Lincoln deer research unit
LINCOLN DEER RESEARCH UNIT

Edited by: G.K. Barrell
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PREFACE

This booklet has been prepared to provide a description of the Deer Research Unit at Lincoln University (formerly Lincoln College) for information of students, visitors and other people with an interest in the unit. It provides a brief physical description of the unit and conveys an idea of the research activity which has been carried out or is continuing by listing publications which have arisen from this work. In preparing this booklet I have been assisted by other authors, especially Paul Muir who wrote the initial draft of Establishment and management and Alec Familton for his draft of Goats on the deer unit. Other contributors include Martin Keeley and Tim Harrison. Furthermore we are indebted to sponsors who have placed advertisements in this booklet and we acknowledge their generous financial assistance.

Graham Barrell
Animal & Veterinary Sciences Group
1. PHYSICAL DESCRIPTION

(Refer to map)

INTRODUCTION

The Deer Research Unit of Lincoln University comprises 27.8 ha of irrigated farmland which is completely surrounded by a 13 wire deer fence (150 mm, Cyclone Tightlock). Stock include approximately 200 head of red deer (Cervus elaphus), of which about 100 are breeding hinds, and approximately 100 goats (Capra hircus) (mainly breeding does).

LOCATION

The deer unit is situated on the Lincoln University Research Farm which is 2 km west of Lincoln township.

SOIL

Soils of the unit are Wakanui silt loam and some Temuka silt loam on clay loam. A soil analysis carried out in 1988 gave the results presented in Table 1.

Table 1: Soil analysis of Deer Unit. (for ppm multiply by factor)

<table>
<thead>
<tr>
<th>Paddock no.</th>
<th>pH</th>
<th>Ca</th>
<th>Mg</th>
<th>K</th>
<th>Na</th>
<th>P</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(125)</td>
<td>(5)</td>
<td>(20)</td>
<td>(20)</td>
<td>(1)</td>
<td>(1)</td>
<td>(factor)</td>
</tr>
<tr>
<td>3</td>
<td>5.9</td>
<td>8</td>
<td>75</td>
<td>40</td>
<td>12</td>
<td>59</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>5.8</td>
<td>7</td>
<td>50</td>
<td>31</td>
<td>10</td>
<td>42</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>5.8</td>
<td>7</td>
<td>34</td>
<td>18</td>
<td>10</td>
<td>32</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>6.1</td>
<td>10</td>
<td>43</td>
<td>18</td>
<td>16</td>
<td>39</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>6.4</td>
<td>10</td>
<td>35</td>
<td>22</td>
<td>12</td>
<td>39</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>6.4</td>
<td>10</td>
<td>33</td>
<td>36</td>
<td>10</td>
<td>43</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>5.7</td>
<td>8</td>
<td>30</td>
<td>18</td>
<td>10</td>
<td>36</td>
<td>16</td>
</tr>
</tbody>
</table>

Topdressing policy is the application to new pastures of 125 kg/ha of superphosphate and 2.5 tonne/ha of lime wheelf sown. Maintenance applications of these fertilisers are based on soil tests and are applied about every 5 years. About one-third of the unit receives urea at 55 kg/ha in autumn to boost winter and spring growth.
PASTURE

Paddocks 1, 2, 3, 16, 17 contain old sowings of tall fescue (*Festuca arundinacea*) and Huia white clover (*Trifolium repens* cv. Huia). Paddocks 4-15 contain pastures sown in Nui ryegrass (*Lolium perenne* cv. Nui), Kahu timothy (*Phleum pratense* cv. Kahu) and Huia white clover. Paddock 18 has been sown in Nui ryegrass and Huia white clover.

RAINFALL

Annual rainfall is about 600 mm, but varies between 280 and 1200 mm and is distributed throughout the year. Northwest winds, which are hot and dry, can make summer rainfall ineffective.

IRRIGATION

Since 1989 the whole unit can be irrigated from a 125 mm diameter ring main system supplied from a 300 mm bore at 90 m depth on the Horticultural Research Area of the Research Farm. Water is applied by a travelling irrigator gun (Southern Cross 2000) which covers about 2 ha per day. Previously about two thirds of the unit could be irrigated by a lower capacity system which used manually shifted sprinklers.

SHELTER

Older hedges shown on the map are mainly of macrocarpa (*Cupressus macrocarpa*) and cedar (*Cedrus atlantica*), although there are some Douglas firs (*Pseudotsuga menziesii*) at the eastern end of the cedar hedge. Newer hedges include Lombardy poplar (*Populus nigra* cv. Italica), pampas (*Cortaderia atacamensis*), leyland cypress (*x Cupressocyparis leylandii*), willow (*Salix matsudana* x *S. alba* cv. Moutere 1184) along bottom boundary and paddocks 8 and 9 and tortured willow (*Salix matsudana*) plus silver poplars (*Populus alba*) running south, past the yards. Other trees are silver poplars in paddock 1 and the yards, pussy willows (*Salix caprea*) in paddock 17, golden willows (*Salix alba* var. *vitellina*) in paddock 4, tortured willows in paddock 3, broadleaf willows (*Salix glaucohyphloides*) in paddock 9 and a single hawthorn (*Crataegus oxycantha*) growing amongst the cedars.
2. ESTABLISHMENT AND MANAGEMENT

ESTABLISHMENT

Lincoln University has been associated with deer farming from the very beginning of the industry. The first deer farm in New Zealand was established at Lincoln College in 1969 under Professor Ian Coop. Together with financial support from the N.Z. Game Exporters Association the initial interest and impetus plus the necessary stock were provided by the Christchurch firm of Maddren Bros, one of the leading venison exporters of the time. In the years between 1969 and 1974 pioneering work was carried out demonstrating that deer could be farmed and establishing the feed requirements for red deer on a stock unit basis plus the likely meat production per ha that could be obtained from a red deer farming enterprise (Coop & Lamming, 1977).

The present deer unit was re-established by Professor Andrew Sykes in 1979/1980 on 7 ha of the Lincoln College Research Farm. In 1979 30 red deer (predominantly hinds) were provided by the New Zealand Forest Service. These animals were all caught in the valleys of the Harper and Avoca Rivers which are tributaries of the Rakaia River. In addition 24 adult red deer stags were donated by members of the Game Industry Association to enable the deer research programme to get under way. In 1982 4 ha were added and in 1985 a further 12 ha were fenced. Another 5 ha paddock was fenced in 1987, bringing the size of the unit to 28 ha. Deer numbers have increased to over 200 head through natural increase and the unit has also included over 200 goats, about 20 Himalayan tahr (Hemitragus jemlahicus) and some nilgai antelopes (Boselaphus tragocamelus).

The role of the unit is primarily as a teaching facility, firstly as a farm where undergraduate students can learn aspects of deer production at close quarters and secondly a research facility where postgraduate students can carry out research projects with deer. The unit is well set up for animal handling with a covered handling area, scales and crush. In addition a covered shed containing 24 individual deer pens is available for intensive nutrition studies.

MANAGEMENT - General

The approximately 220 head of deer on the unit, typically comprised of about 50 stags, 100 hinds and 70 weaners, together with up to 300 goats and 20 tahr means that the unit has at times carried over 20 stock units per ha.
Stocking rate has been consistently high (over 18 stock units per ha) and is achieved by the conservation of large amounts of silage during spring and by spray irrigation of paddocks during summer.

Grazing of the goats and deer is integrated in a leader follower system and this has had benefits for both species. Goats are allowed to graze from a high to medium pasture mass, which suits their grazing behaviour. Since the grass species grow to a height greater than clover, such grazing increases the proportion of clover in the sward made available for the deer. The tahr and nilgai antelopes are set stocked in a restricted number of paddocks as there are specific fencing requirements (regulations) which have to be met for these species.

MANAGEMENT - Deer

Spring

In mid September, approximately 30% of the unit is closed off for silage which is cut in late October/early November. A strip of approximately 2 m of uncut pasture is left as a border within these paddocks to provide shelter and cover for newborn calves during the subsequent calving period (November/December). Throughout spring stock are rotated around the remainder of the unit with stags and yearlings having first priority for grazing followed by the hinds whose intake is restricted until calving. Hinds are vaccinated in late September with a 5 in 1 clostridial vaccine.

In early November hinds are split into appropriate calving mobs (usually trial groups and/or sire groups) and set stocked. During calving, hinds are checked each morning and evening and calves tagged and weighed within 24 hours after birth. Most hinds whose calf is being tagged will approach the handler and at this stage it is a simple and accurate procedure (with use of binoculars) to determine the identity of the mother. The remainder of the dams are identified by pairing with calves in the yards prior to weaning. Hinds are handled frequently and, consequently, there have been no problems with this procedure.

Stags for velvet antler production are run together and velvet antlers are removed when they reach the appropriate stage. Because there is such a wide range of ages in the stag mob velvet antler removal is carried out over a long period. Thus all stags are regularly yarded (twice weekly) so that velvet antlers can be removed from just a few at a time. Again regular
handling of animals has meant that there are no difficulties with this procedure.

Summer

The deer unit suffers from the perennial Canterbury problem of summer drought and pastures usually have to be irrigated from December to February to provide good quality feed for hinds and calves. In early February yearling stags are introduced to the main stag mob and, provided this is done well before the onset of any rutting activity, there are no social problems. Calves are weaned and vaccinated in early March. Rising 2 year old hinds are then introduced to the hind mating mob(s).

Autumn

Hinds are single sire mated in groups of up to 40 hinds. There is no set number of hinds to be mated per stag as this is usually dictated by experiments that are in progress. Until 1987 some stags from the group that was originally donated were used as sire stags. Criteria for selection were live weight, weight of velvet antler and temperament. A stag was purchased in 1987 to introduce a new bloodline. In 1988 a terminal sire mating system began. This system is as follows:

An elite nucleus mob of 20 hinds is mated, from which selected progeny join the main mating mob of 60 hinds. Selected female progeny from the main mob are introduced to a terminal sire mating group, from which all progeny are sold. Although the whole herd is maintained as a red deer herd, Wapiti-cross bulls could be used as terminal sires, increasing growth rate of the progeny. This system is expected to increase production from the herd whilst minimizing the possibility of inbreeding.

Sire stags are introduced to their mating groups in mid-March and removed in late April/early May. The intention is to have all calves born before the end of December. Mating mobs are usually run together after 2 cycles and stags replaced with fresh and usually younger stags.

The main mob of stags is set stocked over autumn and early winter. Paddock sizes on the unit are small and the mob of up to 70 stags can cause considerable damage to pasture. A pasture renewal programme is carried out on one paddock per year and stags are wintered in this paddock which is cultivated the following spring. Thus only one paddock per year is
'sacrificed'. Stags may be fed supplements such as silage or hay to appetite over this period, although generally not much is eaten.

Winter

To simplify management over winter as few mobs as possible are run. Mature hinds are kept in one mob after mating and are break-fence rotationally grazed with minimal supplementation. When supplements are required hay or silage is provided. The aim is to maintain hind live weights over the winter period during early pregnancy because it is believed that calving difficulties result from hind fatness as well as from overweight calves. Rising 2 year old hinds are grazed separately as they have not reached their mature live weight and require more than maintenance levels of feed. All weaners are run together over the winter set stocked on a paddock of high pasture mass.

ANIMAL SALES

Research requirements largely dictate mating groups, stock movement, selection and sales.

Selection for replacements occurs at weaning

Stags required for research purposes, plus stags for future velvet antler production which have been selected on the basis of their live weight and sire, are retained as replacements for the main adult mob. Adult stags are culled for age or poor velvet antler production and sold in November/December or May/June.

Replacement hinds are selected for research requirements, performance (growth rate from birth to weaning) and temperament. Adult hinds are culled for age, or poor reproductive performance or growth rate of their calves and are sold in March.

In the case of unwanted weaners, hinds are sold at weaning while the stags may be sold at weaning or carried through to 12-15 months of age.

ANIMAL PERFORMANCE

Calves have been tagged and weighed at birth since 1983, which has allowed measurement of actual calf growth rates from birth to weaning so that poorly performing hinds could be identified. Some experimental work involving melatonin has been undertaken with small numbers of hinds and as a result of these studies a few calves have been born early (late October/early
November). In spite of this mean data of calving has remained fairly constant, ranging from 26 November to 6 December.

Calving percentage (calves weaned/hinds mated) for the 5 years from 1984 has averaged 87%.

Live weights in March and growth rates from birth to weaning are given in Tables 1 and 2. Fluctuations in live weight are evident between years reflecting both the effects of droughts and the retention of animals for research projects which otherwise would have been culled. However, there has been a general increase in growth rates in successive years.

Table 1: Average calf growth rate (birth to weaning) and live weights of weaner, 15 month old and mixed age stags recorded in March each year.

<table>
<thead>
<tr>
<th>Year</th>
<th>growth rate (g/d)</th>
<th>weaning (kg)</th>
<th>15 mnth (kg)</th>
<th>mixed age (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>352</td>
<td>53</td>
<td>108</td>
<td>155</td>
</tr>
<tr>
<td>1985</td>
<td>360</td>
<td>47</td>
<td>115</td>
<td>133</td>
</tr>
<tr>
<td>1986</td>
<td>366</td>
<td>48</td>
<td>117</td>
<td>132</td>
</tr>
<tr>
<td>1987</td>
<td>486</td>
<td>64</td>
<td>98</td>
<td>150</td>
</tr>
<tr>
<td>1988</td>
<td>443</td>
<td>47</td>
<td>113</td>
<td>160</td>
</tr>
<tr>
<td>1989</td>
<td>419</td>
<td>48</td>
<td>100</td>
<td>148</td>
</tr>
</tbody>
</table>

Table 2: Average calf growth rate (birth to weaning) and live weights of weaner, 15 month old and mixed age hinds recorded in March each year.

<table>
<thead>
<tr>
<th>Year</th>
<th>growth rate (g/d)</th>
<th>weaning (kg)</th>
<th>15 mnth (kg)</th>
<th>mixed age (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>---</td>
<td>52</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>1985</td>
<td>---</td>
<td>43</td>
<td>94</td>
<td>92</td>
</tr>
<tr>
<td>1986</td>
<td>397</td>
<td>48</td>
<td>91</td>
<td>92</td>
</tr>
<tr>
<td>1987</td>
<td>380</td>
<td>54</td>
<td>96</td>
<td>98</td>
</tr>
<tr>
<td>1988</td>
<td>402</td>
<td>43</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td>1989</td>
<td>358</td>
<td>41</td>
<td>86</td>
<td>94</td>
</tr>
</tbody>
</table>

Until 1985 much of the research work undertaken on the unit was concerned with velvet antler production. The variety of treatments and harvesting times mean that velvet production data from the first few years are
meaningless. However, total velvet antler production between 1985 and 1988 is shown in Table 3.

Table 3: Velvet antler production of adult stags (2 years and older) from 1985 to 1988.

<table>
<thead>
<tr>
<th>Year</th>
<th>total (kg)</th>
<th>no. stags producing velvet</th>
<th>kg/hd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>72</td>
<td>62</td>
<td>1.2</td>
</tr>
<tr>
<td>1986</td>
<td>95</td>
<td>57</td>
<td>1.7</td>
</tr>
<tr>
<td>1987</td>
<td>125</td>
<td>60</td>
<td>2.0</td>
</tr>
<tr>
<td>1988</td>
<td>109</td>
<td>55</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Death rate on the unit has averaged 3 to 4%. The highest rates are from stags which is partly a reflection of the high proportion of old stags in the herd. The large live-weight losses of stags during the rut are more pronounced in older animals, and undoubtedly renders them more susceptible to disease. Malignant catarrhal fever, yersiniosis and fighting activity account for most deaths. Tuberculosis has never been recorded and the unit has recently passed its second whole herd test.

REFERENCE

3. DEER RESEARCH

Deer research at Lincoln University has been focussed on three major areas - antler growth and composition, reproduction, copper metabolism.

ANTLER GROWTH AND COMPOSITION

Early studies of antlers carried out by Paul Muir under Professor Andrew Sykes' supervision were designed to describe their changes in composition during growth and the effects of nutrition on velvet antler production. This work showed that the best compromise between weight, maximum blood content and minimal calcification could be achieved by harvesting velvet antlers from red deer between about 65 and 70 days after casting. The nutritional studies showed that there was very little effect of winter nutrition on velvet antler weight provided the stags were adequately nourished, and this is in keeping with the current view that the major factor which determines velvet antler weight is pre-rut live weight.

An important finding is that a large proportion of the total mineralisation of the bone in antlers occurs over a relatively short time span (between 90 and 120 days after casting). Bone minerals (e.g. calcium) have to be provided from the rest of the skeleton to meet this short-term demand from the antlers. Dr Graham Barrell and his co-workers have continued to investigate the role of hormones, particularly the sex steroids, in the control of this mineralisation and in the casting process.

REPRODUCTION

Graham Barrell has coordinated a series of studies on the control of seasonal breeding in both stags and hinds. These have included the initial observations of the effectiveness of melatonin for advancing breeding activity which led to the availability of Regulin implants for achieving this on commercial farms. Other studies are concentrating on changes in the release of hormones which regulate reproduction in red deer and how these are linked to changes in daylight.

COPPER METABOLISM

Copper metabolism in deer is of major interest to Professor Sykes and Dr Alex Familton who have supervised postgraduate workers such as David Freudenberger, Huda Osman and Tim Harrison in studies of this issue. By
use of liver biopsies and blood samples involving trial animals and surveys from deer slaughter premises, a picture of copper status in New Zealand deer is emerging. It is quite clear that in all respects of copper metabolism, including interactions between copper, molybdenum and sulphur, deer are different to sheep or cattle. This means that strategies for determining and dealing with copper deficiency in deer require a whole new programme of basic research on this topic. Research on the underlying biology of copper metabolism is accompanied by trials on the effectiveness of remedies for supplementing copper levels in deer.

BEEF-VENISON PRODUCTION SYSTEM

A novel meat production system which utilises Charolais x Angus heifers and red deer hinds is being developed at Lincoln University by Dr Alastair Nicol. These animals are bred once before slaughter in a system which maximises their biological potential for meat production and matches the seasonal pasture supply curve. This system is run on a separate 12 ha unit developed just for this purpose in 1989.
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5. GOATS ON THE DEER UNIT

BACKGROUND

Feral goats were obtained from Westland and Marlborough in the late 1970s to provide animals for nutritional experimentation and since then they have been grazed in conjunction with deer on the Research Farm. More recently there has been a serious attempt to integrate these animals into the deer grazing management system.

In 1981 it was realised that some of the feral goats grew reasonable quantities of cashmere (down) fibre. It was decided to attempt to select within the flock for cashmere production by breeding selected does to bucks which had also been selected for production of cashmere. The balance of the does, with little or no visible down fibre, were to be bred to Anglo-Nubian cross bucks with the object of developing a line of fast growing animals suitable for meat production. This philosophy of breeding has continued over recent years. In addition a deliberate policy of grazing management has been developed in association with that of the deer herd.

CASHMERE (DOWN) FIBRE PRODUCTION

A flock of 35 does which produced cashmere fibre ranging from an average fibre diameter of 14.5 to 16.0 microns was developed on the property. The yield of this fibre ranged from 60 to 180 g per head. It was decided to concentrate on maintaining low fibre diameter, rather than attempting to increase yield, by crossing with a white Angora strain. This obviously delayed gains in increase of yield and the does generally had black guard hair and a white cashmere undercoat. This flock has been used extensively in undergraduate degree and diploma student experiments and projects.

Cashmere fibre is a valuable commodity and prices have ranged from $40 to $180 per kg. However when it is considered that the average doe in New Zealand produced an average of only 60 g of cashmere fibre per year, there had to be a major improvement in the yield from these animals to provide economic returns for goat farmers. It is obvious that the flock at Lincoln University made some progress along this path.
MEAT PRODUCTION

A group of goats has been selected for high growth rate and early maturity by using approximately equal inputs of feral and dairying strains. The intention has been to produce animals with large frame size and high milk production but with the high fecundity and hardiness of ferals.

After 5 years a 9 kg live-weight differential existed at weaning (at 3 months of age) between the high growth rate selected animals and those of the flock which had been selected for cashmere fibre yield. The entire male animals were achieving weights in excess of 60 kg at 15 months of age, and have been sold to other meat goat producers for commercial sires. Kidding percentages (kids born per does mated) are averaging 160-190% with up to 160% kids being weaned.

Now that a strain of goat has been developed which fulfils some of our requirements, it is proposed to undertake research with these animals to produce information on areas such as muscle development in relation to weight gain and to study meat characteristics.

TRACE ELEMENT REQUIREMENTS

Very little information exists on trace element requirement and utilisation by goats. Copper deficiency and its treatment has been investigated within the Lincoln College flock and the work may be extended to include selenium. These experiments will produce information to give farmers some indication of the correct quantities required to correct and prevent deficiencies and will enable them to avoid toxicity problems.

GRAZING POLICY

The policy of presenting goats with long pasture during spring and autumn (the periods of maximum pasture production in Canterbury) and removing them when pasture length is approximately 5 cm has resulted in the largest weight gains that we have recorded. Subsequent short periods of regrowth have produced pasture with relatively high clover content (since the taller horizon grazed by the goats was mainly grass) which has proved ideal for deer. The pasture being used is mainly ryegrass and white clover with no access to 'browse', apart from occasional weeds such as thistles. Supplementary feeding is provided by access to hay and silage produced on the Unit.
6. GOAT RESEARCH

DIGESTIVE PHYSIOLOGY

In spite of the notoriety of goats as being superior animals to sheep in terms of digestion of forage and supply of nutrients to the intestines, detailed comparisons have not shown any major differences between the two species. At Lincoln University the two species have been compared for ability to use both high and low quality forages. No differences in any of the criteria of digestion studied (e.g. *in vivo* dry matter digestion, duodenal protein supply/kg of digestible organic matter intake) were recorded between sheep and goats. Goats do have different grazing and browsing behaviour and this may give them some intake advantages over other species but their ability to extract nutrients from ingested feed is essentially identical to that of sheep. Much of this work has been conducted under the supervision of Dr Dennis Poppi.

GRAZING BEHAVIOUR

Goats do not readily graze pasture to low levels as sheep and cattle do. This grazing feature has been studied at the College by Dr Alastair Nicol and his co-workers. They have come to the view that use of pasture may be optimised by strategic grazing with different combinations of animal species, either alternating or grazing the animals together. Recently these studies have been extended to deer-cattle comparisons of a similar nature.
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8. COURSES AVAILABLE AT LINCOLN UNIVERSITY

All of the courses listed below include options for specialisation in some aspect of deer or goat production science. The level and degree of specialisation depends entirely on the type of course being undertaken. For instance some of the recent Doctor of Philosophy graduates have confined their whole course to some aspect of deer or goat science whereas a Diploma student may spend only parts of some subjects dealing specifically with these animals. Alternatively a Diploma or Degree student may select specialist deer and goat subjects within these courses.

In the case of Bachelor of Agricultural Science, the subject Animal Science in the 1st and 2nd year and Livestock Production Science in 3rd year all deal with physiology, health and husbandry of deer and goats. In the 4th year there is a group of animal science subjects specialising in advanced level physiology, nutrition and breeding which contain large deer and goat components and there is an advanced level production subject which has specific options for production science of selected animal species. The 4th year subjects are built up from optional units each lasting almost 3 weeks, e.g. Antler growth is one such unit. A similar development of specialisation occurs within the Bachelor of Commerce degree in the first two years and Commerce students have access to advanced options from the Agricultural Science degree during their 3rd year.

Lincoln University has responded to the educational needs of all of the livestock industries by providing such specialist options within courses. In addition, principles of agriculture such as soils, plants, pasture management, management systems in general, agricultural finance and marketing, form essential cores common to many types of livestock production.

Diploma:

Diploma in Farm Management (2 years)
Diploma in Field Technology (2 years)

(degrees overpage)
**Bachelor:**

- Bachelor of Agriculture (3 years)
- Bachelor of Agricultural Science (4 years)
- Bachelor of Agricultural Science with Honours (4 years)
- Bachelor of Science (3 years)
- Bachelor of Science with Honours (4 years)
- Bachelor of Commerce (Agriculture) (3 years)
- Bachelor of Commerce and Management (3 years)

**Master:**

- Agricultural Science (2+ years)
- Applied Science (2+ years)
- Science (2+ years)
- Commerce (2+ years)

**Doctor:**

- Doctor of Philosophy (2+ years)