

Collection Policy: PLANT BREEDING

[Subject Scope](#) | [Priority Tables](#) | [Other policies . . .](#)

1.0 TEACHING, RESEARCH AND EXTENSION PROGRAMS

1.1 Mission and emphases of the department

The mission of the department, particularly noted for excellence in research, is the genetic improvement of crop plants for the benefit of society. This includes such activities as molecular study of crop plant genomes to field evaluations in multiple locations.

1.2 Faculty research

The Department has 10 regular faculty members. Their research efforts are supplemented by those of postdoctoral fellows, research associates, visiting scientists, technicians, research support specialists and faculty members housed in other Cornell departments who participate in the Graduate Field of Plant Breeding. Research projects include:

- Tissue culture for crop improvement
- Genetics of disease resistance
- Genetics of insect resistance
- Vegetable breeding
- Forage breeding and genetics
- Tomato breeding and genetics
- Potato breeding and germplasm development
- Maize breeding and Genetics
- Small grains breeding and genetics
- Bean breeding and yield physiology
- Plant transformation
- Plant biotechnology transfer
- Crop varieties and seed production
- Molecular genetics of rice
- Genetics of legume and woody perennial crops (Geneva)
- Chromosome and ploidy manipulation of higher plants
- Conservation of genetic resources
- Biochemistry of secondary metabolites
- Apple breeding and genetics (Geneva)
- Grapevine breeding and genetics (Geneva)
- Small fruit breeding (Geneva)
- Rhizobotany and rhizogenetics (USDA Laboratory)

1.3 Graduate program

The Graduate Field of Plant Breeding has about 50 graduate students, with about 60% from outside the U.S. This field offers M.S., M.P.S. and Ph.D degrees aimed toward students pursuing careers in directing or leading plant breeding research at private companies or public institutions either nationally or internationally.

1.4 Undergraduate program

Teaching is primarily at the graduate level but several undergraduate level courses are offered. Plants, Genes, and Global Food Production fulfills the biological sciences distribution requirement for undergraduates in CALS. 400-level courses in plant tissue culture are also offered.

1.5 Extension activity

In general, extension responsibilities are aimed at advising on crop varieties that perform best in New York and the Northeast, through comparative trials, publications, field, training programs and conferences. Specific extension programs include:

- The New York Seed Improvement Project, producing and distributing foundation and certified seed, and granting official certification of seed.
- Hybrid corn, forage and cereal grain variety tests.

Other collaborative outreach programs include:

- Genome Database Projects, organizing molecular and agricultural information about rice, small grains, and Solanaceous crops for global computer access.
- The International Service for the Acquisition of Agri-Biotech Applications, which seeks to improve living standards in developing countries through appropriate biotechnology techniques.
- Moderation of relevant email discussion groups.

1.6 Noteworthy facilities (e.g. unique classrooms, laboratories, farms, etc.)

- Laboratories for work in molecular and cell biology of crop plants.
- Greenhouses and growth chambers in the Guterman complex.
- The Love Field House, which includes facilities for processing, drying, cleaning, storing and testing seeds and plant materials.
- Experimental farms at various sites in Tompkins County and adjoining counties.

2.0 SUBJECT DESCRIPTION AND GUIDELINES

2.1 Subject definition

"Plant breeding is the genetic adjustment of plants to the service of man." [Frankel, O.H. *Journal of the Australian Institute of Agricultural Science* 24:112 (1958).]

2.2 Subject scope

Crops of highest priority include grains (corn, wheat, oats, barley, rice) potato, forages, and fruits and vegetables (melon, tomato, pepper, squash, cucumber, broccoli, cabbage, beans). There is also interest in crops for medical uses.

The following topics are collected at a level 4:

Traditional Plant Breeding and Genetics: evolution of cultivated plants, relationship of plant genetics to global food production, plant introductions, modes of reproduction in relation to plant breeding methods, variability in plants, genes and qualitative characters in plants, quantitative inheritance, role of the environment in plant breeding, selection in self-pollinated crops, hybridization and gene combinations, breeding self-pollinated crops by hybridization and pedigree selection, bulk population method of breeding self-pollinated plants, backcross method of breeding, cross-pollinated crops, control of cross-pollination, selection in cross-pollinated crops, inbreeding and heterosis, hybrid varieties, recurrent selection, synthetic varieties, autopolyploidy in plant breeding, allopolyploidy, aneuploids, mutagens and crop improvement, interspecific hybridization, interspecific transfer of characters, genetics of resistance to diseases and insects, breeding for resistance to diseases to diseases, insects and abiotic stress (e.g., heat, cold), maintenance and distribution of varieties, field-plot technique and experimental design.

Newer developments:

molecular biology techniques to supplement classical breeding methods, plant genome organization, plant biotechnology, gene transfer, transgenic plants, molecular markers, plant biodiversity and germplasm collections, utilization of exotic germplasm, cytoplasmic male sterility, improvement of quality characters, intellectual property issues and patents, variety protection

2.3 Emerging trends in the subject area

- Genome Database
- Breeding for sustainable, low-input systems
- Crop and cultivar adaptation
- Bioinformatics (e.g., the handling and analysis of DNA sequence data)

Transgenic plants and public reaction to them
Intellectual property issues and patents
Needs of developed versus developing countries
Variety protection
Manipulation and utilization of crops to produce non-plant products (e.g., plastics, non-nutritive fats)
Quantitative trait loci
Comparative genomics

3.0 SPECIAL INFORMATION NEEDS AND RESOURCES

3.1 Special information needs of those working in this subject area.

BIOSIS Previews, CAB Abstracts, AGRICOLA, Biotechnology Abstracts.
Genome databases, such as those available on the Internet (Cornell is a pioneer in this area).
Basic works and core journals in plant molecular genetics and biochemistry, such as are collected for other sections.
Techniques manuals, specifically for tissue culture and biotechnological techniques

3.2 Special collections or noteworthy resources in the field

Genome databases developed at Cornell.

3.3 Endowment funds or special funding arrangements

- Mann Endowment -- General biology
- Ferguson -- Botany
- Burnham -- Botany
- Sarna -- Genetics

4.0 TYPES OF MATERIALS

4.1 Priorities for types of materials

See [Priorities Table](#).

4.2 Format

4.3 Geographical guidelines

International; within developing countries, places concerned with food security. Publications of major institutions.

4.4 Language guidelines

English. Spanish for material from Latin America. Other languages on request.

4.5 Chronological guidelines

Current, except for some interest in the history of plant breeding, plant domestication and plant introduction.

5.0 OTHER RELATED LIBRARY COLLECTIONS

- Biotechnology Library in Biotechnology Building
- Entomology Library -- pesticide and insect resistance, integrated pest management

- Geneva -- seed science, grape and apple breeding; however, core journals in these areas should be in Mann.

6.0 POLICY QUESTIONS, COLLECTION NEEDS, FUNDING PROBLEMS OR OPPORTUNITIES

7.0 PRINCIPAL LC CLASSES

SB 123-124
 SB 185.7
 SB 189.5
 SB 319.6
 SB 224.7
 SB 357.3
 SB 406.8
 QKs for basic plant science and genetics.

8.0 RELATED COLLECTION POLICIES

- [ENTO](#)
- [NATR](#) -- food supply, biodiversity
- [AGRO](#) -- seed production
- [Horticultural Sciences](#) -- seed production
- [GENE](#)

Priorities Table for Plant Breeding

Code	IMPORTANCE/INTENSITY CODES DEFINITIONS
NA	Not applicable to the discipline.
0	Ephemeral; of insufficient value to be provided by library.
1	Of short term interest, but with little or no enduring value; very selectively acquired; retained, uncataloged, for limited duration only, e.g. newsletters in newly emerging, poorly documented areas, and manuals or pamphlets for reserve reading.
2	Limited scholarly interest or utility; collected very selectively, but not of high priority.
3	Important for research and/or instruction; should be well represented, but collected selectively rather than intensively.
4	Very important for faculty and/or students; intensively collected, i.e. every effort is made to provide as deep coverage of this literature as possible.

5	Essential to work in the discipline; the most important type of material for research or instruction purposes. Ensuring the highest possible coverage should be the library's top priority in this discipline.
---	--

Code	SERIALS	Notes
5	Journals, scholarly	-
4	Journals, technical	-
-	Journals, other (describe)	-
3	Annual reviews, advances in...	-
Varies	Scientific and technical reports and research bulletins of major academies, learned societies, professional research and educational organizations and government agencies	Some, like PNAS, are essential. Others may be less so.
3	Proceedings, of international congresses and symposia	-
3	Proceedings, national or local	-
-	Statistical series	Not sure what this means.
2	Trade journals and periodicals	-
0	Popular periodicals, hobby	-
Varies	Popular periodicals, semi-technical	Sci. American, etc. would be 4.
2	Popular periodicals, farm press	-
Varies	Newsletters/newspapers	Genet. Eng. News would be 1-2; newspapers=0
NA	Proceedings of legislative bodies	"Federal Register"
0	Student publications	-
2	Administrative publications of major academies, learned societies, professional, research and educational organizations and government agencies	-
0	Corporate annual reports	-
-	Yearbooks	Yearbook of Ag is useful.
0	Press releases	-
0	Lists	-
0	Working papers	-
Code	MONOGRAPHS	Notes
5	Major scholarly monographs	-
5	Professional and technical	-
3	Subject histories	-
4	Textbooks, upper division, graduate	-
2	Biographies	-
2	Popular monographs	-

-	Technical reports	-
-	Government reports	-
3-4	Proceedings, international	-
3	Proceedings, other	-
No	Theses and dissertations (outside CU)	-
NA	Festschrift	-
NA	Patents	-
2	Corporate histories	-
3	How-to books & lab manuals	-
0	Pamphlets	-
-	Ephemera (describe)	-
-	Maps	-
-	Technical bulletins/handbooks/compendia	Handbook of Chem. & Physics is important.
Code	ELECTRONIC INFORMATION	Notes
-	Applications programs	-
5	Bibliographic databases	Agricola, Biosis, etc.
-	Bulletin boards	-
-	Fulltext files	-
-	Geographic information systems	-
-	Numeric/statistical files	-
5	Other (describe, taking as much space a necessary)	Gene and protein sequences