

## **ANIMAL-CENTRED INDICATORS OF DAIRY GOAT WELFARE**

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### **Introduction**

Intensive breeding of dairy goats, associated for example to the reduction of the time spent by the stockman with the flock, the equipment which can be fear eliciting or harmful for the animals, the stocking density, the flock management, or the artificial feeding of kids, may result in poor animal welfare. Among the different methods for assessing animal welfare (Broom, 1991), few are centred on the direct observation of animals (Johnsen *et al.*, 2001). The purpose of this study is to assess dairy goats welfare on the basis of four behavioural tests, conducted on an experimental flock of 108 Alpine goats.

### **Material and methods**

#### **Emotional reactivity**

Forty goats were tested alone in a test pen of 4 x 3 m, isolated from the other goats. They stayed alone during 5 minutes, then four different stimuli were presented during 3 minutes each in this order: a white and red cone, a non familiar person, the same person moving through the pen, an immobile dog; the stimulus being always placed at the same place. Then they stayed three more minutes alone. A little amount of food was placed near the stimulus. Collected data were: the number of displacements, cries, micturition and defecation, the number of times the animal put its legs on the pen barrier, the number of times the animal sniffs at the stimulus, if it feeds near the stimulus and if it stays near or far the non-familiar person when immobile and if it is indifferent or frightened when moving.

#### **Hierarchical structure**

The same 40 goats were regrouped in a test pen and marked with a fat pen. They were observed 30 minutes during an activity period and 30 minutes during feeding period. The pen lacked of several feeding places in order to promote competition between animals. Data collected were the number of antagonistic reactions initiated and received per animal and their nature (displacing, supplanting, frightening or assaulting).

#### **Milking platform**

The entire flock of dairy goats was passed on the milking platform. This was made 2 times. During the ascent and the descent, hesitations or refusals were noticed as well as the time to move through the ramp. When the animals were on the platform, limbs and udders were examined in order to detect health problems like caprine arthritis encephalitis virus symptoms or mastitis. The order of passage and age of the animal were also taken into account.

### Kid feeding

In this test, 13 goat kids were filmed with a digital video recorder during 90 minutes. Data collected were the number of time spent at the feeding place, the total time spent suckling and number of time supplanted at the feeding place.

### Results

#### Emotional reactivity

Most animals calmed down during the tests, reducing their displacements, cries and attempts to go out the pen (Figure 1). An increase of displacements and glances toward the moving non-familiar person can be seen. There were two kinds of animals: those threatened and fleeing (40%, N=16) and those indifferent (60%, N=24) during this phase of the test.

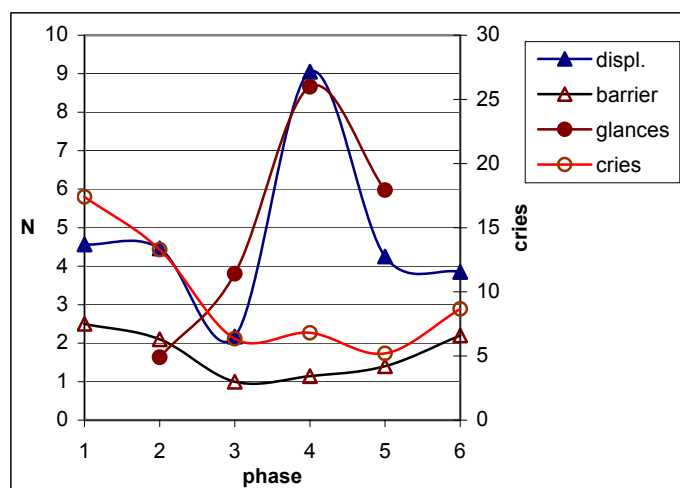


Figure 1: Mean of different variables during the test of emotional reactivity.

displ.: number of displacements of the animal; barrier: number of attempts to get out; glances: number of glances in direction of the stimulus; cries: number of cries. In 1 (adjusted to 3 min.) and 6 animals alone; 2: cone; 3: immobile non-familiar person; 4: moving non-familiar person; 5: immobile dog.

#### Hierarchical structure

There is no difference between young and old goats for the number of initiations of antagonistic interactions, but young ones receive more interactions than the elder (interaction received =  $2,8 - 0,348(\text{AGE})$ ,  $p < 0.05$ ). Elder goats initiate more than the young ones (Figure 2a) ( $\%init = 0,2 + 6,2(\text{AGE})$ ,  $p < 0.05$ ). Three classes of animals can be identified (Figure 2b): dominated ( $\%init \sim 0-20\%$ ,  $N=13$ ), middle-ranked ( $\%init \sim 20-80\%$ ,  $N=15$ ), and dominants ( $\%init \sim 80-100\%$ ,  $N=7$ ).

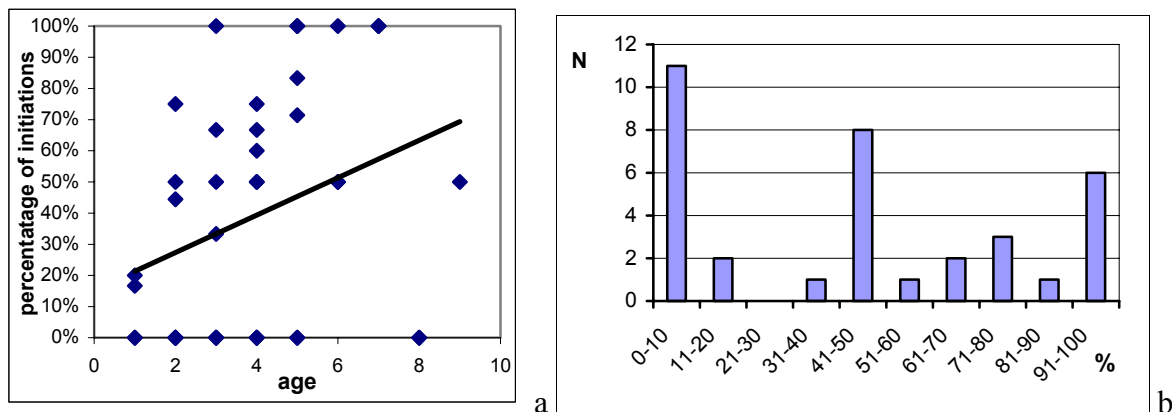


Figure 2a: percentage of initiation of an antagonistic reaction a function of the age.

Figure 2b: distribution of the percentage of initiation of an antagonistic reaction.

### Milking platform

Elder animals have more limbs problems ( $p < 0.05$ ). Animals with limbs problems hesitate or refuse more to ascend the ramp to the platform ( $p < 0,05$ ). The order of passage is highly (positively) correlated with the articulations problems ( $p < 0,05$ ) and the order of passage is conserved for the two iterations ( $p < 0,05$ ).

### Discussion

As observed by Vandenhede *et al.* (1998), stressed animals moved and cried more than the others. Sounds have been recorded and showed differences in intensity and frequency of vocalisations between calm animals and agitated ones. Some tested animals showed an aversion to the non-familiar person, especially when she was moving; in most of the cases they calmed down after few time, but some didn't get used to the situation. A great number of this kind of animals could reveal a problem with the human socialisation.

Dominant, middle class and dominated animals can be identified in a flock. Some of the dominated ones received only one or two interactions but some received more and from several animals. If the space allowed to animals and food distribution are not adequate, the most dominated could undergo a lack of social relations, of food or resting place (Barroso *et al.*, 2000).

The limbs problems experienced by elder animals led to more aversion to ascend the ramp to the milking ramp. If this aversion is too important, a chronic stress or a fear at the milking platform could arise.

No welfare degradation due to access to milk has been identified by the kid feeding test: they had at disposition a milking machine which produced milk upon request, so a kid could feed at any time in a day, and this machine was not a factor of limitation for food.

Some behavioural indicators used are correlated and a detailed analysis may show links between indicators of the different tests. A positive correlation between cries and displacements, and a tendency to an association between the number of received antagonistic interactions and the order of passage at the milking platform have been identified. Further analyses will be conducted on these observations.

### **Conclusion**

It has been shown that these tests are in relation to animal welfare. Limbs and age can be a source of inconveniences for dairy goats. Arrangement of the flock can induce a welfare degradation of animals constantly frightened by the others. At last, socialisation to human may be a problem due to the importance of interactions between men and the flock.

Applied to a large number of animals, the tests developed here could be used to establish references in terms of animal welfare for this type of production system. They will also be used to design a simplified in-farm appreciation of dairy goat welfare.

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