

Effect of concentrate supply on creole kid performances in a suckling system at pasture in Guadeloupe (FWI)

Alexandre G., Fleury J., Coppry O., Archimede H.

in

Ledin I. (ed.), Morand-Fehr P. (ed.).
Sheep and goat nutrition: Intake, digestion, quality of products and rangelands

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 52

2000
pages 137-141

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=600325>

To cite this article / Pour citer cet article

Alexandre G., Fleury J., Coppry O., Archimede H. **Effect of concentrate supply on creole kid performances in a suckling system at pasture in Guadeloupe (FWI)**. In : Ledin I. (ed.), Morand-Fehr P. (ed.). *Sheep and goat nutrition: Intake, digestion, quality of products and rangelands*. Zaragoza : CIHEAM, 2000. p. 137-141 (Cahiers Options Méditerranéennes; n. 52)



<http://www.ciheam.org/>
<http://om.ciheam.org/>

Effect of concentrate supply on creole kid performances in a suckling system at pasture in Guadeloupe (FWI)

G. Alexandre, J. Fleury, O. Coppry and H. Archimede
Unité de Recherches Zootechniques, INRA Antilles-Guyane,
BP 515, 97165 Pointe à Pitre Cédex, Guadeloupe, Antilles-Guyane

SUMMARY – The objective of this experiment was to estimate the effect of supplementation, during the suckling growth period, of the Creole kids reared at pasture in Guadeloupe. Creole goats grazed *Digitaria decumbens* pastures. Three cohorts of goats were conducted: in the dry season (season D; 50 does and 86 kids), in the rainy season (season R; 64 does and 112 kids) and in the intermediate season (season I; 50 does and 93 kids). Does were supplemented: 35.3 kg of commercial pellets (0.86 UFL and 115 g PDIN), were gradually distributed per goat and per lactation. At each season, two groups of suckling does with their kids were determined according to the kid's supplementation level: in group S (supplemented; GS), commercial pellets were supplied *ad libitum* from the 6th week to weaning and in group N, (GN) no supplementation. Weaning took place at 81.7 ± 5.9 days post-partum. Intensive helminths and ticks controls were applied. The adjusted mean daily milk production for the first 6 weeks of lactation was 1218 g/d. No difference between supplementation groups was noted. However a season effect ($P < 0.05$) was recorded. Daily weight gain of kids (DWG) from birth to 40 days reached 87.8 g. It was not different between kids of either feeding groups or kidding seasons. Kid's supplementation significantly ($P < 0.01$) increased DWG from 40 days to 80 days, weaning weight and live weight at 120 days (6 weeks after weaning): 69.2 vs 61.5 g; 8.0 vs 7.6 kg and 9.9 vs 9.4 kg, respectively for kids in GS and for kids in GN. A season effect was observed for the same variables. Lower performances occurred during the rainy season. Concentrate supply (23 g DM/ LW^{0.75}) improves the suckling kids performances before and after weaning. Thus supplementation strategies could be set up to improve the mother-young(s) performances: decreasing does' supplementation while increasing the kids' supplementation.

Key words: Criollo goats, suckling goats, nutrition level, kidding season, growth performances, tropical pasture.

RESUME – "Effet de l'apport du concentré sur les performances des chevreaux Créoles en système allaitant sur pâturage en Guadeloupe". Ce travail porte sur la complémentation des chevreaux Créoles élevés sous la mère. Le troupeau allaitant était conduit sur pâturages de *Digitaria decumbens* en Guadeloupe. Cette expérimentation a été menée durant trois saisons de mise-bas : en saison sèche (D ; 50 chèvres et 86 chevreaux), en saison humide (R ; 64 chèvres et 112 chevreaux) et en saison intermédiaire (I ; 50 chèvres et 93 chevreaux). Les mères allaitantes étaient complémentées : 35,3 kg/tête, d'un concentré du commerce (0,86 UFL and 115 g PDIN), distribués graduellement au cours de la lactation. A chaque saison, deux groupes d'animaux étaient constitués en fonction du niveau de complémentation des chevreaux : groupe S, apport de concentré du commerce *ad libitum* depuis leur sixième semaine jusqu'à leur sevrage, groupe N aucune complémentation. L'âge moyen du sevrage était de $81,7 \pm 5,9$ jours. Une prophylaxie antiparasitaire rigoureuse a été appliquée. La production laitière journalière, durant les 6 premières semaines de lactation, était de 1218 g. Aucune différence n'existait entre les deux groupes de complémentation. Seul un effet de la saison fut relevé. Le gain moyen quotidien (GMQ) des chevreaux entre la naissance et 40 jours a atteint 87,8 g et aucune différence entre les groupes ou entre les saisons fut observée. Le GMQ entre 40 et 80 jours, le poids au sevrage et le poids vif à 120 jours ont été significativement supérieurs ($P < 0,01$) pour les chevreaux élevés dans le groupe S que pour ceux du groupe N : 69,2 vs 61,5 g ; 8,0 vs 7,6 kg and 9,9 vs 9,4 kg, respectivement. Des performances moindres ont été relevées pour ces mêmes variables, en saison humide. En conclusion, la complémentation des jeunes sous la mère (23 g MS/ kg^{0,75}) leur est bénéfique pour de meilleures performances péri-sevrage. Il convient d'élaborer des stratégies de complémentation du troupeau allaitant afin de maintenir un niveau de production élevé tout en réduisant les intrants.

Mots-clés : Chèvre Créole, chèvre allaitante, niveau de nutrition, saison de naissance, performances de croissance, pâturages tropicaux.

Introduction

In the Caribbean, the goat population is mainly raised on the suckling system for meat production (Devendra and Bums, 1983). Systems of production are based on grazing natural pastures. Nutritive

value of such tropical forages (Aumont *et al.*, 1995) is poor compared with high animal requirements. In Guadeloupe, Creole goats, a continuous breeder, used to suckle their kids (1.5 to 2.3 kids/litter and three kiddings in two years) for more than 2 months (Chemineau *et al.*, 1984). Improved nutrition level of the Creole goats increases milk production (Alexandre, 1983; Alexandre *et al.*, 1997b) and kids' preweaning growth rates, and decreases kids' mortality rates (Alexandre, 1983). Few studies exist upon the interest of suckling young's supplementation. Providing ingestible, energetic and nitrogenous feeds to young lambs improve their preweaning performances and allow weaning at an early age (Brown, 1964; Prache and Theriez, 1988). In Creole kids (Levy and Alexandre, 1985), a strict suckling period occurs from birth to 6 weeks (first stage), in which milk is the main trigger to growth. Beyond this stage (second stage), kids begin to ingest solid feeds (forages and pellets).

The objective of this experiment was to estimate the effects of concentrate supply to the Creole kids, during the second stage of the suckling period, upon their growing performances.

Materials and methods

Animals and their management

Creole meat type goats, a small-sized breed (25 kg LW) described by Chemineau *et al.* (1984), were used in this experiment. At three different breeding seasons, 164 goats gave birth to 291 kids (47 singles, 214 twins and 30 triplets). In dry season (season D), there were 50 does and 86 kids, in rainy season (season R) 64 does and their 112 kids and then in intermediate season (season I) there were 50 does and 93 kids. Kids were weaned at 81.7 ± 5.9 days. Regular drenchings were carried out, in order to control gastro-intestinal parasitism, monthly for kids from birth to weaning and every two months for weaned kids and goats. External parasites were controlled every two weeks for young's and adults (spray of acaricides).

The diet was composed of Pangola (*Digitaria decumbens*) grazed every 35 days (0.74 UFL and 79 g PDIN per kg DM, Aumont *et al.*, 1995). Goats were grazing rotatively Pangola pasture at an average stocking rate of 1400 kg LW/ha. Goat dams were offered commercial pellet (0.86 UFL and 115 g PDIN per kg DM), composed of maize (32.5%), wheat issues (40.0%), soya bean meal (15.0%) sugar cane molasse (6.0%) and minerals (6.5%). A total of 35.3 kg of pellets were gradually distributed to each goat: 700 g/goat/day during the first 3 weeks, 500 g the 3 following weeks, 300 g the 3 other ones and 200 g the last 3 weeks. At the beginning of each season two groups of suckling does and their kids were determined (Table 1) according to the kid's supplementation level: in the first group (GS), the same commercial pellets as mentioned above, was offered *ad libitum* from the 6th week of age to weaning (12 weeks), whereas in the second group (GN) no pellets were supplied. In both group, kids had no access to pellets when does were fed.

Table 1. Composition of the two groups[†] of suckling Creole goats and their kids according to the kid's supplementation level and the kidding season

Kidding season	Group S		Group N	
	Goats	Kids	Goats	Kids
Dry season	23	40	27	46
Rainy season	33	57	31	55
Intermediate season	25	46	25	47

[†]Kid's supplementation group: S, pellets offered *ad libitum* from 6 to 12 weeks, and N, no supply.

After weaning, kids of both group were gathered and separated according to sex. There was no more supplementation applied. Kids were grazing the same stand of Pangola pasture (as mentioned above) with a mean stocking rate of 1000 kg LW/ha. Pasture biomass and quality were not estimated.

Measurements and statistical analysis

In each group, milk production of 8 multiparous twins-suckling goats was estimated by the oxytocin method (Alexandre, 1983) weekly from the second to the sixth week of lactation. In group S, pellets offered to the kids were weighed every day and pellets "intake of the kids" group was estimated by weighing collective refusals twice a week. Goats and kids were weighed every two weeks from birth to weaning. After weaning, kids were weighed weekly during the six weeks following weaning. The individual live weights were used to estimate the live weight at fixed ages: at 40 days (LW40), at 80 days (LW80) and at 120 days (LW120). The daily weight gain between birth and LW40 (DWG 0-40) and between LW40 and LW80 (DWG 40-80) were then calculated.

General linear model procedures (SAS 1988) were used to adjust data to the following sources of variation: supplementation group, kidding season, sex and litter size.

Results

Before start of pellet distribution to kids

The adjusted mean daily milk production of multiparous twins-suckling goats, during the first 6 weeks of lactation, was 1218 g/day (Table 2). No difference between kid's supplementation groups was noted. However goats reared in season D showed a higher ($P < 0.05$) milk production than during the two other seasons (Table 2). The mean kid's birth weight was 1.71 kg and no difference was observed according to group (Table 2). A slight but significant difference ($P < 0.05$) was recorded for kids born in season R relatively to the others born in seasons D and I. During the first 6 weeks of age, pre-weaning daily weight gain (DWG 0-40) of kids, adjusted for birth weight, reached 87.8 g. It was not different between kids of either feeding groups or kidding seasons (Table 2).

Table 2. Least square means of Creole goat's milk production during the first 6 weeks of lactation and birth weight live weight adjusted to fixed age and daily weight gain of Creole kids according to their supplementation level and their kidding season

Variable	Group [†]		Season ^{††}		
	GS	GN	D	R	I
Before start of pellet distribution					1
Milk production ^{†††}	1192 ^a	1243 ^a	1299 ^a	1129 ^b	197 ^b
Birth weight (kg)	1.68 ^a	1.74 ^a	1.69 ^a	1.77 ^b	1.65 ^a
LW40 (kg)	5.08 ^a	5.34 ^a	5.19 ^a	5.16	5.05
DWG 0-40 (g)	88.4 ^a	87.2 ^a	87.5 ^a	84.7 ^a	85.0 ^a
Effects of treatment on kid's growth					
Weaning weight	8.00 ^A	7.62 ^B	7.87 ^A	7.32 ^B	8.16 ^A
DWG 40-80 (g)	69.2 ^B	61.5 ^B	66.9 ^A	54.1 ^B	77.6 ^C
LW120 (kg)	9.91 ^A	9.44 ^B	10.13 ^A	8.70 ^B	10.45 ^B

[†]Group is determined according to the kid's supplementation level mentioned in the text.

^{††}Kidding seasons are D: dry; R: rainy; and I: intermediate.

^{†††}Milk production of 8 multiparous twins-suckling goats for each season in each group.

^{A,B,C,a,b}Values within row for each factor of variation with different superscripts differ significantly: a, b, c: $P < 0.05$ and A, B, C: $P < 0.01$.

Effects of treatment

Kids' supplementation significantly ($P < 0.01$) increased DWG from 6 weeks to weaning (DWG 40-80): 69.2 for kids in GS vs 61.5 g for kids in GN. DWG 40-80 was significantly affected by season.

Same factors of variation ($P < 0.01$) were observed for weaning weight: on one hand, 8.00 vs 7.62 kg for GS and GN respectively, and on the other hand, 7.87, 7.32 and 8.16 kg for seasons D, R, and I respectively (Table 2). Live weight at 120 days (Table 2) was significantly higher for kids of GS than for kids of GN: 9.91 vs 9.44 kg, respectively ($P < 0.01$). Differences due to the season effect occurred also for LW120 (Table 2). No significant interaction between sources of variation was found.

Pellets intake of the kids increased rapidly from about 50 g/day/kid to more than 180 g/day/kid from the beginning to the end of the period (Fig. 1). No difference appeared between seasons.

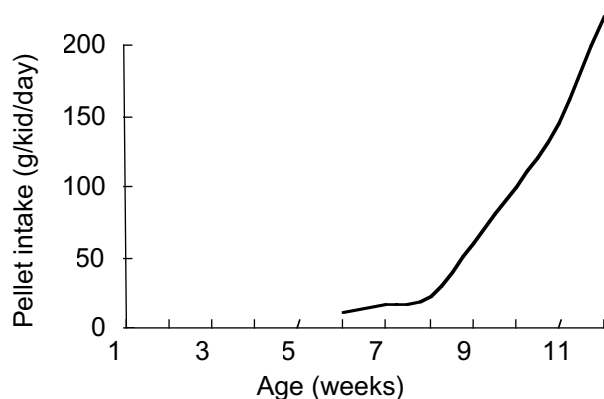


Fig. 1. Evolution of Creole kid's pellets intake (g per kid and per day) during the second stage of their suckling period (from the 6th week of age to weaning and for kids reared in GS).

Discussion

Same level of performances before the beginning of the pellet supplying period were obtained. Creole twins-suckling goats milk production, during the first 6 weeks of lactation, as well as DWG 0-40 were similar between the two groups of animals. Thus, the significant increase in growth performances after 40 days of age and after weaning, could be related mainly to the kid's supplementation level. The response to supplementation in this study is, however, low: 12.5% difference for the DWG 40-80 and 5% difference for live weight at weaning. The kids' milk intake might have been high enough to induce good levels of weaning weights in both group. As a matter of fact, Creole goats exhibit good milking capacities (Alexandre *et al.*, 1997b). This hypothesis is supported by the general conclusion that preweaning growth is mainly dependent on milk production (Singh 1996; Alexandre *et al.*, 1997b). Indeed, preweaning DWG of Creole supplemented kids is quite satisfactory. Our results are similar to even larger breed like the Indian Sirohi goat (Singh 1996) reared under similar feeding level. DWG (g/day) was reported to birth weight (kg BW) in order to make comparisons. Data recalculated were, 4.7 g/day/kg BW vs 5.2 g/day/kg BW, respectively. The same difference (5%) obtained at weaning, was observed 6 weeks after weaning for the kids' LW120. In fact, performances after weaning depend on the feeding level before weaning (Alexandre 1983; Morand-Fehr *et al.*, 1983). But, there might have different tendencies not only for LW but also for DWG. In our experiment, some weaker kids ($n = 54$ in both group), were weaned at a light weaning weight (due to high litter size, low birth weight, low dam's capacities): at 7.3 kg in GS and at 6.8 kg in GN, ($P < 0.01$). Supplementation have reduced the magnitude of their weaning stress, since DWG 2 weeks after weaning were, 36 g vs 9 g, for GS and GN respectively ($P < 0.01$). Same conclusions were related by Morand-Fehr *et al.* (1983) and Prache and Theriez (1988).

The total amount of pellet intake reached about 4 kg pellets per kid over a 6 weeks period. Our estimation, reported to metabolic body weight, indicated an intake of 23 g DM/ LW^{0.75} against 29 g DM/ LW^{0.75} reported by Morand-Fehr *et al.* (1983) for milk breed kids two days before weaning.

The season effect observed in our experiment could be related to the negative effect of the rainy season on goats as it was already mentioned by Alexandre *et al.* (1997a) for goats reared on irrigated

pastures. Goats suffer from the high humidity rate (85%), on the other hand, severe gastro-parasitism constraints reduce goats' performances when reared on pasture (Aumont *et al.*, 1997). In our conditions (irrigated pasture and high stocking rate) it has been estimated, owing to Aumont *et al.* (1991), that the infestation risk increased up to 25% between the humid and the other seasons. The bad sward structure occurring at this season, as measured by Alexandre *et al.* (1997^a) (at 35 days of regrowth high biomass, 6200 kgèyi DM/ha but low leaves/stems ratio, 65%), might have affected the intake level of the does as generally reported for animals reared on pasture (Minson, 1990).

Conclusions

Creole goats exhibit good level of production comparatively to other tropical native breeds provided nutrition level and management are adequate. The high level of concentrates supplied, either for reproductive does or for suckling kids, might have reduced the negative effects of the low nutritive value of tropical forages. However supplementation has a significant economic effect in our conditions specially for high litter size and/or for light live-weighted-kids. Further studies are required to set up supplementation strategies for goats reared under intensive grazing systems. On the one hand, concentrate supplies to mother might be decreased at the end of the lactation period in favour of increasing supply to their offspring(s) before weaning. On the other hand, ingredients composition of commercial pellets should be modified in order to provide adequate sources and amount of energy and protein to animals grazing tropical forages.

References

- Alexandre, G. (1983). *Production laitière des chèvres créoles. Facteurs de variation et influence sur la croissance des jeunes*. PhD Thesis, ENSA, Rennes.
- Alexandre, G., Aumont, G., Fleury, J., Coppry, O., Mulciba, P. and Nepos, A. (1997a). Production semi-intensive au pâturage de caprins à viande en zone tropicale humide : Le cas des cabris Créoles sur Pangola (*Digitaria decumbens*) en Guadeloupe. *INRA Prod. Anim.*, 10(1): 43-54.
- Alexandre, G., Aumont, G., Fleury, J., Mainaud, J.C. and Kandassamy, T. (1997b). Performances zootechniques de la chèvre Créole allaitante de Guadeloupe. *INRA Prod. Anim.*, 10(1): 7-20.
- Aumont, G., Caudron, I., Saminadin, G. and Xande, A. (1995). Sources of variation in nutritive values of tropical forages from the Caribbean. *Anim. Feed Sci. Tech.*, 51: 1-13.
- Aumont, G., Gruner, L. and Berbigier, P. (1991). Dynamique des populations de larves infestantes des strongles gastrointestinaux des petits ruminants en milieu tropical humide. Conséquences sur la gestion des pâturages. *Rev. Elev. Med. Vet. Pays Trop.*(special issue): 123-131.
- Aumont, G., Pouillot, R., Simon, R., Hostache, G., Varo, H. and Barré, N. (1997). Parasitisme digestif des petits ruminants dans les Antilles françaises. *INRA Prod. Anim.*,10(1): 79-90.
- Brown, T.H. (1964). Early weaning of lambs. *J. Agric. Sci. Camb.*, 63: 191-204.
- Chemineau, P., Cognie, Y., Xande, A., Peroux, F., Alexandre, G., Levy, F., Shitalou, E., Beche, J.M., Sergent, D., Camus, E., Barre, N. and Thimonier, J. (1984). Le cabri créole : Monographie. *Rev. Elev. Med. Vet. Pays Trop.*, 37: 225-238.
- Devendra, C. and Burns, M. (1983). *Goat Production in the Tropics*. Commonwealth Agricultural Bureaux.
- Levy, F. and Alexandre, G. (1985). Le comportement alimentaire du cabri créole élevé en stabulation libre de la naissance au sevrage. *Ann. Zootech.*, 34: 181-192.
- Minson, D.J. (1990). *Forage in Ruminant Nutrition*. Academic Press, New York.
- Morand-Fehr, P., Hervieu, J., Bas, P. and Sauvant, D. (1983). Feeding of young goats. In: *Proc. 3rd Int. Conf. on Goats*, Tucson (Arizona), 10-15 January 1983, pp.113-121.
- Prache, S. and Theriez, M. (1988). Production d'agneaux à l'herbe. *INRA Prod. Anim.*,1: 25-33.
- SAS, (1988). *SAS User's Guide. Statistics*. SAS Inst., Inc., Cary, N.C.
- Singh, N.P. (1996). Effects of supplementary concentrate during pregnancy and lactation in Sirohi goats. In: *Proc. VI Int. Conf. on Goats*, Beijing (China), 6-11 May 1996, 2: 646-648.