

Department overview

- 12 Research and 4 Extension faculty.
- Faculty aligned with commodities, commodity groups, and breeding programs.
- Neil C. Gudmestad Endowed Chair of Potato Pathology.
- Research and Extension activities on plant diseases of economic importance to the state.
 - ◊ Plant diseases and their management cost ND producers hundreds of millions of dollars per year, affect rotations, and can limit where crops are produced.
- Departmental work includes:
 - ◊ Original research on biology and management of plant diseases of economic importance.
 - ◊ Collaboration/cooperation with breeding programs, RECs, and commodity groups to develop disease-resistant germplasm and varieties.
 - ◊ Partnering with industry to develop effective and sustainable disease management tools for producers.
 - ◊ Outreach with producers and other stakeholders.



Grad students, both from ND, conducting field trials to control bacterial blight of common bean with experimental copper compounds.

NDSU PLANT PATHOLOGY

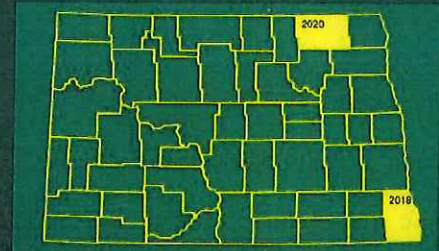
Challenges

1. Novel and adaptive pathogens

- Over 20 new diseases have arrived in ND since ca. 2000 (e.g., Soybean cyst nematode, sudden death syndrome, frogeye, clubroot, Goss' wilt, and bacterial leaf streak).



Natural occurrence of Goss' wilt on corn (left) and bacterial leaf streak on wheat (right) in producer's fields.



Sudden death syndrome on soybean (left) found in Richland and Cavalier Counties in 2018 and 2020, respectively (above). The distribution of the disease in the state is an important question.

- New races and forms of existing pathogens are developing.

A new form of soybean cyst nematode that has defeated widely-used genetic resistance in commercial cultivars is emerging and spreading in the state. Questions exist about the distribution and response of commercial cultivars to this form of the pathogen.



- New pathogen groups are emerging (e.g., bacteria, plasmodia, and viruses) with which the department has limited expertise.
- Fungicide resistance in existing pathogens limiting input options and affecting fungicide rotations.

Challenges (continued)

2. Space

- The Walster Hall departmental home has small labs and a problematic association of “dirty lab” activities with modern molecular research efforts.
- Waldron Hall, Potato Research, and equipment storage sheds are insufficient.
- Insufficient infrastructure for several programs.



Seed preparation for pulse crop pathology field experiments on folding tables in a Walster Hall hallway.

3. Staffing

- Department has limited expertise with bacteria and viruses.
- Faculty responsibilities for multiple crops and diseases over wide geographical areas makes it difficult to address all producer needs, especially as crops and diseases change.

Requests

1. Waldron Hall replacement to enhance and/or segregate:

- Departmental activities for all field-based research including sample processing, seedstock preparation, plot yield determinations, and so forth.
- Plant Diagnostic Laboratory and seed-health testing services.
- Capabilities for nematode extraction from soil to facilitate commodity needs.
- Field equipment storage and glasshouse-based research.



Seed potato samples in Waldron Hall hallway awaiting testing for assorted seed-borne pathogens.

2. Soybean Extension Specialists and operating for applied research

- Variety testing for multiple diseases in replicated on-field trials throughout the state.
- State-wide monitoring of emerging diseases.
- Dedicated Extension activity with producers as commodity spreads.

3a. Bacteriology faculty position and Research Specialist

- Address established and emerging bacterial diseases in corn, wheat, potato, dry bean, etc.

3b. Virology faculty position and Research Specialist

- Address economic virus diseases in the state in potato, sugarbeet, wheat, etc.

4. Pulse Crop Research Specialist

- Research specialist to assist field- and lab-based research activities on all pulse crops across ND.



The NDSU nematology lab has one sink for all nematode extractions from all soil samples.

#1 Request