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Goats Husbandry for Extensive Use

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1 Introduction

Most goats are mainly kept in the Tropics and Subtropics by a poorer population for subsistence reasons. Marginal locations, little know-how and an extensive production orientation characterise these locations.

Due to the goat's small stature it is possible for a poorer population in rural areas and settlements to keep goats on smaller areas or in areas where the animals are fed with collected feed. The direct income of goat keeping (the sale of milk or meat) often plays a more important role for the population concerned than the improvement in nutrition.

For successful husbandry it is important however to choose suitable stock. According to the animals' genetics, animal husbandry should be adapted to the climate and marginal supply of feed.

2 Background and Aim of the Study

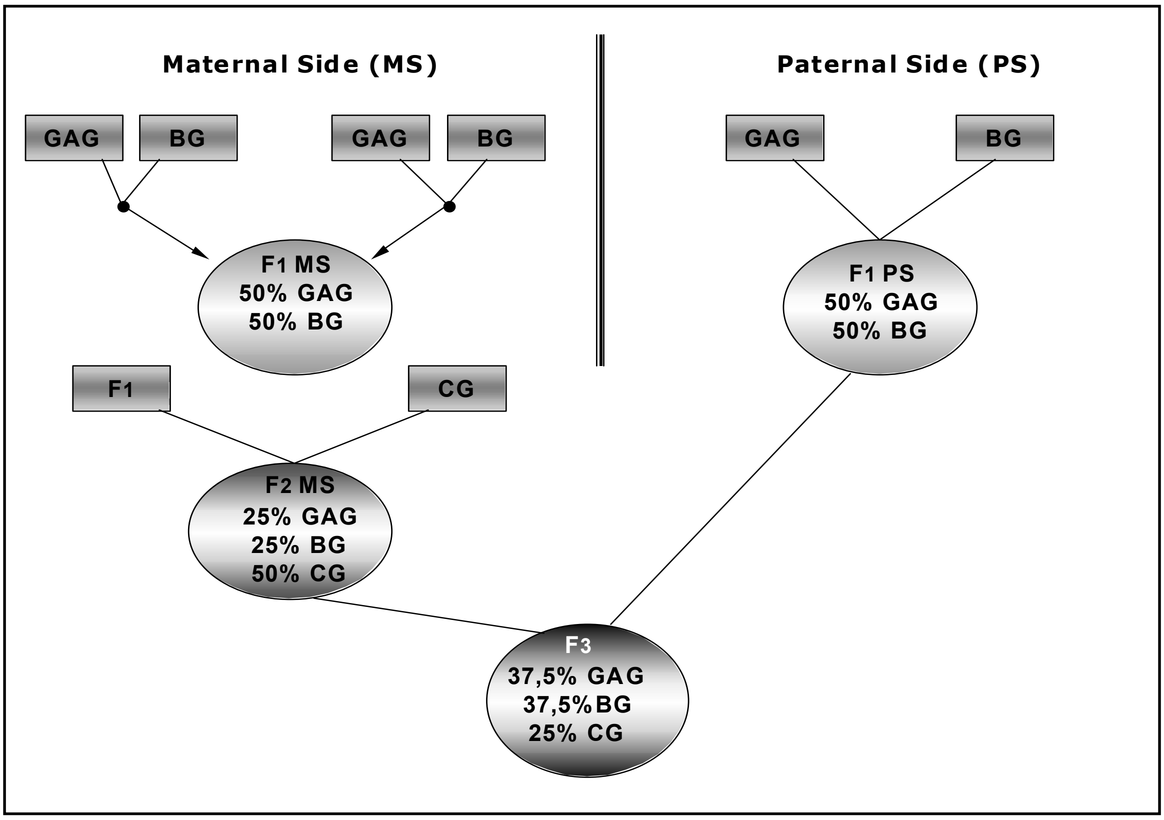
The work on this goat breeding programme began in 1995 by TAWFIK et al. The aim of this programme was to achieve a breed of goat for extensive production by crossing goats with:

- a good breeding capacity
- robustness, weather hardiness and resilience,
- an adequate muscle build
- good, frugal feeding capacity.

Three breeds were chosen:

- German Alpine Goat (**GAG**) for good milk capacity
- Boer Goat (**BG**) for good meat capacity
- Cashmere Goat (**CG**) for robustness and good fibre capacity

Figure 1: Graphic representation of the breeding programme



One aspect is the survival of the breeding capacity and robustness of the final breeding group (F_3 - generation) to record the current breeding level. The data is to be recorded also on one of the three original breeds, i.e. the Cashmere goat. Since the Cashmere goat has been taken into the goat breeding programme due to its robustness, a comparison with this original breed is especially important to examine the breeding progress with regard to robustness.

Productivity, health and robustness are basically the most important quality characteristics. Endoparasites are one of the most prevalent causes of small ruminant losses. The costs caused by this are immense. Infestation with various gastro-intestinal-strongyles cause the main losses. Parasites resistance and diseases are important for economic and ecological reasons. Due to reduced or non-use of anthelmintika grazing areas are less burdened or not burdened at all by faecal residual substances.

3 Aspects of Investigation

3.1 Endo-parasites

SPEEDY et al. (1992) found a possible resistance to parasites in tests with sheep. In their paper they also noticed an increasing parasite prevalence in lambs. This developed to a fairly high infestation over a longer period of time. Furthermore they pointed out the problem of parasite resistance after the use of anthelmintika (over a period of years).

MANDONNET et al. (2001) conducted an investigation on Creole goats in the Tropics to record the genetic variance of resistance to endoparasites. The goats became infected mainly with endo-parasites, e.g. *Haemonchus contortus* and *Trichostrongylus colubriformis*. These results correspond to trials done before and confirm that breeding towards parasite resistance is possible and advantageous.

The number of eggs (or oocysts with Eimeria) per gram of faeces can be a characteristic for selection. Goats which excrete fewer worm eggs, are not so encumbered with worms (RUSSEL, 1998).

3.2 Assessment of claws

The goats‘ claws are adapted to their original habitat, i.e. arid and stony regions. The claws are hard and the horny areas grow well (3-5 mm/month). Due to this good horny growth the claws are well adapted to the wear and tear on stony regions (GALL, 2001). However if the horn growth is more than is worn down, soil, stones and dung can be found under the growth of curved outer horn.

This material is an ideal medium for possible infections which infiltrate the horny areas and can cause foot rot (SPÄTH et. al., 1997). Good care of the claws and tissue is absolutely necessary. Depending on the number of animals care and management of the claws can be costly and time consuming.

3.3 Productivity

One of the main indicators of productivity is the reproduction capacity. Classical data for reproduction are the kidding rate and rearing results. Important is the birth weight of the kids and the development of the animals in general within a certain period of time. A series of scientific papers have confirmed the importance of high birth weights (or a negative effect with low birth weights). This plays an especially important role for survival of the new born kids (LÖER, 1998; AWEMU et al., 1999, HUSAIN et al., 1995).

The negative effect of a low birth weight can be seen by the significant longer period of time taken for the first intake of colostrum (KROGMEIER, 1990). With a later colostrum intake the antibody transfer after birth is not sufficient. This can be seen in kid losses within the first seven weeks where the immunglobulin concentration in the blood is significantly the lowest compared to healthy kids with a sufficient and timely colostrum intake (O`BRIEN and SHERMAN, 1993).

4 Material and Methods

4.1 Animal material and Survey Set Up

All data recorded were from animal stock of the Department of International Animal Husbandry of the University of Kassel. They consisted of 20 Cashmere dams and 26 crossbred dams of the F_3 generation. The data on endo-parasite infection and the monitoring of the growth of hoofs has been taking place during the whole of the year 2002 and therefore not yet completed.

4.2 Endo-parasites

Every two months (start February 2002) the number of endo-parasites was accounted for in a coproscopic trial by counting the egg and oocysts under microscopic conditions. The main point of survey was the gastro-intestinal strongyle and protozoa (see Table 1)

Table 1: Parasites according to Family

Helminths	Protozoae
Haemonchus contortus (round worm)	Eimeria (coccidies)
Strongyloides papillosus (dwarf thread worm)	
Cooperia oncophora (hair worm)	

Faeces were extracted using small plastic bags. As parasites at this time are only few in number and can also be very small, the trial was facilitated with a NaCl-solution. Using a process of flotation which assists the buoyancy of the light stages of parasites in a heavy solution, counting took place according to McMaster. The size was in oocysts per gram faecal material (Opg) with the protozoa and in eggs per gram faecal material (Epg) with the helminthes.

Table 2: Age structure and number of animals in the survey

Breeding group	Age structure	Age structure
F_3 generation	Kids	20
	Yearlings	1
	Mother goats	26
Cashmere	Kids	14
	Yearlings	5
	Mother goats	20

Due to the poor comparability the data of the yearlings (F_3 generation n=1 and Cashmere n=5) have not been taken into consideration in the assessment.

4.2 Claw assessment

The claws of the F_3 generation were examined with regard to the intensity of growth and the frequency of the claw cutting. Parallel to the F_3 generation the condition of the claws of the Cashmere goats was recorded for reasons of comparison. Using a grading method (see Table 3) the claw condition was recorded and classified.

Table 3: Grading Code for classification of the growth of claws

1 very good	Small claw growth Normal clipping of claws can take place
2 good	Small claw growth, however small cavities have developed
3 bad	Quick growth of claws, hollow and cavities development
4 very bad	Very quick growth of claws. Large deformation of the claws. Horny layer of claw can be separated from the outer claw wall easily

4.3 Productivity

All reproduction data were recorded during the lambing season between February and March 2002. The birth weight and the weight development of the kids of both breeding groups were recorded during a period of 8 weeks.

The male kids of both breeding groups were used for meat, and data was recorded for classification of slaughtering.

The feeding trials for the breeding groups under marginal feeding conditions have not been completed and are therefore not mentioned further here.

The conditions on a marginal feed location were investigated in a three month long trial. Both breeding groups with their female offspring were tested (kidding season 2002) without added feed to record the weight development.

5 Preliminary Results

5.1 Test of Endo-parasites

The preliminary results show the counts in the faecal trials during the months February, April, June and August. The kids of both breeding groups were only included in the trial group from the end of April. In the following tables the arithmetic mean values of the quantitative coprological trial for each breeding and age group have been recorded, divided up according to the months of the survey.

Table 4: Results of the coprological survey on the F_3 kids

Parasite	Mean value April n=20	 June n=19	 August n=19
Eimeria (Opg)	3475,5	5263,16	5157,89
Haemonchus contortus (Epg)	710,71	923,08	842,30
Cooperia oncophora (Epg)	410,71	453,84	484,61
Strongyloides papillosus (Epg)	571,43	611,54	565,38

Table 5: Results of the coprological survey on Cashmere kids

Parasite	Mean value April n=14	 June n=13	 August n=13
Eimeria (Opg)	4267,86	5784,62	5650
Haemonchus contortus (Epg)	1000	1292,11	1013,16
Cooperia oncophora (Epg)	402,5	442,11	460,53
Strongyloides papillosus (Epg)	560	665,79	636,84

Table 6: Results of the coprological survey on the mother animals of the F_3 line

Parasite	Mean value (n=26) February	 April	 June	 August
Eimeria (Opg)	425	378,85	373,08	409,62
Haemonchus contortus (Epg)	157,69	180,77	232,69	242,31
Cooperia oncophora (Epg)	111,54	167,31	217,31	209,62
Strongyloides papillosus (Epg)	109,62	203,85	265,38	261,54

Table 7: Results of the coprological survey on Cashmere mother animals

	Mean value (n=20)			
Parasite	February	April	June	August
Eimeria (Opg)	446,5	445	430	405
Haemonchus contortus (Epg)	120	215	292,5	272,5
Cooperia oncophora (Epg)	157,5	262,5	290	365
Strongyloides papillosus (Epg)	152,5	270	372,5	302,5

Striking for both breeding groups is the big difference in the egg and oocysts excretion in comparison in the age groups. The kids excrete far larger amounts of eggs and oocysts than the mother animals.

Considering the excretions of the kids differentially it can be seen that in the F_3 generation the excretion of all parasites was lower than with the Cashmere kids. It is a similar case with the mother animals.

5.2 Claw assessment

The mean value of the animals surveyed is taken for the claw assessment. The preliminary results only contain data of the mother animals and the yearlings as the kids were on average 1-2 weeks old when the first claw care took place in 2002 (March/April).

Table 8: Claw assessment of both breeding groups

Breeding group	Age structure and Number of Animals		Mean values of grading*
F_3 generation	Kids	---	
	Yearling	1	1
	Mother goats	26	1,43
Cashmere	Kids	---	
	Yearling	5	1,86
	Mother goats	20	2,19

*(1= very good / 2 good / 3 bad / 4 very bad, see also Table 3)

It is noticeable there is a better assessment for the group of the F_3 generation of the mother goats. The individual yearling of the F_3 generation is not sufficient for a qualitative statement. Grading with the kids of both breeding groups will show whether there is a positive trend.

5.3 Productivity

5.3.1 Reproduction data

The following reproduction data were recorded for both breeding groups

- **Fertilisation** = kidded mother goats / serviced mother goats
- **Kidding rate** = kids born / serviced mother goats
- **Kidding results** = kids born / kidded mother goats
- **Rearing results** = reared kids (after 90 days) / kidded mother goats
- **Rearing rate** = reared kids (after 90 days) / kids born
- **Productivity** = reared kids (after 90 days)/ serviced mother goats

The reproduction data show in all points excluding data for kidding results slightly increased values for the F_3 generation (Table 9).

Table 9: Reproduction data 2002

Reproduction data	Cashmere	F_3 Generation
Serviced goats	20	26
Kidded goats	17	24
Kids born	29	41
Reared kids (after 90 days)	25	38
Fertilisation rate	0,85	0,92
Kidding rate	1,45	1,58
Kidding results	1,71	1,71
Rearing results	1,47	1,58
Rearing rate	0,86	0,93
Productivity	1,25	1,46

5.3.2 Birth weights

The differences in birth weights can easily be identified between the individual breeding groups and within the breeding groups. Table 10 shows the mean values for the birth weights of both groups and sex.

Table 10: Birth weights of breeding groups and sex

Breeding group		n	Mean values of the birth weights
F_3 generation	Male	19	3311,58g
	Female	22	2924,40 g
Cashmere	Male	14	2595,71 g
	Female	15	2486,43 g

The male kids of the F_3 generation differ on average by 715,87 g from the male Cashmere kids, the female kids of the F_3 generation by 444,97 g from the female kids of the Cashmere group. The difference in birth weight between the sexes was higher in the F_3 generation than the Cashmere group. The birth weights of the male kids were on average 377,18 g higher than both female groups. It was a similar case with the males kids of the Cashmere group.

5.3.3 Kids daily weight gain

The evaluation of the daily weight gain for both groups was done separately. As seen in previous trials (HAUMANN 2000) the lowest daily gain for male and female kids was in the Cashmere group. The daily weight gain of both groups of the F_3 generation was significantly higher than the Cashmere group.

The daily weight gains were more significant according to sex within and between the groups. However the difference within the F_3 generation at 23,4 g was far higher than 6,33 g within the Cashmere group. Table 11 shows the daily weight gains according to breeding group and sex.

Table 11: Daily weight gain in the first eight weeks according to sex and breeding group

Breeding group		n	Daily weight gain (g)	Difference
F_3 generation	male	17	167,70	23,40
	female	20	144,30	
Cashmere	male	13	134,81	6,33
	female	14	128,48	

5.3.4 Dressing percentage

All male kids of both breeding groups were weighed before and after slaughtering to record the dressing percentage. The age on average was 5 months. As the values in Table 12 show the difference in the dressing percentage was at 0,8% not significant. The fluctuation in the number of animals in comparison to Table 11 was due to the sale of animals.

Table 12: Dressing percentage of male kids of both breeding groups

Breeding group	n	Dressing percentage (%)
F_3 generation	9	36,39
Cashmere	7	35,52

5.3.5 Marginal feeding conditions

The feeding trails for the breeding groups under marginal feeding conditions have not been completed and are therefore not further mentioned here.

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