Plant Breeding Coordinating Committee

Initial Employment of Plant Breeding Ph.D. Graduates

2015 – 2020

A survey was conducted in 2021 to determine the initial job placement of new Plant Breeding Ph.D. graduates. The primary objective of the survey was to determine the distribution of new plant breeding Ph.D. graduates accepting employment in private industry versus the public sector.

Methods

The following information request was distributed initially to “agronomy and horticultural” department heads at 1862 Land Grant Universities (LGU), 1890 LGU, and other universities that grant graduate degrees pertaining to plant breeding. A total of 120 departments at 87 universities were contacted. Of those, 68 universities responded with 53 having a Ph.D. degree in plant breeding (or a generic name with a plant breeding emphasis) and 36 of the 53 having awarded Ph.D. degrees in plant breeding during the five-year time frame of the survey, academic year (AY) 15-16 through AY 19-20.

Institution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Respondent’s name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | AY 15-16 | AY 16-17 | AY 17-18 | AY 18-19 | AY 19-20 |
| Number Plant Breeding Ph.D. Students Employedas a Plant Breeder in **PRIVATE SECTOR**at Time of Graduation |  |  |  |  |  |
| Number Plant Breeding Ph.D. Students Employedas a Plant Breeder in **PUBLIC SECTOR** at Time of Graduation |  |  |  |  |  |
| Number Plant Breeding Ph.D. Students Unemployed as a Plant Breeder at Time of Graduation |  |  |  |  |  |

* Public sector includes post doc positions

Results

A total of 477 Ph.D. degrees were awarded by these 36 universities during this time frame, with 210 accepting employment in private industry, 228 accepting employment in the public sector, and 39 either unknown or not having employment at the time of graduation. Note that post-doc positions were to be identified as public sector since most, if not all, would be at universities or with ARS. Thus, 44 % of the new Ph.D. plant breeders went to private industry, 48 % went to public employment, and 8 % were either unknown or unemployed at graduation. There was no attempt to determine if the graduates entered the work-force in a plant breeding position or in a related position.

Concern has been expressed for several years that LGU and other agricultural universities were not replacing retiring plant breeders with plant breeders. However, these data suggest that U.S. universities do recognize the value of plant breeders in educating the next generation in this cornerstone arena of American agriculture and in the area of cultivar/germplasm development. It must be noted, however, that the definition of plant breeder is evolving and today includes not only the traditional phenotypic plant breeders who utilizes Mendelian principles and classical genetics in crop improvement but also molecular geneticists whose contributions extends the profession of plant breeding into genomics, genotyping, gene editing, etc. The advent of high throughput phenotyping, artificial intelligence, and drone technology will further expand the areas of expertise that will fit under the umbrella of plant breeding.

The data also suggests that university education in the area of plant breeding is not equally distributed across these universities. The 10 universities producing the most Ph.D. plant breeding graduates produced 60% of all Ph.D.s (288 of 477) while 17 of the 53 institutions with a Ph.D. plant breeding degree available graduated no Ph.D.s in plant breeding during the five-year time frame. Fourteen of the 36 universities granting plant breeding Ph.D.s averaged one or fewer Ph.D. plant breeding graduates per year from AY 15-16 through AY-19-20. If one assumes that universities that graduated several plant breeding Ph.D.s had more plant breeding teaching faculty than universities that graduated none or few Ph.D.s in this survey, then one could assume that the subject matter breadth and depth of plant breeding courses vary considerably across the United States. The Plant Breeding Coordinating Committee continues to explore ways to share teaching expertise across universities.

Placement in public or private employment of new Ph.D. graduates in Plant Breeding (or related degree with emphasis) for academic years 2015/16 through 2019/2020.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| University | Total private | Total public | Total unemployed  or unknown | Grand total |  | % to private | % to public | % unemployed |
| Arkansas State University | 0 | 0 | 0 | 0 |  |  |  |  |
| Brigham Young University–Idaho | 0 | 0 | 0 | 0 |  |  |  |  |
| California Polytechnic State University | 0 | 0 | 0 | 0 |  |  |  |  |
| Florida Southern College | 0 | 0 | 0 | 0 |  |  |  |  |
| Northwest Missouri State University | 0 | 0 | 0 | 0 |  |  |  |  |
| Prairie View A&M University | 0 | 0 | 0 | 0 |  |  |  |  |
| Temple University | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Arizona | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Hawaii | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Maine | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Maryland Eastern Shore | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Nevada at Reno | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Puerto Rico | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Vermont | 0 | 0 | 0 | 0 |  |  |  |  |
| University of Wyoming | 0 | 0 | 0 | 0 |  |  |  |  |
| Utah State University | 0 | 0 | 0 | 0 |  |  |  |  |
| West Virginia State University | 0 | 0 | 0 | 0 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Auburn University | 0 | 2 | 0 | 2 |  | 0.0 | 100.0 | 0.0 |
| Clemson University | 1 | 2 | 1 | 4 |  | 25.0 | 50.0 | 25.0 |
| Colorado State University | 2 | 2 | 0 | 4 |  | 50.0 | 50.0 | 0.0 |
| Cornell University | 12 | 14 | 0 | 26 |  | 46.2 | 53.8 | 0.0 |
| Iowa State University | 19 | 8 | 0 | 27 |  | 70.4 | 29.6 | 0.0 |
| Kansas State University | 2 | 3 | 0 | 5 |  | 40.0 | 60.0 | 0.0 |
| Louisiana State University | 3 | 2 | 2 | 7 |  | 42.9 | 28.6 | 28.6 |
| Michigan State University | 10 | 7 | 0 | 17 |  | 58.8 | 41.2 | 0.0 |
| Mississippi State University | 1 | 3 | 0 | 4 |  | 25.0 | 75.0 | 0.0 |
| Montana State University | 5 | 3 | 2 | 10 |  | 50.0 | 30.0 | 20.0 |
| New Mexico State University | 1 | 1 | 0 | 2 |  | 50.0 | 50.0 | 0.0 |
| North Carolina State University | 10 | 9 | 3 | 22 |  | 45.5 | 40.9 | 13.6 |
| North Dakota State University | 2 | 10 | 6 | 18 |  | 11.1 | 55.6 | 33.3 |
| Ohio State University | 5 | 12 | 0 | 17 |  | 29.4 | 70.6 | 0.0 |
| Oklahoma State University | 0 | 3 | 1 | 4 |  | 0.0 | 75.0 | 25.0 |
| Oregon State University | 2 | 7 | 0 | 9 |  | 22.2 | 77.8 | 0.0 |
| Pennsylvania State University | 0 | 4 | 0 | 4 |  | 0.0 | 100.0 | 0.0 |
| Purdue University | 8 | 5 | 0 | 13 |  | 61.5 | 38.5 | 0.0 |
| Tennessee State University | 1 | 2 | 0 | 3 |  | 33.3 | 66.7 | 0.0 |
| Texas A&M University | 13 | 14 | 1 | 28 |  | 46.4 | 50.0 | 3.6 |
| Texas Tech University | 1 | 7 | 1 | 9 |  | 11.1 | 77.8 | 11.1 |
| Tuskegee University | 2 | 6 | 1 | 9 |  | 22.2 | 66.7 | 11.1 |
| University of Missouri | 2 | 5 | 1 | 8 |  | 25.0 | 62.5 | 12.5 |
| University of Arkansas | 4 | 8 | 0 | 12 |  | 33.3 | 66.7 | 0.0 |
| University of California | 3 | 4 | 0 | 7 |  | 42.9 | 57.1 | 0.0 |
| University of Florida | 12 | 11 | 0 | 23 |  | 52.2 | 47.8 | 0.0 |
| University of Georgia | 14 | 11 | 6 | 31 |  | 45.2 | 35.5 | 19.4 |
| University of Idaho | 1 | 1 | 0 | 2 |  | 50.0 | 50.0 | 0.0 |
| University of Illinois | 23 | 16 | 0 | 39 |  | 59.0 | 41.0 | 0.0 |
| University of Kentucky | 4 | 0 | 1 | 5 |  | 80.0 | 0.0 | 20.0 |
| University of Minnesota | 16 | 10 | 0 | 26 |  | 61.5 | 38.5 | 0.0 |
| University of New Hampshire | 0 | 2 | 3 | 5 |  | 0.0 | 40.0 | 60.0 |
| University of Tennessee | 1 | 4 | 0 | 5 |  | 20.0 | 80.0 | 0.0 |
| University of Wisconsin | 20 | 27 | 0 | 47 |  | 42.6 | 57.4 | 0.0 |
| Virginia Tech University | 2 | 2 | 0 | 4 |  | 50.0 | 50.0 | 0.0 |
| Washington State University | 8 | 1 | 10 | 19 |  | 42.1 | 5.3 | 52.6 |
| Totals | 210 | 228 | 39 | 477 |  | 44.0 | 47.8 | 8.2 |

Placement in public or private employment of new Ph.D. graduates among the top 10 universities granting Ph.D. degrees in Plant Breeding (or related degree with emphasis) for academic years 2015/16 through 2019/2020.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| University | Total private | Total public | Total unemployed  or unknown | Grand total |  | % to private | % to public | % unemployed |
| University of Wisconsin | 20 | 27 | 0 | 47 |  | 42.6 | 57.4 | 0.0 |
| University of Illinois | 23 | 16 | 0 | 39 |  | 59.0 | 41.0 | 0.0 |
| University of Georgia | 14 | 11 | 6 | 31 |  | 45.2 | 35.5 | 19.4 |
| Texas A&M University | 13 | 14 | 1 | 28 |  | 46.4 | 50.0 | 3.6 |
| Iowa State University | 19 | 8 | 0 | 27 |  | 70.4 | 29.6 | 0.0 |
| Cornell University | 12 | 14 | 0 | 26 |  | 46.2 | 53.8 | 0.0 |
| University of Minnesota | 16 | 10 | 0 | 26 |  | 61.5 | 38.5 | 0.0 |
| University of Florida | 12 | 11 | 0 | 23 |  | 52.2 | 47.8 | 0.0 |
| North Carolina State University | 10 | 9 | 3 | 22 |  | 45.5 | 40.9 | 13.6 |
| Washington State University | 8 | 1 | 10 | 19 |  | 42.1 | 5.3 | 52.6 |