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# WINTER CEREAL PASTURE AND *ERAGROSTIS CURVULA* HAY FOR FAT LAMB PRODUCTION

**N.J. Fair & J. Reyneke**

*Agricultural Research Station, Bethlehem*

*OPSOMMING:* WINTERGRAANWEIDING EN *ERAGROSTIS CURVULA* VIR VETLAMPRODUKSIE

Ondersoek is ingestel na die benutting van wintergraanweiding deur Dohne Merino ooie. Ooie en lammers is tot twee uur weityd per dag beperk waarna 0,46 kg *E. curvula* hooi per ooi gevoer is. Speen op agt weke is vergelyk met speen op bereiking van slagmassa (32 kg). Verder is beperkte kragvoer byvoeding van lammers vergelyk met *ad lib.* voeding. Daar is ook gepoog om 'n alternatief vir wintergraanweiding te verkry deur gebruik te maak van hoog bemeste *E. curvula* hooi, met en sonder byvoeding van kragvoer. Dieselfde speen en byvoedingbehandelings is by hierdie lammers toegepas as by die groepe op weiding. Vroegspeen en beperkte byvoeding van lammers op weiding het die grootste ekonomiese voordele ingehou. Die vervanging van wintergraanweiding deur *E. curvula* hooi was hoogs bevredigend in die stelsel waar lammers vroeg gespeen en kragvoer *ad lib.* gevoer was. Deur ooie van die *E. curvula* groep vir die eerste vier weke van laktasie kragvoerbyvoeding te gee het die wins op lammers verlaag. Die ooie op weiding het 'n toename in lewende massa getoon en hulle bronstigheidsaktiwiteit is nie deur laktasie beïnvloed nie. Laktasie het egter wel die aktiwiteit van die ooie wat *E. curvula* gevoer was, en afname in lewende massa getoon het, onderdruk. Die interaksie tussen laktasie en voeding op bronstigheid het duidelik na vore getree.

*SUMMARY*

The utilization of winter cereal pasture was investigated using Dohne Merino ewes. They were grazed for two hours per day on pasture and in addition were fed 0,46 kg of *E. curvula* hay. Weaning at eight weeks was compared with weaning at slaughter mass (32 kg) and restricted supplementary concentrate feeding of lambs was compared with *ad lib.* feeding. An economical alternative feed to cereal pasture was sought by using *E. curvula* hay of good quality, supplemented and unsupplemented with concentrates, together with the same weaning and supplementary feeding treatments of lambs as adopted in the pasture groups. Early weaning and restriction of supplementary feeding of lambs on pasture resulted in greatest profits. *E. curvula* hay was found to be a highly satisfactory substitute for cereal pasture when early weaning and *ad lib.* lamb concentrate feeding was practised. Supplementing of ewes in the *E. curvula* groups with concentrates during the first weeks of lactation reduced lamb profits. Oestrus activity of ewes was not suppressed by lactation in the pasture groups, which were gaining mass, but was markedly reduced in *E. curvula* hay groups, which were losing mass. The interaction between lactation and nutrition on oestrus was clearly illustrated.

Climatic conditions in the Eastern and North Eastern Free State favour the cultivation of winter cereal pasture. The value of such pasture for fat lamb production has been demonstrated by Van Niekerk & Barnard (1969) and by Reyneke (1971). Reyneke (1971) restricted the daily grazing time of the ewes to $1\frac{1}{2}$ hours per day and weaned lambs at 112 days. Van Niekerk & Barnard (1969) allowed ewes free access to pasture and reported that weaning at 56 days was as successful as weaning at 91 days. The unrestricted feeding of concentrates to lambs on pasture resulted in higher lamb mass at 119 days but appeared to have little economic advantage.

Penzhorn (1945) found winter cereal pasture suitable for fat lamb production in the North Western Free State but considered it too much of a risk due to the problem of pasture establishment under adverse climatic conditions. This view-point was supported by Preller & Coetzee (1964). Reyneke (1971) stressed the need for alternative feeding systems in event of pasture failure.

The present study was undertaken to investigate the utilization of winter cereal pasture under the following conditions: Ewes were restricted in their access to pasture; lambs were fed various levels of supplementary concentrates and weaned at either eight weeks or at slaughter. Furthermore, an alternative feeding system was tested in which a suitable hay was used with lamb weaning and feeding practices similar to those adopted in the pasture groups. Finally, with a view to intensifying fat lamb production, the occurrence of oestrus in ewes was recorded for the period 60 to 120 days post partum.

## Procedure

One hundred and fifty gestating Dohne Merino ewes were run on veld until 3 weeks prior to the start of lambing (lambing period 35 days). At this time, i.e. 3 weeks prior to lambing, the ewes were divided into 2 equal groups, viz. group A and B according to age and body mass. Group A was given access to winter creal pasture for 2 hours per day and in addition were pen fed 0,46 kg of *Eragrostis curvula* hay per ewe per day. Group B pen fed *E. curvula* hay *ad lib.* After parturition ewes were given an additional 0,46 kg of concentrates (Ration I) for a period of 4 weeks only (composition of hay and concentrates are given in Table 1. A group of 10 ewes were selected from group B at lambing and designated group C. These ewes received only *E. curvula* hay *ad lib.*

At the completion of lambing Group A was subdivided into two comparable Groups, A1 and A2. The lambs in these groups were weaned at 56 days and on

**Table 1**

*Composition of concentrate rations and chemical analyses of* E. curvula *hay.*

| | | Ration | |
|---|---|---|---|
| | | 1 | 2 |
| Maize meal | % | 65 | 80 |
| High Prot. concentrate | % | 30 | – |
| Lucerne meal | % | – | 15 |
| Salt: Bonemeal | % | 5 | 5 |
| Cost | c/kg | 4,9 | 3,6 |
| *E. curvula* hay | | | |
| Crude Protein | | 10% | |
| Fibre | | 27,8% | |

achieving slaughter mass (32 kg) respectively. Group B was similarly subdivided into groups B1 and B2. Group C was not subdivided and all the lambs in this group were weaned at 56 days.

Lambs in each Group A1, A2, B1 and B2 were subdivided into two comparable groups for comparison of *ad lib* and restricted concentrate feeding treatments. Early weaned lambs in the pasture groups remained on pasture where they were fed a concentrate ration on an *ad lib.* and restricted basis respectively. Suckling lambs in pasture groups had access to pasture for two hours per day and received the creep feeding treatments as set out in Table 2.

All lambs in Group B and C received *E. curvula* hay *ad lib. Ad lib.* and restricted concentrate feeding treatments were applied to both early weaned and suckling groups. The scheme of treatments applied to ewes and lambs is presented in Table 2.

Sixty days after parturition raddled teaser rams were put twice daily to ewes in all groups excepting to those in group C. The body mass of the ewes and lambs was determined after completion of parturition and thereafter at 14 day intervals. Wool samples were taken from ewes by clipping a skin area of 100 $cm^2$ posterior to the left shoulder, according to the procedure described by Coetzee (1967), at parturition and 120 days later. The clean wool yield was determined from the samples by the S.A. Fleece Testing Centre. The first 5 lambs in each group to reach 32 kg live mass were slaughtered and the carcasses evaluated according to the Starke & Joubert (1961) score card for lamb and mutton carcasses. Winter cereal pasture was established by planting a mixture of summer wheat and stooling rye at adequate fertilization rates. Moisture conservation was practised on the lands during the month preceeding planting.

**Table 2**

*Treatment of ewes and lambs*

| Ewe Group | n | Ration of ewes per day | Lamb Group | n | Weaning weight or age | Lamb roughage | Lamb concentrates |
|---|---|---|---|---|---|---|---|
| A1 | 20 | Winter cereal pasture (2 hours) + 0,46 kg *E. curvula* hay | LA1 | 10 | 8 weeks | Winter cereal pasture *ad lib.* | Ration 1 *ad lib.* |
| | | | LA2 | 10 | 8 weeks | Winter cereal pasture *ad lib.* | Ration 1 Restricted* |
| A2 | 20 | Winter cereal pasture (2 hours) + 0,46 kg *E. curvula* hay | LA3 | 10 | 32 kg | Winter cereal pasture 2 hours per day | Ration 2 *ad lib.* |
| | | | LA4 | 10 | 32 kg | Winter cereal pasture 2 hours per day | Ration 2 Restricted |
| B1 | 20 | *E. curvula* hay *ad lib.* + 0,46 kg concentrates (ration 1) first 4 weeks of lactation | LB1 | 10 | 8 weeks | *E. curvula* hay *ad lib.* | Ration 1 *ad lib.* |
| | | | LB2 | 10 | 8 weeks | *E. curvula* hay *ad lib.* | Ration 1 *ad lib.* |
| B2 | 20 | E. curvula hay *ad lib.* + 0,46 kg concentrates (ration 1) first 4 weeks of lactation | LB3 | 10 | 32 kg | *E. curvula* hay *ad lib.* | Ration 2 *ad lib.* |
| | | | LB4 | 10 | 32 kg | *E. curvula* hay *ad. lib.* | Ration 2 Restricted |
| C | 10 | *E. curvula* hay *ad. lib.* | C | 10 | 8 weeks | *E. curvula* hay *ad. lib.* | Ration 2 *ad lib.* |

*Restricted lamb concentrate feed schedule

Birth to 8 weeks : *ad lib.*
8 to 12 weeks : 0,34 kg/lamb/day
12 weeks to slaughter : 0,46 " " "

Table 3

*Average number of days for lambs to reach slaughter mass (32 kg)*

| Main ration of ewes | Group | Weaning age or mass | Lamb creep feed | Number of days to reach slaughter mass |
|---|---|---|---|---|
| Winter cereal pasture | LA1 | 8 weeks | A | 109,9 |
| pasture | LA2 | 8 weeks | R | 106,8 |
| | LA3 | 32 kg | A | 114,6 |
| | LA4 | 32 kg | R | 112,7 |
| *E. curvula* hay + | LB1 | 8 weeks | A | 116,8 |
| concentrates | LB2 | 8 weeks | R | 144,3 |
| | LB3 | 32 kg | A | 116,4 |
| | LB4 | 32 kg | R | 131,1 |
| *E. curvula* hay | LC | 8 weeks | A | 114,8 |

Highly significant (P < 0,01) L.S.D. = 16,6
Significant (P < 0,05) L.S.D. = 12,5
A = *ad lib.*
R = Restricted.

Table 4

*Average carcass score (Starke & Joubert, 1961) and the range within groups*

| | LA | LA2 | LA3 | LA4 | LB1 | LB2 | LB3 | LB4 | C |
|---|---|---|---|---|---|---|---|---|---|
| Mean carcass score | 74,4 | 68,0 | 72,0 | 64,6 | 73,2 | 63,6 | 68,4 | 65,4 | 71,6 |
| Range | 9 | 15 | 6 | 12 | 10 | 15 | 13 | 21 | 13 |
| Creep feed | A | R | A | R | A | R | A | R | A |
| n | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

A = *ad lib.*
R = Restricted

## Results

### *Lamb birth mass*

The birth mass of lambs from ewes receiving pasture was greater than those of the ewes receiving only hay i.e., 4,67 as opposed to 4,09 kg (P < 0,01). The differential feeding was initiated 27 days prior to the midpoint of lambing.

### *Lamb growth*

The average number of days required for lambs to reach slaughter mass are given in Table 3.

Weaning at 8 weeks and restricting concentrate feed had no detrimental effect on lambs in the pasture groups. The restriction of concentrate feed in the *E. curvula* groups resulted in a prolonged period for lambs in these groups to reach slaughter mass. This period was further prolonged by early weaning. However, early weaning with *ad lib.* concentrate feeding gave highly satisfactory lamb growth in *E. curvula* groups LB 1 and LC.

### *Lamb carcass quality*

The average carcass score according to a score cared (Starke & Joubert, 1961) and the range within each group are given in Table 4.

The large variation within groups and the small number of lambs slaughtered resulted in non-significant differences between groups. However a trend for *ad lib.* concentrate feeding to produce better carcasses with less range within groups than restricted feeding is clearly evident. Comparison of grouped data for all *ad lib.* and restricted groups resulted in a highly significant difference (P < 0,01) in mean carcass score. The mean score was 72,0 and 65,4 for *ad lib.* and restricted creep fed lambs respectively.

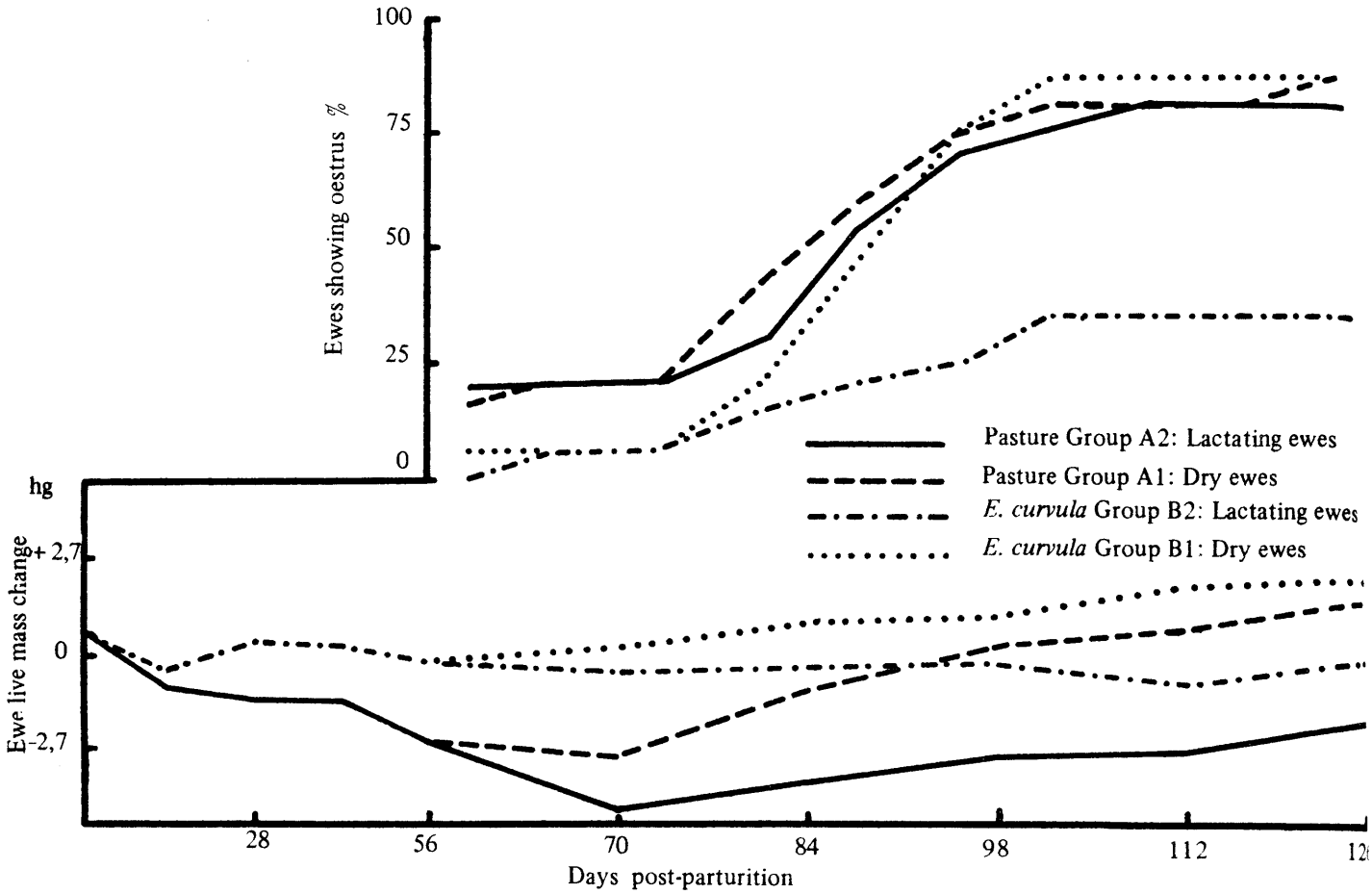


**Fig. 1.** – *Ewe live mass changes and percentage showing oestrus.*

*Ewe mass changes and occurrence of oestrus*

In Figure 1 the ewe live mass changes during the first 120 days post partum are illustrated as well as the incidence of oestrus between 60 and 120 days post partum.

The interaction between nutritional levels and lactation is clearly illustrated. Lactation did not suppress oestrus activity of ewes on pasture (Group A2) as these ewes were on a sufficiently high nutritional plane to allow for an increase in mass. However, the nutritional plane of the lactating ewes in the *E. curvula* group (Group B2) was inadequate and ewes continued to loose bodymass, although only very slightly, for the duration of lactation. The occurrence of oestrus was suppressed in these ewes. Weaning eliminated the lactation stress and ewes in the *E. curvula* group (Group B1) gained mass and exhibited oestrus.

*Economic analysis*

The relative profitability of the various production systems is illustrated in Table 4.

In calculating the relative profits the following were assumed:

1. Winter cereal pasture was valued 0,33 c/kg (11,7 tons green material/ha). Mature ewes consumed 4,6 kg/day and lambs 2,0 kg/day.
2. *E. curvula* hay was valued at 1,65c/kg.
3. Cost of veld grazing was not considered.
4. Rations 1 and 2 were valued at 4,9c/kg and 3,6c/kg respectively.
5. Lamb carcasses were of the same grade and were valued at 55c/kg.
6. The value of ewe wool production was not considered.

**Table 5**

*Comparison of profitability as obtained by deducting feed costs from carcass value*

| Ewe ration | Lamb treatments | | Gross income (R) less feed costs |
|---|---|---|---|
| | Weaning | Concentrates | |
| Winter cereal pasture | 8 weeks | *ad lib.* | 4,53 |
| | 8 weeks | restricted | 5,02 |
| | 32 kg | *ad lib.* | 4,09 |
| | 32 kg | restricted | 3,96 |
| *E. curvula* hay + supplementary concentrates | 8 weeks | *ad lib.* | 3,23 |
| | 8 weeks | restricted | 2,92 |
| | 32 kg | *ad lib.* | 1,62 |
| | 32 kg | restricted | 0,88 |
| *E. curvula* hay + supplementary concentrates | 8 weeks | *ad lib.* | 4,51 |

In Table 5 it can be seen that winter cereal pasture was the most profitable main feeding system. Early weaning generally resulted in greater profits despite the fact that the concentrate ration (ration 1) fed to early weaned lambs was 36% more expensive than that (ration 2) fed to the non-weaned lambs. The restriction of concentrates was beneficial in the early weaned pasture groups gut resulted in markedly reduced profits in both weaned and nonweaned hay groups. The supplementation of hay with concentrates reduced profits.

## Conclusions

The restricted use of winter cereal pasture was found to be highly suitable for fat lamb production. This is in agreement with the findings of Reyneke (1971). Greater profits were realised with early weaning and restriction of supplementary concentrates, however, there was some indication that the latter could also have an adverse effect on carcass quality. Clearly, further research into the optimum level and composition of concentrates for early weaned lambs grazing on cereal pasture is necessary.

From the present study it appears that good quality *E. curvula* hay can be an economic substitute in the event of pasture failure provided that early weaning and *ad lib.* concentrate feeding of the lambs is practised. The addition of limited amounts of concentrates to the ewe's ration during the first month of lactation resulted in better wool growth and maintenance of live mass but the relative profit on the lamb carcass was reduced.

Observation on the incidence of oestrus in ewes revealed that early re-breeding, i.e. at 60 days post partum, might succeed with both dry and lactating ewes on pasture and with dry ewes on *E. curvula* hay. These results agree with those of Hunter (1971) who found that lactation anoestrus was of little practical significance provided that ewes were adequately fed.

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