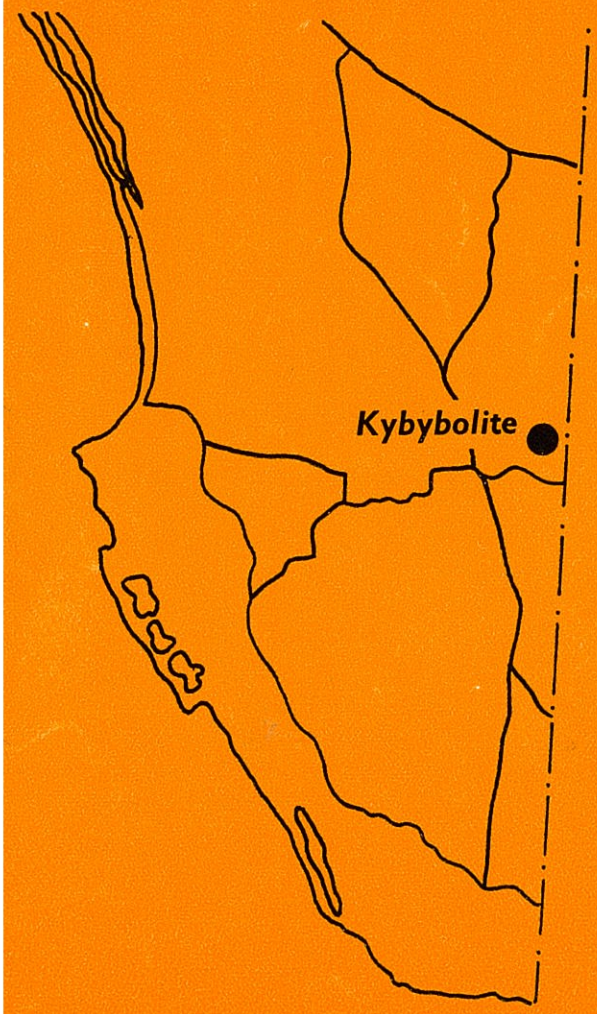
KYBYBOLITE

RESEARCH CENTRE



FIELD DAY 1963

DEPARTMENT OF AGRICULTURE - - - SOUTH AUSTRALIA

contents . . .

KYBYBOLITE RESEARCH CENTRE

Many changes have taken place in the hundred years since 1861, when the late James Affleck built his homestead at Kybybolite. On the 26,000 acre holding over which some 12,000 sheep grazed there are now fifty holdings which run nearly 75,000 sheep.

Land tenure and stock carrying capacity are not the only things to have changed. Most striking has been the soil fertility transformation brought about by the use of superphosphate and subterranean clover. Kybybolite Research Centre has, since 1905, played no small part in meeting the problems of a changing agriculture.

THIS BOOKLET has been prepared to present visitors to the Centre with an account of some current and past research work. It is hoped that the information set out in the following pages will be of benefit to primary producers generally.

SOME FACTS AND FIGURES

LOCATION 13 miles from Naracoorte on the main road to Frances.

ADDRESS P.O. Box 2, Kybybolite, South Australia.

TELEPHONE Kybybolite 2.

STAFF

(As at 6/11/63).

Officer in Charge	P. E. Geytenbeek, B. Ag. Sc.
Research Officer (Agronomy)	P. S. Cocks, B. Ag. Sc.
Research Officer (Animal Husbandry)	I. C. Fletcher, B. Ag. Sc.
Field Officer	B. A. Ninnes, R.D.A.
Field Officer	R. J. R. Hodge, R.D.A.
Technical Assistant	F. J. Turner.

AREA 760 acres.

RAINFALL 21.70 inches (30 year mean).

RAINFALL SEASON 8.1 months.

SOILS Principally sands and loamy sands of 8" to 18" depth, overlying heavy yellow-brown clay. Restricted areas of grey, brown clay soils of a "crab-hole" nature.

SHEEP

(As at 6/11/63).

Merino ewes	445	
Crossbred ewes	680	
Corriedale ewes	30	
Wethers, hoggets and rams	680	
Total grown sheep		1,835
Lambs:		
Merino	340	
Crossbred	745	
Total lambs		1,085

PASTURE SPECIES

SUBTERRANEAN CLOVER (Mt. Barker strain) has been the principal legume used in the red gum lands of the South East. Its use is still recommended. On heavier soils and where water-logging is prolonged the Yarloop strain can also be most profitably used.

WIMMERA RYEGRASS is the most useful annual species, and with subterranean clover, provides productive pastures. Annual pastures need renovation every five or six years, and this fits in well with cereal cropping.

PHALARIS TUBEROSA has proved the outstanding perennial grass at Kybybolite. It gives a pasture with a long growing season, and its vigorous growth enables it to compete most successfully with the less desirable weed species which invade annual pastures.

LUCERNE has a limited role on the red gum soils because of their poor drainage. However, on selected sites lucerne has proved its value to provide:

- Excellent legume hay.
- Fire protection to homesteads and outbuildings.

PASTURE SPECIES TRIAL

In July, 1955, Field 4A was sown to pasture. Eight grass species and mixtures were used:

A. 8 lb. Cocksfoot.
B. 10 lb. Prairie grass.
C. 8 lb. *Phalaris tuberosa.*
D. 8 lb. Perennial ryegrass (New Zealand certified).
E. 8 lb. Timothy.
F. 8 lb. Wimmera ryegrass.
G. 6 lb. *Phalaris tuberosa* plus 2 lb. Perennial ryegrass.
H. 6 lb. Cocksfoot plus 2 lb. Perennial ryegrass
J. 8 lb. H1 ryegrass.
K. Control.

Establishment varied, being highest for the ryegrasses and least for the timothy.

The field has been maintained for eight years, and the only species still established is *Phalaris tuberosa.*

CONCLUSIONS

1. Annual grass species (H1 ryegrass, Wimmera ryegrass and Prairie grass) will not persist for more than a few years.
2. Perennial ryegrass will not withstand the dry summer periods under Kybybolite conditions.
3. *Phalaris tuberosa* is hardy and provides excellent competition for both annual grasses and broad-leaved weeds.

PHALARIS TUBEROSA—its role in the red gum country

PHALARIS TUBEROSA

is a hardy perennial grass which is outstanding in the red gum country of the South East. First sown in 1930, it has persisted well and when well established is capable of carrying large numbers of stock.

Among its advantages can be listed:

- A long growing season.
- Useful winter production.
- Control of annual weeds, thus giving stability in pastures.
- Persistance under waterlogged conditions.
- Ability to recover from heavy, continuous grazing.

ESTABLISHMENT

Phalaris tuberosa is not vigorous as a seedling, but care and attention which guarantee a successful establishment will be well justified. Recommendations include:

- Autumn-early winter seeding.
- A fine weed-free seedbed.
- Compaction of seedbed by rolling where necessary.
- The use of adequate seeding rates.

SEEDING RATES

At this Centre successful pastures have been established with from 2 - 4 lb. of seed per acre.
On old subterranean clover land where soil fertility is high the competition from weeds can be serious, and heavier seeding rates may be justified.

PHALARIS RATE OF SEEDING TRIAL 1963

AIM:
To determine:
(1) Optimum seed rate for—
  a. Rapid establishment.
  b. A balanced pasture mixture.
(2) Effect of rolling before and after seeding.

DESIGN:
Factorial randomised block design.

Seeding Rates		Rolling Treatments		Replications
5	×	3	×	6

TREATMENTS:
Seeding Rates—
(1) 1 lb. per acre with 90 lb. super.
(2) 2 „ „
(3) 4 „ „
(4) 8 „ „
(5) 16 „ „

Seedbed Consolidation—
(1) Rolled before seeding.
(2) Rolled after seeding.
(3) No rolling.

DATA TO BE COLLECTED:
(1) Soil density measurements.
(2) Plant establishment counts.
(3) Production cuts and botanical composition.

PASTURE RENOVATION

After many years of subterranean clover growth, soil fertility has been lifted to a high level over much of the red gum country. Invasion of pastures by undesirable annual species is a major problem.

Chief of these are the annual grass species *Hordeum leporinum* (barley grass) and *Bromus* spp. (soft and sterile brome grasses).

A wide range of broad-leaved weeds includes *Cryptostemma calendula* (Capeweed or dandelion), *Rumex* spp. (Dock) and *Echium plantagineum* (Salvation Jane).

Renovation often consists of:

1. Growing one or more cereal crops, e.g. oats.
2. Use of summer growing fodder crops, such as chou moellier or rape.
3. Reseeding to pasture, either annual or perennial.

Weed control by cultivation and cropping may not always be effective. Ploughing to establish a perennial pasture has disadvantages:

- Ploughing and cultivating costs are high.
- The land is unproductive for a long period.

The use of chemicals to destroy weeds ("chemical ploughing") and oversowing with perennial grasses have been investigated recently.

DIQUAT TRIAL

AIMS:
To determine:—

(1) Most economical spray concentration.
(2) Effectiveness in aiding oversowing of grasses.
(3) Optimum sowing time in relation to time of spraying.
(4) Suitability of different grasses.

Design Factorial:—

Spray Treatment	×	Time of Sowing	×	Grass Variety
Nil		— 1 week		Perennial ryegrass 15/acre + 90 lb. super.
2½ oz./acre	×	at spraying	×	Currie cocksfoot 6 lb./acre + 90 lb. super.
5 oz./acre	×	+ 1 week		*Phalaris tuberosa* 4 lb./acre + 90 lb. super.
				Phalaris coerulescens 4 lb./acre + 90 lb. super.
				Nil 90 lb. super.

Treatments:—
3 × 3 × 5 = 45

Replications:—
Spray treatment 4 Time of oversowing 2

Data to be collected:—

(1) Grass cuts, winter and end of season.
(2) Botanical composition (Levy Point Quadrat).

Method:—

	Time of Oversowing		
	—1	0	+1
Time of oversowing	29th May	11th June	19th June
Time of spraying	—	8th June	—

Sod Seed — Disc drill.
Spray — Low volume boom spray.
Location — R plots.

RESULTS:

1962

Dry matter production in lbs/acre

TREATMENT	WINTER			SPRING
	Capeweed	Other	TOTAL	Total
Nil	3040	563	3603	634
2½ oz. Diquat	237	773	1010	915
5 oz. Diquat	8	311	319	934

NOTE—(1) Effective control of capeweed using Diquat.
(2) Spraying markedly reduced total winter production.

It is obvious that unless the capeweed is replaced by another species then spraying is of little or no benefit.

1963

A. Area not oversown
Dry matter production in lbs/acre

TREATMENT	WINTER ONLY		
	Capeweed	Other	TOTAL
Nil	1161	292	1453
2½ oz. Diquat	347	657	1004
5 oz. Diquat	259	855	1114

NOTE—(1) Spraying in previous year has reduced capeweed in following year.

NOTE—(2) Total production on sprayed area however is still well below unsprayed area.

B. Area oversown with Phalaris tuberosa
Dry matter production in lbs/acre

TREATMENT	WINTER ONLY		
	Capeweed	Other	TOTAL
Nil	1355	182	1537
2½ oz. Diquat	321	955	1276
5 oz. Diquat	163	1073	1236

NOTE: (1) Oversowing has slightly increased total winter production (compare with previous table).

(2) Oversowing has replaced capeweed with a perennial species which is more vigorous and a competitor against both capeweed and other annuals.

BUT SEE:
COCKS PS (1963) AJEx A-AH 67:38

OATS—a valuable cereal

Oats can play an important part in the South East:

- As a crop in a pasture renovation programme oats give heavy yields from the high fertility built up under clover pasture.
- To bridge the winter feed shortage early sown oats are valuable.
- The grain is a valuable supplement to weaner sheep and to ewes in the last few weeks of pregnancy.

Many varieties have been tested at this Centre for both grazing and grain. Grain yields have been best from the varieties Avon, Fulmark and Early Kherson; while an unnamed crossbred from Roseworthy College designated OXB 12 (not yet released) has performed very well.

Grain yields from the six leading varieties from 1957-1962 (inclusive) averaged:

OXB 12	68.6 bush/acre
AVON	66.8 ,,
FULMARK	61.6 ,,
EARLY KHERSON	60.9 ,,
KENT	52.2 ,,
ORIENT	51.0 ,,

Varieties which have yielded the greatest quantities of forage for winter grazing have been:
ALPHA, KENT, FULGHUM, MULGA, AVON.

BARLEY—an alternative grain crop

In 1961 and 1962 the production of barley for both grazing and grain has been compared with oats.

From the figures presented below it will be seen that the barley variety Noyep has given substantially more winter feed than oats. In 1961 Noyep gave a higher grain yield than Avon oats. In 1962 the yields were reversed.

COMPARATIVE PRODUCTION OF BARLEY AND OATS

Variety	Grain Yield (lb. per acre)		Dry Matter Production (Winter) (lb. per acre)	
	1961	1962	1961	1962
OATS				
Avon	1612	3540	585	592
Kent	—	2040	—	574
Early Kherson	1160	—	551	—
BARLEY				
Noyep	2375	2600	750	1120
Beecher	1940	3620	509	597
Prior	—	3060	—	951

Two seasons' results would suggest that greater use could be made of barley for both grazing and grain production.

MAINTENANCE PHOSPHATE TRIAL

Pastures at the Centre have been regularly topdressed with superphosphate for over 40 years. During that period some soils have had a total application in excess of 3,500 lb.

- To what extent has a build-up of soil phosphorous occurred?
- What is the minimum dressing needed to maintain soil fertility and pasture production?
- At what level of soil fertility can phosphate dressings be reduced to a maintenance level?

To answer these and other economic questions a long term trial was commenced in 1957.

AIM

To determine:— (1) minimal dressings of superphosphate (2) frequency of dressings *for maintenance of* (a) soil phosphate level (b) pasture balance (c) pasture production on a pasture of sub-clover and annual grasses.

DESIGN

Randomised blocks

7 treatments × 4 replications = 28
7 × 1 acre plots × 4 blocks = 28 plots

Treatments	Dressing Rates lbs/acre	Treatments	Dressing Rates lbs/acre
1. Nil	Nil	5. 112 lbs. super/biennially	56
2. 28 lbs. super/annum	28	6. 168 lbs. super/triennially	56
3. 56 lbs. super/biennially	28	7. 112 lbs. super/annum	112
4. 56 lbs. super/annum	56		

Programme

Treatment	Year						Total
	1958	1959	1960	1961	1962	1963	
1.	0	0	0	0	0	0	0
2.	28	28	28	28	28	28	168
3.	56	0	56	0	56	0	168
4.	56	56	56	56	56	56	336
5.	112	0	112	0	112	0	336
6.	168	0	0	168	0	0	336
7.	112	112	112	112	112	112	672

METHOD

Grazing—16 Merino wethers per treatment rotated weekly through 4 blocks, i.e. 4 sheep/acre.
Superphosphate Used—9.6% T.P.—7.9% W.S.P., .7% C.S.P., 1.0% A.S.P. Total super dressing prior to trial—3,490 lbs.

Data to be Collected

1. Pasture—Dry weight and chemical analysis—twice/year. Botanical composition (Levy point quadrat)—once/year.
2. Soil—Chemical analysis—once/6 yr. cycle.
   a—pH. b—Total N. c—Organic C. d—Total P. e—Available P.
3. Sheep—Body weights and body scoring—monthly. Greasy wool weights —annually. Tattoo patch clippings (clean scoured weight)—monthly.

RESULTS

The first six year cycle concludes at the end of 1963. Results to the end of 1962 indicate:

1. In two winters (1959 and 1962) there were large differences in pasture production between treatments. Plots receiving 56 lb. of superphosphate or more in those seasons outproduced plots receiving no super. These figures suggest that lack of readily available phosphate may reduce winter production.
2. Total wool per acre has varied between treatments, with the NIL plot producing about 4 lb. an acre (i.e. 1 lb. a head) less wool per annum than the most productive of the fertilised plots.
3. Production of wool, sheep live weights and dry matter production on the nil plots have only dropped below the fertilised plots in the fourth and fifth years of the trial.
4. Plots receiving 56 lb. an acre per annum have produced as well as those receiving 1 cwt. an acre per annum.

TIME OF MATING – effect on fat lamb production

Three groups, each of 100 Border Leicester x Merino ewes, were mated over a six year period (1952-1957) at the following times:
Early mated—December 15-January 25.
Mid-season mated—January 25-March 7.
Late mated—March 7-April 17.

The percentages of lambs marked and of dry ewes were as follows:

	Early mated flock		Mid-season mated flock		Late mated flock	
	Lambs marked %	Dry ewes %	Lambs marked %	Dry ewes %	Lambs marked %	Dry ewes %
1952	87	14	102	7	145	2
1953	99	10	119	9	145	1
1954	122	6	141	9	146	1
1955	119	7	143	3	157	0
1956	92	17	140	4	142	1
1957	98	18	129	3	153	1
Means	103	12	129	6	149	1

The higher lambing percentages in the mid-season and late mated flocks were due to:

1. Higher fertility (number of ewes which lambed).
2. Greater prolificacy (higher twinning in ewes which lambed).

TIME OF MATING MERINOS

The Merino flock at Kybybolite has over the years 1960-1963 comprised a normal and a late-mated group.

RESULTS

1. Lambing percentages (% lambs born to ewes mated) have been as follows:

	Joined 30th Nov. %	Joined 11th Jan. %	Joined 21st Feb. %
1960	89	104	—
1961	122	—	108
1962	112	—	120
1963	123	—	129

2. Fertility in Merino ewes varies from season to season, and gains from later mating have not been large or consistent.
3. Late mated ewes need less supplement prior to lambing—paddock feed is more plentiful.
4. Late dropped lambs have faster growth rates, but they do not reach the same weight as the early dropped lambs at the end of the growing season.
5. No difficulty is experienced in rearing weaners from either flock, and hogget liveweights and wool weights are similar.

GRAZING MANAGEMENT FOR FAT LAMB PRODUCTION

A major study at the Centre is a comparison of grazing management systems being undertaken at three levels of stocking.

STOCKING RATE – GRAZING MANAGEMENT TRIAL

(Border Leicester x Merino ewes; Southdown rams).

1. Sheep Numbers

	Trial			Reserves
	2 ewes/acre	3 ewes/acre	4 ewes/acre	3 ewes/acre
Set Stocked	38	57	76	40
Rotated (Lambing-weaning)	38	57	76	—

2. Management Practice

	Tease	Mate	Mid-mate	End of Mating	Mid-Preg.	6 Weeks Due	Crutch Drench	Brand Vacc.	Shear
Date	11/1	26/1	16/2	9/3	13/4	14/5	28/5	19/6	1/10

3. Ewe Weighing — Yes | No | Yes | Yes | Yes | Yes | No | Yes | Yes

4. Lamb Weighing — Birth | Marking | 12 Weeks | Market

5. Grazing Management

	J	F	M	A	M	J	J	A	S	O	N	D
Set Stocked	----------		Rotated	----------		Lambing	------	Set Stocked	------			Market
Rotated	----------		Rotated	----------			------	Rotated	------			
Reserves	----------	Set Stocked		----------			------	Set Stocked	------			
Replacements	Rotated						Set Stocked					

6. Duration — 1960 | 1961 | 1962 | 1963 | 1964

RESULTS: Data presented below are the means of the three completed years, 1960, 1961 and 1962.

	2 ewes/acre		3 ewes/acre		4 ewes/acre	
	Rotated	Set Stocked	Rotated	Set Stocked	Rotated	Set Stocked
Lambs marked %	111.4	112.3	104.7	115.8	97.4	102.2
Dry ewes %	12.3	11.4	10.0	8.3	9.7	8.8
Meat per acre lb.	70.3	73.9	90.1	114.3	104.7	122.0
Wool per head lb.	10.03	10.10	9.80	10.23	9.70	10.07

In all factors listed the set stocking of lambs from birth to market has shown production increases over rotational grazing. These have occurred at all three stocking levels.
When results from the stocking levels are pooled, the percentage superiority of the set stocked groups is apparent:

Comparison of production levels between set stocked and rotationally grazed lambs. (Level under rotational grazing = 100).

Production Factor	Rotationally Grazed	Set Stocked
Dry ewes	100	89.1
Lambs born	100	107.2
Lambs marked	100	106.1
Mean carcass weight	100	110.6
Meat production per acre	100	117.0
Wool cut per head	100	103.0

STOCKING RATE—its effect on production

Three years data are presented below. The grazing management treatments have been combined to permit an easy comparison between the three levels of stocking.

For each factor the level of production at the lowest stocking rate is designated as 200.

	2 ewes per acre	3 ewes per acre	4 ewes per acre
Lambs marked	200	296	357
Meat production	200	285	316
Wool production	200	298	393

Increasing the stocking rate has:

1. Decreased the percentage of lambs marked but increased total number of lambs produced per acre.
2. Decreased carcass weights but increased production of meat per acre.
3. Scarcely affected wool production per head in the first three years.
4. Data for teeth wear (not shown) indicates that deterioration in mouths is more rapid at the highest stocking rate.

FLUSHING TRIAL

AIM: This trial has been designed to investigated the importance of the nutrition of the ewe at mating on her subsequent lambing performance. Three hundred Border Leicester x Merino ewes were mated to Dorset Horn rams.

DESIGN:

2 times of mating		2 levels of body condition		2 levels of feeding
December 15 March 7	×	Low-average store High-fat	×	Body condition raised Body condition maintained.

Effects of treatments are being measured by ovulation rate (observed by laporotomy after mating is completed) and lambing performance.

RESULTS: Results presented are those for ovulation rates. These are:

TREATMENT	EARLY MATED			LATE MATED		
	Mean Ovul. rate %	% Multiple Ovul.	% Ewes not Ovul.	Mean Ovul. rate %	% Mult. Ovul.	% Ewes not Ovul.
Low condition maintained	0.84	2.7	18.9	1.16	18.9	2.7
Low condition, Flushed	0.95	10.8	16.2	1.35	35.2	0
High condition maintained	1.14	18.9	5.4	1.70	70.4	0
High condition, Flushed	1.14	29.9	18.4	1.89	89.5	0

Summary of means:

Treatment	Mean Ovulation Rate	Percentage Multiple Ovulations	Percentage Ewes not Ovulating
	%	%	%
Time of mating:			
Early	1.01	15.4	14.8
Late	1.53	53.8	0.7
Level of body condition:			
Low	1.07	16.9	9.5
High	1.46	52.0	6.0
Level of feeding:			
Maintained	1.21	27.7	6.7
Flushed	1.33	41.4	8.2

CONCLUSIONS: The evidence presented above requires confirmation. However, the data would suggest:

1. Time of mating has a substantial effect on both fertility (ewes lambing) and prolificacy (number of ewes bearing twins).
2. Ewes in high body condition at mating will produce more lambs than ewes in low body condition.
3. Flushing of ewes (defined as an increase in body weight during mating) has caused an increase in the number of lambs born.

FERTILITY TRIAL

AIMS:

1. To establish over a number of seasons the monthly incidence of oestrus in Merino and Corriedale ewe flocks.
2. To determine ovulation rates in ewes, particularly during the autumn months (i.e. when the maximum numbers of ewes are in oestrus).
3. To determine the early loss of potential young (measured by shed ova not appearing as embryos 21 days after service).

DESIGN:

1. 90 Merino ewes and 80 Corriedale ewes have been run continuously with raddled teaser rams.
2. From March to July, 1963, the Corriedale ewes were mated at the rate of 4 per week. Ewes selected for mating were those known to be in oestrus at the time of joining (or within a few days).
3. Mated ewes were slaughtered about three weeks after service. Ovulation rates were determined and surviving embryos counted.

RESULTS:

1. *Incidence of Oestrus.*

Percentage of ewes showing oestrus each month are set out below:

		Merino %	Corriedale %			Merino %	Corriedale %
1962	May	—	100	1963	January	100	34
	June	97	99		February	85	60
	July	86	90		March	99	92
	August	67	32		April	97	97
	Sept.	37	1		May	86	100
	October	11	0		June	83	100
	Nov.	28	0		July	18	83
	Dec.	50	5		August	2	—

CONCLUSIONS:

These can only be tentative; the pattern over several years must be recorded.

1. There is a difference in breeding season between breeds.
2. In one year Corriedales showed a marked trough (September-December) and a late peak (March-July).
3. Some Merinos were ovulating right throughout the year.
4. Seasonal differences in Merinos:
   August, 1962—65% in oestrus.
   August, 1963— 2% in oestrus.

RESULTS:

2. *Ovulation Rate.*

Figures showing ovulation rates and early loss of potential young in Corriedales during 1963 are set out below.

	March	April	May	June	July	
Ewes slaughtered	8	15	15	19	18	(12 not ovulating)
Mean ovulation rate	1.62	1.80	1.47	1.26	1.33	(6 only)
Mean early loss of potential young %	30.8	29.6	45.5	58.3	25.0	

CONCLUSIONS:

1. The Corriedale ewes in this trial have high ovulation rates in the period March-July.
2. There is a high early loss of potential young, i.e. many eggs are not fertilised, or if fertilised they fail to implant.

AGE AT WEANING

Trials carried out at this Centre in 1958 and 1959 aimed to determine the effect on Merino lamb growth and wool production of weaning at different ages.

Results in a good season (1958 trial) and in a poor season (1959 trial) are set out below:

IN A GOOD SEASON – 1958 TRIAL

TREATMENT	LIVEWEIGHT (lb.)				FLEECE WT. (lb.)
	4/8/58 12 wks.	30/9/58 20 wks.	25/11/58 28 wks.	24/3/59 45 wks.	20/10/58
1. Weaned 4/8/58-12 wks.	36.5	58.0	62.5	75.8	3.5
2. Weaned 30/9/58-20 wks.	36.1	51.7	59.7	72.4	3.1
3. Weaned 25/11/58-28 wks.	36.0	51.9	60.4	75.0	3.3

IN A POOR SEASON – 1959 TRIAL

TREATMENT	LIVEWEIGHT (lb.)				FLEECEWEIGHT (lb.)	
	31/7/59 12 wks.	25/9/59 20 wks.	20/11/59 28 wks.	7/3/60 43 wks.	16/10/59	17/10/60
1. Weaned 31/7/59-12 wks.	40.5	61.4	71.5	72.9	3.6	10.6
2. Weaned 25/9/59-20 wks.	39.6	47.5	62.1	64.3	2.9	9.4
3. Weaned 20/11/59-28 wks.	40.1	47.2	59.7	62.7	2.9	9.7

MERINO WEANER MANAGEMENT RECOMMENDATIONS . . .

BIRTH TO MID-DECEMBER

1. Set stock ewes with lambs from an early age until weaning.
2. Keep stocking rates down to a level at which pastures will carry ewes through period of feed shortage in winter months.
3. Wean lambs at 12 weeks of age onto clean, worm-free pastures. First year pastures with a high percentage of leafy ryegrass have proved useful.
4. Maintain a high protein level in pastures by controlling insect pests, which damage clover and check its winter production.

MID-DECEMBER TO END OF AUTUMN

1. Split weaners on sex and draft off the "tail," i.e. poorly grown weaners.
2. Supplement wethers with good quality hay.
3. Supplement well grown ewe weaners with ½ lb. oats a head per day.
4. Supplement "tail" with 1 lb. oats a head per day.
5. Run all weaners at 4-5 per acre and set stock at this rate.
6. Disturb weaners as little as possible.

LAMB MORTALITIES

FACTS

Surveys have indicated that for the South East of South Australia the lamb marking figure is only 80 per cent.

The area includes many properties running fat lamb flocks in which the potential lambing percentage is relatively high.

Without doubt the major factor contributing to these low working percentages is the high death rate of lambs between birth and marking.

KYBYBOLITE DATA

Over the years 1952-1959 at the Centre 816 lamb deaths were recorded. This figure represents 11.2% of all lambs born. Mortalities are higher in twins (14.8% of all twins born) than in singles (8.5% of all singles).

Two thirds of all lamb deaths occur within the first three days from birth.

Losses are higher in Merino and Corriedale flocks than in crossbred flocks.

Losses are higher when winter rainfall is above average.

Causes of Lamb Deaths.

Major causes of lamb deaths have been:

	Percentage of all deaths.
Mismothering	14.6%
Stillborn	14.1%
Udder trouble in ewe	12.3%
Lamb weakness	8.2%
Marking	6.2%
Infection (Entero-toxaemia, arthritis, tetanus)	3.7%
Abnormality	2.5%
Predators	1.4%
Unknown	31.8%

CONCLUSIONS:

1. Deaths due to faulty udders in the ewes could be reduced by rigid culling of all ewes showing teat or udder defects.
2. Lamb weakness and some mismothering is reduced by adequate feeding of the ewe prior to lambing.
3. Shelter for lambing flocks is important. Many of the deaths for which there was no apparent cause may well have been due to exposure.
4. Many lambs are stillborn. A large number of deaths cannot be attributed to a single specific cause. It is apparent that much more work remains to be done on this problem.

REFERENCES

Work carried out in recent years at Kybybolite has been published as follows:—

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W. L. HAWES, GOVERNMENT PRINTER, ADELAIDE