Setting up an evaluation method for the fattening condition on Piemontese cows and relations between body condition and fertility.

The benefit from a beef breed is strictly related to the cows reproduction efficiency being the calf the main part of the farm incomes.

The aim for an efficient management of the farm is to obtain an average calving interval of 365 days, namely a calf/year for each cow. Cows with calving problems, or difficulties in recovering after calving, extend their calving interval and by consequence reduce the potential profitability of the farm.

One of the most frequent causes of fertility problems in cows is the inadequate food management. The body condition and consequently the availability of stored nutritionals has a big influence on the animals’ reproduction.

Several researches showed a delayed ovary activity in cows with scarce body condition at calving and this means a longer calving interval. The info about fat condition and dystocia are few although it appears that fat storage in the pelvic area could negatively influence the calving, reducing the size of the duct.

It’s then clear that the availability of a simple method to estimate the body condition of the cows may supply a better info to improve the reproductive efficiency of the stock.

The most used method, both in beef and in dairy cattle is the BCS (Body Condition Score) that shows the fattening condition of an animal through the appraise of some specific anatomic areas.

The total lack of researches made on specialised beef breeds has led us to do this work.
The following study made on over 500 farms of Anaborapi Herd Book allowed to set up a specific method for BCS in Piemontese and to study its relations with fertility.

**BCS in Piemontese**

The evaluation scale goes from 1 to 5 with variations of 0.25 points (17 total codes) defined by Edmonson in 1989 and adjusted for the Piemontese breed. The lower place is for a very skinny animal in bad body conditions while the upper part corresponds to fat cows.

This appraise has nothing to do with the muscular development and the beef conformation of the animal, it just expresses the state of their shape in terms of body deposits. The method refers to the following important points:

- profile of the sacrum-ischiatic ligament
- muscular covering and fat deposit on the bones of the iliac tuberosity
- evidence of the sacrum-iliac ligament evaluating the upper profile of the rump (seen from behind)
- muscular covering on the bones of the ischiatic tuberosity
- evidence of the flank fossa
- evidence of the spinous transverse apophysis in the lumbar vertebrae
- covering of the chest and withers
- evidence of the skin plica in the perinea fossa
- covering at the tail junction and of the coccyx vertebrae

The BCS code is set through the analysis of the specific anatomic areas of the cows and the method concerns only the visual appraise without touching the cow. The appraise is done right before the calving and in the first two months after calving at the resumption of the ovary activity. In these time the differences in the body condition may cause differences in the reproduction efficiency.

In the following pictures we report the areas for the visual appraise of BCS
The results may vary among the farms involved in the research and they are due to the different feeding systems. However there might be differences even among cows of the same farm: on average we registered a decrease of 0.25 in the body condition after the calving. This may be due to the increase of the energetic need of the cows for the milk production related to a constant ration.

The food requirements during lactation, even moderate, are actually higher than those for gestation except the last month. As a consequence if the ration is not adapted to the mutated physiological conditions cows might be in energetic deficit even in the last stage of pregnancy and even more in the beginning of lactation. In these conditions they derive their body reserves for the production of the energy they need: owing to this their BCS decreases.

**BCS and interval calving-first insemination**

In reproduction anestrum is the phase with no heats. This phase is fundamental for the restoring
of the reproductive activity and for a new pregnancy. To optimise the productions this phase must be as short as possible to avoid any delay in the heat.

The body condition is fundamental in this process: cows with BCS inferior to 2.75 have a 10 days delay getting in heat, compared to cows with best body condition. (Graph 1)

The scarce condition in the post-partum period is due to inadequate feeding support. At the beginning of the lactation the needs increase and if the cows has not a well-balanced diet she will derive her body reserves. This will cause a longer anestrum with of course a farm inefficiency.

**BCS and interval calving-conception**
The BCS influences also the gestation rate therefore it’s necessary that cows get to the calving in their best body condition.

Even in this case the cows with scarce body condition (BCS < 2.75) show average intervals 22 days higher compared to cows in optimum conditions (Graph 2).

Therefore the BCS evaluation is a very good tool to estimate the right feeding related to fertility.

**Toward a management model**

Using BCS allows to set up a management model based on the body condition variations in order to maximize the productivity of calves/year.
The results show that the cows in the last 2 months of pregnancy should have a moderate body condition (BCS 3.00 - 3.25). In the period right after calving the increase of energy in the ration should make them reach BCS 3.25. At conception the BCS should get back to 3.00. This would be feasible dividing the herd according their different physiological condition, setting at least two groups: in calf/not in calf.

**Future perspectives**

A further study concerns the genetic parameters of BCS and in particular its relation with the fertility traits. Some studies made with dairy breeds confirms a positive biological correlation between BCS and calving interval (Dal Zotto and coll., 2007). Cows with more than moderate body condition have a shorter calving interval. Furthermore BCS has low hereditability ($h^2$ 0.15 - 0.20), which allows indirectly a selection for fertility.

For what concerns the Piemontese breed the genetic aspects, related to BCS in the fertility improvement, still have to be investigated.