FEATURES OF THE GOAT RESEARCH FACILITY AT PRINCE OF SONGKLA UNIVERSITY

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Abstract Important features of the goat research facility at P.S.U. are described with emphasis upon the practices central to maintaining goats for a program of controlled research.

Introduction

Goats are mainly raised by Muslim Thai's for meat in southern Thailand and over 80% of Thailand's goats are in the south (Chantalakhana 1984). To evaluate and develop methods to improve the potential of these goats a facility for systematic research by the Faculty of Natural Resources (F.N.R.) was established at the Prince of Songkla University (P.S.U.) as part of the Thai-Australian P.S.U. Project. This paper describes the facility and the practices to maintain a healthy herd of goats for this research.

Materials and Methods

Environment and structures

The research facility is established on 5.75 ha of the F.N.R. research farm at the P.S.U. Hat Yai Campus (7° 0'N, 100° 30'E). The area is 20 m above sea level on a gravely colluvium soil and has an annual rainfall of 1120-2800 mm with a dry period commencing in mid-January and marked increases occuring in April and October, temperatures of 20-35 °C, r.h. of 63-88% and 50 min difference in daylength between solstices.

The facility has a netted vermin-proof boundary fence (1.5 m) and an all-weather access road, 6 grazing paddocks (0.334 to 1.18 ha), a paddock to provide hand-fed forage (0.9 ha) and a tree legume research area. Internal fences are Waratah Hinged Joint (8/90/30) with selvage wires and 2 plain wires on top (1.2 m) and uprights of galvanised pipe set in concrete. A large split-level wooden shed is the central work area and the upper section has a large

handling area with slatted flooring, an access ramp, drafting and drenching races, holding pens and an area for feed preparation. The lower section is used as a general purpose laboratory and is to be fitted with offices and facilities for nutrition, slaughter and health research. There are 3 small wooden sheds each with 4 pens on slatted flooring, feed troughs, water facilities and a work area. Each shed accomodates 50 adult goats with access via ramps and the under-area provides shelter for goats.

Pastures

The wettest section of the facility was established with Brachiaria decumbens and Centrosema pubescens on higher parts and Brachiaria mutica on lower parts. The paddock for hand-fed forage is mainly Pennisetum purpureum. Grazing paddocks on higher parts were infested with Pennisetum setosum and Eupatorium odoratum and contain Brachiaria decumbens, Brachiaria ruziziensis and some Cynodon nlemfuensis and Pennisetum purpureum. These paddocks were slashed, disced and fertilized (rock phosphate, 300-400 kg/ha) and established with Centrosema pubescens and Stylosanthes hamata cv. Verano as major legumes. Road edges are stabilised with Macroptilium atropurpureum cv. Siratro and Axonopus compressus. One paddock has a row of Leucaena leucocephala and some Gliricidia sp and shade trees are protected by netted guards.

Administration and introduction of goats

The goat project leader and an Australian advisor direct management and a manager and 5 graduates execute day-to-day management practices and maintain research records. Labourers assist with routine duties. The village goats introduced are similar to Malaysian Kambing Katjang (KK) goats, but about 20% smaller (Saithanoo et al. 1985). Females were introduced from June to September 1984 (110) with further introductions during 1985 (60) and males were introduced as sires (12), teasers (6) and experimental animals (9). After purchase, goats are fitted with a numbered ear tag and quarantined (4 weeks) prior to release at the facility. Goats are weighed, housed in individual pens and fed fresh forage ad lib. and concentrate (conc. mix 1, Table 1). The goats

are photographed, body characteristics are recorded, hooves are trimmed and they are sprayed with Asuntol 50 and Lindane. Does for breeding are injected with Lutalyse to terminate pregnancies. Internal parasite burdens are determined by faecal egg counts (McMaster f.e.c. technique, Baldock 1984) and major species are identified (Thienpont et al. 1979) followed by drenching with Panacur and Sulfaline and assessment of burdens 7 days later. Serum from goats is tested for Brucellosis sp and goats are vaccinated against foot and mouth disease (Type A, O & Asia), haemorrhagic septicaemia, Clostridial diseases and caseous lymphadenitis ("Glanvac-5", C.S.L., Australia).

Grazing and feeding management

Grazing management involves rotational grazings of 3-4 weeks from mid-January to mid-November, slashing and spreading dung on pastures and fertilizing in April and September (200 kg rock phosphate & 100 kg urea/ha) and hand control of Eupatorium odoratum. Pastures are fully utilised in the dry season by grazing higher areas and then rotating goats to lower paddocks. All hand-fed forage is supplied from 1 paddock and areas cut each week are fertilized (N,P,K,S&Ca) and forage residues are returned to this paddock.

Pregnant does are fed conc. daily (0.75% wt, mix 1) from mid-January and the Ca content is adjusted before and after kidding. Up to 350 g of conc. is fed after kidding and maintained until the dry season breaks. After weaning, does are fed conc. (0.3% wt/d) and on wet days the conc. is raised to 0.5%. Weaned kids are housed (6 weeks) and fed daily high quality fresh forage ad lib. and conc. (1.25% wt, mix 3, Table 1) and during subsequent grazing are fed conc. daily (1% wt, mix 2, Table 1). Does graze fresh paddocks and are fed conc. (0.5% wt/d) during mating in October. All goats are housed from mid-November to mid-January (wet season) and fed fresh forage ad lib., Leucaena leucocephala leaves (200 g/h/d) and conc. (0.75% wt/d).

Herd health and husbandry practices

All initial vaccinations are maintained with boosters and post-mortems are done on goats that die. Goats with contagious ecthyma (c.e.) are fed soft

forage, lesions are swabed with iodine preparations, copper sulphate and Cetavlon solutions and antiseptic ointment is applied. Goats with respiratory problems are treated with Borgal and any with wounds are treated with Penstrep and Negasunt. Photosensitized goat are housed and treated with Chlorpyrimine and goats with CNS dysfunction are injected with Vitamin B1 and Vibecol.

Goats are segregated (12-18/group) according to dominance order for conc. feeding and wet season housing. Each month goats are weighed, condition scored (1-4) and hooves are trimmed if required and parasite burdens are assessed by f.e.c. of 'marker' goats (20% of herd). Panacur is given if burdens reach >500 eggs/g and goats are housed overnight to empty-out before entering fresh paddocks. Ivomec has been used to control concurrent internal and external parasite burdens and goats with >5000 oocysts/g are given Sulpaline. External parasites are controlled by spraying with Asuntol 50 and Lindane and goats are drenched and sprayed before housing in mid-November and prior to release in mid-January.

Does are kidded indoors and hypoglycaemic does are dosed with glycerol. New born kids are fitted with a numbered ear tag, weighed and body characteristics are recorded and does with retained placenta are injected with Oxytocin. Kidded does remain in the barn 4-7 days and does with congested teats are milked-out and colostrum (stored frozen) is given to weak kids. On return to pasture kidded does are weighed and body measurements recorded and does and kids are checked daily. Kids are vaccinated against c.e. ('home-made' vaccine) and treated with Sulfaline at 4 weeks and at weaning (12 weeks). Vaccinations against endemic infectious diseases and with Glanvac-5 are performed at 8-10 weeks and 2-4 weeks post weaning. Kids are weighed weekly and at weaning body characteristics are recorded and does are milked-out.

Results

After initiation of management practices in February 1985 the mean weight of 80 non-pregnant does increased 31% over 7 mo and following mating 68 does were 26% heavier after 12 weeks lactation. The weights for does of

Table 1. The composition of three concentrate mixes offered to goats

Mix no.	Component (g/kg air-dry material) Corn	Oil palm meal	Soybean meal	Rice bran	Molasses	Milk powder	Ground Oyster shell	Salt	D.C.P.
1	325	290	150	90	100	-	20	20	5
2	310	275	190	85	95	-	20	20	5
3	290	260	185	80	90	60	20	15	-

Calculated nutrient content and cost per kg dry matter

Mix no.	M.E.(MJ)	C.P.(g)	E.E.(g)	C.F.(g)	Ca(g)	P(g)	Ca:P	Baht
1	11.4	150	79	124	11.1	6.3	1.76	3.4
2	11.4	167	76	121	11.1	6.4	1.73	3.6
3	11.9	177	88	114	10.4	5.5	1.9	6.7

Table 2. Mean liveweights (kg) for various age groups of non-pregnant and kidded native does

NON-PREGNANT 1985				KIDDED 1986			
Month	*age n	≤ 2 44	≥ 4 36	Month status	≤ 2 26	4 27	≥ 6 15
Jan.		14.1†(2.9)	18.4(3.0)	Nov. early preg.	17.3(2.1)	20.4(3.2)	22.8(2.9)
Mar.		16.0(2.7)	20.4(3.2)	Jan. mid preg.	18.8(2.0)	21.7(3.6)	24.2(4.0)
May		17.4(2.7)	22.3(3.3)	Mar. late preg.	23.4(4.3)	26.3(3.8)	28.8(5.7)
Jul.		19.0(2.9)	22.8(3.7)	May lactation	21.2(2.8)	23.4(3.2)	25.4(4.5)
Sep.		19.4(3.6)	22.6(4.4)	Jul. kids weaned	23.4(2.3)	25.3(3.0)	26.8(4.7)
#Wt.inc.(%)		36	23		35	25	18

*No. of permanent incisors in May (non-pregnant) and Nov. (kidded); † ± standard deviation;
#Wt. increase Jan. to Sep. (non-pregnant) and Nov. to Jul. (kidded).

Table 3. The number and mean liveweights(kg) of does kidded, kids born and weaned(12 wks.) and mean growth rates according to birth type

Birth type	Does kidded n	wt.	All kids born n	wt.	Kids born alive n	wt.	Kids weaned n	wt.	Growth rate (g/d)
Singles	45	22.5*(4.2)	45	1.9(0.36)	44	1.9(0.36)	42	10.9(2.3)	106(23)
Multiples	26	23.8(3.8)	53	1.5(0.32)	49	1.6(0.28)	49	8.9(1.7)	85(15)
Total	71		98	[a]138 %	93	[b]131 %	91	[c]128 %	

* ± standard deviation; a =% born; b =kidding %; c = weaning %.

various ages over these periods are shown in Table 2. Only 7 from 119 breeding does died to September 1986; 1 death each due to helminthiasis, pneumonia, bullying, strangulation, incorrect hypomagnesaemia diagnosis and 2 does euthanased due to persistent c.e.. Salient features of the March/April 1986 kidding and kid growth are shown in Table 3. Three kids that died at birth were born outdoors and the other 2 were euthanased; 770 g twins born to a doe with persistent c.e.. One kid, 735 g at birth, died after 7 days. Despite vaccination at 4 weeks, 61 kids contracted c.e. and 1 kid died; scabs contained Parapoxvirus particles (W. Wattanavijarn, personal communication).

There have been no cases of contagious diseases, except for c.e., no Clostridial diseases or metritis and only mild coccidiosis and mastitis. Panacur effectively controls high nematode burdens in quarantine, and subsequent f.e.c. have always been <1000 eggs/g with only 1 tactical and 4 strategic drenchings over 18 mo. There were no cases of hypocalcaemia at kidding, but 4 does were treated for hypoglycaemia. Segregation for hand-feeding minimises the persistent problem of bullying. Respiratory infections are generally arrested and goats with CNS dysfunction respond to vitamin B therapy. The pastures have persisted, the boundary fence excludes vermin, internal fences control all goats and the facility supported 270 goats in August 1986. The annual cost of conc., fertilizer and drugs for 115 does and progeny to 8 mo is 420 baht/doe.

Discussion

Despite pregnancy and lactation, 26 young does attained weights similar to the mature weight of KK does (Khusahry and Yusuff 1984) and that of 1-2 year old stall-fed Thai does (Anēkawiang et al. 1982, cited by Chantalakhana 1984). Furthermore, 22 were only introduced to the facility 2 mo prior to mating, 11 had milk teeth at mating and only 350 g of conc. was fed in peak lactation in the dry season. Older does gained considerable weight and exceeded reported mature weights for KK goats (Khusahry and Yusuff 1984). The 138% kids born supports reports of the fecundity for does of this type and kid

birth weights were well above KK kids and similar to Saanen X KK kids (Khusahry and Yusuff 1984) and 15% below that for 15 kids recorded at Kasetsart Univ. (Anekawiang et al. 1982, cited by Chantalakhana 1984). Kid weaning weights were 66 and 50% greater than the weights for KK and Anglo-Nubian X KK kids respectively, but similar to Saanen X KK kids (Khusahry and Yusuff 1984). These results and the respective mortalities of 6 and 7% for adults and kids demonstrate that conditions at the facility are near ideal for optimum goat production.

Most does kidded between 1000-1600 h (>30 °C & <70% r.h.) and the 10 that inadvertantly kidded outdoors did not seek shade and 3 lost kids. Thus, kid losses were minimised by shedding peripartum does. With the addition of 2 large pens and 50 single pens there will be adequate accomodation for herd management. A 25% reduction in annual conc. costs (315 baht/doe) is feasible with forage from 0.2 ha of tree legumes being established. The absence of digestive disorders and poor health with increased conc. feeding on wet days to offset restricted grazing justifies this practice. Slashing has encouraged young nutritious pasture growth, restricted seeding and improved the utilisation of the aggressive weed Pennisetum setosum and enhanced the growth of Stylosanthes hamata cv. Verano seedlings possibly through reduced shading. The goat's apparent preference for grasses possibly helps maintain the twining legume component with Brachiaria spp.

As some weaners had mature Moniezia spp, and possibly had infections undetected by f.e.c. before weaning, it is now routine practice to control this parasite in suckling kids. Although control of nematodes and coccidia has been effective, all drenching strategies must minimize selection for drug resistance and encourage parasite tolerance in the goats. The low kid mortality due to c.e. and the apparent minimal effect on kid growth reflects the response to treatment. However, since the disease may restrict production at the facility and appears to affect village goats, a vaccine is needed.

The report of jaundice and photosensitization in goats grazing Brachiaria

decumbens (Opasina 1985) may explain the occurence of similar mild symptoms in some goats in 1985. Although these symptoms have not reoccured, this could be a problem with Brachiaria decumbens.

In addition to goat research, the facility is used for undergraduate teaching and serves as a ruminant model for research. The material presented illustrates that the facility has the essential features for trained research staff to produce valid and meaningful results from programs of research on many facets of goat production.

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