BCS alert thresholds and a BCS collection and monitoring system must be defined on reasoned samples of animal populations.

It is an easy-to-use field tool. However, a good mastery of the BCS grid as well as a regular practice of scoring are necessary to obtain precise and reproducible ratings. It can also be used as a tool for monitoring and alerting the nutritional level of animal populations. Thus, the farmer can be called at any time to intervene on the feed ration and / or the health of the animal.

In African regions, most of the sheep breeds belongs to slender type, with elongated legs and poorly developed muscular masses. Fat is mainly deposited on internal organs (e.g. intermuscular). According to Richard (1997), it is possible to identify a scale of variation according to the general individual body condition following criteria similar to those used in Europe. Inspired in the body condition scoring grid (from 0 to 5) developed by Russel et al. (1969), Richard (1997) proposed a scoring

system for Fulani sheep widely present in the Sahelian regions.

In 2020, Vall proposed a standardized BCS scoring system for tropical livestock animals for large animals (cattle, camels), small animals (sheep, and goats) and for donkeys, and horses. This document presents this BCS system applied to the Sahelian goat. For harmonizing the BCS method to be used in sheep with regard to that used for other species, we propose a 6-level system assuming that sheep flocks and populations may include extreme animals, going from very thin (i.e. due to extreme feeding and nutritional conditions or as a consequence of gastrointestinal parasitism), to very fatty or obese (resulting from intensive farming with generous fattening feeding systems).

2 METHODOLOGY

2.1 Principles of construction of the BCS grid

This document aims to present a BCS grid for sheep following the principles and criteria of the harmonized BCS system proposed by Vall (2020) which are as follows:

- 1) Represent females, because they are the keystone of breeding, because they represent the largest number of breeding animals, and because their body condition is a very good indicator of the good or bad breeding management (in a herd a deterioration of females BCS is indicative of a disorder or problems in rising management);
- 2) Standardize and simplify the work of assessors by proposing a BCS grid comprising:
 - a) A panel of around ten harmonized anatomical points, generally identical for all species, and distributed over three areas of the body: the hindquarters or rump, the thorax and abdomen, the shoulders and the neckline. The detailed description of the anatomical points has been adapted to the case of each species. The ten anatomical landmarks retained are:
 - 1) Pelvis and hip bone: iliac and ischial spines of the pelvis, and coxo-femoral joint
 - 2) Base of the tail (caudal strait and caudal vertebrae)
 - 3) Pelvis
 - 4) Thighs
 - 5) Lumbar vertebrae (transverse processes of the lumbar vertebrae)
 - 6) Hollow side
 - 7) Backline (spinous processes of the dorsal vertebrae)
 - 8) Ribs
 - 9) Shoulder: shoulder blade, and humerus joint
 - 10) Neckline (hollow of the neck and general appearance)
 - b) The same range of scoring (from 0 to 5) for all the species. Beyond 6 levels, the distinction between two BCS levels becomes very subjective and below that it lacks of acuity. The 6-level rating systems are the most widespread in the literature;
 - c) A “back BCS” and a “right-side BCS”, with a Final BCS corresponding to the average of the two;

2.2 Source of BCS grid drawings

As it is not easy to have animals in the same position, we chose to create a BCS grid with drawings representing a typical animal in the different BCS levels and from two perspectives angles (side view, back view). The grid was developed from a series of photos of sheep; part of which is presented in the Annex. The drawings were made in Indian ink by Eric Vall.

The photos were taken by Eric Vall in Burkina Faso, Ivory Coast and Senegal. The animals were photographed from two perspectives (side view, back view) at approximately 3 m of distance.

3 PRESENTATION OF THE BCS GRID

3.1 Anatomical landmarks used to rate the BCS

Most of the sheep breeds reared in the Sahel and Savannah regions are short-haired, without wool. Therefore, scoring by visual assessment supported in key and previously defined anatomical points may be possible. Nevertheless, to clarify that lateral BCS assessment and better consider the internal fat deposits, we suggest performing a lumbar palpation in order to complete and confirm the visual scoring of the lateral, flank side. To characterize the appearance of the anatomical points corresponding to each BCS value, we relied in a series of stocked pictures from the field, available in our library. The scoring is made by visual observations of the BCS landmarks distributed on the three parts of the body, represented on the Figure 1:

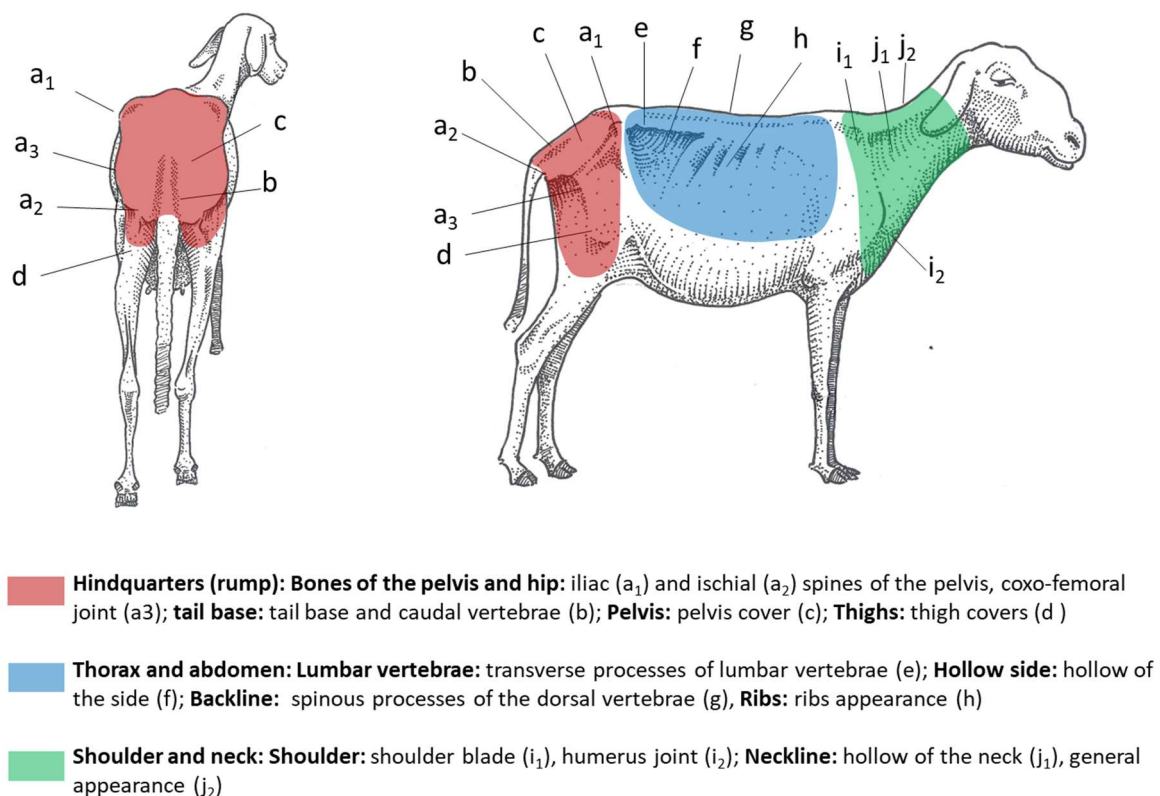


Figure 1. BCS landmarks for a sheep (back and right-side views)

3.2 BCS grid for sheep

Table 1. BCS grid for sheep

	Hindquarters (rump)				Thorax and abdomen					Shoulders and neck	
Score	Bones of the pelvis and hip	Tail base	Pelvis	Thighs	Lumbar palpation	Lumbar vertebrae	Hollow side	Backline	Ribs	Shoulder	Neckline
0	Very prominent, skin glued to the bones	Deep caudal strait, Prominent caudal vertebrae	Very concave	Skeletal	Without muscle or fat tissue between the skin and the bones.	Individualized apophyses	Wide and strongly depressed	Very marked over the entire length of the back	All visible, skin glued to the bones	Skeletal shoulder line	Emaciated, hollow of the neck concave
1	Very prominent	Visible caudal strait and caudal vertebrae	Concave	Very skinny	Vertebral arch and mamillary apophyses easily palpable. Poor muscle mass. Hollow well palpable between the two transverse apophyses.	Line of protruding apophyses marking a sharp angle	Depressed	Marked to the middle of the back	Visible over 75% of the back of the ribcage	Protruding shoulder line	Skinny, hollow of the neck concave
2	Totally visible	Nascent caudal strait and caudal vertebrae	Flat	Skinny	Mamillary apophyses still palpable. Hollow palpable between the two transverse apophyses.	Line of apophyses with non-sharp angle	Marked	Marked behind the withers	Visible over 50% of the back of the ribcage	Shoulder: Angular shoulder line	Neckline: Skinny, hollow of the neck concave to filled
3	Visible, fat deposit sensitive to the touch	Barely visible caudal strait	Flat to convex	Fleshy (dry)	Vertebral arch and mamillary apophyses can no longer be pinched between two fingers. Transverse apophyses covered. Space between two transverse apophyses differentiable with pressure exerted by finger	Barely visible line of apophyses with rounded angle	Nascent	Perceptible behind the withers	Visible over 10% of the back of the ribcage	Round shoulder line	Full, hollow of the neck filled
4	Barely visible, fat cover visible	Filled caudal strait, emerging fat cover	Convex	Fleshy (full)	Perceptible with pressure exerted by a finger. Ending transverse apophyses are no longer palpable. Strong pressure needed to distinguish space between two transverse apophyses	Line of apophyses detectable	Barely visible	Barely visible	Barely visible, light fat cover	Round shoulder line, emerging fat cover	Muscular, hollow of the neck filled
5	Difficult to locate, evident fat cover	Invisible caudal strait, evident fat cover	Markedly convex	Fleshy (rounded, globular)	Strong pressure needed to distinguish space between two transverse apophyses Well defined and firm lateral muscle masses. Fat mass (tail crease and around the rectum)	Line of apophyses invisible (due to fat cover)	Invisible (due to fat cover)	Invisible	Invisible (due to fat cover)	Round shoulder line, evident fat cover	Muscular (globular), hollow of the neck filled

Figure 2. BCS grid for sheep (commented drawings): scoring from 0 to 2

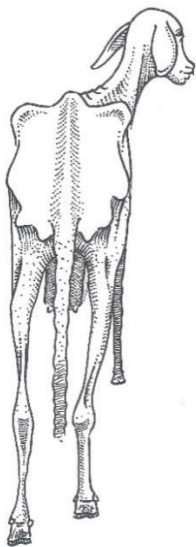
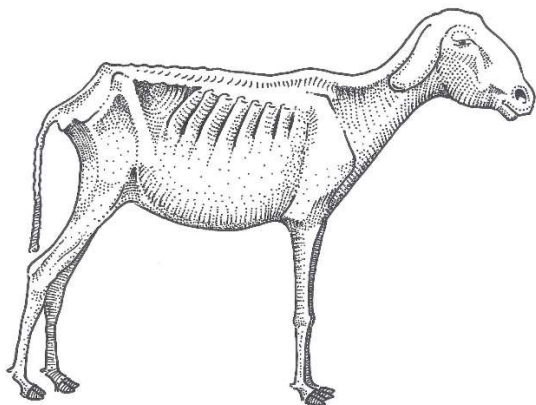
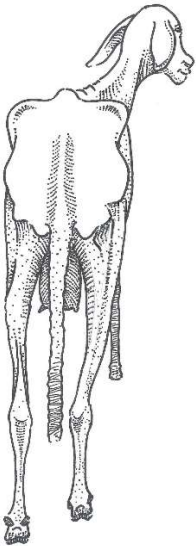
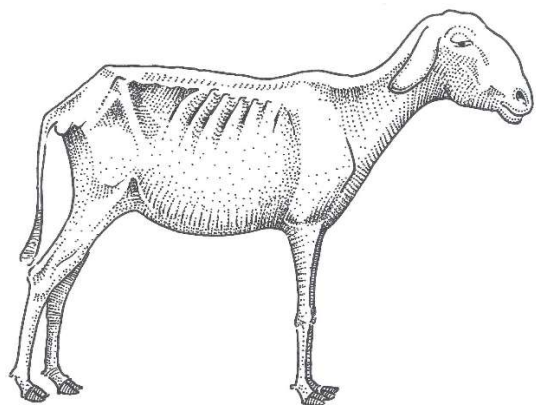
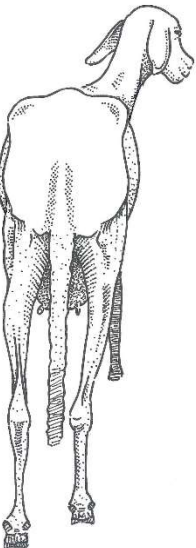
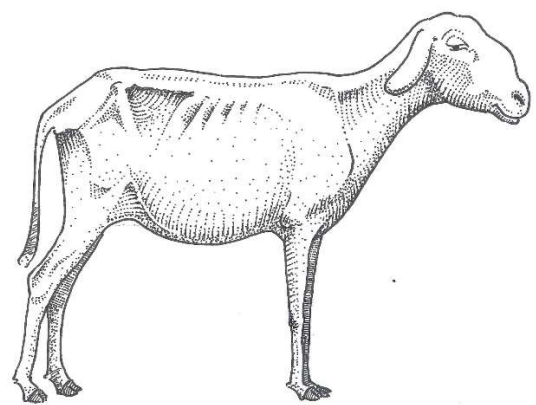
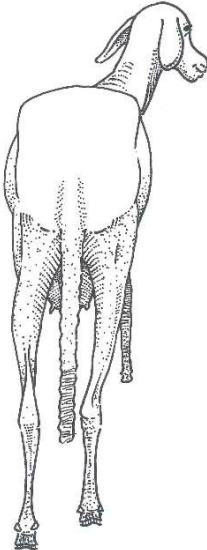
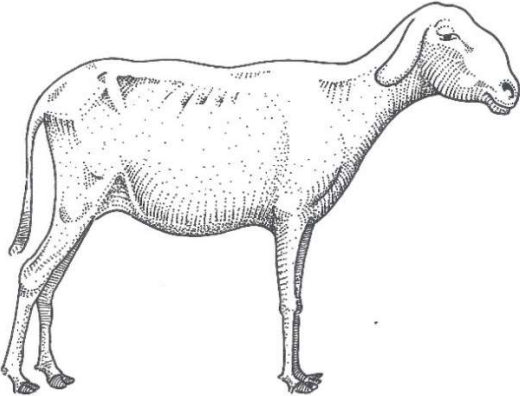
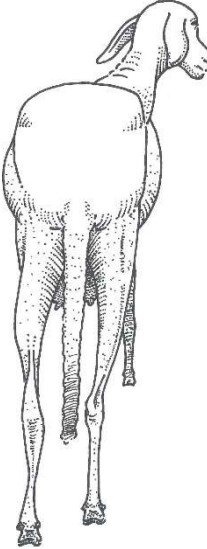
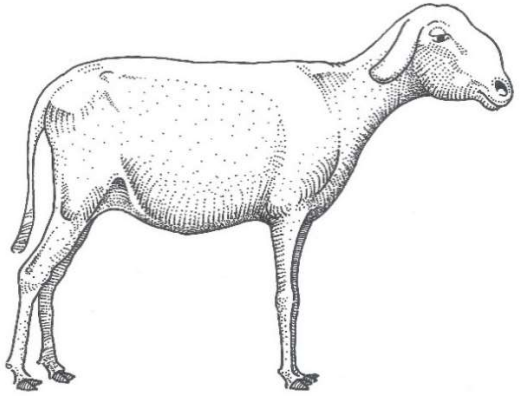
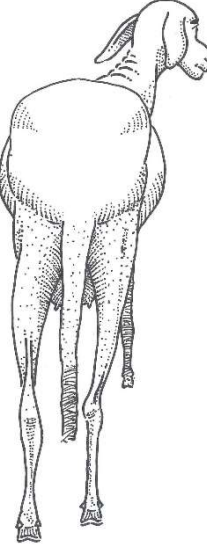
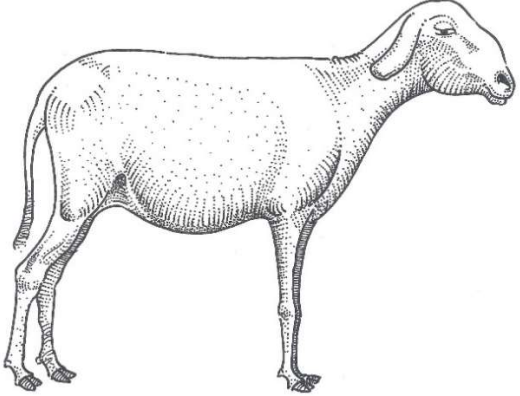
Score	Back view	Right side view
SCORE 0: Very emaciated, skeletal animal Bones of the pelvis and hip: Very prominent, skin glued to the bones Tail base: Deep caudal strait, Prominent caudal vertebrae Pelvis: Very concave Thighs: Skeletal Lumbar vertebrae: Individualized apophyses Hollow side: Wide and strongly depressed Backline: Very marked over the entire length of the back Ribs: All visible, skin glued to the bones Shoulder: Skeletal shoulder line Neckline: Emaciated, hollow of the neck concave		
SCORE 1: Very thin animal Bones of the pelvis and hip: Very prominent Tail base: Visible caudal strait and caudal vertebrae Pelvis: Concave Thighs: Very skinny Lumbar vertebrae: Line of protruding apophyses marking a sharp angle Hollow side: Depressed Backline: Marked to the middle of the back Ribs: Visible over 75% of the back of the ribcage Shoulder: Protruding shoulder line Neckline: Skinny, hollow of the neck concave		
SCORE 2: Skinny, lean animal Bones of the pelvis and hip: Totally visible Tail base: Nascent caudal strait and caudal vertebrae Pelvis: Flat Thighs: Skinny Lumbar vertebrae: Line of apophyses with non-sharp angle Hollow side: Marked Backline: Marked behind the withers Ribs: Visible over 50% of the back of the ribcage Shoulder: Angular shoulder line Neckline: Skinny, hollow of the neck concave to filled		

Figure 3. BCS grid for sheep (commented drawings): scoring from 3 to 5

Score	Back view	Right side view
SCORE 3: Animal with good body condition Bones of the pelvis and hip: Visible, fat deposit sensitive to the touch Tail base: Barely visible caudal strait Pelvis: Flat to convex Thighs: Fleshy (dry) Lumbar vertebrae: Barely visible line of apophyses with rounded angle Hollow side: Nascent Backline: Perceptible behind the withers Ribs: Visible over 10% of the back of the ribcage Shoulder: Round shoulder line Neckline: Full, hollow of the neck filled		
SCORE 4: Animal with excellent body condition Bones of the pelvis and hip: Barely visible, fat cover visible Tail base: Filled caudal strait, emerging fat cover Pelvis: Convex Thighs: Fleshy (full) Lumbar vertebrae: Line of apophyses detectable Hollow side: Barely visible Backline: Barely visible Ribs: Barely visible, light fat cover Shoulder: Round shoulder line, emerging fat cover Neckline: Muscular, hollow of the neck filled		
SCORE 5: Fat and smooth, overweighted animal Bones of the pelvis and hip: Difficult to locate, evident fat cover Tail base: Invisible caudal strait, evident fat cover Pelvis: Markedly convex Thighs: Fleshy (rounded, globular) Lumbar vertebrae: Line of apophyses invisible (due to fat cover) Hollow side: Invisible Backline: Invisible (due to fat cover) Ribs: Invisible (due to fat cover) Shoulder: Round shoulder line, evident fat cover Neckline: Muscular (globular), hollow of the neck filled		

4 REFERENCES

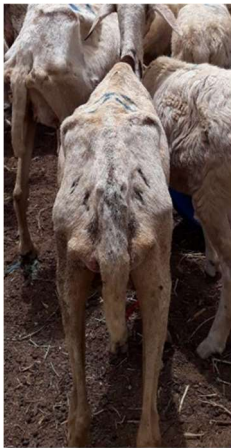
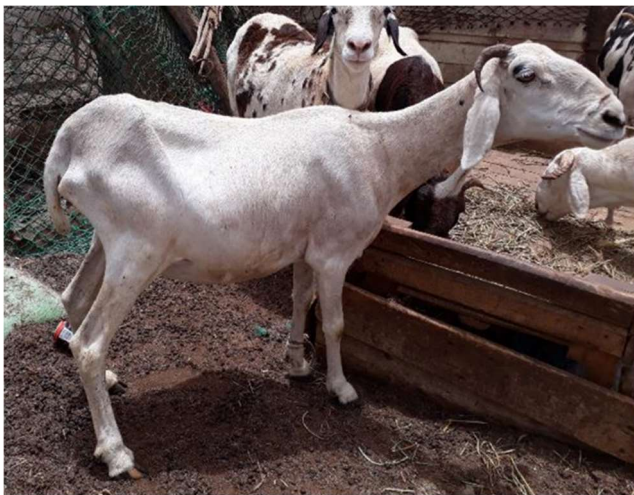
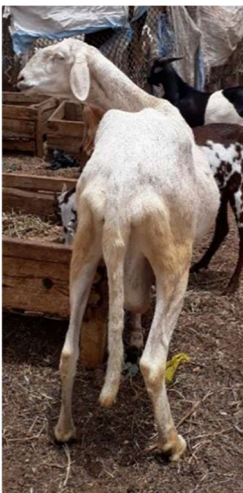
Richard D. (Dir. Scientifique), 1997. Ovins Doc : Système multimédia sur la production et la pathologie ovine en Afrique tropicale. AUPELF-UREF, CIRAD, Montpellier, France, CD Rom.

Russel A. J. F., Doney J. M., Gunn R. G., 1969. Subjective assessment of body fat in live sheep. J. agric. Sci., Camb., 72: 451-454.

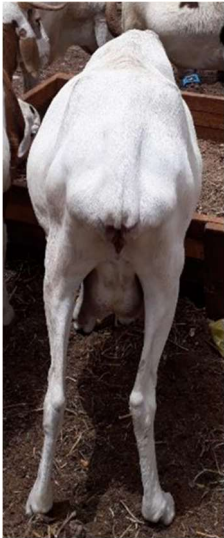
Vall E., 2020. Guide harmonisé de Notation de l'Etat Corporel (NEC) pour les animaux de ferme du Sahel : Ruminants de grande taille (Bovins, Camelins) et de petite taille (Ovins, Caprins) et équidés (Asins et Equins). CILSS, Cirad, Montpellier, France, 43 p.

5 ANNEXES

Annexe 1. Pictures of sheep with BCS varying from 0 to 2

Score	Back view	Right side view
SCORE 0: Very emaciated, skeletal animal		
SCORE 1: Very thin animal		
SCORE 2: Skinny, lean animal		

Annexe 2. Pictures of sheep with BCS varying from 3 to 5

Score	Back view	Right side view
SCORE 3: Animal with good body condition		
SCORE 4: Animal with excellent body condition		
SCORE 5: Fat and smooth, overweighed animal		

