

RESEARCH AND GRADUATE STUDIES

IN THE DEPARTMENT OF

Agronomy

UNIVERSITY OF KENTUCKY

The science of Agronomy addresses an enormously broad spectrum of subject matter: it includes the chemistry, physics and biology of both plant and soil systems; and it ranges from the molecular, to the whole plant, to the ecosystem level. This diversity and breadth provides an outstanding environment for the integrative, multi-disciplinary studies needed for future advances in crop biotechnology and sustainable land management.

Our vision and fundamental objective in the Department of Agronomy is to integrate:

- creative basic research on plants and soils,
- outstanding educational programs, both on- and off-campus, and
- applied research addressing significant issues in land use and plant production.

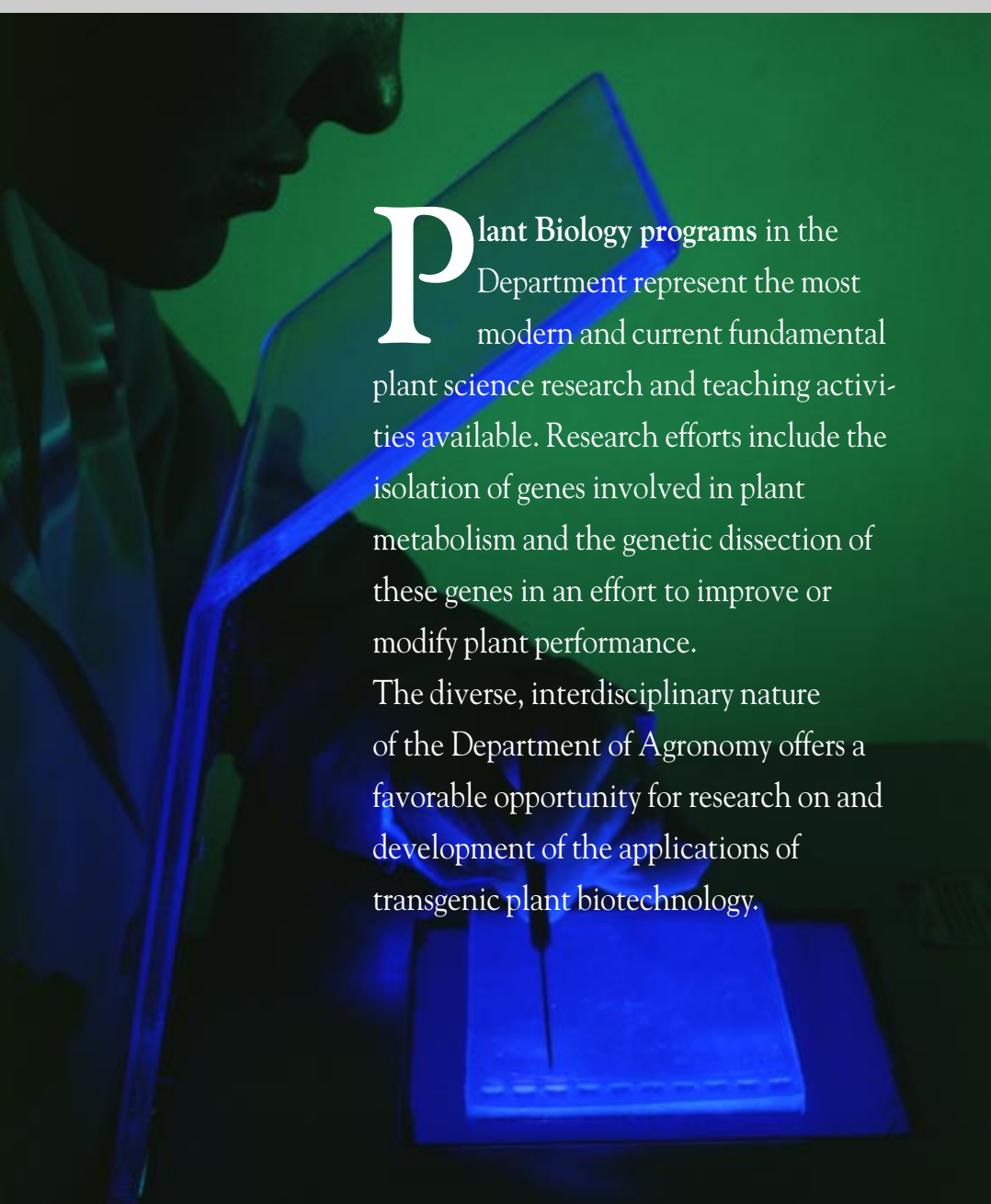
The Department of Agronomy is one of the largest and, perhaps, the most diverse departments at the University of Kentucky. The Department strives to balance, and excel in, all three mission areas of a land grant institution: research, teaching and outreach.

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■ Plant Physiology, Biochemistry and Molecular Biology

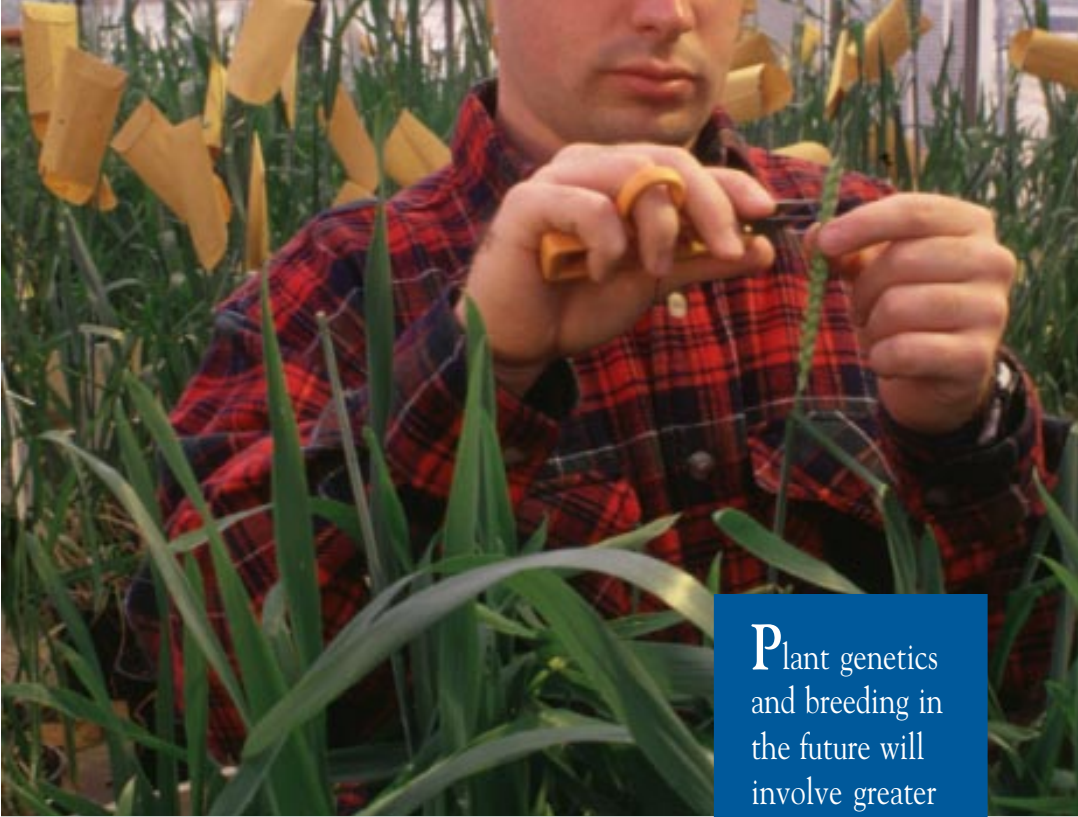
Faculty interests in the Plant Physiology, Biochemistry and Molecular Biology program range from the molecular to the whole plant level. Areas of research emphasis include:

- molecular biology and genetics,
- enzymology and protein chemistry,
- plant-pathogen interactions,
- plant gene expression,
- tissue culture and plant transformation,
- physiological and environmental regulation of productivity and quality, and
- plant biotechnology.



Plant Biology programs in the Department represent the most modern and current fundamental plant science research and teaching activities available. Research efforts include the isolation of genes involved in plant metabolism and the genetic dissection of these genes in an effort to improve or modify plant performance.

The diverse, interdisciplinary nature of the Department of Agronomy offers a favorable opportunity for research on and development of the applications of transgenic plant biotechnology.



■ Plant Breeding and Genetics

Research in the Plant Breeding and Genetics program has a strong commodity and crop orientation. Current programs focus on wheat, soybeans, corn, red clover, fescue, and tobacco. Release of agronomically adapted varieties and germplasm remains an important objective. Furthermore, plant breeders in the Department are leading investigations to:

- improve breeding efficiency,
- increase options for crop improvement, and
- manipulate plant quality and utilization factors.



Plant genetics and breeding in the future will involve greater team effort among breeders, cytogeneticists, pathologists, entomologists, molecular biologists, physiologists, biochemists, engineers and statisticians.

All plant breeding programs have full access to modern genetic technology, including the use of biochemical and/or molecular markers, recombinant DNA gene transfer methods and cellular genetics strategies.



■ Soil Science

The Soil Science program has been uniquely successful in integrating a strong basic research program with applied research on soil management. Major contributions have been made in no-tillage research, efficient fertilizer management, and reclamation of surface-mined lands. Exploring new soil management practices which protect water quality, conserve soil resources and enhance crop production remains our top priority.

Active research programs in basic soil chemistry and mineralogy, microbiology and physics complement more applied efforts in pedology, fertility and management. Fundamental investigations of physical, chemical and microbiological processes in soils seek to unravel the complex mechanisms which sustain soil quality and productivity.



Soils are critical determinants of environmental quality. We are conducting studies on the impact of agricultural practices and chemicals on surface and groundwater.

Use of wetlands for treatment of wastes and clean-up of contaminated waters is just one of the innovative research areas in the Department of Agronomy at UK.



■ Crop Physiology, Ecology and Management

We seek technology to improve the efficiency of crop production while enhancing quality and yield. Areas of emphasis include:

- **Forage-grazing systems:** improving forage quality and utilization.
- **Turfgrass:** interdisciplinary management studies for enhanced recreational and aesthetic uses.
- **Seed science:** physiology of development, vigor and deterioration.
- **Weed science:** weed ecology and management, and physiology of herbicide action and selectivity.
- **Crop management:** physiology and ecology of yield limiting processes.



Research in Crop Physiology, Ecology and Management is designed to advance fundamental understanding of crop ecosystems and to expand our knowledge of the biology of crop plants. Field, greenhouse and laboratory studies emphasize important Kentucky crops: forages, grain crops, tobacco and turfgrasses.



Graduate Study

The Department of Agronomy offers exciting opportunities for graduate study. Four different graduate programs are administered by faculty in the Department, but all are inter-departmental and interdisciplinary. The large (65 member), diverse graduate faculty makes it possible for students to seek training in the many varied aspects of plant and soil sciences. Graduate thesis opportunities range from fundamental studies of plant physiology and molecular biology, to environmental analysis of plant/soil/water systems, to investigations of innovative crop management technologies.

The graduate faculty includes many internationally recognized research scientists. We place the highest priority on excellence in graduate training, and the high ratio of faculty to students promotes individualized guidance and extensive interaction. Excellent facilities are provided to graduate students for both laboratory and field research. Assistantship support is available on a competitive basis to well-qualified candidates.

Degree Programs

■ Plant and Soil Science (M.S. degree)

Options:

- Crop Science
- Horticultural Science
- Plant Physiology
- Soil Science

■ Plant Physiology, Biochemistry and Molecular Biology (Ph.D. degree)

■ Crop Science (Ph.D. degree)

■ Soil Science (Ph.D. degree)



For more information

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