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COMPLEMENTARY GRAZING OF SHEEP AND GOATS ON *ACACIA NILOTICA*

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AIM

An experiment was designed to determine the combination of sheep and goats needed to control *Acacia nilotica* subsp. *indica* and the economic and biological consequences of complementary grazing.

METHODS

A combination of merino wethers and first-cross cashmere goats were grazed on Mitchell grass (*Astrebla* spp.) pastures with an over story of *A. nilotica*. The site was located on "Politic" north east of Aramac (AAR 462 mm). Treatments were 20 sheep + 0 goats, + 10 goats and + 20 goats (replicated twice). The area of each paddock was 40 ha and estimated total canopy of *A. nilotica* averaged 3.3% at the beginning of the experiment late in October 1987.

Changes in plant size and canopy cover were determined by measuring the height and canopy cover of plants in three transects per paddock. Stocking rates as opposed to animal numbers were calculated in dry sheep equivalents/ha (Table 1). Differences in stocking rate between years were due do a partial destock for 82 days in 1988 and general increase in body size over two years.

EFFECTS ON TREE GROWTH

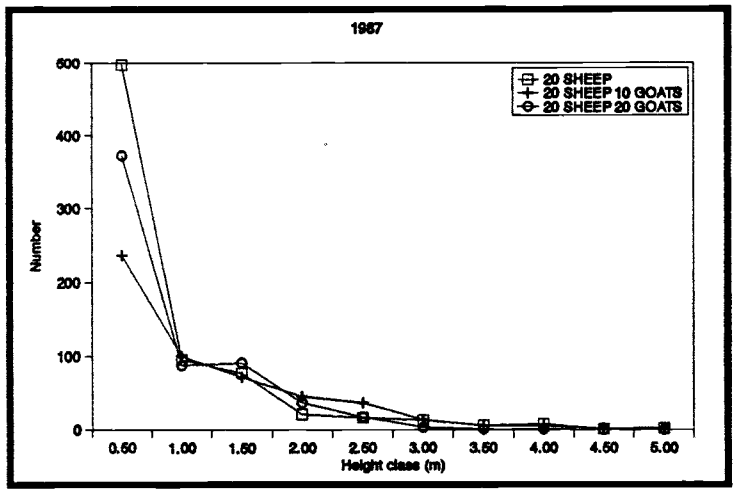
During the first year (1988) rainfall was 239 mm and in the second year (1989) was 575 mm. Rainfall had a major effect on the growth of *A. nilotica*. During 1988 there was an 8% increase in total canopy cover in the 0 goat and the 10 goat treatment while there was a decrease in canopy cover in the 20 goat treatment. In 1989 canopy cover increased by 66% in the 0 goat treatment and by 105% in the 10 goat treatment and by 19% in the 20 goat treatment.

Table 1. Summarised data on changes in plant populations, stocking rates, fibre production and economics.

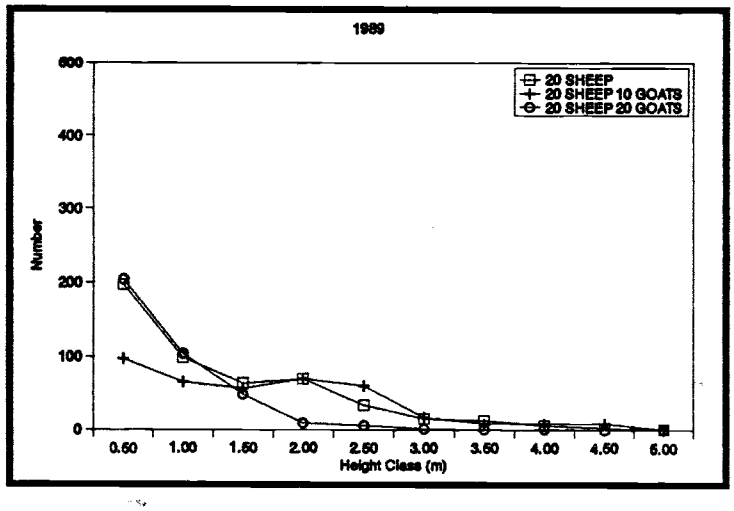
		0 Goats 20 Sheep	10 Goats 20 Sheep	20 Goats 20 Sheep
Canopy inc. (dec.) (%)	87-88	+8.3	+7.7	(-25.4)
Canopy inc. (dec.) (%)	88-89	+65.8	+105.0	+19.2
D.S.E. / ha	87-88	0.44	0.62	0.79
D.S.E. / ha	88-89	0.60	0.89	1.13
Greasy wool/sheep (kg)	87-88	4.3	4.3	3.7
Greasy wool/sheep (kg)	88-89	5.8	6.6	6.2
Fibre / goat (g)	87-88	-	80	95
Fibre / goat (g)	88-89	-	85	120
Returns $/sheep/y	87-89	34.6	35.6	34.3
Returns $/goat/y	87-89	-	8.0	8.0
Total returns $/ha/y	87-89	18.6	21.7	21.8

Returns are for gross income averaged over 1988 and 1989

Plants in the 20 goat treatment the smaller trees were decreased in height with canopy often consisting of regrowth from the tree base. In the other treatments trees became taller and had larger canopies (Figs. 1a and 1b). It is likely that large trees will eventually need to be mechanically pulled or burnt to put all trees in browse range. Plant numbers in all treatments decreased by about 40% in 1988 due to drought (mainly death of seedlings). In 1989 the 20 goat treatment showed a decrease in plant numbers in the 0-3 m height range whereas, there was little change in the other two treatments.



Figures 1a. Stand structure (numbers of plants in each height class as measured in permanent transects) at beginning of the experiment in 1987.



Figures 1b. Stand structure (numbers of plants in each height class as measured in permanent transects) after two years (1989).

EFFECTS ON ANIMAL PRODUCTION AND ECONOMICS.

There was no decrease in wool production in the 10 goat treatment in 1988 or either the 10 or 20 goat treatments in 1989, (an above average year). This suggests complementary grazing may have occurred in the 10 goat treatment in 1988. In 1989 the situation is not clear due to a surplus of feed which existed for most of the year. However, the trends were similar to those in 1988. In the 20 goat treatment wool production was lower in 1988 under drought conditions compared with the sheep only treatment but returns for their lower micron wool exceeded the yield loss. Initial data on financial returns showed that the 10 goat treatment gave the best results for sheep and the 20 goat treatment the best for goats and the best overall.

The experiment will continue for another two years and will be fully analysed using a dynamic simulation model to account for the variations in rainfall and its interactions with plant growth and effects of stocking rate. The model will estimate how many goats would be needed for how long to control a given cover of *A. nilotica* and the economics of the action considering premiums for fibre diameter.