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Effects of reduced feeding space on feeding, comfort and agonistic behaviour of goats

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This study was conducted at the Department of Animal Sciences, Georg-August University, Göttingen, Germany

66th EAAP Annual Meeting – Warsaw – September 2, 2015

Background

- Competition for resources (i.e. feed, water) can negatively impact welfare of individuals.

- Behaviour including feeding, resting and aggressive interactions are most feasible welfare indicators (Dawkins, 2004; Nowak et al., 2008)

- Reducing the lying area from 1.0 to 0.5 m^2/ewe (Bøe et al., 2006)
  - ➢ Lying time: 70% to 63% ↓
  - ➢ Synchronisation of lying: 45% to 6% ↓
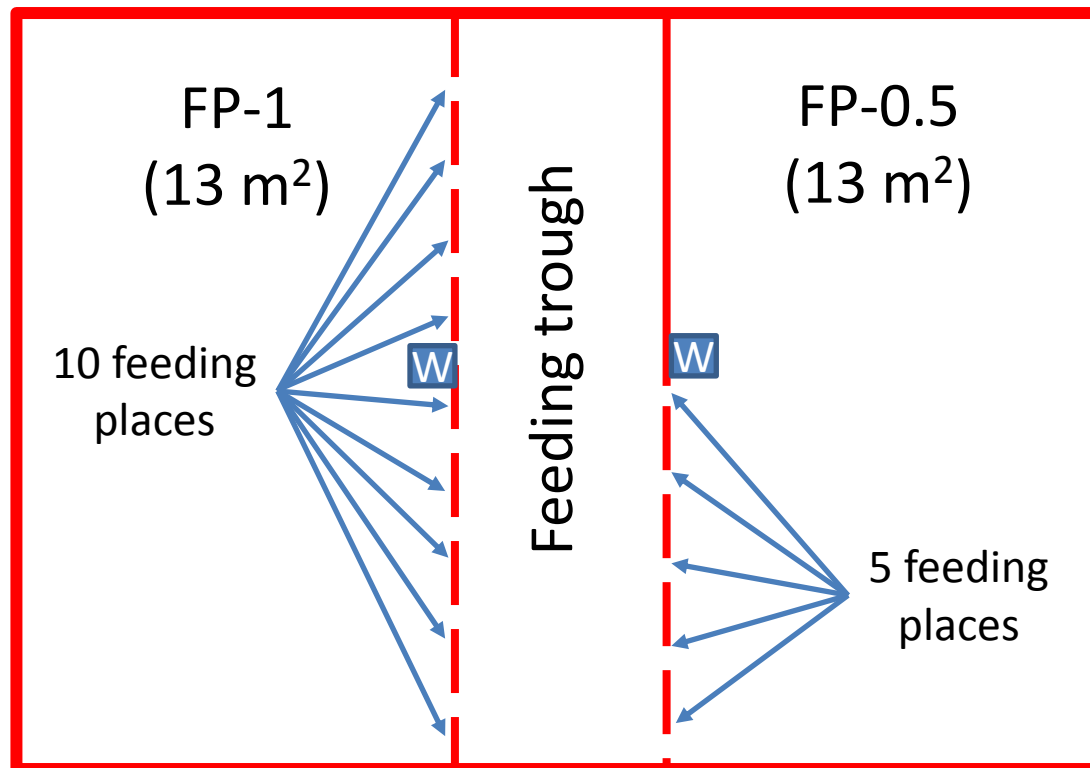 - ➢ Displacements of lying ewes: 6.4 to 28.9 ↑

Objectives

Estimate the effects of a reduced number of feeding places (0.5 instead of 1) on feeding, comfort and agonistic behaviour in Boer goats.

Materials and methods

- 2 trials: 6 weeks each
- 20 early-pregnant hornless Boer goats per trial allocated to two treatments (n = 10)

Materials and methods

- Hay (2.2 kg) and concentrate (0.8 kg)/animal provided twice daily

- Water available ad libitum

- Video recording for behavioural observations
  - → once a week for 24 h for each of the 6 experimental weeks of each trial
  - → continuous sampling method

| Pattern	Behaviour	Definition
Feeding	Feeding	Head through the feed barrier
Comfort	Lying	Lying down in any resting position
	Standing	Standing without queuing or performing any other behaviour
Competition	Attempting	Attempt to reach a feeding place that is occupied
	Queuing	Head oriented towards the feed barrier; waiting in front of the feeder while all feeding places are occupied
Agonistic interaction	Fighting	Number of continuous aggressive interactions
	Threatening	Directing forehead towards opponent without physical contact
	Withdrawing	Goat withdraws from another after threatening or physical contact
	Heading	While resting, continuous butting another goat with the head
	Butting	While feeding, contiuous butting another goat
	Displacing	A goat forces another to change/leave the feeding place
	Displaced	A goat stops feeding after being forced by another

Dominance index (D)

- % of animals dominated in relation to all animals with which the individual has interacted within the group (Lamprecht, 1986)

- Individuals of each group evaluated based on the with-drawal and displacement behaviour

  - Low-ranking: D < 33%

  - Medium-ranking: D = 33 to 66%

  - High-ranking: D > 66% (Barosso et al., 2000)
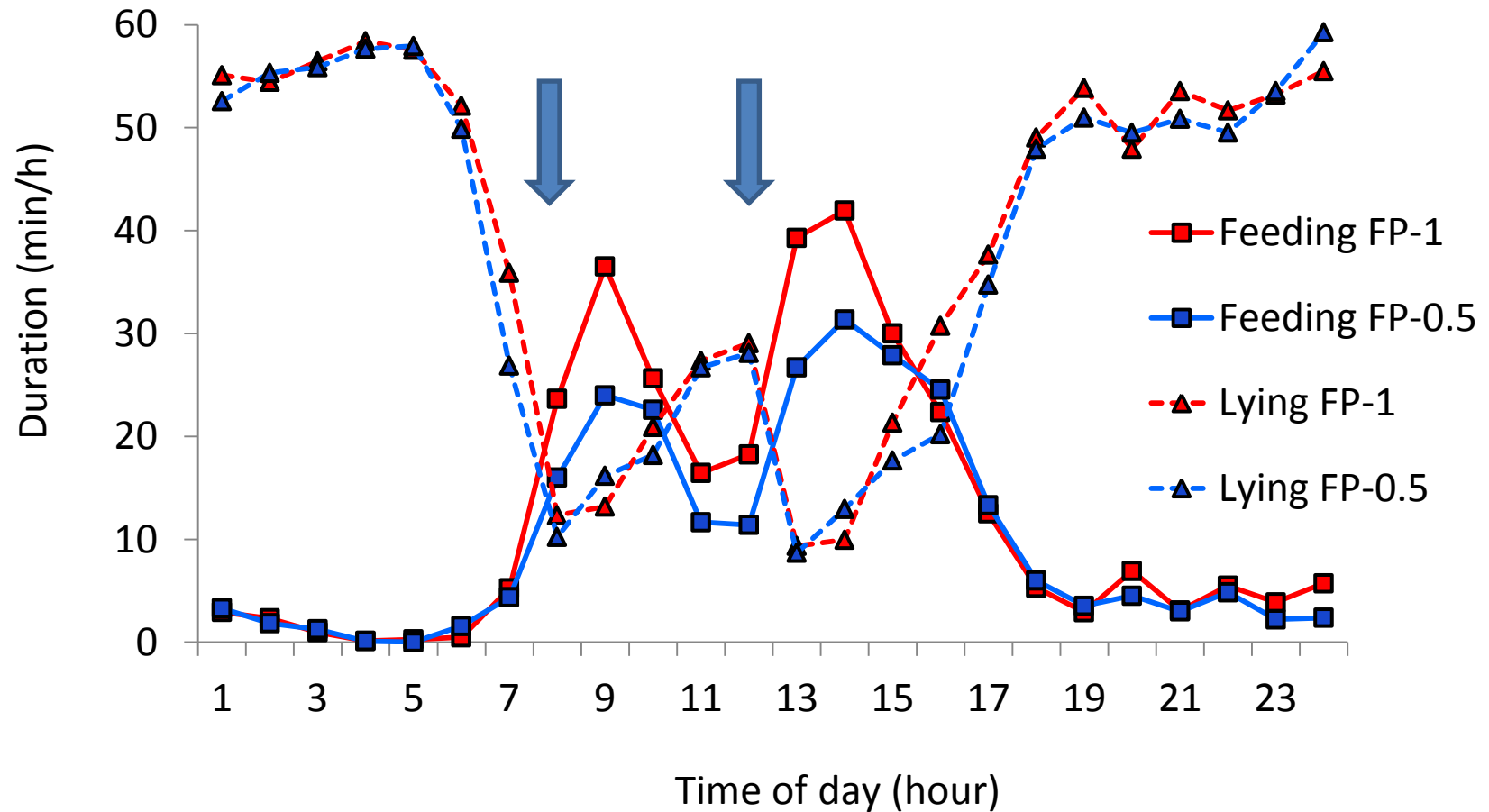
Statistical analysis

- Repeated-measures ANOVA with the fixed effects of
  - Treatment (FP-1, FP-0.5),
  - Rank (low, medium, high),
  - Hour (1-24),
  - Experimental week (1-6),
  - Trial (1, 2)
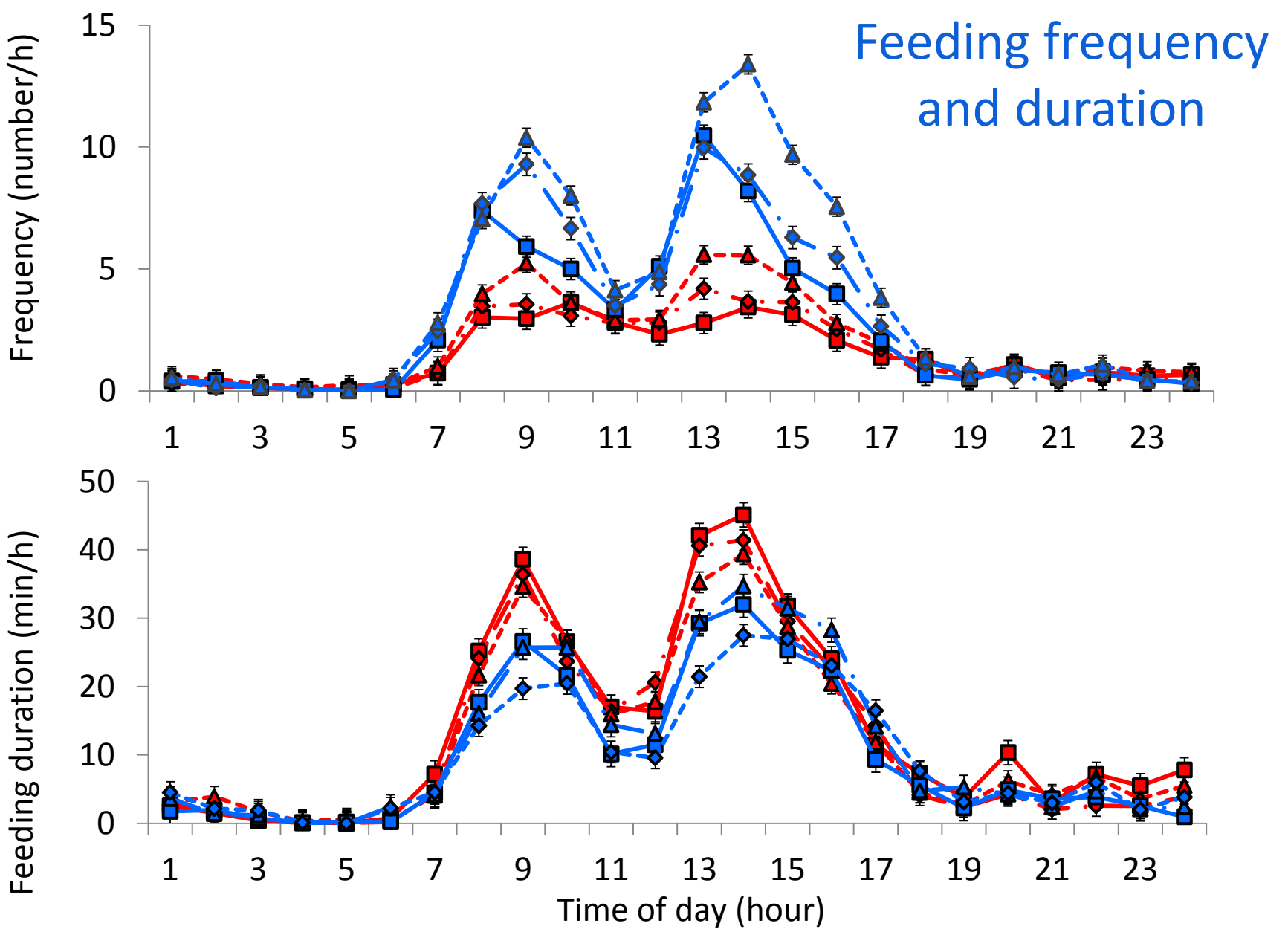 - … and 2- and 3-way-interactions
- Animal as random effect

Results and discussion

Time budget
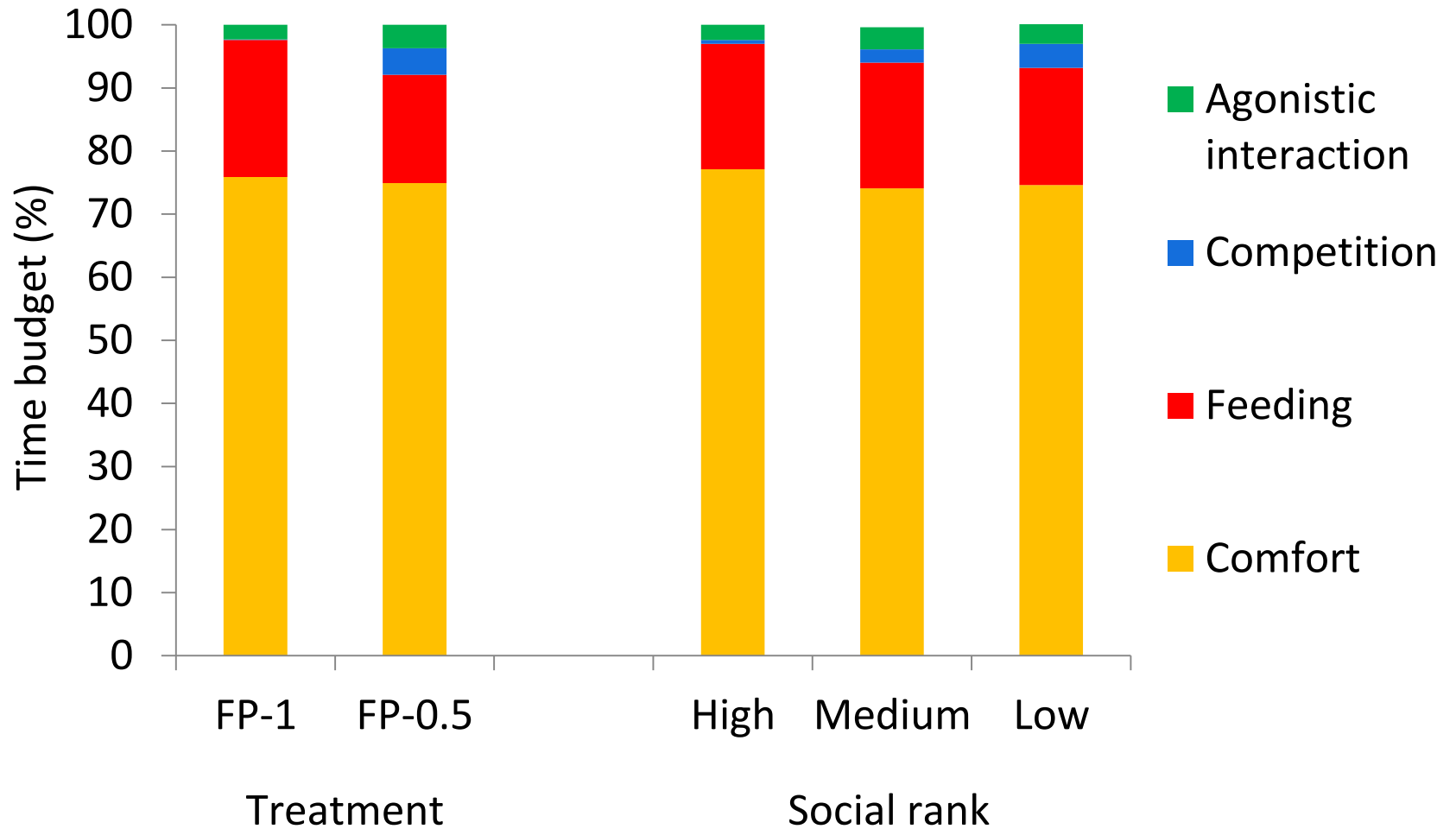
Feeding and lying

Feeding frequency and duration

Competition

Behaviour	Feeding place (FP)				Rank					FP x Rank
	FP-1	FP-0.5	SE	P≤	High	Medium	Low	SE	P≤	
Attempting										
Duration, sec/h	1.2	31.8	2.41	0.001	7.2[a]	11.3[a]	30.9[b]	3.09	0.001	0.001
Frequency, no./h	0.1	0.8	0.04	0.001	0.3[b]	0.4[b]	0.6[a]	0.05	0.002	0.001
Queuing										
Duration, sec/h	2.5	120.0	8.82	0.001	15.1[a]	62.8[b]	105.7[c]	11.3	0.001	0.001
Frequency, no./h	0.1	1.6	0.07	0.001	0.4[c]	0.8[b]	1.4[a]	0.09	0.001	0.001

Agonistic interactions

Behaviour	Feeding place (FP)				Rank					FP x Rank
(no./h)	FP-1	FP-0.5	SE	P≤	High	Medium	Low	SE	P≤	
Withdrawing	0.4	0.6	0.05	0.016	0.1^c	0.5^b	1.0^a	0.06	0.001	0.079
Displacing	0.6	1.3	0.08	0.001	0.6^b	1.1^a	1.2^a	0.09	0.001	0.772
Displaced	0.2	1.7	0.08	0.001	0.5^c	0.9^b	1.3^a	0.09	0.001	0.001
Butting	0.4	1.2	0.10	0.001	1.3^a	0.7^b	0.4^b	0.1	0.001	0.053
Fighting	0.1	0.2	0.02	0.004	0.2	0.2	0.1	0.02	0.401	0.376
Threatening	0.2	0.1	0.05	0.368	0.3^a	0.1^b	0.0^b	0.06	0.009	0.927
Heading	0.4	0.6	0.05	0.003	0.7^a	0.4^b	0.3^b	0.06	0.002	0.191

Conclusions

Reducing feeding space (0.5 instead of 1) …

… decreased time spent feeding and resting,

… increased competition and agonistic interactions.

Goats with restricted feeding space compensated reduced feeding duration by increasing feeding frequency.

Particularly low-ranking individuals may suffer from competition and aggression resulting from reduced feeding space!

Thanks for your attention !