

Use of feeding yoke traps decreases food wastes in dairy goats

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Housing facilities are of primary importance (Toussaint 1997) as these can promote animal welfare (Wechsler 2005) and affect the efficiency of the farm (Toussaint 1997). Controlling the entrance to the feeding bunk is possible with the use of a “feeding yoke trap” (Fig. 1). This is particularly useful in large groups, where the competition for food and space might be higher (Jørgensen *et al.* 2007). In goats, there is no information regarding the effect of the device on the feed waste when whole forage is provided. The objective of this study was to evaluate the impact of using feeding yoke traps on the feed waste, body weight and milk production in housed dairy goats.

Adult French Alpine goats (25), 5–6 months of lactation, were placed in a 160 m² pen with a free access feeder. Food was provided at 08:00 (30 kg oat hay and 22 kg maize silage), 12:00 (15.5 kg alfalfa hay) and 15:00 h (11.6 kg maize, sorghum and soy concentrate) (Fig. 2) During a 10-day period (phase 1), the leftover food (inside the feeder) and wasted feed (outside the feeder but inside the pen) were weighed daily. In the second phase (10 d), the goats were placed into another contiguous pen of similar dimensions with a feeder that was equipped with 25 automatic feeding yoke traps in a non-activated state (goats were not trapped when entering the feeder). In a third phase (10 d), the feeding yoke trap was activated so that the animals were automatically trapped when entering; the goats remained trapped during a 2 h period after each food administration. Phases 2 and 3 started after an adaptation period of 2 d for the goats to learn how to enter the feeder, and the same measures as described for Phase 1 were applied. Milk production was also registered daily in every phase, and all goats were weighed at the beginning and at the end of the three phases. Comparisons were made between the different phases using analysis of variance and t-test (SAS 1999).

The use of the yoke traps decreased the forage waste significantly ($P<0.01$; Table 1). When activated so that the goats were automatically restrained, the amount of forage that was available in the feeder at any given time increased and was not wasted ($P<0.01$). When calculating the total

Table 1. Total daily feed waste (mean±se) in a group of 25 goats using feeders with free access to food (Phase 1) and with inactive (Phase 2) and active yoke traps (Phase 3)

	Phase 1	Phase 2	Phase 3
Total forage waste (kg) ¹	21.1±0.6 ^a	3.6±0.1 ^{b*}	2.5±0.1 ^{b*}
Remaining forage in feeder (kg)	0±0 ^a	7.2±0.8 ^b	10.4±0.7 ^c
Forage waste (%)	70.6 ± 2.0 ^a	12 ± 0.5 ^{b*}	8.6 ± 0.3 ^{b*}
Total feed waste ² (%)	26.7 ± 0.7 ^a	4.5 ± 0.2 ^{b*}	3.2 ± 0.1 ^{b*}

^{a,b} ($P<0.01$; * P , 0.06 between phases); ¹considering the forage outside the feeder and inside the pen; ²considering the entire ration administered, including concentrate.

waste, considering the entire ration, in phase 1 (free access to feeder) the waste was 26%, whereas the waste was 4 and 3%, respectively, in phases 2 and 3 (when yoke traps were present in the feeder). Other modifications at the feeding place were tested for goats, partitions and platforms have been used, and were found effective in reducing agonistic interactions (Aschwanden *et al.* 2009) and, possibly, in causing the forage to be used more efficiently (Jørgensen *et al.* 2007, Aschwanden *et al.* 2009).

Body weight was not negatively affected in any of the phases, and was increased when using the yoke traps -phase 3-(phase 1, 1.04±0.5; phase 2, -0.53±0.5; phase 3, 2.2±0.5; kg±SE; $P<0.05$). The animal/feeding place ratio is an important parameter to consider when modifying the feeder, as has been shown in other species (Magowan *et al.* 2008). In dairy goats, the number of goats per feeding place has dramatic effects on a number of parameters. When there is one goat per feeding place, feeding and lying time are increased and queuing time, physical displacements and aggressive behaviours are decreased compared to the values of these parameters when there are three goats per feeding place (Jørgensen *et al.* 2007). When using yoke traps in dairy goats, at least one feeding place per goat is necessary to avoid serious competition and negative effects such as delays in growth and decreases in milk production (Fernández *et al.* 2007).

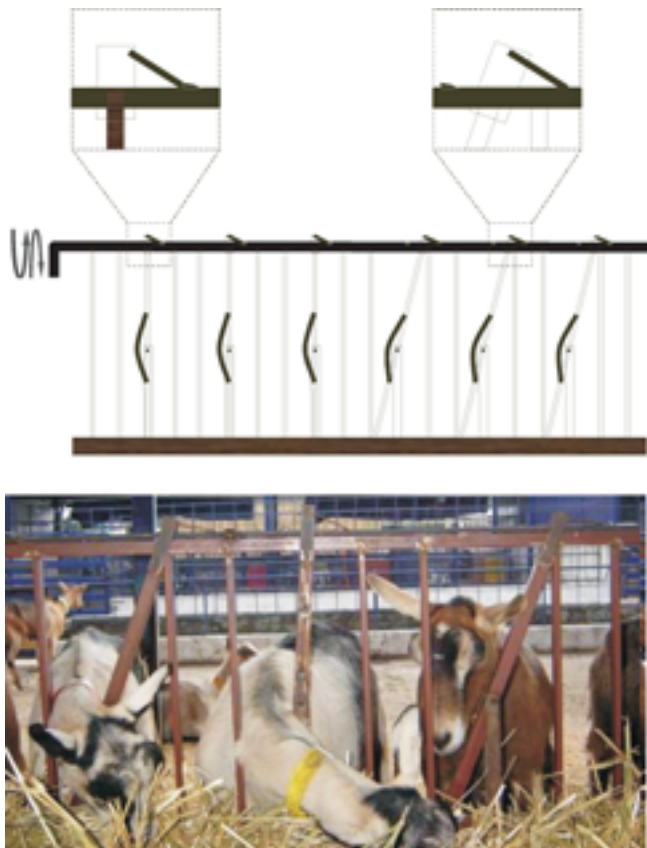


Fig. 1. Feeding yoke traps used to maintain goats in a single place over the feeder.

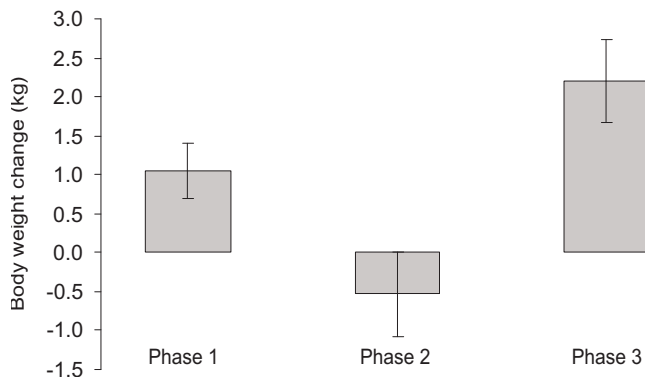


Fig. 2. Body weight change during each phase (mean ± SE).

Daily milk production did not differ statistically between phases (phase 1: 1.02 ± 0.01 ; phase 2: 0.95 ± 0.01 , and phase 3: 0.94 ± 0.01 , $1d^{-1} \pm SE$, $P > 0.05$). The observed decrease in milk production in the second and third phases was not statistically significant, suggesting a non-negative effect. Such a decrease could be due to the natural decline in milk production at the end of lactation (Salama *et al.* 2003). We conclude that the use of feeding yoke traps significantly reduced feed waste in confined goats without negatively affecting body weight. These results have important

economic implications.

SUMMARY

The objective of this study was to determine the effect of using feeding yoke traps on feed waste, milk production and body weight in a group of 25 dairy goats. During a 10-day period (first phase), goats were housed in a pen with free access to feed bunks. Feed waste and milk production were registered daily. Goats were then moved to another pen with feeding yoke traps and, in the second and third phases (with non-activated and activated traps, respectively), the same measures were recorded. The use of feeding yoke traps significantly reduced the daily feed waste for first, second and third phases. Altogether, feed wastes was reduced from 26% in the free access feeder to 3–4% in feeders with yoke traps. Milk production did not differ significantly between phases. Body weight was not negatively affected in any of the phases, and increased in goats placed in pens with yoke traps. We conclude that the use of feeding yoke traps significantly reduced feed waste in confined goats without negatively affecting body weight or milk production.

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REFERENCES

- Aschwanden J, Gyax L, Wechsler B, Keil N M. 2009. Structural modifications at the feeding place: Effects of partitions and platforms on feeding and social behaviour of goats. *Applied Animal Behaviour Science* **119**: 180–92.
- Fernández M A, Alvarez L, Zarco L. 2007. Regrouping in lactating goats increases aggression and decreases milk production. *Small Ruminant Research* **70**: 228–32.
- Jørgensen G H M, Andersen I L, Bøe K E. 2007. Feed intake and social interactions in dairy goats — The effects of feeding space and type of roughage. *Applied Animal Behaviour Science* **107**: 239–51.
- Magowan E, McCann, M E E, O'Connell N E. 2008. The effect of feeder type and change of feeder type on growing and finishing pig performance and behaviour. *Animal Feed Science and Technology* **142**: 133–43.
- Salama A A K, Such X, Caja G, Rovai M, Casals R, Albanell E, Marin M P, Marti A. 2003. Effects of once versus twice daily milking throughout lactation on milk yield and milk composition in dairy goats. *Journal of Dairy Science* **86**: 1673–80.
- SAS. 1999. User's guide. Statistics, SAS Institute Inc., Cary NC, USA.
- Toussaint G. 1997. The housing of milk goats. *Livestock Production Science* **49**: 151–64.
- Wechsler B. 2005. An authorisation procedure for mass-produced farm animal housing systems with regard to animal welfare. *Livestock Production Science* **94**: 71–79.