

Grant Code: AP6299

Title: Support for Pathology Diagnostic and Extension Projects

Personnel: Dr. Juliet Marshall, Ext. Crop Mgmt. Specialist, Agronomy and Pathology (SC and E Idaho)

Address: Dr. Juliet Marshall, 1776 Science Center Dr, Suite 205, Idaho Falls, ID, 83402; 208-529-8376; jmarshall@uidaho.edu

Justification/Rationale:

The College of Agriculture and Life Sciences offered three years financial support to the development of the Idaho Falls Diagnostic Lab as an extension to the Parma Diagnostic lab which is the central diagnostic lab for the University of Idaho. Due to severe budget constraints, CALS has been required to reduce financial support for the salaries of many support personnel, including the diagnostics position at Idaho Falls. We had financial backing for about a year, and as yet do not have enough samples and customer stream to become self-supporting. The previous diagnostician left the University for another position, and we will be re-hiring pending approval of the position through CALS and the Provost's office. We seek additional support to cover salary costs that are not covered by the university. We will also require funds to pay for the consumables of various tests, potentially to travel to outbreak sites and relevant meetings, but that will be sought from other resources. We are getting some support from the National Plant Diagnostic Network for lab equipment and for salary support. Salary plus benefits will run at about \$78,000 per year.

The Idaho Falls lab offers fee-based testing service, with the bulk of its diagnostic work being diagnosis of known diseases and nematode issues. Our goal in Idaho Falls is to focus initially on cereals and potatoes, develop an organized system of standard operating procedures for the diagnostic services and expand to nematode testing. The utilization of modern molecular assays requires specialized skills from trained personnel. Confirming the causal agent of plant diseases with new real-time PCR or LAMP assays improves precision and speed of diagnoses and requires specialized equipment and reagents. In the last year, the Idaho Falls lab has implemented several LAMP assays and is continuing to work with the Parma Diagnostic lab to expand the tests offered for other pathogens. The Idaho Falls lab also obtained additional need-based funding from NPDN to purchase a deoxynivalenol testing machine to bring additional services to area growers. Additionally, we have developed SOPs and implemented procedures for accepting and tracking samples received in our database. We saw an increase of 25% in our sample number from 2020 to 2021 and expect to continue seeing an increase in these numbers as our services and reputation grow. We are hopeful that over time the lab will become an indispensable and self-supporting part of the resources the University of Idaho offers to eastern Idaho producers and ag consultants.

Objectives

1. Undertake diagnostics of cereal and potato diseases.
2. Become a trusted location for routine nematode sampling and identification for the eastern and southern Idaho agricultural industry.
3. Assist with other research associated with spore trapping and rapid detection of critical plant pathogens in Idaho.

Methods/ Plan of work:

1. Provide rapid testing utilizing real-time PCR tests, LAMP and other molecular tests.
2. Assist the Parma diagnostic hub lab in rapid response for late blight outbreaks.
3. Become a resource lab for extension pathologists and industry personnel.

Duration: two years

Cooperation/Complementation

The Plant Pathology and Diagnostics program will collaborate with Dr. James Woodhall, Dr. Kasia Duellman and Dr. Phillip Wharton for potatoes.

Anticipated Benefits/Expected Outcomes/Information Transfer

Plant diseases and soil borne nematodes are a significant constraint in agricultural production. This project will enable the delivery of high-quality diagnostic and extension work from the Plant Pathology and Diagnostics Programs at Parma and Idaho Falls. We intend to rapidly develop new tests and provide a rapid response to plant disease outbreaks. It will ensure relevant information is disseminated to the industry in a timely manner.

Literature review: none

FY2024

COMMODITY COMMISSION BUDGET

Principal Investigator: Marshall

Allocated by <u>Idaho Wheat Commission</u>	during FY2022	\$	14,180
<i>(Commission/Organization)</i>			
Allocated by <u>Idaho Wheat Commission</u>	during FY2023	\$	14,360
<i>(Commission/Organization)</i>			

REQUESTED SUPPORT:	<i>Awarded for FY2023</i>	<i>Requested for FY2024</i>
Budget Categories		
(10) Salary <i>(staff, post-docs, et NOTE: Faculty salary/fringe not allowed)</i>	\$ 10,200	\$ 10,535
(12) Temporary Help/IH	\$ -	\$ -
(11) Fringe Benefits	\$ 4,160	\$ 4,425
(20) Travel	\$ -	\$ -
(30) Other Expenses	\$ -	\$ -
(40) Capital Outlay >\$5k	\$ -	\$ -
(45) Capital Outlay <\$5k	\$ -	\$ -
(70) Graduate Student		
Tuition/Fees	\$ -	\$ -
TOTALS	\$ 14,360	\$ 14,960
TOTAL BUDGET REQUESTED FOR FY2024:		
		\$ 14,960

BREAKDOWN FOR MULTIPLE INDEXES:					
Budget Categories	<i>Marshall</i>	<i>(Insert Co-PI Name)</i>	<i>(Insert Co-PI Name)</i>	<i>(Insert Co-PI Name)</i>	
(10) Salary <i>(staff, post-docs, et</i>	\$ 10,535	\$ -	\$ -	\$ -	
(12) Temporary Help	\$ -	\$ -	\$ -	\$ -	
(11) Fringe Benefits	\$ 4,425	\$ -	\$ -	\$ -	
(20) Travel	\$ -	\$ -	\$ -	\$ -	
(30) Other Expenses	\$ -	\$ -	\$ -	\$ -	
(40) Capital Outlay >\$5k	\$ -	\$ -	\$ -	\$ -	
(45) Capital Outlay <\$5k	\$ -	\$ -	\$ -	\$ -	
(70) Graduate Student					
Tuition/Fees	\$ -	\$ -	\$ -	\$ -	
TOTALS	\$ 14,960	\$ -	\$ -	\$ -	
Total Sub-budgets				\$	14,960
Budget Justification					
\$ 10,535	Support Scientist at \$24.50 per hour for 430 hours				
\$ 4,425	Fringe Benefits, staff @42%				

ANNUAL REPORT

Grant Code: AP6299

Title: IWC Support for Pathology Diagnostic and Extension Projects

Personnel: Dr. Juliet Marshall, Ext. Crop Mgmt. Specialist, Agronomy and Pathology (SC and E Idaho); Dr. James Woodhall, Parma, Plant Pathologist; Margaret Moll, Diagnostician Idaho Falls

Address: Dr. Juliet Marshall, 1776 Science Center Dr, Suite 205, Idaho Falls, ID, 83402;
208-529-8376; jmarshall@uidaho.edu

Abstract: There is a large gap in southeast Idaho for disease and nematode diagnostics. To improve response time and access, we have been building a diagnostic program in southeast Idaho, with personnel housed in Idaho Falls. Our diagnostician took another position, and we are currently undergoing a search for an additional candidate. In the meantime, the nematode diagnostics continues with the hiring of a skilled nematologist who has worked to identify plant parasitic nematodes in cereals and sugarbeets. Other staff members continue to fill in until we can hire a replacement. We are working with the National and Western Plant Diagnostic Network for additional funding and recently obtained a Qaunt Studio 3 PCR machine to assist in molecular diagnostic work.

Background / Objectives:

The College of Agriculture and Life Sciences offered three years financial support to the development of the Idaho Falls Diagnostic Lab as an extension to the Parma Diagnostic Lab which is the central diagnostic lab for the University of Idaho. Due to severe budget constraints, CALS has been required to reduce financial support for the salaries of many support personnel, including the diagnostics position at Idaho Falls. We had financial backing for about a year before funding was eliminated and as yet do not have enough samples and customer base to become self-supporting. We are therefore asking for support to cover salary costs that are no longer covered by the university. We will also require funds to pay for the consumables of various tests, and potentially to travel to outbreak sites and relevant meetings. We are receiving federal support from the National Plant Diagnostic Network to support about one-third of the costs associated with salary for the position, and we will continue to seek funds elsewhere (Idaho Barley Commission and various other commodity groups). I previously paid for Margaret Moll to attend a weeklong training at Clemson University for nematode identification. She has good experience in nematology from her previous work experience as well as working with Dr. Pooria Ensafi, and her expertise in diagnostics and plant sampling is excellent. Margaret also obtained a weeklong training in Dr. Woodhall's lab to ensure same quality service at both locations. Salary plus benefits will run at about \$78,000 per year.

Results / Accomplishments:

The Idaho Falls lab is now offering fee-based testing service, with the bulk of its diagnostic work being diagnosis of known diseases. Our goal in Idaho Falls is to focus initially on cereals and potatoes, develop an organized system of standard operating procedures for the diagnostic services and expand to nematode testing. We are utilizing modern molecular assays that require specialized skills from trained personnel like Margaret. A number of LAMP assays are now

available, and we are continuing to work with the Parma diagnostics lab to continue to add to this growing list of assays. In the last year, there was a 25% overall increase of total samples submitted as well as an increase in soil samples for nematode analysis, which accounted for 20% of all samples submitted compared to only 6% in 2020. We expect this upward trend to continue for both total samples and nematode sample submissions. Additionally, we have developed SOPs for diagnostic procedures and have been working towards new services to offer to growers. Of note, a new service now being offered at the Idaho Falls lab is deoxynivalenol testing, using a machine purchased with funding from NPDN. The lab is also actively involved the NPDN, growing its own network of colleagues and resources to further improve diagnostic resources and capabilities. Confirming the causal agent of plant diseases with new real-time PCR or LAMP assays improves precision and speed of diagnoses and requires specialized equipment and reagents. We are hopeful that over time the lab will become an indispensable and self-supporting part of the resources the University of Idaho offers to eastern Idaho producers and ag consultants.

Outreach / Applications / Adoption: Growers, consultants, industry representatives, and public and private researchers can utilize the diagnostic labs to diagnose disease and nutrient issues in the field to advance research, new varieties, and agronomic practices. The SGR report provides an anchor to the Cereal Schools and field days to draw attendance, facilitating technology transfer and communication from the UI, IBC, IWC and Grain Producers organization to the growers that we represent. Results are presented at cereal schools, field days and many other grower meetings.

Developing Goals/Objectives

1. Currently providing diagnostics of cereal and potato diseases.
2. Continue to promote and grow as a trusted location for routine nematode sampling and identification for the eastern and southern Idaho agricultural industry.
3. Assist with other research associated with CCN, spore trapping and rapid detection of critical plant pathogens in Idaho.

Next Steps / Projections: Developing additional Procedures / Plan of work:

1. Continue to develop rapid testing for additional pathogens utilizing real-time PCR tests, LAMP and other molecular tests.
2. Assist the Parma diagnostic hub lab in rapid response for late blight outbreaks.
3. Become a resource lab for extension pathologists and industry personnel.

The Plant Pathology and Diagnostics program also collaborates with Dr. Kasia Duellman and Dr. Phillip Wharton for potato diseases. Plant diseases and soil borne nematodes are a significant constraint in agricultural production. This project will enable the delivery of high-quality diagnostic and extension work from the Plant Pathology and Diagnostics Programs at Parma and Idaho Falls. We are developing new tests (through Dr. James Woodhall's lab in Parma) and will provide a rapid response to plant disease outbreaks. It will ensure relevant information is disseminated to the industry in a timely manner.

Publications/ Presentations / Popular Articles / News releases / Variety Releases:

We continue to promote the diagnostic services at grower meetings, extension functions, including Cereal Schools and Annual Potato Conference.

<https://www.uidaho.edu/cals/plant-diagnostics>