January 1, 2016 to December 31, 2016

Annual Report
Department of Plant Sciences

Dakota Ruby, developed by Dr. Susie Thompson, NDSU Plant Sciences plant breeder

Photo provided by Dr. Susie Thompson
DEPARTMENT OF PLANT SCIENCES
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A. Significant departmental achievements in research, teaching and outreach during the past year

a. Teaching

The new teaching laboratory in Loftsgard 116 was opened in fall 2016. Courses taught in fall 2016 in the new classroom included PLSC 110 (World Food Crops), PLSC 215 (Weed Identification), PLSC 315L (Genetics Lab), and PLSC 320 (Principles of Forage Production). A total of 532 students were enrolled in the four courses. The location of the new teaching laboratory allows students ready access to greenhouses in Waldron Hall and the growth room in Loftsgard Hall.

b. Research/Scholarly/Creative Activities

On average North Dakota produces over 60% of the durum in the United States and over 90% of the ND durum acreage is sown with varieties developed at NDSU. Varieties developed by NDSU generate over $400 million directly to producers annually. Carpio and Joppa, two new varieties developed by the NDSU breeding program are quickly being adopted by producers and have high yield and excellent quality potential.

The NDSU forages research program developed improved management recommendations for alfalfa that lead to an increased forage yield on average of least 0.3 ton/acre/year. Given 0.41 million acres of alfalfa and 1.38 million acres of alfalfa/grass mixtures in North Dakota in 2015 and a price of $100/ton of hay, the improved management recommendations would have resulted in an economic impact of $53.6 million/year.

<table>
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<tr>
<th>Category</th>
<th>Total</th>
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<tbody>
<tr>
<td>Peer Reviewed Publications (published or accepted)</td>
<td>108</td>
</tr>
<tr>
<td>National or International Invited Presentations</td>
<td>49</td>
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<tr>
<td>Research Grants and Contracts <em>(number that are active)</em></td>
<td>171</td>
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<tr>
<td>Cumulative Amount <em>(total value of active grants and contracts)</em></td>
<td>$8,815,258</td>
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c. Extension/Outreach

The popular NDSU Extension forum called the Best of the Best in Wheat and Soybean Research and Marketing focuses on providing research based education. In 2016, participants estimated the value of the new knowledge they gained if it was implemented on their farm at $4.56 per acre. The 520 attending growers collectively are farming a total of 553,000 acres. If half of the acres are either sown with wheat or soybean, the total estimated perceived value of this meeting series would be $1.25 million.
Gardeners produce approximately over $55 million of vegetables in North Dakota each year. A team of over 200 families evaluated promising vegetable cultivars in their gardens. Participation in this project led to improved gardening practices, higher yields and healthier diets.

d. Service
- Dr. Clifford Hall received the Odney Excellence in Teaching award.
- Dr. Todd West received the Outstanding Faculty Advisor Award during the NDSU Celebration of Faculty Excellence.
- Dr. Chiwon Lee received the Northern Plains Sustainable Agriculture Society Friend of the Farmer Award.
- Dr. Richard Horsley was named a Fellow of the Crop Science Society of America.

B. Department goals and priorities for the past year, including narrative about progress toward those goals.

Two breeding pipeline managers were hired in summer 2016 to fulfill the previously identified need of having bioinformaticists to aid plant breeders and geneticists. A major responsibility of these two individuals will be to identify software, methods, and procedures that can be used to efficiently store phenotypic and genotypic data generated by breeders and geneticists in the AES.

C. Department challenges for the past year, including narrative on how those are being addressed.

The research and teaching facilities in Harris Hall are in disrepair and it is not cost-effective to make most repairs or renovations. A new durum wheat mill was purchased, but it cannot be moved into the building without dismantling a doorframe and wall. Ash and odor from the ash ovens are taken up by the ventilation system and deposited throughout the building. Water-flow into some labs has not worked since 2002, making the labs unusable. Additionally, piping is not present to carry distilled water to labs, so it is delivered with buckets from the still in the 3rd-floor men’s restroom.

D. Department goals and priorities for the coming year

a. Work with faculty and stakeholders to develop a curriculum for a possible new major based around sustainable local food systems. The new major would include the areas of production of crops under sustainable/organic production systems and food science/safety.

b. Work with the breeding and genetics group in the department to update the curriculum and teaching assignments. Currently, we have no one assigned to teach PLSC 734 (Field Design II) and PLSC 785 (Plant Breeding Program Management).