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Indigenous Characterisation of Local Camel Populations and Breeding Methods of Pastoralists in Northern Kenya

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Abstract

Dromedaries (*Camelus dromedarius*) provide nomadic livestock keepers in Northern Kenya with the mobility they need and milk for their daily diet. Because of their high adaptability, dromedaries are particularly suited for areas with seasonally varied forage supply and a high production risk due to recurrent droughts. In the past the characteristics of local camel breeds, which are named after the ethnic groups of their owners, were described only sketchily. However, knowledge on characteristics of local camel breeds and indigenous breeding methods is a prerequisite for the understanding and development of means to improve the pastoral system of camel keeping. Therefore the aim of this study was to record the indigenous characterisation of local camel breeds and to identify the breeding methods of Rendille and Gabbra pastoralists.

Both, open and structured interviews were conducted with 20 Rendille and 23 Gabbra pastoralists. The results comprised the two main areas indigenous characterization of local breeds and pastoral breeding methods and are as follows:

The Rendille and the Gabbra categorise camels of their own local breed into different types. These types are determined by a certain combination of characteristics: a) low drought tolerance and high milk yield but only in the rainy season and; b) moderate drought tolerance and moderate milk performance throughout the year; c) high drought tolerance and low milk yield. The categories are also reflected in the breeding concept: In view to breeding, a herd with an ideal composition of the various types is considered more important than breeding towards one ideal camel with specific characteristics. Hence there is no single breeding aim for the camel population, but the maintenance of a herd composed of different well defined types. Combination of animals with different characteristics in the herd, and splitting up these animals to stationary and mobile camps reduces risk and maximises drought tolerance and milk yield for the camel keepers.

1. Introduction

Recent studies based on body measurements revealed clear morphological differences among the local camel populations Rendille, Gabbra, Turkana and Somali, which are kept by pastoralists in Northern Kenya (Hülsebusch and Kaufmann, 2002). Indigenous criteria to characterise and distinguish camel breeds exist among pastoral people and can hint on important differences, which are not obvious to outsiders. Local knowledge on livestock classification is not easy to shed light upon, because pastoralists are mostly not able to oversee the diversity of camels breeds in a region, in order to position their own respective camel breed within the spectrum of different breeds. One possibility is to study camels of those pastoral communities, who differentiate several types of camels within their own local population (Abbas and Tilley 1991, Hjort and Dahl 1984). The Rendille and Gabbra-communities are able to distinguish different types of camels within their own breed. Two objectives were focused on in the study. The first objective was the indigenous characterisation of the local camel breeds Rendille and Gabbra on basis of types. Descriptions of every Rendille and Gabbra type were recorded, criteria to characterise and categorise types were identified and expressions of the criteria for every type were recorded. The second objective was to assess the pastoralists breeding aim.

2. Material and Methods

Face to face interviews with 20 Rendille and 23 Gabbra pastoralists were conducted in Northern Kenya in the year 2000.

On the objective of the indigenous characterisation open interviews were carried out. Without giving further suggestions, the question: "Please describe the features of the type "A" and how is this type looking like", was asked for all Rendille and Gabbra types to get a comprehensive but uninfluenced physical and morphological description. This technique was used to identify pastoralists own categorization criteria without being influenced by scientific criteria of categorizing types. The disadvantage of the open character of the question was that not necessarily a complete set of information for each type from every pastoralist was given and that the pastoralists did not necessarily use exactly the same terms when describing features of the different camel types. Hence a big effort was posed on the correct identification and translation of the meaning of the terms used in order to be able to group them under the respective English translation.

From the extensive type description, differentiation criteria were identified, which can be used for all Rendille respectively Gabbra types. Criteria that were mentioned by at least 50 % of the respondents were regarded as most important and termed as main criteria. Criteria mentioned by 21-49 % of the pastoralists were termed as secondary criteria. This paper focuses on the Rendille-types, but respective results were obtained for Gabbra camels (Adams, 2002).

Furthermore for each criterion and type, expressions were identified, for example for the criterion "milk yield in rainy season" the expression is "high" for Dabach type , "medium" for Godan and "low" for Coitte type.

For collecting information on the breeding aim, structured interviews were used. The following questions were asked: How many dams of the type "A" do you have at the moment in your herd? Would you prefer your female camels to be only from the type "A". If you had a herd of 10 dams, how many dams should belong to which type? What type of camel is your current bull, and what type was your previous bull?

3. Results and Discussion

Indigenous Characterisation

The Rendille differentiate three types named Dabach, Godan and Coitte, the Gabbra the four types Qorti, Mirgissa, Baku and Ajun.

Table 1 shows main criteria for differentiating Rendille camel types. The performance criterion milk yield is divided into milk yield in rainy season, amount of milk for owner and for calf in dry and rainy season. For milk yield in general, more important for the camel keeper is whether the dam produces enough milk for the calf and even more to nourish the pastoralists' family. This differentiation is important for pastoralists because there are types, which produce a lot of milk in the rainy season but are not able to feed its own calf in the dry season.

It seems that very few criteria are said to be crucial for identifying the type of a camel, because a maximum of 5 criteria could be identified as main criteria per type.

Table 1: Main criteria** for differentiating Rendille camel types, compiled as mentioned by Rendille pastoralists (values represent the proportion of respondents mentioning the respective criterion in %)

Criteria	Dabach n*=20	Godan n*=20	Coitte n*=20
<u>Performance criteria</u>			
Milk yield in rainy season	100	70	80
Amount of milk for owners in rainy season	15	70	60
Amount of milk for calf in rainy season	10	10	50
Amount of milk for calf in dry season	50	35	50
<u>Adaptation criteria</u>			
Female camel's health status in rainy season	55	35	30
Condition in rainy season	0	50	5
Condition in dry season	50	20	15
Body strength in rainy season	20	60	15
Body strength in dry season	30	65	15
Dry season-tolerance	70	40	30

n = number of respondents; ** bold values indicate main criteria.

Criteria that were mentioned by only a few pastoralists were considered individually and were named secondary criteria (Table 2). They show the variety of features that pastoralists use to differentiate the types.

Table 2: Secondary criteria ** for differentiating Rendille camel types, compiled as mentioned by Rendille pastoralists (values represent the proportion of respondents mentioning the respective criterion in %)

Criteria	Dabach	Godan	Coitte
	n*=20	n*=20	n*=20
<u>Performance criteria</u>			
Amount of milk for owners in dry season	5	45	40
Weight gain of calf in rainy season	25	5	5
<u>Adaptation criteria</u>			
Feed requirements	45	5	0
Water requirements	25	5	0
Long-watering interval tolerance	40	5	0
Weight loss at the beginning of dry season	45	35	5
Weight gain at the beginning of rainy season	25	35	0
Body strength during lactation	35	0	0
Female camel's health status in dry season	5	20	30
Calf's health status in rainy season	30	45	30
Calf's health status in dry season	20	45	30
Fat content of hump in rainy season	10	25	0
Fat content of hump in rainy season	10	25	0
Body shape in dry season	25	20	10
<u>Other criteria</u>			
Herding area in dry season	30	5	0

n = number of respondents; ** bold values indicate secondary criteria.

Rendille types are said to be differentiated in adult age after first parturition by determining the milk yield, while the Gabbra are able to identify the type directly after birth by means of morphological criteria. In other aspects Gabbra use similar main (Table 3) and secondary criteria (Table 4) to differentiate their camel types.

Table 3: Main criteria** for differentiating Gabbra camel types, compiled as mentioned by Gabbra pastoralists (values represent the proportion of respondents mentioning the respective criterion in %)

Criteria	Qorti	Mirgissa	Baku	Ajun
	n*=23	n*=23	n*=23	n*=23
<u>Performance criteria</u>				
Milk yield in rainy season	61	96	91	65
<u>Morphological criteria</u>				
Udder size	52	87	74	43
Body size	78	35	52	100
<u>Adaptation criteria</u>				
Drought tolerance	26	61	70	52
Feed requirements	52	30	13	26
Body strength in dry season	0	22	57	26

* n = number of respondents; ** bold values indicate main criteria

Beside the main criteria secondary criteria were identified, which were considered meaningful for the type differentiation. These are shown in Table 4.

Table 4: Secondary criteria** for differentiating Gabbra camel types, compiled as mentioned by Gabbra pastoralists (values represent the proportion of respondents mentioning the respective criterion in %)

Criteria	Qorti n*=23	Mirgissa n*=23	Baku n*=23	Ajun n*=23
<u>Performance criteria</u>				
Milk yield in dry season	0	35	26	0
Amount of milk for owner in rainy season	0	13	30	4
Amount of milk for owner in dry season	0	9	26	4
Amount of milk for calf in dry season	4	0	30	9
Amount of milk for calf in rainy season	4	0	30	9
Persistence of lactation	0	4	22	0
<u>Morphological criteria</u>				
Stomach size	26	9	0	4
Body size at birth	22	9	4	13
Body width	22	22	4	13
Ear size and position	22	0	0	0
Tail length	17	30	9	9
Teat length	17	9	22	4
Neck length and width	17	13	9	26
<u>Adaptation criteria</u>				
Water requirements	35	26	4	17
Body weight	35	9	9	9
Weight gain at the beginning of rainy season	4	22	4	0
Weight loss at the beginning of dry season	9	39	22	9
Body conformation in dry season	4	9	30	17
Body conformation in rainy season	0	0	26	13
Walking ability	9	4	17	22
Body strength in rainy season	0	9	22	4
<u>Other criteria</u>				
Bone marrow amount in long bone	22	26	22	13
Bone constitution	22	26	26	17
Diameter of long bones	35	43	30	22
Herding area in dry season	9	22	13	9
Herding area in rainy season	9	22	13	9

n = number of respondents ** bold values indicate secondary criteria.

When describing the types, pastoralists mentioned the expression for the different criteria used to differentiate between the types. In this paper, the description of Rendille types will be given exemplarily in the following text.

1) Dabach-type

According to the defined main criteria, Dabach camels are described as having a high milk yield during the rainy season, thus providing surplus milk for sale. During the dry season, the milk yield can be so low, that it is often even insufficient for the calf. The dry season tolerance, i.e. the adaptation to feed and water shortage of Dabach camels is poor, resulting in a rather weak condition during dry season. This is also reflected in the meaning of the Rendille word “Dabach”, literally translated as “weak”.

Considering the secondary criteria, the following further characteristics of Dabach camels were stated by the Rendille respondents: A large amount of feed and also water is needed to adequately feed Dabach camels, and if the feed and water requirements are not met, Dabach camels lose body weight very quickly. Dabach camels are therefore predominantly kept in the mobile camps during the dry season rather than in stationary settlements, because feed and water supply during the dry season are insufficient in the latter. This is what is meant by the secondary criterion “Herding area”, which refers to either the mobile distant herds or the more stationary herds, which are always herded in the vicinity of the household in order to supply the family with milk. However, even when kept in the mobile herds, Dabach camels get “skinny” during the dry season.

Dabach camels seem to considerably lose body weight during lactation. Pastoralists speak of “body weakness” during this time. However, with the onset of the rainy season, Dabach camels are said to gain weight rapidly. This fast regeneration is accompanied by an increase in milk yield. The health status of calves of Dabach camels during the rainy season is said to be good, their weight gain is characterised as high, whereas in the dry season both health status and body condition are low.

2) Godan-type

The Rendille word Godan means “little milk“. According to the defined main criteria, Godan camels are said to yield a medium amount of milk during the rainy season. A synonym for Godan is the Rendille word Urambilla. This is translated as “it decorates the home”, which means that for visitors the Godan camel gives the impression of having a high milk yield, because it looks healthy and well fed, which is misleading to some extent. Nevertheless, pastoralists explained that the milk is available for the owner but not enough for sale. The body strength of Godan camels is said to be very good both in the rainy and in the dry season. The condition of Godan camels during the rainy season was said to be good.

Considering the secondary criteria, the following further characteristics of Godan camels were stated by the Rendille respondents: The milk yield is satisfactory during the dry season. The fact that the pastoralists have some milk at their disposal during both the rainy and the dry season indicates a good persistence of lactation. The calves of Godan camels obtain sufficient milk during the dry season, and are usually in a good health status during the rainy and the dry season.

Godan camels apparently lose weight only slowly and to a small extent during the dry season, and the amount of hump fat (size of the hump) seems to be the same during rainy and dry season, indicating a stable body condition throughout. The drought tolerance is said to be moderate.

3) Coitte-type

According to the translator, the Rendille word Coitte does not have any meaning. Going by the defined main criteria, the milk yield of Coitte camels is said to be sufficient only to feed the calf, even during the rainy season. There is no adequate surplus quantity of milk available for the

pastoralists' family. Therefore, Coitte camels are regarded as important for the upkeep of the camel herd (maintaining herd size), as Coitte camels would not permit their calves being deprived of milk by milking.

Considering the secondary criteria only a few further characteristics of Coitte camels were stated by the Rendille respondents: Coitte type camels are drought tolerant and the female camels' health status is said to be good during both the rainy and the dry season, as is the case for their calves.

Breeding aim

During feedback seminars in the frame of the camel breed characterisation project¹, pastoralists were asked how they would define the ideal camel for their purposes and which features it should have. It turned out that the pastoralists distinguish the above mentioned types of camels in their herds. As a matter of fact the herders perception is strongly influenced by this categorisation in types, which impedes having one single breeding aim. Hence, neither the Gabbra, nor the Rendille regard a particular type of camel as "the ideal camel". The distinct characteristics of the types show different advantages and disadvantages for the pastoralists. Therefore the composition of the herd according to types of the dams was used to assess the "ideal herd".

The results are exemplarily given for the Rendille. The actual composition of the herd according to types of the dams (Table 5) found in the present herds with on average 5.65 dams shows a predominance of milk type Dabach and only a few of the better adapted types Godan and Coitte. As opposed to this, in a fictive herd of 10 dams pastoralists wished to keep more of the better adapted Godan and Coitte types because of increasing dry seasons and droughts in the previous years.

They rather prefer to keep a mixture of different types to build an ideal herd. Keeping a combination of animals with different characteristics to reduce the risk for the camel keepers while maximising drought tolerance and milk production.

Table 5: Real and desired composition of dam types in Rendille herds, stated by herders (N=20 herds)

Type	Actual composition of types		Desired composition of types in a fictive herd of 10 dams
	Mean	Proportion of types in %	Proportion of types in %
Dabach	4	71	34
Godan	0.75	13	43
Coitte	0.9	16	23
Total	5.65	100	100

Pastoralists stated that by selecting the bull of a certain type, they try to influence the composition of dam types in their herds. They also mentioned that if both parents belong to the same type the offspring will follow equally. Consistent with the actual composition of dam types, the previous kept bull type was predominantly a Dabach. Pastoralists stated that due to long dry seasons and

¹ implemented by KARI (Kenya Agricultural Research Institute), Nairobi, ILRI (International Livestock Research Institute), Nairobi, FARM Africa, Nanyuki and Institute of Animal Production in the Tropics and Subtropics, Department of Animal Breeding and Husbandry, University of Hohenheim, Stuttgart

frequent droughts in the past, they prefer nowadays bulls of the more adapted types, which is reflected in the higher proportion of Godan- and Coitte-bulls that were selected for the current bull (Table 6), as well as in the desired herd composition according to dam types.

Table 6: Bull types kept in Rendille herds in % (N= 20 herds)

Type	Previous bull type	Current bull type
Dabach	73	53
Godan	17	26
Coitte	11	21
Total	100	100

4. Conclusions

The study shows that pastoralists in Northern Kenya have a distinct knowledge of camel breeding. Open interview techniques helped to record the knowledge in a comprehensive, largely uninfluenced way. The indigenous knowledge on characterisation of livestock resources gives an insight in breeding concepts of pastoralists, who live and produce in marginal areas under high risks.

The criteria used by pastoralists to differentiate types within the local camel populations Rendille and Gabbra hint towards the importance of the respective characteristics in the frame of the production environment. Particularly, criteria relating to adaptation were considered in a sophisticated manner by the pastoralists, leading to differentiation on a level previously not recognisable to outsiders. Populations which appear to be homogenous to outsiders in the first place, become differentiable using the indigenous criteria and finally show their inherent structure. Awareness about this structure serves as an entry point to the breeding concept behind. Pastoralists' concept of a breeding aim is directed towards an "ideal herd" instead of an "ideal animal" and represents a different breeding concept to one in intensive animal production.

Further studies are necessary to validate the assessment of the characteristics of the single types given by the pastoralists in order to assess their potential in selection processes. However, already now there is evidence that the breeding knowledge of pastoralists should not be ignored when intending to set-up suitable breeding programs, that are directed towards dynamically maintain and further develop local breeds.

5. References

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