MIDWEST FOOD PRODUCTS ASSOCIATION, INC.
2022 EXECUTIVE SUMMARY FOR RESEARCH PROPOSALS
(Two-Page Maximum, Not Including Progress Report)

PROJECT TITLE:
Investigating seed-applied and at-plant fungicides for disease control in snap beans and identifying cause of root rot and damping off in English pea

PROJECT COORDINATOR:	**EMAIL & PHONE NUMBER:**
Amanda Gevens	**gevens@wisc.edu; 608-575-3029**

PROJECT STATUS		**PROJECT DURATION**	**PROJECT INITIATION YEAR**
NEW	**CONTINUING**	ONE YEAR ☐	
COMPLETELY NEW	**YEAR TWO X**	TWO YEARS ☐	
PREVIOUSLY FUNDED ☐	YEAR THREE ☐	**THREE YEARS** X	2021

BUDGET			
TOTAL REQUESTED FROM MWFPA IN CURRENT YEAR:	$10,000	**TOTAL BUDGETED TO REQUEST IN FUTURE YEARS:**	$20,000
SALARY	$10,000 (incl. fringe)		
SUPPLIES	$0		
TRAVEL	$0	YEAR TWO $10,000	
MISC. EXPENSE	$0	YEAR THREE **$10,000**	

AFFILIATION & COOPERATORS: Dr. Stephen Jordan, UW-Madison Plant Pathology, will be lead field trial coordinator in this project. Project will be located at the UW Hancock Agricultural Research Station in multiple fields which have been maintained to promote build up of soil borne pathogens known to be responsible for root rot and damping off in legume crops. Dr. Jordan will also collect pea plant samples and conduct diagnostic assessment in the UW Vegetable Pathology Laboratory to determine causal agents. Molecular confirmation and characterization of pathogens will be conducted in partnership with UW Plant Disease Diagnostic Clinic directed by Dr. Brian Hudelson.

LOCATION OF PROJECT (Include Cooperators): Dr. Stephen Jordan will be lead field trial coordinator in this project. Project will be located at the UW Hancock Agricultural Research Station in multiple fields which have been maintained to promote build up of soil borne pathogens known to be responsible for root rot and damping off in legume crops. Dr. Jordan will also collect pea plant samples from commercial locations and conduct diagnostic assessment in the UW Vegetable Pathology Laboratory to determine causal agents. Molecular confirmation and characterization of pathogens will be conducted in partnership with UW Plant Disease Diagnostic Clinic directed by Dr. Brian Hudelson.

SUMMARY OF PROPOSED RESEARCH: We will investigate the disease management performance of seed-applied and at-plant fungicides for control of damping off and root rot in snap beans at the UW Hancock Agricultural Research Station. Selections of snap bean cultivars, fungicides, and their rates will result from consult with commercial producers to most effectively target industry needs. We will coordinate collection of diseased commercial pea samples at the UW Hancock Agricultural Research Station, or through direct contact with Drs. Gevens or Jordan in order to survey the top causal pathogens of pea damping off/root rot in our commercial production region. Data will be provided to industry at end of the 2021-2023 growing seasons for discussion and consideration. Summaries can be provided at education conferences as appropriate.

Please utilize the requested information below for a Research Proposal (2 pages for a new project; 1-page progress report if for a continuing project):

SUMMARY OF PROPOSED RESEARCH: Our goals are to a) document the effectiveness of contemporary, reduced risk fungicides applied as either seed-applied treatments or in-furrow-applied treatments to limit early season, stand-limiting diseases in order to develop innovative, effective disease management programs for commercial snap beans in Wisconsin, and to b) survey the pathogens prevalent in symptomatic English pea roots and lower stems.

Update. **During June-August, we conducted a field evaluation of fungicides for the control of root rot and damping off in snap bean ('Huntington') at the UW Hancock Agricultural Research Station.** A trial to evaluate the effectiveness of fungicides to control root rot and damping off of snap bean was established on 1 Jun at the University of Wisconsin Hancock Agricultural Research Station located in central Wisconsin. The commercially available cultivar, 'Huntington' was used. Plots were 20 ft long with four rows spaced 18 in. apart with a seeding rate of 8 seeds per ft. The trial consisted of four replications, and plots were arranged in a randomized complete block design. The trial was established in a root rot nursery with a history of root rotting disease, and susceptible legumes were cropped in this field in the previous year to increase multiple genera of soilborne pathogens in the field. Naturally occurring inocula were the only source of pathogens for disease development. Fertility, insects, and weeds were managed during the growing season according to standard grower practices for the region. Seed treatments were applied at a rate of 25 ml per lb of seed and allowed to dry prior to planting. In-furrow fungicide applications for control of root rot and damping off were applied as a drench over the top of the planted row in a volume of 1 L per plot. Emergence data and the number of seedlings dying from damping-off were recorded on 23 Jun by counting the number of emerged, dying, and dead plants in the two center rows. On 17 Aug, ten feet from the two center rows were hand harvested and weighed. All data were analyzed using analysis of variance (ANOVA) at α=0.05 and Fisher's least significant difference (LSD) at α=0.05 (SAS Version 9.2). The trial received 8.05 in. of irrigation (20 applications) to supplement 15.79 in. of natural precipitation.

Weather conditions during the initial few weeks of this trial were atypically hot and dry for the region. There were no significant differences between treatments for emergence, seedlings lost to damping-off, and yield. Plants in all plots were stunted as a result of extreme disease pressure and yields were low. Observation of the root system showed uniformly rotted tap roots in all treatments, with only few healthy, shallow lateral roots allowing for plant survival. The table provided below offers a summary of the outcomes of our study on disease control in snap beans (Appendix Table 1).

We received relatively few English pea (or bean) samples for diagnostic survey work. The first approach that we offered was a commercial drop off of symptomatic samples at the UW Hancock Agricultural Research Station. Growers or other industry representatives could also alert us to samples by directly contacting me for coordination of pick up. The second approach was direct field visits and sample collection. We welcomed reports of possible disease in commercial fields to which we will coordinate a visit for sample collection. All samples were brought back to the lab for triage diagnostics. We partnered with the UW Plant Disease Diagnostic Clinic in conducting molecular biological approaches to support pathogen confirmation (Appendix Table 2).

In this renewal request proposal for Year 2, we request $10,000 in each of the next 2 years of the total 3 year project to conduct snap bean and pea disease research as previously described, for a total of $30,000. These funds will pay a portion of salary and fringe benefits in support of Dr. Stephen Jordan, outreach specialist and field trials coordinator in UW-Madison Plant Pathology. Dr. Jordan will coordinate the snap bean disease study at Hancock and will coordinate pick up of pea samples for diagnostic evaluation in 2021-2023.

Appendix

Table 1. Outcomes of fungicide evaluation study to control bean root rot.

Treatment and rate[z]	pplication Timing[y]	Emergence (%)	Post-emergent Damping-off Seedlings (per plot)	Yield (ton/A)
Non-treated Control	NA	88.8	23.0	0.76
Ridomil Gold 0.42 fl oz	IFAP	82.5	10.8	1.13
Ridomil Gold 0.42 fl oz + Quadris 2.018 SC 0.8 fl oz	IFAP	94.7	8.3	1.56
Quadris 2.018 SC 0.8 fl oz	IFAP	82.7	8.8	1.56
Velum Prime 0.45 fl oz	IFAP	86.0	18.3	1.13
Serenade ASO 4.4 fl oz	IFAP	90.0	24.8	0.95
Double Nickel 2.2 fl oz	IFAP	87.5	25.8	0.87
Propulse .36 fl oz	IFAP	81.3	22.5	0.77
Proline 0.192 fl oz	IFAP	84.7	18.8	0.80
Regalia 4.4 fl oz	IFAP	85.8	25.8	0.62
Howler 5.5 oz	IFAP	81.6	21.5	0.69
Vibrance 4.3 SC 0.16 fl oz/ 100 lb seed	Seed Treatment			
Ridomil Gold 0.42 fl oz	IFAP	87.0	21.5	1.02
Vibrance 4.3 SC 0.16 fl oz/ 100 lb seed	Seed Treatment	78.8	20.5	1.13
EverGol Energy 1 fl oz/100 lb seed	Seed Treatment	72.7	15.5	1.20
Vitoflow 2.6 ml/kg seed	Seed Treatment	75.0	16.3	0.73
Ridomil Gold 2.5% v/v	Seed Treatment	90.2	22.8	0.98
Velum Prime 1.5 fl oz/100 lb seed	Seed Treatment	77.5	22.3	0.73
Saltro 4.17 FC 1.5 fl oz/100 lb seed	Seed Treatment	92.7	24.3	1.02

[z]Treatment rates applied in-furrow are given per 1,000 row ft. Seed treatments are given per seed weight or v/v in water.
[y]Seed treatments and in-furrow treatments were applied at the time of planting.

Table 2. Diagnostic results of 2021.

Date in 2021	**Crop**	**Diagnoses**	**WI County (sample origination)**
June 25	Bean	Aphanomyces, Fusarium, Pythium	Wood
July 2	Bean	Poor nodulation – no pathogen	Dane
	Pea	Fusarium wilt, Nematode (suspected)	Dane
July 16	Pea	Root rot, Fusarium	Lincoln
	Snap bean	Virus (not specified)	Dane
July 23	Pole bean	Herbicide damage	Dane
July 30	Pea	Powdery mildew, root rot (unspecified)	Price
September 3	Kidney /cranberry bean	Alternaria leafspot, Anthracnose, Phyllosticta	Waushara