

SHEEP PRODUCTION IN A COMMERCIAL RUBBER PLANTATION: A MALAYSIAN EXPERIENCE ²

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By utilizing the pasture under rubber trees, a Selangor rubber estate was able to establish a flock of sheep for meat production. The project, initiated in 1968, was developed through buying in sheep and breeding within the flock. By 1978 the population had risen to 500 animals. The owners aim to increase sheep numbers and to establish similar units at other estates. Interesting managerial and disease problems have been encountered. Possible methods to overcome these problems, alternative management systems, future development and likely problems are discussed.

Key Words: Sheep, meat, integration, rubber plantation

At present in Malaysia there is only limited experience with the management of livestock grazing pastures beneath tree crops. For this reason it is of interest to discuss a sheep production project initiated in 1968 by a commercial rubber estate in this country.

Developmental History

Lowe (1968) observed that sheep thrived on the vegetation under mature rubber trees, and that they caused no damage to the trees. The vegetation included the grass species *Panicum*, *Axonopus*, and *Paspalum*; the fern species *Lygodium* and *Dryopteris*; and other plant species such as *Mikania*, *Mimosa*, *Vitis* and *Ficus*. The ferns were the predominant plant species found. Except for these fern species all plant types were grazed by the sheep. They also ate rubber seeds and fallen leaves, young lalang (*Imperata cylindrica*) as well as any remaining plants from the leguminous cover crop (*Pueraria phaseoloides*).

As a result of these observations it was decided to examine the feasibility of rearing sheep under rubber trees. The initial 20 animals in the project were descendents of earlier crossings of Dorset Horn with local Malaysian sheep. These crossbreds genetically ranged from 15/16 to 1/2 bred Dorset Horn. By 1972 the flock had increased to 107 animals. Over a 3 year period from 1973 to 1975 a further 116 local sheep were purchased. In late 1975 a Wiltshire Horn ram was imported from Britain, but sired few lambs. Thus the genetic make-up of the average sheep in the project was of the local Malaysian type with a small unknown amount of Dorset Horn. In February 1978 the total population was 466 animals. (Table 1).

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Table 1:
Sheep population - February 1978

Grouping		Number of animals
Rams:	Wiltshire Horn	1
	Wiltshire Horn x Local (1st Cross)	1
	Local	3
	Local (to be vasectomized)	2
Ewes:	(over 12 months of age)	221
Females:	(4 - 12 months)	73
Wethers:	(4 - 12 months)	87
Lambs:	Male and Female (0 - 4 months)	78
Total		466

Flock Management

The sheep were divided into four flocks. (The Wiltshire Horn ram was kept in a separate paddock.)

1. Ewes and lambs under 1 month.
2. Ewes with lambs 1-4 months old, young females 4-12 months old and a Wiltshire Horn crossbred ram.
3. Ewes (lambs already weaned) and 3 local rams.
4. Wethers - castrated males over 3-4 months old.

Under the supervision of four shepherds, the flocks were released from their overnight housing at 8.00am. Flock 1 grazed within $\frac{1}{4}$ mile of their sheds whereas the other three flocks walked one to two miles to their grazing areas. Two hundred and forty hectares of the estate were available, with each flock having approximately 10 different grazing areas. These areas were rotated with each locality being grazed for three consecutive days. The sheep were returned to their sheds at 4.30pm, i.e. a daily grazing period of 8 $\frac{1}{2}$ hours. At night all sheep received a supplementary feed of 110 gms of tapioca chips (*Manihot esculenta*) per head and had access to water and a mineral supplement.

All lambs were eartagged at the time of weaning i.e. between 3-4 months old. At the same time male lambs were castrated by the closed Burdizzo method. These wethers were ready for sale at 6-8 months of age, when they weighed between 16-23 kgs.

Individual animal identification and records have been kept since 1975. The records include:- births, deaths, sales, and weights of all animals every three months. (Table 2.)

Table 2:

Average sheep weights

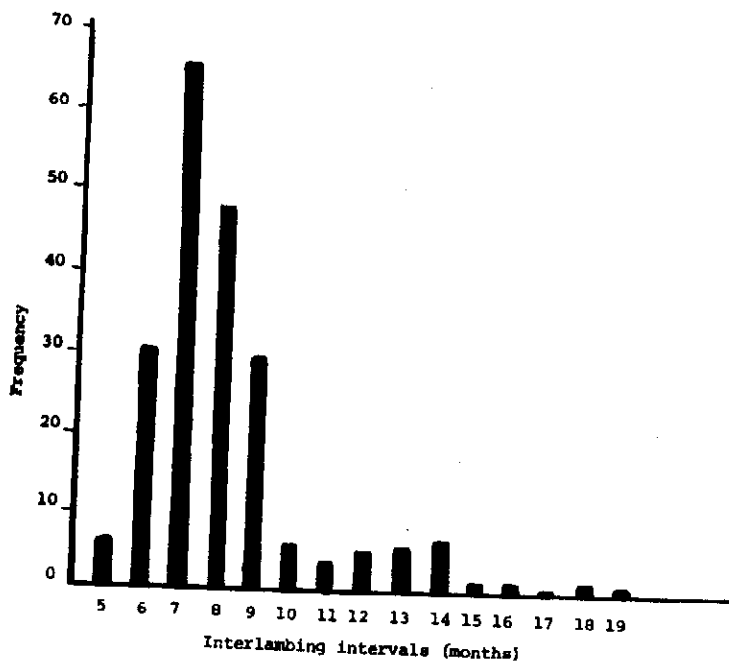
Group		Average weight (kgs)
Rams:	Local breed	39
	Wiltshire Horn	65.3
Ewes:		25
Lambs, at birth:	Local	1.8 - 2.3
	Wiltshire Horn cross	2.7 - 3.2
Lambs, at 4 months:	Local	11.3

Lambing

The management did not restrict the mating period and as the local Malaysian sheep have no specific breeding season, lambing occurred throughout the year. In this project each ewe lambed approximately 3 times every two years. Between 1975 and 1978 from a total of 122 ewes, the most common interlambing interval was 7 months. (Figure 1.)

Figure 1

The distribution of 223 interlambing intervals from 122 ewes between 1975 and 1978.



Breeding Program

Local demands call for meat production rather than wool production. The indigenous sheep of Malaysia produce little wool and are of small body size. For these reasons the aim has been to increase growth rate. The Wiltshire Horn ram was imported to upgrade the flock. This large bodied breed of sheep has very little wool production and in Britain has been reported to shed its fleece once per year (Gunston 1961). The ram in this project was observed to shed its fleece twice per year: a characteristic also seen in Malaysian sheep.

The production of Wiltshire Horn crossbred lambs has been disappointingly low. This apparently has been due to heat stress affecting the ram's ability to mount ewes successfully. His semen was of good volume, good motility and normal cellular morphology. The crossbred lambs produced have shown higher birth weights and growth rates when compared with local lambs. Unfortunately with the limited number there is insufficient data to evaluate the potential of these crossbreds.

Thus the breeding policy has been to increase the number of crossbred lambs by:-

1. Improving heat detection using two 'teaser' (vasectomized) rams.
2. Restraining the 'on heat' ewe in a head bail or confining the ewe and ram to a small area of the ram paddock.
3. Investigating the possibility of artificial insemination using the Wiltshire Horn ram's semen as well as synchronization of oestrus in the ewes.
4. Producing lambs sired by the Wiltshire Horn crossbred ram.

Local rams have been used with the 'difficult to breed' ewes, i.e. those not yet pregnant four months after lambing. There has been no selection carried out within the ewes, other than culling aged and non-breeding animals.

Disease Problems

- Parasitic
- a) By far the most important disease problems have been due to infestations of the strongyle worms, *Haemonchus contortus*, *Mecistocirrus digitatus* and *Trichostrongylus colubriformis*.
 - b) Tapeworms, *Monezia expansa*, and coccidia, *Eimeria* spp. have been found in high numbers but without obvious pathogenicity in the host.
 - c) Ticks are a potential problem but have been controlled thus far by regular dipping of sheep.

Nutritional Poor growth rate and death have occurred in young lambs as a consequence of the ewe's poor mothering ability or inadequate milk production. Malnutrition or strongyle worm infestation or a combination of both resulted in a high lamb mortality. (Table 3.)

Other disease problems These have included: arsenic poisoning, tetanus, pregnancy toxæmia, screw-worm (*Chrysomya bezziana*). The Burdizzo method of castration was used in preference to the open method because of problems encountered previously with screw-worm.

Table 3

Lamb mortality

Year	Births	Lamb deaths	Mortality (%)
1973	73	3	4
1974	94	15	16
1975	100	31	31
1976	156	20	13
1977	270	39	14
1978 (Jan & Feb only)	42	3	7

(These results are from the flock records and unfortunately do not include age of lambs at the time of death.)

Initially all sheep were routinely drenched every six weeks using thiabendazole¹ but in late 1976 it was discovered that *H. contortus* in these sheep had developed a resistance to the drench (Buick and Ng, 1976). Consequently the increasing worm burdens caused ill-thrift and deaths, mainly in lambs but also in adults. The drug, levamisole², has been used successfully since then.

In addition management changes have been necessary to reduce reinfestation:-

1. Although the overnight houses had slatted floors raised from the ground, manure accumulated in the sheds and daily cleaning was necessary.
2. Sheep were sent immediately to grazing each morning. Previously they were held in small paddocks for three hours and then sent to graze in the rubber estate. These small paddocks soon became heavily contaminated with manure and infective strongyle larvae.

Reinfestation continues to be a serious problem and further management changes may be necessary.

Income and Expenditure

The project was initiated to investigate the potential of sheep production increasing financial returns from the estate through:- sale of meat, decreased weeding expenditure, increased soil fertility.

1. Sale of meat - While sheep numbers were being increased only wethers and culled animals were sold. The 1978 price was \$(Malaysian) 2.88-\$3.33 per kg live weight (cf. goat meat \$4.44-\$5.11 per kg live weight).

¹ "Thibenzole", Merck Sharp and Dohme. ² "Nemicide", ICI

2. Decreased weeding expenditure - Approximately \$2000 per annum (Gopal 1978). This figure is not included in Table 4.
3. Increased soil fertility - No measurements have been made.

Table 4:

Yearly income versus expenditure

Year	Income (\$)	Expenditure (\$)
1973 & 1974 (total)	5,320	2,790
1975	3,672	11,965
1976	2,200	7,210
1977	5,296	15,883

Bamford (1974) extrapolated from his finding with the flock in 1973 and 1974. He estimated that from a flock of 100 breeding ewes it should be possible to make a net profit of \$1350 per annum (Total income-Total expenditure); however for each of the years 1975, 1976 and 1977 the total expenditure has exceeded the total income. (see Table 4) This was not unexpected as developmental costs were high over that period. These costs included the costs of building sheep sheds, drainage, establishment of grazing paddocks (for ewes with recently born lambs), fencing, fertilizers, etc. The major fixed costs were for labour and supplementary feed. For the year 1977 these costs were:- total salaries - \$6676, supplementary feed - \$2255, that is a total fixed cost of \$8931. So if we consider the income and expenditure for 1977, omitting the developmental costs and including the \$2000 saved on weeding, the fixed expenditure totalled \$8931 and the income totalled \$7296 giving a net loss of \$1635. This is not an unreasonable loss at this stage of development where animal numbers are increasing and few are sold. To accurately assess the economic viability of such a project it would be necessary to do a detailed analysis taking into account the value of the capital investment, i.e. the value of sheds, paddocks, drainage, fencing, etc. as well as the value of the flock of 500 animals.

Discussion

The owner's aim is to continue increasing animal numbers and to establish similar units at other estates.

Possible improvements and alternatives in future development:-

1. Selection of ewes - The following characteristics were of importance in this project:- mothering ability (including milk production), short interlambing interval, growth rate of lambs and ability to shed fleece.

2. Local rams or other imported rams (or semen) must be incorporated into the breeding program. The sole use of the Wiltshire Horn ram or of his male offspring would lead to the undesirable consequences of inbreeding.
3. Restriction of the breeding season to three times every two years would simplify management procedures and recording of data.
4. Restrict supplementary feeding to ewes with lambs or set up control trials to investigate the returns in weight gain versus cost.
5. The management procedures have a number of drawbacks:-
 - a) Cost of overnight housing and cost of labour to maintain and clean these sheds.
 - b) Parasitic reinfestation.
 - c) Distance the animals must walk each day.

An alternative system would be to have small temporary yards in the estate. Under the supervision of shepherds the animals would graze throughout the day and be returned to their nearby yards at night. These yards could be shifted regularly to parasite free areas. The risk of theft at night may make this system unsuitable. Alternative systems of management could be tried when establishing similar units at other estates.

While these observations were part of a commercial rather than research undertaking, the information obtained does provide valuable knowledge on the indigenous sheep of Malaysia, management procedures, and disease problems. The project presents the possibility that sheep production integrated with tree crops may be economically viable.

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