Feeding and Spatial Behavior of Free-grazing Cattle in the Upper Ouémé Basin of Benin

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Introduction

In West Africa, cattle are mainly fed on natural rangelands, which represents the majority of feeds consumed.

The scarcity and degradation of rangelands strongly contribute to changing behavior of animals on pastures.



Objectives

• Analyze the management practices of cattle herders on communal rangelands by monitoring the feeding and spatial behaviors of cattle herds according to the pastoral calendar in the districts of Tchaourou and Djougou, Upper Ouémé Region of Benin.

Methods

 Daily monitoring of grazing herds: small (20-50 head: PT), medium (50-100 head: MT) and large (>100 head: GT);



Study areas

- Tchaourou District
- Djougou District



Fig. 1. Study areas

• The data collected were: grazing itineraries, distance and travel times of the animals using a GPS (GT-730FL-S). Also, information were collected on cattle feeding, resting, watering and vegetation units according to the five periods of the pastoral calendar (*Yanne, Dabune, Ceedu, Seeto, Ndungu*).

 Descriptive (mean and standard deviation) and variance (ANOVA) analyses were performed. Google Earth Pro software (7.3.4.8248) was used to map the daily grazing itineraries of cattle herds.

Results

□ Travel time and distance trekked

• PT spent 10.1±1.0 hours grazing in Tchaourou and 10.0±1.1 hours in Djougou; MT spent 9.7±1.0 hours grazing in Tchaourou and 10.1±0.4 hours in Djougou; GT spent 9.6±1.2 hours grazing in Tchaourou and 9.6±0.9 hours in Djougou.

• PT travelled 7.8±0.7 km in Tchaourou and 10.2±2.3 km in Djougou; MT travelled 12.4±3.3 km in Tchaourou and 13.2±4.3 km in Djougou; GT travelled 11.8±4.6 km in Tchaourou and 11.6±2.3 km in Djougou.



□ Time spent on grazing activities

• Animals spent an average of 61.6% of grazing time grazing in Tchaourou and 67.6% in Djougou; 28.9% walking in Tchaourou and 26.3% in Djougou; 7.2% resting in Tchaourou and 4.1% in Djougou; 2.3% drinking in Tchaourou and 2.0% in Djougou.

Tab. 1. Proportion of daily time allocated to different activities by cattle according tograzing periods

Periods	Activities	Tchaourou			Djougou		
		PT	МТ	GT	PT	МТ	GT
Yanne	Walking	24.3	27.2	20.7	14	24.9	31.8
	Fedding	64.2	63.7	69.5	73.9	74.3	65.3
	Resting	10.4	6	5.2	10.6	0	0
	Watering	1.1	3.1	4.8	1.5	0.8	2.9
Dabune	Walking	31.8	24.4	35	26.6	24.1	16.8
	Fedding	38.9	68.7	62.4	72.5	74.2	75.3
	Resting	28.5	6.2	1.9	0	0	7.1
	Watering	0.8	0.7	0.8	1	1.8	0.8
Ceedu	Walking	34.5	38.4	40	29.7	40.7	36.8
	Fedding	54.7	60.3	55	68.5	52.5	59.1
	Resting	8.6	0	3.6	0	5.7	0
	Watering	2.2	1.3	1.5	1.8	1.1	4.1
Seeto	Walking	19.3	21.2	22.6	15	25.4	26.4
	Fedding	64.8	73.8	69.7	70.5	70.2	70
	Resting	14.1	3.7	4.2	8.5	3.5	0
	Watering	1.8	1.3	3.5	6	1	3.6
Ndungu	Walking	40.5	33.2	21.1	23.1	41.6	18.2
	Fedding	48.5	61	68.4	53.5	57.6	76
	Resting	7.5	0	8.5	22.5	0	4.9
	Watering	3.6	5.8	2	1	1	1

Fig. 3. Duration of the daily circuits of the bovine herds

Fig. 4. Daily distance travelled by cattle

Results indicated that the pastoral seasons strongly influence the travel times of grazing cattle (p < 0.05). In addition, the cattle herd types have a statistically significant effect on distances travelled by animals (p < 0.05).

□ Vegetation unit frequencies and ingested forage resources

Vegetation units visited in Tchaourou (fallows: 43.6%, plantations: 18.5%, savannahs: 14.6%, wetlands: 13.7%, forests: 9.3%) and in Djougou (fallows: 33.7%, savannahs: 21.2%, plantations: 18.7%, wetlands: 17.4%, forests: 9.0%).

The main resources ingested by cattle on rangelands are herbaceous species, especially Poaceae (63.6%), Fabaceae (45.4%) and domesticated resources, especially Poaceae (30%) and Fabaceae (40%).



Results indicated that the travel times have a significant influence on grazing activities including walking, fedding, resting and watering (p < 0.05).</p>

□ Voluntary feed intake

The average daily amount of dry matter ingested by : TP is 5.1±1.1 kg in Tchaourou and 5.8±1.9 kg in Djougou; MT is 7.1±2.2 kg in Tchaourou and 7.7±1.4 kg in Djougou; GT is 6.4±2.0 kg in Tchaourou and 7.8±1.2 kg in Djougou.



Fig. 5. Feeding patterns of small (a), medium (b) and large (c) herds in Djougou (Top) and Tchaourou (Bottom) municipalities

The records showed that herders are diversifying their grazing routes and sites. In addition, movements are organized around the home range, grazing search and watering points.

Conclusion

- The length of daily animal circuits, distances travelled, and amounts of feed ingested varied across the study areas.
- Food availability varies according to pastoral seasons, agro-ecological areas (study districts) and influences the dry matter intake of different herd types.
- This analysis is necessary to better structure the feeding and monitoring of grazing animals.

Fig. 6. Feed consumption by animals

 Results indicated that the cattle herd types have a significant effect on dry matter intake (p < 0.05).



Fig. 2. Data collection and analysis tools