

# Educating agronomists at Lincoln University; undergraduate and postgraduate programmes

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## Abstract

In the Bachelor of Agricultural Science degree at Lincoln University there are three 300 level papers in Agronomy; PLSC 320 Crop Science, PLSC 321 Pasture Agronomy and PLSC 327 Tropical Agronomy. All teaching is on a Semester basis. Semesters last 13 weeks and a subject is 65 hours of instruction with, usually, 3 hours/week of lectures and 2 hours/week of laboratories or field trips. To enter these subjects students must have completed papers in introductory Plant Science (at least two papers), Soil Science, and Plant Protection. By this stage in their degree they will also have completed at least one paper in Farm Management.

There are several methods by which students can obtain postgraduate qualifications in Agronomy. The simplest is via the Post Graduate Diploma in Agricultural Science. This involves a student, who is a graduate, taking eight subjects, four per semester during the normal academic year. There is also a one year taught Masterate available in crops or pastures. For this qualification the student completes six masters papers, 3 per semester, during the normal academic year (February to November). Before the start of the next academic year the student must submit a project. Research based Masterate degrees take at least two years. As with the taught Masterate degree the student must offer 6 papers but in place of the project must complete a research thesis. The papers taken usually include a paper in Agronomy (2 units) and a Thesis paper (2 units). Finally, the PhD degree is still a research degree and is based on the completion of an original research project. There is a minimum time requirement for the degree of 2 years but most students usually take at least three years before they submit their thesis.

## Introduction

According to Blair (1978) Plant Science has had a long history at Lincoln University. F.W. Hilgendorf was appointed in 1899 and in 1930 he was appointed Professor of Agricultural Botany of the University of New Zealand. However, it was probably not until the appointment of Professor R.H.M. Langer as Professor of Plant Science in 1959 that there was a rapid expansion in postgraduate teaching of agronomy.

Presently, there are over 60 honours and postgraduate students in the Plant Science Department at Lincoln University. Of these, 13 are studying agronomic topics ranging from climatic restraints on growth and development of pinto beans, to factors affecting seed production of browntop. There are 5 students studying for PhDs in agronomy, 4 studying for Masterate degrees, and 4 honours/postgraduate diploma students in agronomy.

## Undergraduate Courses

Before students are allowed to specialize into agronomy, they receive a good agricultural science background through compulsory papers in plant protection, animal science and production, crop husbandry, pasture management, soil science and farm management. Starting in their third year it is possible to begin an agronomic specialization, although most students begin specializing in year 4. In order to obtain admission to one of the 300 level agronomy papers (Table 1) a student will normally have:

1. Completed at least 5 Semesters of their degree.
2. Passed two introductory units in Plant Science, a unit in Plant Production and in Biometrics, and units in both Plant Protection and Soil Science.

All agricultural degrees at Lincoln University have a compulsory practical work component, one period of

**Table 1. Undergraduate and postgraduate agronomy papers available at Lincoln University (Lincoln University, 1994).**

Subject code	Subject title
PLSC 320	Crop Science
PLSC 321	Pasture Agronomy
PLSC 327	Tropical Agronomy
PLSC 410	Temperate Pasture Ecosystems
PLSC 601	Agronomy
PLSC 602	Crop Physiology
PLSC 605	Cereal Agronomy
PLSC 606	Grain Legume Agronomy
PLSC 607	Tropical Agronomy

which must be spent on a cropping farm. Some students who intend taking up research careers spend one vacation, usually between their 3rd and 4th year, working for a relevant CRI or a university department associated with a research programme.

### Honours

Students who by the end of their third year have passed all of their units and have an average mark of 60 % or higher for all units completed may be invited to undertake an Honours programme.

Honours students replace two of their eight final year units with a dissertation which is a small research project. The dissertation programme involves planning and conducting an individual research project focusing on an agronomic problem. Examples of dissertations from the past include; a study of herbicide damage to lentils; response of Russell lupins to phosphorus and pH levels; water use of lucerne grass mixtures; and flowering pattern and seed set of *Lotus* species.

Honours students also have the opportunity to go into areas of particular interest to them by taking Special Topics which are usually individually designed for the student. These papers allow one to one contact between the student and staff member.

Students obtaining First class honours or a good Second class division one honours degree may be eligible to enrol directly into a PhD program without completing a Masterate degree.

### Postgraduates

There are a number of methods by which students can undertake postgraduate study in Agronomy at Lincoln

University (Table 2). While all of these require potential students to have completed an undergraduate degree, the time requirement for completion of the various options ranges from one year for the Postgraduate Diploma in Agricultural Science, to a minimum of two years for the PhD degree. Candidates for some postgraduate programs may require more than a Bachelors degree. For instance, a candidate with a BSc may be required to complete a Postgraduate Diploma in Agricultural Science before being allowed to enrol for a Master in Agricultural Science (MAgrSc) degree. However, the same student could enrol directly into a Master of Applied Science (MApplSc).

**Table 2. Postgraduate agronomy qualifications available at Lincoln University.**

Qualification	Duration	Structure
PGDipAgrSc	2 Semesters	8 x 300 or higher level units, 2 may be replaced with a dissertation.
MApplSc	1 Calendar Year	6 x 600 level units, combined with a project to be submitted by end of one year from enrolment
MAgrSc or MApplSc	2 Years (Minimum)	6 x 600 level units combined with a research project leading to a thesis
PhD	2 Years (Minimum)	A research degree. However, students may be required to take selected units by their supervisor

For a Masterate degree the student must take 6 units at the 600 level and complete a research based thesis. The 600 level agronomy papers consist of PLSC 601 Agronomy, PLSC 602 Crop Physiology, PLSC 605 Cereal agronomy, PLSC 606 Grain legume agronomy, PLSC 607 Tropical agronomy, and PLSC 610 Temperate pasture ecosystems. Masterate level papers normally consist of a number of topics, of which the students choose five. Each topic is introduced in a lecture by the supervising staff member. Students then research the topic, return for a group discussion, then write an in-depth detailed essay on the subject. This is usually followed up by a seminar presentation on the their specific topic.

For the one year Masterate in Applied Science the choice is limited, and as there is only a small research

component, these degrees are not intended to train students for research positions. For the two year Masterate degrees students will normally take the 2 units subject PLSC 601 Agronomy, which covers a number of agronomy topics at an advanced level. A further two units will usually be the Thesis paper. This paper provides students with the background knowledge to plan, conduct, measure and analyze their research project. Generally the paper will ensure that students are familiar with the necessary techniques to undertake their research, and it gives them a head start on their literature reviews.

The Department is currently developing a 1 unit paper in Research Methodology which will also become compulsory. This paper will ensure that students understand the scientific method and will provide considerable statistical information.

The PhD degree is research based, meaning that there are no compulsory papers. However, supervisors can require students to sit any papers required to upgrade particular skills. Often statistical skills may need upgrading or improving. There are a number of areas in which potential students may study for a PhD in agronomy. These include: grass seed production, stability and productivity of grass/legume mixtures, water use of crops and or pastures, evaluation of new cultivars and or new crops, nutrient responses of crops and or pastures, grain legume agronomy including a diverse range of species.

The multidisciplinary nature of the Plant Science Department means that potential students can study combination topics such as weed science and agronomy; agronomy and plant pathology; and agronomy and plant breeding. Indeed one of the strengths of an agronomy PhD at Lincoln is the combination of field and laboratory studies.

## Conclusions

The Plant Science Department at Lincoln University has produced many graduates in agronomy in the past. Many New Zealand graduates work in our research stations, private industry and universities, while former students are employed as academics at Universities in the USA, Thailand, Pakistan, Bangladesh and Australia, to name a few of the countries. Additionally graduates have risen to be Directors of Research Stations in Pakistan and Malaysia, while many graduates are staff members of these institutions. An Agronomy degree from Lincoln University is valued by employers because graduates are well rounded academically, and research oriented.

## References

- Blair, I.D. 1978. *The Seed They Sowed*. Whitcoulls, Christchurch, 360 pp.  
Lincoln University 1994. *1994 Calendar*. 422 pp.