Factors influencing weaning percentages of indigenous goats on communal grazing

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Abstract

The traditional system of goat management is mainly characterised by low survivability and high mortalities of kids, which result in low weaning percentages. High mortality among kids and slow growth among those that survive are the major constraints to production. Weaning percentage is a measure of survivability of kids from birth to weaning. By examining the variables which affect weaning percentages in a communal goat farming system, it should be possible to develop an appropriate extension message to decrease kid mortalities and increase productivity. The aim of this study was to examine the factors that influence the survivability of kids from birth to weaning. The predisposing factors were used to develop extension messages for use by farmers in communal and small-scale systems. The methods in this study were based on participatory rural appraisal (PRA) and farming systems research and extension (FSR/E). Initially 20 farmers were subjected to structured interviews. Two-stage cluster sampling was done where farmers were the primary units and goats were the secondary units. The allocation procedure was based on the purposive selection of goatherds on communal grazing within Jericho (the district falls under North West Province, South Africa). Initially 20 farmers were interviewed using a structured questionnaire. Thirteen farmers with 131 does remained in the survey over the long term and were visited once a month over the course of a full year. Body condition score, weighing of kids and collection of faecal samples for evaluation of internal parasites were done. Management was observed and informal discussions conducted during the visits. Monthly precipitation and temperature data was obtained from the Department of Soil, Climate and Water. The parameters that were measured to study the relationship with mortality rates of the kids included: demographics and socio-economics of owners, nutrition, parasites (internal and external), infectious diseases, micro and macro environment (including housing scores), management, mortalities of goat kids (n = 131) over the course of 12 months. Internal and external parasites were sampled monthly and the weight, health status and body condition scores were monitored. The total mortality (n = 41) was found to be 37% of the total number of kids born (n = 131) and the survival rate to weaning was thus 63%. The majority (n = 10) of farmers were pensioners of fairly advanced age (mean = 68.9 years) who were also performing household chores. This reflects a shortage of labour. Nutrition did not appear to be a major problem. The major problems in this case were considered to be housing and internal parasites. For the appropriate and relevant extension message it is on these factors that more emphasis should be placed. It was found that a good market for goats exists in communal areas and flock turnover was about 20%. Thus, any improvement in the survival of kids would lead to a better financial return for farmers by having more goats available for sale.

Introduction

The death of kids before weaning is perhaps the single biggest cause of economic loss to goat farmers. Low survivability and high mortalities of kids result in low weaning percentages. Any attempt made to ensure survival of kids is bound to increase productivity and economic returns (Devendra & Burns, 1970; Ademosun, 1987; Lebbie & Manzini, 1989).

Under extensive systems in tropical areas, a pre-weaning mortality of 16-60% has been recorded, which is higher than in intensive systems. This may be underestimated as deaths of newborns, which occur when goats are browsing, may go unnoticed (Ademosun, 1992). The predisposing factors may be lack of

colostrum, poor mothering, poor nutrition of the doe leading to low milk production, hygiene lack allowing build-up of infective agents and contaminated water (Peacock, 1996). Mortality of kids may be reduced by control of internal and external parasites, feeding of the dam, vaccination and improved housing (Morand-Fehr *et al.*, 1984; Ndamukong *et al.*, 1989; Boomker *et al.*, 1997; Payne & Wilson, 1999). Weaning percentage is a measure of survivability of kids from birth to weaning. Prolificacy (number of kids per doe that kidded per year) is a measure of multiple births and does that kidded more than once in a year. Kidding percentage is a measure of the kids born per doe in the flock and is a measure of the flock composition (Donkin, 1993; Mamabolo, 1999).

The aim of this study was to examine the factors that influence the survivability of kids from birth to weaning. The identified factors could be used to develop extension messages for use by farmers in communal and small-scale systems (Doll & Orazem, 1984). As the market for goats exists in communal areas, any improvement in the survival of kids will lead to a better financial return for farmers by having more goats available for sale.

Materials and Methods

The methods were based on participatory rural appraisal (PRA) and farming systems research and extension (FSR/E) (Amir & Knipscheer, 1989; Van Rooyen *et al.*, 1990; Van Vlaenderen, 1995; McCrindle *et al.*, 1996). Field visits and structured interviews were done over a 12-month period. Thereafter scenarios for impaired productivity were evaluated and compared.

The system being modelled was a communal low input/low output extensive goat production system. The variables that were considered were those impacting on survival of kids. Weaned kids were the measurable outputs. Scenarios were compared using data obtained from farm visits and the literature.

Feedback from the farmers was also used to obtain and record the information with regard to the birth loss of the goat kids. The factors influencing the survivability of goat kids were ranked in importance so as to identify possible key factors that are likely to have a significant impact on the desired outputs (McCrindle *et al., 1996). Nutrition and growth rate were estimated by weighing kids and through monitoring of the body condition score (BCS) of does (Peacock, 1996). Kids were weighed monthly from birth to weaning using a small pocket spring balance and a harness made out of nylon ski-rope. Rectal faecal samples for evaluations of internal parasites were collected directly from the does and kids of above three weeks of age. Nematode eggs per gram (epg) and coccidia (*Eimeria)* oocysts were counted by means of a modification of the McMaster slide technique (Reinecke, 1983). Diseases were recorded from clinical signs or necropsy. Housing was evaluated using a housing checklist (Table 3). Management was evaluated on a scale of 1 to 5 where 1 was very poor and 5 was excellent. Data was entered into Excel and transferred to the SPSS statistical program (SPSS 9.0 for Windows) for multifactor analysis of variance and covariance.

Results and Discussion

Table 1 Causes of kid loss observed/recorded by farmers

Causes of loss/mortality[a]	N[b] = 48
Unknown	16
Suspected fleas	2
Missed (Lost)	2
Suspected footrot	1
Diarrhoea	4
Suspected malnutrition	4
Suspected heartwater	2
Suspected predators	2
Suspected internal parasites	2
Killed by dog	5
Stillbirth	1
Fell in the toilet pit	1
Total death	42

[a]excluding necropsied kids (N = 6)
[b]N = number of kids that died

All farmers interviewed about the weaning of kids mentioned that they used natural weaning at approximately five months (150 days). Kid mortality refers to all post-natal deaths that occurred during the trial (Table 1). The proportion of kids dying is shown as a proportion of the number of kids born during the year (Mamabolo, 1999). The total mortality incurred during the survey was 48 kids. This was 37% of the total number of kids born (n = 131) and the survival rate to weaning was 63%. From our survey it was found that prolificacy and kidding percentage per farmer ranges from 100% to 160% and from 44.4% to 170% respectively. Mortality rate and weaning rate per farmer ranged from 0% to 75% and 25% to 100%, respectively

From necropsy of kids found dead (n = 6) causes of kid mortality were: heartwater (n = 1), acute septicaemia (probably pasteurellosis) (n = 1), haemonchosis (n = 2), severe verminosis (mixed infection) (n = 1) and undernutrition (starvation) (n = 1). Most of the farmers (65%) were pensioners of fairly advanced age. During the structured interview five farmers said that they herded their goats and 15 farmers said that they just let their goats out to graze on their own. However, over the course of the trial it was observed that no farmers herded their goats. There was no supervision of kidding during the kidding season and this could also be the reason for the high level of mortality of kids. The farmers seldom used veterinary products or supplementary feeding .The breeding season was not controlled and the buck was always with the does. The male goats were castrated, slaughtered or sold as kids because uncastrated bucks wandered too far. Goats were housed for security after dark.

Poor housing can cause adverse effects in goats resulting in pneumonia and increased parasitic infestation (Devendra & McLeroy, 1982). Goat houses in the study area were made of wire, scrap and corrugated iron, thorn bushes and wooden poles. This is in agreement with Payne & Wilson (1999). Using the housing checklist, a score of 2.5 and above was taken as acceptable. It was found that 92.3% of houses had a score below 2.5. However, only 30.8% of the houses were overcrowded. Bad roofing was common resulting in accumulation of water and muddy floors, 46% of the houses provided no shelter from the rain. Ficarreli (1995) reported that in Malawi goat keepers lose 30% of their young stock during the rainy season. Only 47% of the houses provided shelter from the prevailing wind. Only one house had insufficient ventilation, as the owner was worried about stock-theft. One farmer had five kids killed by dogs, when they escaped from the kraal. Mowlem (1988) recorded similar results.

In order to get an effective extension message, cost effectiveness must be considered (Bembridge, 1991). Statistical analysis, using Pearson correlations and regression (Thrusfield, 1995) was done to investigate correlations between the variables reported and kid mortality. Significant correlation of average and total mortality was found only with the presence of internal parasites.

Conclusion

The findings suggested sub-optimal management factors which could be addressed by extension. The major causes of low weaning percentage were poor housing, leading to cold stress in the winter and a build up of manure which probably increased the levels of parasites. Improvement of housing and strategic deworming would be appropriate extension messages. Observation of does during partus would decrease peri-natal mortality.

Poor housing facilities allow the build-up of pathogens and the survival of and infection by internal parasites (Payne & Wilson, 1999). Since poor housing acts as the harbour for infection for goats by pathogens and internal parasites, the extension message should be to shift the goat house or to remove the faeces from the house shortly before the beginning of every kidding period, which will reduce the infection of newly born kids. Strategic deworming of does and kids, as well as partus observation are also recommended.

References

Ademosun, A.A., 1987. Appropriate management systems for the West African dwarf goat in the humid tropics. In: Goat production in the humid tropics. Eds. Smith, O.B. & Bosman, H.G., Proc. Workshop at the University of Ife, Ile-Ife, Nigeria. pp. 21-28.

Amir, P. & Knipscheer, H.C., 1989. Conducting on-farm animal research: Procedures & Economic Analysis. Winrock International Institute for Agricultural Development and International Development Research Centre. pp. 1-10.

Bembridge, T.J., 1991. Practice of agricultural extension - A training manual. Development Bank of South Africa, Halfway House 1685, Gauteng, South Africa.

Boomker, J., Kiwanuka, K., Bester, J., Kotze, A., Mosupi, H., Green, E., Motsabi, H. & Kyozaire, J., 1997. Goats and Sheep. In: Resources and needs of animal owners at Jericho. Ed. Stewart, C.G.

Devendra, C. & McLeroy, G.B., 1982. Goat and sheep production in the Tropics. Longman: London and New York.

Donkin, E.F., 1993. Goats for meat and milk production in developing areas. Proc. K Birch Veterinary Education Programme: Extensive meat and milk production in developing area. pp.54-62.

Ficarelli, P.P., 1995. Goat and Sheep keeping in Malawi. Manual for Trainers and extension workers, Malawi German livestock programme. *Deutsche Gesellschaft Fur Techniste Zusammenarbeit* (GTZ), Malawi. pp. 3.11, 4.8.

Lebbie, S.H. & Manzini, A.T., 1989. The productivity of indigenous goats under traditional management in Swaziland. In: African Small Ruminant Research and Development. Eds. Wilson, R.T. & Melaku, A.

Mamabolo, M.J., 1999. Dietary, seasonal and environmental influences on the semen quality and fertility status of indigenous goats in Mpumalanga Province (South Africa). M.Inst.Agrar. thesis, University of Pretoria. 112 pp.

McCrindle, C.M.E., Cornelius, S.T. & Krecek, R.C., 1996. Socio-economics of veterinary research and training: A forum. Proceedings of a forum presented by the Department of Veterinary Tropical Diseases of the Faculty of Veterinary science at Onderstepoort on September 28, 1995.

Morand-Fehr, P., Villette, Y. & Chemineau, P., 1984. *Influence des conditions de milieu sur la mortalite des chevreaux. Les maladies de la chevre goat diseases.* INRA Publishers, France. p. 28.

Mowlem, A., 1988. Goat farming. Farming Press Books, United Kingdom. p. 25.

Payne, W.J.A. & Wilson, T.R., 1999. An introduction to animal husbandry in the tropics. Fifth ed., Blackwell Science Ltd. United Kingdom. pp. 447-481.

Peacock, C., 1996. Improving Goat Production in the Tropics. Manual for development workers: An Oxfarm/Farm-Africa Publication, UK and Ireland. pp. 46-63, 153-161, 204-205.

Thrusfield, M., 1986. Veterinary Epidemiology. 2ⁿᵈ edition. Blackwell Science Ltd. Oxford, London. pp. 47-75, 217.

Van Rooyen, J., Stilwell, T. & Gouws. L., 1990. A review of farming systems research and extension (FSR/E). FSR-E Newsletter No1 of September 1990. Southern Africa. pp. 1-4.

Van Vlaenderen, H., 1995 Methods in socio economic impact assessment: The use of PRA. Workshop socio-economic aspects of animal diseases in Southern Africa. Research Priorities in Veterinary Science. Convened by Foundation for Research Development.

Reinecke, R.K., 1983 Veterinary Helminthology. Butterworths, Durban. pp. 325-326.