

Plant breeding efforts by crop

Crop Group	Releases in the past 5 years		
	PYs	Germplasm	Cultivars
Wheat	2.3	0	5
Barley	1.2	0	2
Potato	1.0	0	5
Oilseeds (Meadowfoam)	0.8	0	1
Vegetables	1.0	0	2
Hazelnuts	1.0	0	7
Forest Trees	3.0	N/A ^z	N/A
Total^y	10.3	0	22

^zMost tree improvement occurs via progressive population improvement that does not involve any official release of germplasm or named cultivars. ^yTotal does not include USDA-ARS small fruits, hops and grass breeding PY located at OSU.

Plant breeding efforts by activity

Activity	PYs	%
Plant Breeding Research	0.9	8
Germplasm Enhancement	3.8	34
Cultivar Development	3.6	31
Biotechnology Research and Development	2.0	18
Plant Breeding Education	1.0	9
Total	11.3	100%

Rationale for breeding programs at Oregon State University, and future plans

Agriculture in the Pacific Northwest (PNW) supports many high value specialty crops that are difficult to grow elsewhere. In addition to grains and forages, specialty crops such as fruits, nuts, vegetables for processing and fresh market, and vegetables, forages, and grass for seed are extensively grown. The cool Mediterranean climate is unique to the PNW, and crops may require special adaptation. Growing conditions are excellent and pests and crop failures are rare. The relatively high costs of inputs (labor and water) compared to the Midwest favors specialty crops over commodities.

Reflecting the diversity of the PNW, plant breeding programs at OSU are mostly centered on crops, that have little private sector breeding activity. The one exception is Douglas-fir, which has one of the largest private/public sector tree breeding programs in the world. In addition to the university supported breeding programs, USDA-ARS has plant breeding and germplasm enhancement programs based at OSU that breed small fruits (blueberries, cane fruits, and strawberries), hops, and forage grasses. As such, OSU has one of the most diverse applied breeding programs in North America. Several breeders (hazelnuts, hops, meadowfoam, Douglas-fir) have few if any counterparts on the continent. Well organized commodity commissions administer competitive funds for public research and provide a means to obtain research grant for applied research. The region is a major area for seed production of many field and vegetable crops, which provides an additional concentration of professionals and infrastructure that typically interface with plant breeders. Breeding efforts at OSU impact the entire PNW and are highly collaborative with Washington State University, University of Idaho and USDA-ARS. OSU wheat varieties are widely grown in WA and ID, and potato breeding is a collaborative tri-state effort.

In the long run, most OSU breeding programs will maintain an applied focus to their research. A top priority for Horticulture is to hire an ornamental plant breeder to support the nursery industry, the largest agricultural industry in the state. In Crop Science, replacing the oilseed/specialty crop geneticist is a high priority.

Job placement of recent graduates

Plant breeding graduate students from Oregon State University predominantly find jobs in the private sector, with some placements at land grant universities. Graduates work as crop-specific breeders at seed companies including Monsanto, Seminis, Sakata, and Syngenta, and vertically integrated food and beverage companies such as Coors. In the public sector, graduates have been placed USDA-ARS, CIMMYT, and INIA in Uruguay. About 1/3 to 1/2 of graduate students are foreign, and return to their country of origin upon graduation. We find that plant breeding graduates from OSU are in demand by private seed companies, and as other public institutions have cut back on plant breeding activities or converted positions to basic molecular positions, demand has increased. Students from OSU are trained in a wide range of plant breeding and molecular techniques with most programs emphasizing applied field plant breeding. Private seed companies find that students from OSU have the skills to administer a plant breeding program without remedial training.

Plant Breeding and Genetics Courses

•Core Courses:

Plant Breeding and Genetics

CSS/HORT 530 (3) Plant Genetics
 FS 530 (3) Biotech: Ag., Food and Res. Issues
 FS 544 (3) Forest Genetics
 HORT/CSS 550 (4) Plant Breeding
 GEN 530 (3) Intro. Population Genetics
 HORT/MCB 573 (4) Cytogenetics
 CSS 598 (3) Plant Chromosome Biology
 HORT 611 (3) Plant Genetics
 CSS 620 (1) DNA Fingerprinting
 CSS 621 (1) Genetic Mapping
 CSS 622 (1) QTL Analysis

Statistics

ST 511 (4) Methods of Data Analysis
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 ST 515 (3) Design and Analysis of Planned Experiments or CSS 590 (3) Field Plot Techniques

Biochemistry

BB 550 (4) and BB 551 (4)
 or BB 590 (3) and BB 591 (4)

Biotechnology

HORT 541 (4) Plant Tissue Culture
 MCB 524 (1) Molecular and Cellular Biology Techniques
 MCB 525 (3) Techniques in Molecular and Cellular Biology or BB 594 (3) Biochemistry Laboratory
 MCB 556 (4) Molecular and Cellular biology

•Other Relevant Courses:

HORT 505B (1) Breeding Vegetatively Propagated Crops
 HORT 512* (1) Crop Domestication
 HORT 512* (1) Plants and Patents
 HORT 513 (3) Plant Genetic Engineering
 CSS 630 (3) Advanced Plant Breeding I
 CSS 650 (3) Advanced Plant Breeding II
 MCB 554 (4) Microbial Genetics
 GEN 555 (4) Eukaryotic Molecular Genetics
 FS 523 (4) Natural Resource Data Analysis

*Reading & conference course with rotating topics.

Plant breeding graduate students 2000 - 2006

	M.S.	Ph.D.	Total
Domestic	5	7	12
International	7	6	13
Total	12	13	25

Graduate students currently in training

	M.S.	Ph.D.	Total
Domestic	5	3	8
International	3	3	6
Total	8	6	14