

**COORDINATING COMMISSION
FOR POSTSECONDARY EDUCATION**

140 N. 8th Street, Suite 300
Lincoln, NE 68508

Telephone: (402) 471-2847
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PROPOSAL FOR NEW INSTRUCTIONAL PROGRAM
Form 92-40

SECTION I

Institution Submitting Proposal: University of Nebraska-Lincoln

Title of Program: Plant Pathology

CIP Code: 26.0305

Organizational Unit in which program will be located:

College of Agricultural Sciences and Natural Resources

Name of contact person in the event additional information is needed: Dr. David S. Jackson

Telephone: 402-472-5242

Degree, Diploma, or Certificate to be offered (use separate submittal for each level):

Master of Science in Plant Pathology

Proposed date to initiate program: When approved by the Coordinating Commission

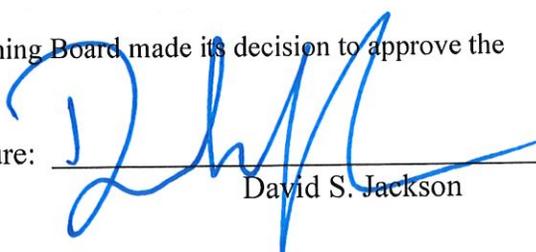
List the location(s) where this program will be offered: UNL

If the program has a projected ending date, please so indicate:

Date approved by Governing Board: December 5, 2019

(Attach all documents related to this proposal upon which the Governing Board made its decision to approve the proposal.)

Chief Executive Officer's or other Authorized Officer's signature: _____


David S. Jackson

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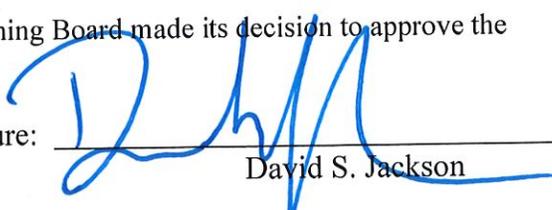
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David S. Jackson

TO: The Board of Regents Addendum IX-A-3
Academic Affairs

MEETING DATE: December 5, 2019

SUBJECT: Establish the Master of Science (MS) and Doctor of Philosophy (PhD) degrees in Plant Pathology in the Department of Plant Pathology in the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln (UNL)

RECOMMENDED ACTION: Approval is requested to establish the Master of Science and Doctor of Philosophy degrees in Plant Pathology in the Department of Plant Pathology in the College of Agricultural Sciences and Natural Resources at UNL

PREVIOUS ACTION: The UNL Department of Plant Pathology was established prior to modern records of Board approvals.

EXPLANATION: Plant Pathology is the science of plant disease. It encompasses the study of the organisms that cause disease in plants; the study of the interactions between these causal agents, the plant, and the environment during the disease process; and the development of strategies and tactics for managing or controlling plant disease.

The purpose of these proposed graduate majors are to formalize in name a program for training Master of Science (MS) and Doctor of Philosophy (PhD) students in plant pathology at UNL. This program has existed for over 100 years. Training of plant pathology graduate students at UNL currently is administered through two academic programs: Biological Sciences in the School of Biological Sciences, College of Arts and Sciences; and Agronomy and Horticulture in the Department of Agronomy and Horticulture, College of Agricultural Sciences and Natural Resources. The purpose for the new major is to consolidate plant pathology graduate training within its formal administrative unit, the Department of Plant Pathology.

There are no new costs associated with this proposal.

This proposal has been reviewed by the Council of Academic Officers and approved by the Executive Graduate Council; it also has been reviewed by the Academic Affairs Committee.

PROGRAM COST: \$0

SOURCE OF FUNDS: Not applicable. No new funding is being requested.

SPONSORS: Richard E. Moberly
Interim Executive Vice Chancellor and Chief Academic Officer

Ronnie D. Green, Chancellor
University of Nebraska-Lincoln

RECOMMENDED:



David S. Jackson
Interim Executive Vice President and Provost

DATE:

November 8, 2019

University of Nebraska-Lincoln
New Graduate Major or Degree

I. Descriptive Information

Name of Institution Proposing New Major or Degree:
University of Nebraska-Lincoln
Name of Proposed Major or Degree:
Plant Pathology
Degree to be Awarded to Graduates of the Major:
Master of Science (M.S.); Doctor of Philosophy (Ph.D.)
Other Majors or Degrees Offered in this Field by Institution:
None
CIP Code:
26.0305 Plant Pathology/Phytopathology
Administrative Units for the Major or Degree:
College of Agricultural Sciences and Natural Resources
Proposed Delivery Site:
University of Nebraska-Lincoln
Program will be Offered:
<input checked="" type="checkbox"/> On-campus only <input type="checkbox"/> Distance only <input type="checkbox"/> Both (on-campus and distance)
Date Approved by the Governing Board:
Proposed Date the New Major or Degree will be Initiated:
Upon approval

II. Details

A. Purpose of the Proposed Major or Degree:

The purpose of this proposed graduate major is to formalize in name a program for training Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) students in plant pathology at UNL. This program has existed "unofficially" for over 100 years. Training of plant pathology graduate students at UNL currently is administered through two academic programs, Biological Sciences in the School of Biological Sciences, College of Arts and Sciences; and Agronomy and Horticulture in the Department of Agronomy and Horticulture, College of Agricultural Sciences and Natural Resources. The purpose for the new major is to consolidate plant pathology graduate training within its formal administrative unit, the Department of Plant Pathology.

Plant pathology is the science of plant disease. It encompasses the study of the organisms that cause disease in plants; the study of the interactions between these causal agents, the plant, and the environment during the disease process; and the development of strategies and tactics for managing or controlling plant disease. Plant pathology interfaces with many scientific disciplines including mycology, bacteriology, nematology, virology, agronomy, microbiology, botany, biochemistry, genetics, molecular biology, plant breeding, statistics, and computational biology. Thus, the training of plant pathologists includes research and coursework experience in plant pathology and the many disciplines with which it interfaces.

The Department of Plant Pathology strives to serve the University, the State of Nebraska, and the global agricultural and scientific community by training effective and impactful future scientists and leaders who will address current and future critical needs in agriculture. The most important of these needs is increasing plant productivity to feed the world's growing population using economically and environmentally sustainable practices. Training of plant pathologists is essential because there is high demand in the world's plant protection industries and research institutions for their expertise, which through scientific innovation will contribute to increased food availability and security and improved quality of life.

History of the Plant Pathology Graduate Program:

Plant pathology training at UNL began in 1884 with the creation of the Department of Botany, which included plant pathologists. When founded in 1920, the Department of Plant Pathology was a member of the Experiment Station but not an instructional department in the College of Agriculture. Consequently, faculty members in Plant Pathology carried titles in the Department of Botany in the College of Arts and Sciences and all instruction in plant pathology was part of the Department of Botany course offerings. In 1973, the Department of Botany joined other units to form what is now known as the School of Biological Sciences (SBS) within the College of Arts and Sciences. The Department of Plant Pathology elected to keep its affiliation with SBS for its teaching component, while retaining funding and administration of the Department within the College of Agriculture in the Institute of Agriculture and Natural Resources (IANR).

This organizational mechanism by which the Department's graduate degrees were granted through SBS has continued to the present, the Plant Pathology "emphasis" in SBS being formalized as a Specialization in Plant Pathology in 2006. In the same year, the Plant Pathology Specialization in Agronomy and Horticulture (A&H) also was created. While the two Specializations are parallel -i.e., entry requirements are similar and a standard curriculum is required for students in both programs -creating Specializations in two graduate programs provided opportunities to attract students with more agricultural or crop production focus, as well as students from traditional biology backgrounds. Since 2006, increasing numbers of students have been admitted through both programs. Currently, close to 90% of the Department's graduate students are registered in A&H (**Figure 1**). In the past five years, our department has hired five new faculty, bringing the number of faculty actively involved in guiding and training graduate students to 20. At the same time, the number of graduate students that are advised by faculty in our department are at record highs, 28 as of September 2018. Therefore, the number of graduate students and faculty members in the Department of Plant Pathology have increased to levels that make it feasible for the Department to offer and administer its own degree program.

Importance of the New Proposed Program:

Consolidation of the two parallel Specializations into a single program and elevation of the program into a major will have two significant benefits. The first is that it will increase the national and international profile of the Plant Pathology graduate program, and consequently, will enhance recruitment of new students and placement of its graduates. Currently, the graduate program in the Department of Plant Pathology leads to M.S. degrees in Agronomy and Horticulture or Biological Sciences and the Ph.D. in Agronomy or Biological Sciences. Among the 30 other university departments in the U.S. with "Plant Pathology" in their name, all offer a M.S. and Ph.D. in 'Plant Pathology'. The absence of 'Plant Pathology' in our degree name is an impediment to more effective recruitment, and potentially places our graduates at a disadvantage when competing in the job market for plant pathology-related positions. Faculty in the Department report that the absence of a 'Plant Pathology' identity at UNL has led some prospective students to go to other U.S. universities where 'Plant Pathology' degrees are offered. Internationally, the title of a degree can hold even greater significance; in the past, international governmental agencies funding students to train specifically in the field of plant pathology were hesitant to allow their students to train at UNL because the degree did not specify 'Plant Pathology'. Thus, the creation of a Plant Pathology major will be a beneficial factor in more effective recruitment and placement of domestic and international students.

The redirection of our graduate students through a single program also will have a positive benefit on learning outcomes. Our department currently has 28 graduate students working across our faculty labs. The diversity within our department should be captured to help facilitate intercultural adaptability for our students as they end up around the world helping to protect our food supply. There is a tremendous opportunity for these students, faculty and staff to grow

further by increased engagement within the Department. Currently, however, several factors hinder student engagement within our Department. First, there exist extra course requirements for students in the Specialization within the A&H program specified by that department that are not placed on students entering in the Specialization through SBS. Students in the Specialization within A&H are required to enroll in both AGRO 991 Seminar Presentation & Evaluation (an A&H requirement) and PLPT 968 Seminar in Plant Pathology (a Plant Pathology requirement), which have overlapping content. These students also are required to complete an additional three credit hours in an Agronomy graduate course in crop production, soil science, or crop breeding. Another factor that has contributed to an atmosphere of dual identities among current students in Plant Pathology is the divergence of admission requirements between the A&H and SBS since the inception of the parallel Plant Pathology Specializations. Third, leadership and outreach are important experiences for students in our Department, and we have a strong contingent of students engaged in these activities through their student clubs. Since these students have dual membership in two departments, their efforts are often divided between the departments, and because they represent a minority of the students within their respective departments of admission (25 of ~150 students in A&H; 3 of 83 students in SBS), their interests within those departments are diminished.

Collectively, a new degree program in Plant Pathology would enhance our students' experience in several ways: 1) curricular requirements would be uniform for all of our student; 2) rigorous admission standards established by our Department will be applied uniformly to all applicants, thus ensuring that all in-coming students have the necessary background to succeed; and 3) our students will have a single home department and will no longer experience "dual membership." This will allow them to engage with each other and the Department with a greater sense of community.

B. Description of the Proposed Major or Degree:

The new graduate program in Plant Pathology will provide opportunities for students to earn Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Plant Pathology, which are distinct from all other programs at UNL (see Section III, Part E). While it is expected that graduation of most of the M.S. students in this major will be based on a thesis (Graduate Studies Option I), a non-thesis M.S. (Option II) also will be offered. In addition, a minor in Plant Pathology will be available to students in other graduate majors. The purpose of this degree program is to train students in all areas of plant pathology from basic to applied. Emphasis is placed on the development of solid research, teaching and/or extension expertise that provides graduates a competitive advantage for employment in private industry, academia, and government positions. Currently, the main subject areas related to plant health are pathogenic and beneficial interactions between plants and microbes, diagnostics and management strategies, basic and applied mycology, bacteriology, nematology, virology, and epidemiology. All these areas are supported by foundational knowledge in other science disciplines including agronomy,

microbiology, botany, biochemistry, genetics, molecular biology, plant breeding, statistics, and computational biology.

The goal of the program is to train our graduates in current knowledge of organisms and environmental conditions that cause disease in plants, the mechanisms of disease development, disease progression in time and space, the interactions between disease causal agents and plants, the effects of disease on plant growth, yield and quality, and the methods of diagnostics and disease management. Graduates will be able to generate new knowledge and make information- and research-based decisions that will enhance plant health and increase crop production and food security.

Learning Outcomes:

As with other graduate programs in Science-Technology-Engineering-and-Math (STEM) fields, the Plant Pathology Graduate Program provides opportunities for students to develop the attributes and skills of cutting-edge scientists. These include the ability to think critically, conduct research using the scientific method, interpret research results, and communicate research findings to the scientific community and the general public in written and verbal forms. Regardless of whether a student's interest leads to a regulatory, research or teaching/outreach career, the Plant Pathology Graduate Program trains and exposes its graduate students to diverse research methodologies and provides students with opportunities and experiences in teaching and outreach. These learning objectives are achieved by completion of the Research and Teaching Requirements outlined below.

Specialized training in Plant Pathology requires transferring and transforming skills and knowledge to research, outreach, and extension activities. Specific skills of plant pathologists include disease diagnosis, plant pathogen isolation and culturing, and identification of plant pathogenic organisms. Core plant pathology-specific knowledge areas include the biology and ecology of plant pathogenic organisms; plant disease epidemiology; evolution, phylogenetics, and systematics of plant pathogens; molecular, cellular and genetic interactions between plant pathogens and plants; and plant disease management strategies. To meet the plant pathology-specific learning objectives, a slate of graduate courses currently taught by faculty in the Department of Plant Pathology was identified as the Plant Pathology Graduate Curriculum for this program (see Course Requirements).

Admission Requirements:

Credentials of applicants are evaluated without consideration of gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation. In addition to the documents required by UNL's Office of Graduate Admissions, the Department of Plant Pathology also requires applicants to submit the following: 1) curriculum vita or resume; 2) letter of intent/background; 3) three letters of recommendation, and 4) general GRE score in the

50-100th percentile range (or waived, as described below). These documents are used for decisions on eligibility. A GPA of 3.0 or above is generally required, although strong letters of recommendation or a trend toward academic improvement later in the undergraduate or graduate program may warrant provisional admittance.

English Proficiency Requirements:

A fundamental knowledge of the English language is required for admission to the Plant Pathology Graduate Program. International students and/or applicants from non-English speaking countries must show evidence of adequate proficiency in the English language. Therefore, the following minimum scores are required for the admission of international students whose native language is not English: 79 on Internet TOEFL; 550 on Paper TOEFL; 6.5 on IELTS. Exemptions for the English proficiency requirement are granted for non-native speakers who have received a bachelor's or more advanced degree either from an accredited U.S. institution or from an institution outside the U.S. at which English is the official language of instruction.

Prerequisites:

The rigor of graduate studies in Plant Pathology requires fundamental knowledge of math and science. The following courses are required for full admission into the M.S. (Option I and II) and Ph.D. programs:

- calculus and/or statistics – one semester
- basic chemistry – two semesters
- advanced chemistry – one semester (i.e. analytical, bio-, inorganic, or organic chemistry)
- physics – one semester
- biological science – two semesters
- advanced biological science – one semester (i.e. botany, cell biology, ecology, evolution, plant physiology, systematics)
- genetics – one semester

These requirements can be met by any of the following:

- completing the above courses with a minimum C grade or equivalent
- completing equivalent courses
- passing qualifying exam assessing content knowledge of the above courses arranged by the Graduate Committee as needed
- providing the syllabus from a prior course which included the required subject matter

These prerequisites may be satisfied at either the undergraduate or graduate level. Otherwise, qualified applicants with prerequisite course deficiencies will receive (1) provisional admission or (2) a waiver of prerequisite course requirements based upon recommendation of the advisor, as explained below. The department recommends that all graduate students complete an M.S.

degree before entering a Ph.D. program. Students wishing to bypass the M.S. may petition to advance to the Ph.D. after admission to the program (see M.S. Bypass Option). Direct admission to the Ph.D. is granted only for a student who has already qualified for an outside fellowship or training grant support that requires a direct Ph.D. program.

Provisional Admission:

Prerequisite course deficiencies will be listed in the student's admission letter. Students admitted provisionally are expected to remove any deficiencies by the end of their first year. Students admitted on this basis will submit a written plan to the Graduate Committee Chair within 30 days of enrollment, detailing how the deficiencies will be met. A grade of 2.0 (C) or "pass" is required to remove a deficiency. In certain circumstances, a student may be allowed to take a test to remove a deficiency. Students who fail to fulfill deficiencies by the end of their first year will be prohibited from course registration.

Waiver of Prerequisite Course Requirements and/or GRE Requirement:

Advisors can choose to waive prerequisite course requirements according to program needs and this will be stated in the student's admission letter. Students that have been admitted prior to approval of these changes can have their advisors submit a letter to the Graduate Chair stating they wish to waive these requirements. Note of the waiver will be put into the student's departmental file. The candidate may request to have the general GRE requirement waived due to financial, geographic, or other hardship.

M.S. Bypass Option:

Admission to the Ph.D. program requires an M.S. degree involving research or approval to advance to the Ph.D. program after completion of at least one year in the M.S. (Option I) program. Advancement to the Ph.D. program without an M.S. degree will require Graduate Committee approval, as per policy below.

Students admitted to the M.S. program will follow the procedure below to request approval to bypass completion of the M.S. degree. Students desiring to advance to the Ph.D. program without having previously obtained an M.S. degree must demonstrate a high level of academic achievement, have excellent written and oral communication skills, and provide evidence of scholarly creativity. Students can petition to transfer from an M.S. to a Ph.D. program with the approval of their graduate advisor and the Graduate Committee, after completion of at least one year in the M.S. program. Evidence supporting the student's ability to successfully pursue a Ph.D. degree is to be submitted to the Plant Pathology Graduate Committee for review and final approval. Materials submitted to the Graduate Committee in support of the student's application or petition should include: 1) letter of intent from the student describing the proposed research; 2) academic transcripts; 3) a supporting letter from the major advisor; 4) candidate's current CV; and 5) delivery of a proposal seminar advertised in the Department.

Course Requirements:

A distinctive element of the graduate program in Plant Pathology is a compulsory curriculum comprising a set of graduate-level courses in the Department of Plant Pathology. The curriculum is critical to Plant Pathology graduate students achieving the program's learning objectives (described above). It clearly distinguishes the Plant Pathology graduate program from the graduate programs in Agronomy and Horticulture and Biological Sciences. The curriculum (**Table I**) is essentially the same curriculum established in 2006 that has been applied effectively in training graduate students in the Plant Pathology Specializations within the Agronomy and Horticulture and Biological Sciences graduate programs. Additional credit hours in PLPT 899 Thesis Research and PLPT 999 Dissertation Research also are required to meet the total credit hours of graduate coursework required for the degree, as specified by UNL Graduate Studies. Courses PLPT 899 and PLPT 999 do not currently exist and a proposal to establish the courses is being submitted to the CASNR Curriculum Committee concurrently with this proposal.

Table 1. Plant Pathology Graduate Curriculum (Course Requirements)*

M.S. Students (Option I and II)	PhD Students
PLPT 801 Biology of Pathogens, 3 cr hr PLPT 802 Ecology & Management of Plant Pathogens, 3 cr hr PLPT 891 Plant Disease Across Nebraska, 1 cr hr PLPT 968 Plant Pathology Seminar, 2** cr hr	PLPT 801 Biology of Pathogens, 3 cr hr PLPT 802 Ecology & Management of Plant Pathogens, 3 cr hr PLPT 891 Plant Disease Across Nebraska, 1 cr hr PLPT 968 Plant Pathology Seminar, 3** cr hr <u>One course from the following:</u> PLPT 866 Plant Pathogenic Nematodes, 3 cr hr PLPT 867 Plant Associated Microbes, 4 cr hr PLPT 963 Genetics of Host-Parasite Interaction, 3 cr hr PLPT 965 Plant Virology, 3 cr hr
Total PLPT credit hours: 9*	Total PLPT credit hours: 13-14*

*In addition to completion of these required courses, M.S. (Option I and II) and Ph.D. students must also meet other credit hour requirements as specified by UNL Graduate Studies

**PLPT 968 is a 1 credit hour course that must be taken multiple times to satisfy the total number of credits specified above

Comprehensive Exams:

Written comprehensive exams are required for all Ph.D. and M.S. (Option I and II) students. The type and format of the examination will be determined by the student's advisor and Supervisory Committee. These examinations are usually taken after the completion of all

coursework requirements. Guidelines for comprehensive exams will be consistent with guidelines stipulated by Graduate Studies.

Oral comprehensive exams may be required for both M.S. (Option I and II) and Ph.D. students at the discretion of the student's advisory or Supervisory Committee. For M.S. Option II students, the comprehensive examination in the minor field(s) (written and/or oral) may be waived subject to the approval of the minor department(s), provided all grades in the minor department(s) are at least a B or pass.

Research Requirements:

The subject of the thesis/dissertation should be chosen from the candidate's area of interest that includes aspects of research with implications in plant pathology, with input provided by the student's advisory or Supervisory Committee. The thesis/dissertation should reveal a capacity to carry out independent study or research and should demonstrate the student's ability to use the techniques employed in his/her field of investigation and to communicate research results.

Annual Progress Reports:

Annual Progress Reports are required from all graduate students in the Department and require approval by the student's Supervisory Committee. A student may have their GRA withdrawn if they do not have satisfactory progress toward degree completion documented prior to annual GRA renewal decisions.

Teaching Requirements:

All on-campus graduate students in the Department are encouraged to incorporate meaningful teaching experiences in their programs. Examples include: teaching or assisting in lab or lecture; organizing seminars; giving presentations; and contributing to extension and other educational outreach efforts. The student's teaching experience should be noted on their Annual Progress Report. The student's advisor should assist in contacting teaching faculty to arrange for appropriate teaching or extension opportunities.

Defense Requirements:

The thesis/dissertation and abstract in preliminary form must be approved by the adviser prior to applying for the final defense examination. The student will present a public talk describing his/her thesis/dissertation research. A closed-door oral examination by the Examining/Supervisory Committee will follow. The student passes the oral defense if no more than one member of the Examining/Supervisory Committee votes to fail the student. The Faculty Advisor will notify the Graduate Committee in writing of the outcome. If the student fails the examination, a written description of what the student must do before taking another exam must be filed with the Graduate Committee. All actions must comply with University of Nebraska Graduate Studies guidelines.

Thesis/Dissertation Requirements:

The student's Examining/Supervisory Committee will determine if they wish the student to present them with bound or digital copies of the thesis/dissertation. UNL's Office of Graduate Studies requires all graduating thesis/dissertation students to upload an electronic copy of their thesis/dissertation to the Digital Commons in order to complete their graduation requirements.

III. Review Criteria

A. Centrality to role and mission

The new Plant Pathology graduate program will be administered by the Department of Plant Pathology, a unit of the College of Agricultural Sciences and Natural Resources (CASNR) in the Institute of Agriculture and Natural Resources (IANR). Therefore, the new graduate program in Plant Pathology will play important roles in the missions of UNL, IANR and CASNR. The mission statement of UNL states "The University of Nebraska- Lincoln, chartered by the Legislature in 1869, is that part of the University of Nebraska system which serves as both the land-grant and the comprehensive public University for the State of Nebraska. The University of Nebraska-Lincoln has been recognized by the Legislature as the primary research and doctoral degree granting institution in the state for fields outside the health professions." As a land-grant University, the University of Nebraska is charged with instruction, research, and outreach in agriculture and mechanic arts not excluding other scientific or classical areas of study. The IANR was established through Nebraska legislative action to leadership in and service in agriculture, natural resources, and related fields of study. CASNR is home to 26 graduate degree programs (10 Ph.D., 14 M.S., two professional) providing instruction, research, and outreach in agriculture, natural sciences, and other related fields.

The proposed program in Plant Pathology is consistent with the respective missions of the University, IANR, and CASNR. It will provide research and academic training as part of the M.S. and Ph.D. degrees, allowing our students to become a hallmark for integrated training in science, spanning the breadth of basic (molecular/genomic) and applied research that will directly contribute to the improvement of farming, food production, and the quality of life in Nebraska and the world.

B. Relationship of the proposal to the NU Strategic Framework

Offering a graduate program in Plant Pathology will serve to address the mission of the University to provide opportunities for Nebraskans to enjoy a better life through access to high quality, affordable undergraduate, graduate and professional education. UNL is the only institution in the U.S. that has a Department of Plant Pathology and does not offer graduate degrees in Plant Pathology. By creating this new program, Nebraska residents intending to earn a graduate degree in Plant Pathology will no longer need to leave the state to earn such a degree. The proposed program will expand lifelong educational opportunities by providing additional terminal degree programs.

The proposed graduate program in Plant Pathology also serves to address the goal of building and sustaining undergraduate, graduate, and professional programs of high quality with an emphasis on excellent teaching. Building upon our history of producing graduate students that go on to serve in high profile positions in Plant Pathology, students entering the new graduate program will be even more competitive when seeking employment in plant pathology-related fields by holding a degree in Plant Pathology. This will also improve the quality of the experience for students by making it more student-centric and support department's aspirations to emphasize teaching excellence in graduate education. This, in turn, will allow an already strong department to be more competitive for national and international student fellowships. It also will elevate the national reputation of the Department of Plant Pathology, enabling the University to attract and retain the best faculty talent to the University.

The proposed graduate program also will serve to support the *pursuit of excellence and regional, national and international competitiveness in research and scholarly activity*. Producing a sustainable food supply requires the science of plant pathology for innovation in disease management. Creating a new graduate program in Plant Pathology will attract graduate participation in research and provide experiential learning opportunities, with implications from local to global. Plant pathology, as a discipline, is an interdisciplinary science and the training of students in a diverse science supports interdisciplinary graduate education. This also will position our Department to be competitive for USDA, NSF, and NIH training grant support to provide additional student opportunities.

C. Consistency with Comprehensive Statewide Plan for Postsecondary Education

The Department of Plant Pathology was established in 1920 with the mission to educate and conduct research related to plant disease management and basic pathogen understanding. Our department has contributed to the University of Nebraska mission for nearly 100 years. During that time, we have successfully trained scientists who have gone on to lead successful careers in multiple aspects of Plant Pathology in academia, government agencies, extension, agricultural production, or industry, in the United States and throughout the world.

Plant pathologists play a central role to agriculture in Nebraska, which is the foundation of Nebraska's economy. The two primary priorities of UNL are instruction and research, of which this new graduate program in Plant Pathology will provide both. Furthermore, Nebraska's postsecondary education institutions are to be student-centered and offer learning opportunities that are responsive to students' needs. Creating a new graduate program in Plant Pathology will make our program student-centric by providing coherency in the admission/administration process and eliminating unnecessary duplication of required courses for graduate students in our department that currently receive training in the existing parallel *Specializations* in Plant Pathology.

This new graduate program aligns with the Comprehensive Statewide Plan for Postsecondary Education in several other ways. By creating a formal graduate degree program, it will provide our students with a degree equivalent to our peer departments (Table 2). We anticipate that this will increase the demand for our graduates who have played key roles in Nebraska and nationwide efforts to combat plant diseases, which directly supports "the state's economic development goals by contributing to a competent and competitive workforce for our state". We anticipate this degree program will be more competitive and be able to attract more top candidates looking to obtain a degree within our field of research, enabling our program and "institute to remain highly competitive". As stated in our learning outcomes, this program "will foster critical thinking skills and provide graduates with the knowledge and workplace skills needed to be successful employees, innovative entrepreneurs, and responsible citizens on a global stage". Combined, this new graduate degree will enable increased placement of our students into the top institutions, companies, and organizations within our career field, "promoting an innovative and entrepreneurial culture that rises to the challenge of globalization".

D. Evidence of need and demand

Some of the most serious challenges and existential threats faced by humankind arise from the largely unchecked parasitism of crops by microbial pathogens. While worldwide yields of staple crops must increase 23% by 2040 in order to feed the projected mid-century human population, just a handful of fungal, oomycete, bacterial and viral plant pathogens have the capacity to devastate global food security. Moreover, trade and climate change are relocating pathogens to previously pristine environments. Not just crops, but the microbial destruction of forests and ornamental plants is accelerating. Therefore, there is a critical need for scientists with advanced training in plant pathology who can identify plant pathogens, conduct research to understand their biology, and develop strategies and tactics for effective management of the plant diseases they cause. For example, the misidentification of a fungal infection on a plant imported from continental Europe to be sold in UK nurseries led to the release of the causal agent of ash dieback, a fungus likely to wipe out the ash tree population of the UK island. Ironically, following a previous tree-killing fungal outbreak that destroyed elm trees in the 1970's, ash became an alternative host for rare elm tree lichens. These lichens will now likely be driven to extinction along with the ash trees. Collectively, the impacts of plant diseases are far-reaching, unpredictable, and extend deep into the environment.

Closer to home, wheat grown in the state of Nebraska has no resistance to two pathogens causing blast and rust diseases that are ravaging crops in Brazil and the Middle East and Asia, respectively. Nebraska wheat yields would be decimated if these diseases emerged here. Famine caused by wheat rust is described in the Bible, and have likely plagued humankind since the dawn of agriculture. Therefore, the need for plant pathology-trained researchers to identify, understand, and develop strategies to manage diseases caused by plant pathogens in our dynamic world is critical. Today's disease management solutions, however, might not be appropriate for

the farms of tomorrow. Fungicides, for example, can damage the environment, leach into groundwater and are often too expensive for widespread use in developing countries. Plant pathologists will be the vanguard in identifying plant pathogens and developing sustainable, safe, and affordable disease management strategies that will benefit Nebraskans and the world.

The Department of Plant Pathology has a long and distinguished history of training highly talented and motivated professionals who, through innovations and discoveries, have a significant positive impact on the future of the world. The expanding interest in the quality of our global environment and increasing global demand for high-quality food, fiber, tree and ornamental plants provides many opportunities for plant pathologists. These professionals often are sought by government and nonprofit organizations and corporations to participate in teams of specialists addressing international agricultural development. Such employment may be on a continuing or a consulting basis. Our graduates can be employed in any of the following institutions, organizations, or companies:

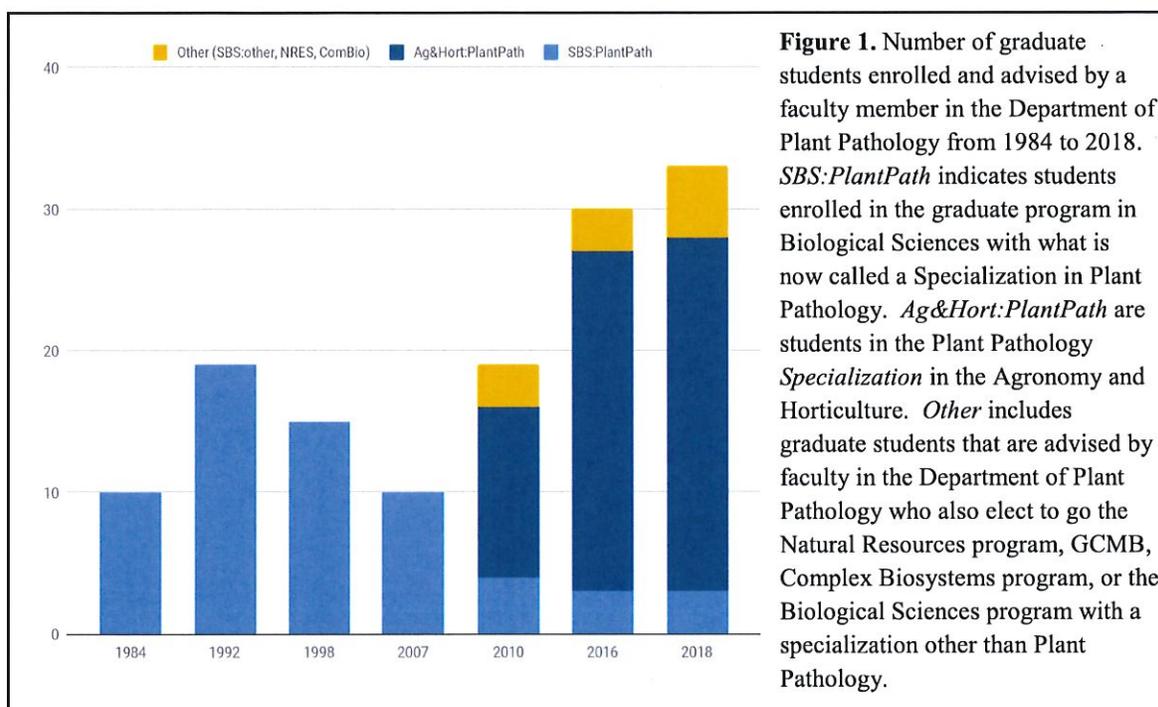
- Colleges and universities (research, teaching, and extension)
- Agricultural consulting companies
- Agrochemical companies
- Seed and plant production companies
- Tissue culture laboratories
- Diagnostic laboratories
- International agricultural research centers
- Botanical gardens and arboreta
- Biotechnology firms
- Biological control companies
- Private practice
- Nurseries and garden centers
- Public policy organizations
- Lawn and landscape maintenance firms
- USDA-Agricultural Research Service
- USDA-Forest Service
- USDA-Animal & Plant Health Inspection Service
- EPA (Environmental Protection Agency)
- State departments of agriculture
- Environmental, agricultural, and patent law firms

Demand for the Program:

The number of graduate students in the Biological Sciences program advised by faculty in Plant Pathology ranged from 10 to 20 for more than 20 years, from 1984 to 2007 (**Figure 1**).

Requirements and curriculum for graduate students in Plant Pathology were formalized with the

creation of the parallel *Specializations* in Plant Pathology in graduate programs administered by Department of Agronomy and Horticulture and the School of Biological Sciences. This increased the demand for our program. While the two programs are parallel – i.e., entry requirements are similar and a standard curriculum is required for students in both programs – the *Specialization* in Agronomy and Horticulture provided opportunities to attract new students who were not from traditional biology backgrounds. Graduate student enrollments in the Plant Pathology *Specialization* went from 16 in 2010, to 27 in 2016 and 28 in 2018. In addition to the *Specialization*, graduate students advised by faculty in the Department of Plant Pathology also go through other Biological Sciences graduate programs, such as the Natural Resources and Complex Biosystems programs. When those students are included, the total number of graduate students currently advised by our faculty conducting plant pathology research is more than 30.



It is expected that the majority of the new graduate students that would typically be admitted through the parallel *Specializations* instead will seek admission through the new program in Plant Pathology. After a period of four to five years, it is estimated that this transition will be complete and all graduate students in the Department will be enrolled in the graduate program in Plant Pathology. This program is not dependent upon graduate students serving specific functions in the Department, such as teaching courses, and so there is no set number of students needed to maintain the program. However, we envision attaining a graduate student enrollment of 25 students and growing to 30 students, which is 20% higher than the average student-to-faculty ratio in other Plant Pathology graduate programs in the U.S. (**Table 2**). This number of

students will also provide consistent enrollments in our courses and we are already close to meeting our goal of 30 students enrolled in the program each year (**Figure 1**).

For the small number of graduate students advised by faculty in the Department of Plant Pathology that are in programs other than the parallel *Specialization* in Plant Pathology (**Figure 1**), it is anticipated that those students will unlikely seek admission to the new graduate program in Plant Pathology because they are not currently seeking admission to the *Specializations* in Plant Pathology. The curriculum within those other programs is distinct from our proposed curriculum, as are the career options sought by graduates in those programs. However, this change will not prevent our faculty from working with future students interested in pursuing graduate studies through other departments. Faculty wanting to advise students in those programs will maintain or seek courtesy appointments in those departments. For future program development, faculty in our Department will continue to foster positive and synergistic relationships with departments (SBS and Agronomy and Horticulture) with which we have had a long and fruitful history.

E. Avoidance of unnecessary duplication

Similar and Overlapping Programs at UNL:

The training in Plant Pathology is highly distinct and no other program currently at UNL or in Nebraska will follow the same curriculum. It is anticipated that the parallel *Specializations* in Plant Pathology offered through SBS and Agronomy and Horticulture will be discontinued when the new graduate program in Plant Pathology is established. The new program then will be the only graduate program in the University of Nebraska system in which the research and coursework focuses on plant pathology. After establishment of the new Plant Pathology major, a minor in Plant Pathology will be available for students in other graduate majors. This will allow students not intending to pursue research in plant pathology to obtain recognition for emphasizing graduate coursework in plant pathology.

A program that is complementary to the proposed Plant Pathology program currently exists in the form of the Doctor of Plant Health (DPH) program. The DPH was established in 2010, in part by faculty in the Department of Plant Pathology, and Department members continue to serve on DPH supervisory committees and provide instruction to DPH students in Plant Pathology graduate courses. Gary Hein, the program's director and a courtesy faculty member in the Department of Plant Pathology, actively participates in the Department discussions relative to teaching to ensure our course offerings are beneficial to both programs. The goal of the DPH program is to educate students to become plant health practitioners. It is a professional program analogous to a medical or veterinary program, wherein graduates of the DPH are prepared to understand and diagnose all plant health issues and manage the entire plant production system. In contrast to the Plant Pathology graduate program which emphasizes research training relating

to plant pathology, the education of DPH students primarily involves graduate-level coursework and is supplemented with internships to provide hands-on experience in the diagnosis and management of plant health problems. While DPH students are required to take graduate plant pathology courses, some of which comprise the Plant Pathology Graduate Curriculum, they must also complete coursework in entomology, weed science, soil science, and agronomy, as well as courses relating to leadership and environmental/agricultural policy or law. Thus, the DPH program is distinct from the proposed graduate program in Plant Pathology. Because of the differences in training between DPH and Plant Pathology graduate students, the career opportunities for DPH and Plant Pathology graduates do not significantly overlap and there is a distinct need for graduates from each program.

Other Graduate Programs in Plant Pathology:

The new Plant Pathology graduate degree program at UNL will be the only graduate program in the field of plant pathology in Nebraska. Among UNL’s 10 Peer Institutions, only two (Ohio State University and University of Minnesota) have a Department of Plant Pathology and both offer a graduate program in Plant Pathology. Four other UNL Peer Institutions (Colorado State, Iowa State, Purdue, and University of Illinois) offer training in plant pathology through a combined department (e.g., Plant Sciences, Plant Pathology and Microbiology, etc.). Across the United States, there are fewer than 30 departments that have “Plant Pathology” as part of their name and, among those, there are 13 that are standalone Departments of Plant Pathology. Except for the University of Nebraska, all other institutions with a standalone department offer graduate degrees in Plant Pathology (**Table 2**). Enrollments in these programs range from 15 to 61 students with an average of 36 students.

Table 2. Universities in the United States that have a standalone Department of Plant Pathology, with graduate degree program in Plant Pathology (M.S. and Ph.D.) indicated. Among these 13, the UNL Department of Plant Pathology is the only one without the M.S. and Ph.D. degrees in Plant Pathology.

State	University	MS		Student		Faculty	Student:Faculty Ratio
		PhD	Enrollment	Enrollment	Enrollment		
AR	University of Arkansas*	yes	yes	21		13	1.6
CA	University of California-Davis	yes	yes	39		20 (+6 adjunct)	1.5
FL	University of Florida	yes	yes	61		36	1.7
GA	University of Georgia	yes	yes	47		28	1.7
KS	Kansas State University	yes	yes	20		28	0.7
KY	University of Kentucky	yes	yes	15		14 (+2 adjunct)	0.9
MN	University of Minnesota	yes	yes	26		20 (+12 adjunct)	0.8
ND	North Dakota State University	yes	yes	48		15 (+8 adjunct)	2.1
NE	University of Nebraska-Lincoln	no	no	28**		18 (+2 adjunct)	1.4
NC	North Carolina State University	yes	yes	32		27 (+3 adjunct)	1.1
OH	Ohio State University	yes	yes	59		15 (+9 adjunct)	2.5
WA	Washington State University	yes	yes	27		26 (+4 adjunct)	0.9
WI	University of Wisconsin-Madison	yes	yes	35		14 (+7 adjunct)	1.7

* This department will be merged with Entomology in 2018-2019

** This represents students enrolled in the *Specializations* in Plant Pathology; 25 in Agro and 3 in SBS

The only state contiguous to Nebraska to offer graduate degrees in Plant Pathology is Kansas. Despite close proximity to other states with programs, including Kansas State University, our *Specializations* in Plant Pathology have maintained enrollments over time (**Figure 1**) and at student-to-faculty ratios that are equal to the average ratio (1.4 student-to-1 faculty) observed among all other formalized programs in Plant Pathology (**Table 2**). The new program proposed here will improve our competitiveness among other Plant Pathology Programs and provide Nebraska students opportunities for a more competitive education leading to advanced degrees in Plant Pathology. The proposed curriculum was developed through consensus of the plant pathology faculty.

F. Adequacy of resources:

Faculty/Staff:

The Department of Plant Pathology places a high priority on teaching and all faculty members, regardless of their designated appointment, embrace the Department's mission to provide students with innovative learning opportunities. The Department of Plant Pathology at UNL has a strong history, with national and international recognition. Three faculty members have been selected as Fellows of the National Academy of Science. Existing faculty within the Department of Plant Pathology will support this degree program. The scope of graduate teaching activities in the Department ranges from training and guiding graduate research and presentation of graduate-level on campus and online courses.

The Department has responsibility for teaching, research and extension. The Department consists of 18.5 state-supported faculty [SE 1] (4 assistant professors, 4 associate professors, 8 full professors, 1 associate professor of practice, 1 assistant professor of practice, 1 extension educator). Faculty efforts for the 18.5 state-funded, Lincoln-based members expressed as full-time equivalents (FTEs) are as follows: 10.94 FTE in research, 3.03 FTE in teaching, 3.26 FTE in extension, 1.0 FTE in administration and .32 FTE in service. The Department had, until the fall of 2014, less than 1.8 FTE allocated to teaching shared among 9 faculty members, and now has 3.03 teaching FTE shared across 12 faculty with the hiring of 4 new faculty members in the last 5 years. All of the courses required for a graduate program in Plant Pathology are already being taught by faculty within Plant Pathology. Due to the recent faculty hires, it is not anticipated that additional faculty will be required if there is program growth.

Despite the Department having just under 3 FTE allocated to teaching, shared among 11 faculty members with teaching appointments, a concerted effort has been made to provide students with a comprehensive knowledge of Plant Pathology by involving all faculty members in instruction. This has resulted in teaching being well integrated with ongoing research and extension programs. The scope of teaching activities in the Department ranges from training and guiding graduate research, student recruitment, presentation of resident and online classes, and participation in other programs in the College of Agricultural Sciences and Natural Resources and the College of Arts and Sciences.

Table 3. Faculty in the Department of Plant Pathology with teaching appointments or graduate faculty status, their current rank, appointment, number of graduate students currently advised, and courses of primary responsibility.

Graduate Faculty Name	Rank	Appointment*	Students	
			Advised	Primary Instructor for:
Gerard Adams, Ph.D.	Assoc. Professor of Practice	33T, 15R, 2S	-	Co-I: PLPT 801, PLPT 802, PLPT 867, PLPT 891 I: PLPT 892-004, PLPT 369L
Anthony Adesemoye, Ph.D.	Asst. Professor	58R, 40E, 2S	2 (Agro)	-
James Alfano, Ph.D.	Professor	20T, 78R, 2S	1 (SBS), 1 (Agro)	PLPT 963: Genetics of Host-Microbe Interactions
David D. Dunigan, Ph.D.	Research Professor	100R	-	-
Sydney Everhart, Ph.D.	Asst. Professor	20T, 78R, 2S	3 (Agro)	PLPT 802: Ecology & Management of Plant Pathogens; PLPT496/892: Disease Dynamics & Evolution
Deanna Funnell-Harris, Ph.D.	Professor (Adjunct)	100R-other	-	-
Hernan Garcia-Ruiz, Ph.D.	Asst. Professor	10T, 88R, 2S	1 (SBS)	PLPT 965: Plant Virology
Loren Giesler, Ph.D.	Professor	100A	2 (Agro)	-
Steven Harris, Ph.D.	Professor (Adjunct)	100A-other	-	-
Robert Harveson, Ph.D.	Professor	48R, 50E, 2S	-	-
Josh Herr, Ph.D.	Asst. Professor	20T, 78R, 2S	1 (SBS), 1 (Agro), 3 (other)	PLPT 892-009 ST: Microbial Ecology
Tamra Jackson-Ziems, Ph.D.	Professor	10T, 10R, 78E, 2S	2 (Agro)	PLPT 891: Plant Diseases Across Nebraska
Amit Mitra, Ph.D.	Assoc. Professor	20T, 78R, 2S	2 (Agro)	PLPT 801: Biology of Plant Pathogens PLPT 867: Plant Associated Microbes
Thomas Powers, Ph.D.	Professor	15T, 83R, 2S	3 (Agro)	PLPT 866: Nematology
Brandi Sigmon, Ph.D.	Asst. Professor of Practice	75T, 25R	-	MBIO 101: Intro Microbiology; BIOS 206: General Genetics; SCIL 101: Science & Decision Making
James Steadman, Ph.D.	Professor	10T, 88R, 2S	-	-
Satyanarayana Tatineni, Ph.D.	Professor (Adjunct)	100R-other	3 (Agro)	-
James L. Van Etten, Ph.D.	Professor	98R, 2S	2 (other)	HONS 198: Creativity in the Sciences and the Arts
Stephen Wegulo, Ph.D.	Professor	40R, 58E, 2S	1 (Agro)	-
Richard Wilson, Ph.D.	Assoc. Professor	10T, 88R, 2S	1 (Agro)	PLPT 968: Plant Pathology Seminar Series
Gary Yuen, Ph.D.	Professor	40T, 58R, 2S	3 (Agro)	PLPT 369: Intro. Plant Pathology; PLPT 414/814: Turfgrass Disease Management; PLPT 817: Plant Pathology: Principles and Application
Lirong Zeng, Ph.D.	Assoc. Professor	20T, 78R, 2S	1 (Agro)	BIOS 497/897/PLPT 892-001

*Appointments are expressed as percentages of a full-time equivalent (FTE), wherein letters designate whether effort is directed towards: T = teaching, R = research, E = Extension, S = service, and/or A = administration.

Administrative support for this program will be handled through Professor Amit Mitra (current Chair for *Specializations* in Plant Pathology) and the admission committee, which will be created upon approval of the degree program. Existing support staff supported by the Department of Plant Pathology will also support this program. One support staff position will be redirected to be responsible for program coordination (0.25 FTE) and is a current staff position in the Department.

Physical Facilities:

The degree program will be administered through the Department of Plant Pathology, which is primarily housed on the 4th floor of Plant Sciences Hall (main office 406 PLSH), located on the East Campus of UNL. Faculty in the Department of Plant Pathology who guide graduate students are concentrated in Lincoln, but some with research and extension appointments (R. Harveson and A. Adesemoye) are located in Scottsbluff (Panhandle Research and Extension Center) and North Platte (West Central Research and Extension Center), respectively, with laboratories equipped for microbiological and molecular research equal to those on the UNL main campus. Some Lincoln-based faculty members are situated in the Beadle Center (J. Alfano and L. Zeng) and in Morrison Hall (J. Van Etten and H. Garcia-Ruiz). All of the sites are well-equipped for plant pathology research, particularly the Beadle Center and Morrison Hall, which are state-of-the-art research facilities. Field work by graduate students is conducted both at Research and Extension Centers and in grower fields, depending upon the nature of the work. Most graduate students focus their field research activities at one or more of the Research and Extension Center farms. Considerable research also is conducted in the Plant Pathology Greenhouse Complex, which consists of four ranges, fifteen rooms and 11,232 square feet of greenhouse space. Space is provided in the Greenhouse Complex as needed for instructional purposes. For instruction, faculty members have access to the Department's conference room/classroom (406B Plant Science Hall), in addition to lecture classrooms in Plant Sciences Hall, adjoining Keim Hall, Morrison Center, and in the Beadle Center on City Campus. Laboratory portions of the Department's graduate courses have traditionally been presented in the instructor's research laboratory or in 274 Plant Science Hall, a classroom designed and used for teaching undergraduate laboratory courses. No additional facilities are required for the proposed graduate program.

Instructional Equipment and Informational Resources:

No additional instructional equipment and informational resources are required.

IV. Abstract of Proposal

The purpose of this proposal is to establish a new Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degree programs in Plant Pathology at UNL. Plant pathology is the science of plant disease, which encompasses the study of the organisms that cause disease in plants; the study of the interactions between these causal agents, the plant, and the environment during the

disease process; and the development of strategies and tactics for managing or controlling plant disease. Plant pathology graduate training has existed "unofficially" at UNL for over 100 years, with our more recent graduate students being administered through parallel Specializations in two academic programs: Biological Sciences in the School of Biological Sciences (SBS), College of Arts and Sciences; and Agronomy and Horticulture in the Department of Agronomy and Horticulture (A&H), College of Agricultural Sciences and Natural Resources. The new major will consolidate plant pathology graduate training within its formal administrative unit, the Department of Plant Pathology.

Key Reasons to Create a New Graduate Program in Plant Pathology

Creating a single graduate program will make our graduate training more student-centric, thus allow our Department to meet one of the goals for graduate programs defined by the Nebraska's Coordinating Commission on Postsecondary Education. The new degree program will enhance our students' experience in several ways:

- There are currently disparities between the SBS and A&H graduate programs as to admission standards and criteria for assessing student progress. In the new major, rigorous admission standards established by our Department will be applied uniformly to all applicants, thus ensuring that all in-coming students have the necessary background to succeed. All students within the program will be administered by a single faculty body, thus ensuring that the same set of standards are applied to all of our students in evaluating progress towards their degrees.
- Currently, students in the Specialization in A&H are required take additional courses above the standard Plant Pathology curriculum. The new major will place uniform curricular requirements on all of our students.
- Students in our department would no longer experience a sense of "dual membership." Because all of our students will have a single home department, they will be able to engage with each other and the Department with a greater sense of community.
- The Department will be better positioned to recruit students whose funding source specify that their degrees must be in Plant Pathology.
- Establishing a Plant Pathology Graduate Program will allow graduate students in other programs to earn a minor in Plant Pathology and, thus, obtain recognition for emphasizing graduate coursework in plant pathology. At the same time, this could increase enrollment in Plant Pathology courses.
- The University of Nebraska is one of 13 institutions in the United States with a "Department of Plant Pathology," but is the only one that does not offer graduate degrees in Plant Pathology. Having Plant Pathology degrees will benefit our graduates when competing in the job market for plant pathology-related positions.

Feasibility of the proposed program

- We currently have 28 graduate students being guided by 18 state-funded Plant Pathology faculty and two adjunct USDA faculty. The current student/faculty ratio of 1.4 is equal to the

national average among plant pathology departments. We anticipate being able to grow the program and increase recruitment of top students once established as a standalone program.

- Required courses for the new major are currently being taught by current faculty members. No additional resources are required or being requested to establish this program.

Support for Creation of the New Graduate Program in Plant Pathology:

Letters of support were contributed by the following individuals representing these groups:

Departments administering current Specializations in Plant Pathology:

- Dr. Michael Herman, Professor and Director, School of Biological Sciences, UNL
- Dr. Deborah Brown, Associate Professor and Chair of the Graduate Committee, School of Biological Sciences, UNL
- Dr. Richard Ferguson, Professor and Interim Department Head, Agronomy & Horticulture, UNL
- Dr. Rhae Drijber, Professor and Chair of the Graduate Degree Program, A&H, UNL

Allied programs at UNL and K-State:

- Dr. Gary Hein, Professor and Director of the Doctor of Plant Health Program, UNL
- Dr. Martin Draper, Professor and Head, Department of Plant Pathology, Kansas State University, Manhattan, KS

Alumni and Industry:

- Dr. Jan Leach (UNL M.S. 1977), Professor and Associate Dean for Research, College of Agricultural Sciences, Colorado State University
- Dr. Lisa Keith (UNL Ph.D. 1998), Research Plant Pathologist, USDA-ARS, Hilo, HI
- Mrs. Amy Timmerman (UNL M.S. 2006), Extension Educator for Holt and Boyd Counties, University
- Dr. Jeffrey Barnes, Group Leader and Sr. Manager – Fungicide R&D North America, BASF Corporation

October 11, 2018

Professor Loren J. Giesler
Department of Plant Pathology Head
406 Plant Science Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0722

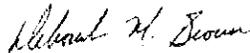
Dear Professor Giesler,

We, the undersigned, represent the graduate committee and faculty of the School of Biological Sciences (SBS) and have a long-standing research and academic relationship with the Plant Pathology department. For the last twenty years, the School of Biological Sciences Graduate Degree Program has included an option for an emphasis in Plant Pathology in which students were recruited and administratively managed through the School, yet received research training by faculty with full time appointments in the Plant Pathology Department.

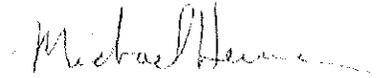
We are writing this letter in support of the proposed new graduate program that would award graduates a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln. In addition, a Plant Pathology Graduate Program can also offer a Minor in Plant Pathology, thus increasing the number and diversity of students served by the program. We believe this new degree program will have a minimal impact on the Biological Sciences degree program, while having a significant positive impact on those students who seek a degree specifically in Plant Pathology. The SBS Graduate Committee and faculty voted unanimously in support of your proposal.

We also affirm that both SBS and the Department of Plant Pathology have benefited from certain Plant Pathology faculty having curtesy appointments in SBS to be able to serve as advisors for students within the SBS Genetics, Cell and Molecular Biology (GCMB) specialization. We expect this arrangement to continue and be unaffected by the new Plant Pathology Graduate Program. However, this arrangement, and our support for the program, will have to be revisited should the Plant Pathology Graduate Program seek to develop a mechanism that would compete for GCMB students, for example by offering a plant molecular biology or microbiology specialization or track.

Sincerely,



Deborah M. Brown, Ph.D.
Associate Professor
Chair, SBS Graduate Committee
School of Biological Sciences



Michael Herman, Ph.D.
Professor and Director
School of Biological Sciences

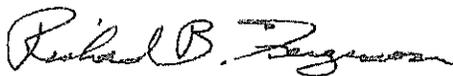
September 24, 2018

Professor Loren J. Giesler
Head, Department of Plant Pathology
406 Plant Science Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0722

Dr. Giesler –

I am writing to express the support of our department for the proposed new graduate program that would award Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) degrees in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln. In recent history the graduate program in Plant Pathology has been managed as part of the graduate program in Agronomy and Horticulture, and we recognize that moving to an independent program in Plant Pathology will slightly decrease apparent participation in our graduate program. However, we fully recognize and support the desire of faculty in Plant Pathology to have an independent program, most directly meeting the needs of students in plant pathology.

Sincerely,



Richard B. Ferguson
Professor and Interim Head

cc: Martha Mamo
Roger Elmore
Rhae Drijber
Don Lee
Kay McClure-Kelly

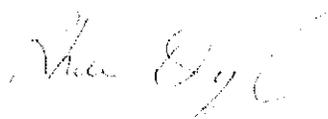
September 28, 2018

Professor Loren J. Giesler
Head, Department of Plant Pathology
406 Plant Science Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0722

Dr. Giesler,

Please accept this letter from me as Chair of the Agronomy & Horticulture Graduate Committee in full support of the proposed new graduate program that would award Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) degrees in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln. The graduate program in Plant Pathology has been managed for many years as part of the graduate program in Agronomy and Horticulture, and with the growth in students and new faculty in the Department of Plant Pathology, the move to an independent graduate program is not only timely but necessary. In the current highly competitive recruitment environment for graduate students having a stand-alone and identifiable graduate program in Plant Pathology will bolster recruitment outcomes. Although this may impact our departments graduate student numbers slightly we anticipate little change in course enrollments and with the creation of a minor in Plant Pathology enrollment in our classes is likely to increase. Also, please don't hesitate to call on us for assistance in getting your program up and running!

Sincerely,



Rhae A. Drijber
Chair, Agronomy & Horticulture Graduate Committee.
Professor of Soil Microbial Ecology

cc: Richard Ferguson
Martha Mamo
Roger Elmore
Don Lee
Kay McClure-Kelly

Dr. Loren Giesler, Head
Department of Plant Pathology
406 Plant Science Hall
University of Nebraska – Lincoln
Lincoln, NE 68583-0722

Dear Dr. Giesler,

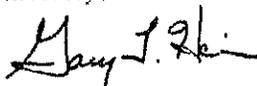
I am writing to support the proposal by the Department of Plant Pathology in the College of Agricultural Sciences and Natural Resources for new Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) programs in Plant Pathology. These proposed degree programs would replace the current specialties in Plant Pathology offered through the Department of Agronomy and Horticulture and the School of Biological Sciences. As Director of the Doctor of Plant Health Program, I strongly support this proposal.

I do not feel the current specialty optimally serves the vast majority of graduate students in the Plant Pathology Department. As a Courtesy Professor in the Department of Plant Pathology who has co-advised graduate students in the current specialty, I feel the proposed changes would better address and much more accurately describe the intended career directions of the students seeking these degrees. Thus, I agree that the proposed changes will enhance the Department's profile in plant pathology and recruitment and placement opportunities.

The Department of Plant Pathology is a central component of the Doctor of Plant Health (DPH) Program, and it has strongly embraced the DPH Program. Thus, it is critical to the DPH Program that the department remain active and vibrant in all aspects of its tri-partite mission (teaching, research, and extension). This proposal could strengthen the department's identity and enhance all aspects of its mission. Our DPH students take several courses in Plant Pathology, interact regularly with Plant Pathology faculty and graduate students, and add diversity of thought to the department. These interactions provide considerable benefit for our DPH students during their degree program, but they will also provide our students strong connections to plant pathology throughout their careers. The long-term stability and vibrancy of the Plant Pathology Department will also enhance the reputation of the DPH Program.

I strongly support this proposal as it will positively impact the quality and functioning of these graduate programs. Please feel free to contact me if you have additional questions.

Sincerely,



Gary L. Hein, Director
Doctor of Plant Health Program

23 September 2018

Loren J. Giesler
Professor and Head
Department of Plant Pathology
406 Plant Science Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0722

Dear Dr. Giesler:

I am pleased to offer my opinion to your department's efforts to offer a degree in plant pathology. I have a broad knowledge of plant pathology programs across the country after my ten years as a National Program Leader for Plant Pathology and Integrated Pest Management. I have also been familiar with the UNL department following more than 25 years of working in plant pathology in the North Central region. While I have no direct connection to the department, I have collaborated with Dr. Yuen on Fusarium head blight research and with you on several soybean disease projects.

Admittedly, I was surprised when I learned just last February that the degrees being granted from the Plant Pathology Department at UNL were not actually degrees in Plant Pathology. I find that to be illogical when the program of study is in plant pathology. As such, I am supportive of the recently proposed graduate program that would award graduates a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln. I know of no other stand-alone plant pathology departments that do not grant degrees in plant pathology. Many combined departments grant degrees in allied disciplines with an emphasis in plant pathology, similar to what UNL is doing now, except the disciplines are housed in that department. As a stand-alone department, they should offer their own degree and the students will benefit from that clear recognition that the degree is focused on their discipline.

The UNL Department of Plant Pathology has the largest faculty roll that I can recall in my career. The graduate student enrollment is strong and their quality is competitive. If the faculty numbers can be maintained and grant funding can be sustained, a fairly stable student census of 20-30 should be reasonably attainable. If graduate minors are offered at UNL, a plant pathology minor could draw more students from allied disciplines to help hold class enrollments above thresholds. Our plant pathology courses at K-State have significant enrollment from outside our department. These students are important for us to offer the breadth of coursework in the science that we do. There are plant pathology degree granting programs throughout the region. However, we see a steady demand for placement from students. At Kansas State, we can accept only about half of the applications we receive each year. Adding another program and increasing the number of well-trained plant pathology graduates should not be threatening to other programs in the region and will be important in filling the need for the

p. 2

upcoming retirements of baby-boomers from academic, industry and regulatory positions. I expect 1/3 of the tenure-track faculty in the Plant Pathology Department at K-State to retire within the next five years. A study of the discipline led by David Gadoury at Cornell and endorsed by the American Phytopathological Society indicates that the next ten years will be a watershed for the science as we try to maintain presence, influence and impact for a world population that is growing and growing hungry.

I do hope that your request is approved. Your faculty has some real strengths that are complementary to our department in Kansas. Together we are serving the central Great Plains region well. With this change, your department will become stronger.

Sincerely,



Martin A. Draper
Professor and Head
Department of Plant Pathology

Interim Associate Dean, Research and Graduate Programs
Interim Director, K-State Research and Extension
College of Agriculture



College of Agricultural Sciences
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September 24, 2018

Dr. Loren J. Giesler
Professor and Head
Department of Plant Pathology
406 Plant Science Hall
Lincoln, NE 68583-0722

Dear Loren:

It is my pleasure to provide this letter in support of the proposed new graduate program that would award graduates a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln.

My comments are based on over 35 years of experience as a Plant Pathologist in academia, and many years of service to our professional scientific societies. I am a former student at the University of Nebraska-Lincoln, earning both a B.S. (1975) and M.S. (1977) in Microbiology from UNL. One of the most important reasons I entered agricultural research was due to undergraduate research experiences in the Department of Plant Pathology at UNL. The training and mentorship I received from faculty in this department were crucial in my decision to pursue a Ph.D. and career in Plant Pathology. I am now a practicing plant pathologist, with the titles of University Distinguished Professor and Research Associate Dean at Colorado State University. I am a Fellow and a past President of the American Phytopathological Society (APS), a premier scientific society for plant pathologists. I currently serving as the President of the International Society of Plant Pathology.

The Plant Pathology department at UNL among the strongest departments in the country, and is one of the few (one of 13) that still maintains a unique identity. Given the fragmentation and dilution of the discipline of plant pathology, having a program that offers graduate students flexibility in their programs and a degree that specifies Plant Pathology as their major will provide your department and students a competitive advantage. The options of both a major and minor in the field will not only increase enrollment, but will address an important problem our stakeholders in industry point out, i.e., the need for cross-trained scientists. Thus, offering graduate degrees in Plant Pathology brings a strong focus to graduate students and their success, and will enhance overall competitiveness.

I wish you the best as you move forward with the development of the Plant Pathology Graduate Program.

Sincerely,

Jan E. Leach
Associate Dean for Research, College of Agricultural Sciences
University Distinguished Professor, Colorado State University



United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

September 21, 2018

Professor Loren J. Giesler
Department of Plant Pathology Head
406 Plant Science Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0722

Dear Dr. Giesler,

It is with great pleasure that I write this letter in support of the proposed new graduate program that would award graduates a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln. I am a Research Plant Pathologist at the USDA ARS in Hilo, HI for more than 16 years now. My current research focusses on the biology, detection, and management of invasive pathogens causing disease on crops grown under tropical and sub-tropical conditions. My main goal is to help solve real-world problems in an environmentally sound and economically viable way. I was also a Graduate Research Assistant in the Department of Plant Pathology at the University of Nebraska in Lincoln from 1993 to 1998, where I pursued my PhD with an emphasis in Plant Pathology created in the School of Biological Sciences (SBS).

I believe the new graduate program in Plant Pathology is an exciting opportunity for the University to build upon the unique strengths of their graduate program. Among other things, it will help to streamline the admission process for students by making the department the first point of contact for students, it will encourage the development of professional clubs at the University, and it will allow the offering of a Minor in Plant Pathology. A graduate program in Plant Pathology would also allow for an innovative academic program tailored to preparing students for a rewarding and challenging career in plant sciences. Since so few departments in the U.S. are stand-alone

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USDA is an Equal Opportunity Employer



United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

Departments of Plant Pathology, it is critical that the University of Nebraska join forces to provide graduate students the opportunity to become more competitive when seeking employment in plant pathology-related fields by holding a degree that specifies Plant Pathology as the major. This would also help employers find quality applicants who are likely to have the education and experience they seek.

The time spent in Nebraska is near and dear to my heart and I believe I am a successful Plant Pathologist today due in large part to the education and experience I received at UNL. I strongly support the development of the M.S. and Ph.D. in Plant Pathology for the reasons mentioned above and I welcome the opportunity to answer any questions you may have. Thank you for your time.

Sincerely,

Lisa Keith

Lisa Keith, Ph.D.
Research Plant Pathologist, USDA-ARS, PBARC

Daniel K. Inoué Pacific Basin Agricultural Research Center (DKI-PBARC)
Tropical Plant Genetic Resources and Disease Research Unit
64 Nowelo Street, Hilo, Hawaii 96720-2788
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Dr. Loren Giesler
Department of Plant Pathology Head
406 Plant Science Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0722

Dear Dr. Giesler,

My name is Amy Timmerman and currently work as a county based extension educator in Nebraska with the responsibility of cropping systems with special emphasis in plant pathology. My career in extension began with my graduate program at the University of Nebraska where I completed by Master of Science in Biological Systems with an Emphasize in Plant Pathology. As an Extension Educator, I still work closely with faculty in the Department of Plant Pathology in the development of educational materials and research plots/demonstration to benefit the clientele of Nebraska.

I am writing this letter in support of the proposed new graduate program that would award graduates a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln.

In Nebraska Extension, we are encouraged to specialize in subject matter areas and to work closely with faculty members in that discipline to continual improve outreach and education. With the current model in Nebraska extension, it is assuring that there is a solid team in each of the geographic areas of the state that can address all the issues/concerns a grower can encounter each year. Plant Pathology serves a critical role in completing that team along with entomology, weed science, soil science, and general agronomy. By having future graduates having this specific degree, it will make them more competitive for future extension educator positions throughout Nebraska extension because their expertise is clearly identified.

For my current position, it was critical when I started my position that I could demonstration to my administrations that I fully understand all concepts of plant pathology since my M.S. is in Biological Sciences. From the title of my degree it was not clear if I understood agriculture and in particular the impacts of plant pathology on Nebraska agriculture. By having a degree stating Plant Pathology, it provides future students more clarity and confidence to future employers what they can offer to their company or business.

The Department of Plant Pathology at the University of Nebraska is one of the last stand alone Plant Pathology Departments in the U.S. This department has great history with two of the three National Academy of Science Award winners from Nebraska. The department continues to be a leader in research and extension in the U.S. The University of Nebraska should be proud to state they have students graduating with a M.S. or Ph.D. specifically in Plant Pathology.

Sincerely,

A handwritten signature in black ink that reads "Amy Timmerman". The signature is written in a cursive style with a prominent flourish at the end.

Amy Timmerman
Extension Educator Holt & Boyd Counties

BASF

We create chemistry

September 21, 2018

Professor Loren J. Giesler
Department of Plant Pathology Head
406 Plant Science Hall
University of Nebraska – Lincoln
Lincoln, NE 68583-0722

Dear Dr. Giesler:

I am writing this letter in support of the proposed new graduate program that would award graduates a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Plant Pathology in the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln (UNL). I have 30 years of industry experience in agrichemical research and development after achieving degrees in Plant Pathology. My position is Group Leader for Fungicide R&D with BASF based in Research Triangle Park, NC. In this role, I interact with all key agricultural Universities in the US, including the recruiting and hiring of many plant pathologists.

BASF has hired many talented UNL students coming from M.S., DPH and Ph.D. programs with various specializations. Your programs are well recognized in the industry as training bright, motivated scientists who are well prepared for careers in the applied agricultural fields.

I believe the degree programs being proposed will make your graduate training more complete and student friendly. This should allow for a more efficient operation and administration of the degree program. Since the Plant Pathology faculty would be the initial and primary point of contact for students, I would expect the admission process would be less complex for the students, possibly resulting in better recruitment and retention efforts. Having a clear sense of belonging and connection to the faculty, staff and fellow students is a very important part of the graduate school experience. Currently, students who "specialize" in Plant Pathology at UNL have a "dual membership" with both Biological Sciences or Agronomy & Horticulture. This split membership student experience, I believe, would reduce the focus, efforts, interests and family experience that I'm sure UNL is striving to achieve.

As the University of Nebraska continues to grow and gain momentum, I believe your institution will greatly benefit from this increased opportunity for students. It will allow the University to better compete with the 13 other stand-alone Plant Pathology departments in the US. Furthermore, it will allow your students to be more competitive in the marketplace when seeking employment in plant pathology specific roles, such as those offered at BASF. I have had many instances where open plant pathology positions at BASF went unfilled because appropriate candidates were not available. The advanced Plant Pathology degrees proposed by UNL will greatly help to fill this void in the talent pool.

I strongly support the development of graduate degrees (major and minor) in Plant Pathology at UNL. I invite you to reach out to me to further expand on my endorsement or answer any questions you may have.

Best Regards,



Jeffrey S. Barnes
Group Leader and Sr. Manager – Fungicide R&D North America
jeffrey.barnes@us.basf.com, 919-547-2317

BASF Corporation
26 Davis Drive
PO Box 13528
Research Triangle Park, NC 27709-3528

TABLE 1: PROJECTED EXPENSES - NEW INSTRUCTIONAL PROGRAM
UNL Plant Pathology Graduate Program

	(FY2020) Year 1		(FY2021) Year 2		(FY2022) Year 3		(FY2023) Year 4		(FY2024) Year 5		Total Cost
	FTE	Cost									
Personnel											
Faculty											
Professional											
Graduate Assistants											
Support Staff											
Benefits											
Subtotal											\$0
Operating											
Operating and Supplies											
Equipment											
Library/Information Resources											
Subtotal											\$0
Total Expenses		\$0		\$0		\$0		\$0		\$0	\$0

TABLE 2: PROJECTED REVENUES - NEW INSTRUCTIONAL PROGRAM
UNL Plant Pathology Graduate Program

	(FY2020) Year 1		(FY2021) Year 2		(FY2022) Year 3		(FY2023) Year 4		(FY2024) Year 5		Total
	FTE	Cost									
Reallocation of Existing Funds ¹		\$10,000		\$10,300		\$10,927		\$11,255		\$11,593	\$54,075
Required New Public Funds ²											
1. State Funds											
2. Local Tax Funds (community colleges)											
Tuition and Fees ³		\$299,531		\$345,856		\$382,230		\$394,470		\$475,160	\$1,897,247
Other Funding											
Total Revenue		\$309,531		\$356,156		\$393,157		\$405,725		\$486,753	\$1,951,322

¹ This will be a reassignment of existing funding and will be a change in responsibility for 0.25 FTE of one office managerial profession. Adoptions of new technologies in the department will open a portion of this time that is currently used for hard copy paper tasks. As the program grows additional funding will come from dollars returned to the department for program credit.

² No new funding is being requested for this program.

³ Tuition and fees are based on student numbers of 25 (2020), 28 (2021), 30 (2022), 30 (2023 and 35 (2024). Dollar amounts are based on using a starting annual assistantship value of \$25,777 per student with a 2% increase each year with 38% for the tuition component plus the starting health insurance of \$2,186 per student and an 8% increase per year.