Increasing the productivity of indigenous goat production systems through participatory research in ethno-veterinary medicine: a case study from India

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Introduction BAIF Development Research Foundation (India) and the Natural Resources Institute (UK) have been collaborating in a research project, funded by DFID's Livestock Production Programme, to identify and address feed-related constraints affecting goat production in semi-arid India. The project has been working in various regions, including Dharwad district, Karnataka. In the Karnataka project area high kid mortality during the rainy season was identified by goat-keepers as their main problem, and the project conducted trials in three villages in 2000 (Trial 1) and 2001(Trial 2) to address this. The researchers hypothesized that the kid mortality was linked to the worm burden of the does at that time of the year. Annual rainfall in the area in 2000 was 764 mm, and in 2001 was 447 mm. The objective of the trials was to determine the effect of anthelmintic treatment of does on kid mortality. Trial 1 took place after, and Trial 2 during, the rainy season.

Material and methods The project worked closely with poor goat-keepers in the three villages, some of whom were landless. The goat-keepers made their animals available for use in the trials, which were conducted *in-situ*. The does were non-descript, and were of varying ages and weights (ranging from 15 to 45 kg). In both trials animals were balanced for age and weight. Equal numbers of does were selected from six weight groups (15-20, 20-25, 25-30, 30-35, 35-40, 40-45 Kgs) for inclusion in the treatment and control groups respectively. The number of goat-keepers participating in Trials 1 and 2 was 21 and 18 respectively. Each participating goat-keeper provided at least one doe to both the treatment group(s) and the control group, the animals being randomly allotted to the groups. The numbers of does involved are shown in Table 1. Some does left the trials, due to sale, deaths etc.

Table 1 Numbers of does starting and completing the trials

	Trial 1		Trial 2		
	Control	**Treatment**	**Control**	**T1 (MP)**	**T2 (F)**
Start	34	34	26	26	26
Finish	23	27	24	24	23

The treatments were given to does 15-30 days before kidding (this varied due to uncertainty about date of kidding), and repeated again on the day of kidding. In Trial 1 the treatment was a commercial de-wormer, *Fenbendazole (F)*, for which the dose was 7.5 mg/kg. body weight. *Fenbendazole* was chosen because it is a broad-spectrum anthelmintic with no known side-effects. In Trial 2 (2001), this treatment was repeated, and another treatment was added - a locally available material known to have anthelminthic properties. The locally available material (used in group T1) was the trichomes (hairs) from the pods of a leguminous creeper present in the area, *Mucuna pruriens (MP)*. The dose was 20 mg of trichomes per kg body weight. This was complemented by 20 grams of sugar. Half the sugar was dissolved in a glass of warm water and the goat drenched with this mixture. Then the other half was mixed with a glass of warm water and the required quantity of trichomes, and the goat was drenched again.

During Trial 2, faecal samples from 20 pregnant does were collected (immediately prior to treatment and seven days after) and analysed to determine the parasitic burden. Faecal pellets, collected directly from the anus, were preserved in a 10% formalin solution before testing. Care was taken to collect faecal samples for all groups (T1, T2 and control) from goats belonging to the same goat keeper. Egg counting was done by the method of Stoll (Thienpont *et al.*, 1986).

A participatory approach was adopted throughout. For example, treatments and doses were determined jointly with the goat-keepers. The idea of using the *Mucuna pruriens* material came from the fact that members of a local caste specialising in buffalo-keeping were known to use it on their buffaloes. The goat-keepers contributed half of the cost of the *Fenbendazole*, and the project the other half. Kid mortality was recorded during the first two months and four months after birth, for the first and second trials respectively. Kid mortality was subjected to the chi square test. Incomplete observations were not considered for analysis, and kids dying from accidents were excluded from the analysis. The faecal egg count data were tested using the *student's* 't' test.

Results The results of *Trial 1(2000)* are summarised in Table 2. Kid mortality was lower after 60 days in the dewormed group (7.9 %) than in the control group (24.2%), but the difference was not significant at the 5% level ($p = 0.08$).

Table 2 Mortality of kids from birth to 60 days, Trial 1

	No. of kids born	No. of kids died			Mortality rate (%)
		1-30 days	31-60	Total	
Control	33	6	2	8	24.2
Treatment	38	3	0	3	7.9

In *Trial 2 (in 2001)*, the two treatment groups were T1 (*Mucuna pruriens*) and T2 (*Fenbendazole*). Mortality of goats during the period 30-120 days after birth was significantly higher (p = 0.04) in kids of control does than in those of treatment does, but there was no significant difference at 30 days (see Table 3). The difference between the control group and the treatment groups is not significant (p=0.12) for the whole period (0-120 days). However, if one compares mortality in the control group with that in the two treatment groups combined, the difference is significant (p= 0.04).

Table 3 Mortality of kids from birth to four months of age, Trial 2

	No. of kids born	No. of kids died[1]			Mortality rate (%)
		1-30 days	31-120	Total	
Control	35	3	11	14	40.0
T1 (MP)	31	3	2	5	16.1
T2 (F)	30	2	4	6	20.0

The parasitical faecal egg counts were significantly lower on the 7th day after deworming in both of the treatment groups, whereas the faecal egg count in the control group increased significantly, as shown in Table 4.

Table 4 Parasitical Egg Count of Does of Different Groups Before and After Treatment

Group	No.of does	Mean number of eggs/g of faecal sample		Difference between mean number of eggs on Day 0 and Day 7	't' value	'P' value
		Day 0	Day 7			
C	6	717	983	+ 267	- 5.59	.003
T1 (MP)	7	971	271	-700	9.72	.0001
T2 (F)	7	757	114	-643	6.03	.0009

Conclusions The results show that both treatments were effective in reducing parasitical faecal egg counts. In both trials, mortality was lower in kids of does receiving the treatments than in those of control group does. It is unclear why mortality rates in Trial 2 were significantly different during the period 31-120 days after kidding, but not in the 0-30 days period. This might be related to the trials being conducted at different times of the year. It appeared to the researchers and participating goat-keepers that the treatments resulted in increased milk production, which is a normal consequence of deworming does immediately prior to, or during, lactation (Peacock, 1996). The increased availability of milk to the kids is likely to be one reason for the lower mortality in the kids of does receiving the treatments. Another possible reason is reduced likelihood of, or level of, infection in these kids.

The data concerning both mortality rates and faecal egg counts strongly suggest that the *Mucuna pruriens*-based treatment is as effective against helminths in pregnant does as the commercial anthelmintic, *Fenbendazole*. Goat-keepers expressed a preference for this treatment, because it does not need to be purchased and is widely available in the project area.

Globalisation could result in imports of cheap animal products undermining local animal production systems. However, the results of these trials and other research by this project (Conroy *et al.*, 2002) suggest that there may be plenty of scope for improving the competitiveness of local systems with simple, low-cost technologies. With demand for meat rising in India and many other developing countries, and likely to continue to do so, there is still a future for meat from non-intensive systems, particularly if animal science assists resource-poor livestock-keepers in increasing the productivity and profitability of their systems.

References

Conroy, C., Thakur, Y. and Vadher, M. In press. The efficacy of participatory development of technologies: experiences with resource-poor goat-keepers in India. *Livestock Research for Rural Development.* **14.**
Peacock, C. 1996. *Improving goat production in the tropics: a manual for development workers.* Oxfam, Oxford, England.
Thienpont, D., Rochette, F. and Vanparis, O.F.J. 1986 *Diagnosing Helminthiasis by Coprological Examination* Second edition. Beerse, Janssen Research Foundation.