USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY15 Final Performance Report
Due date: July 15, 2016

Cover Page

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Fiscal Year:	2015
USDA-ARS Agreement ID:	59-0206-4-006
USDA-ARS Agreement Title:	FHB Management Research in New York.
FY15 USDA-ARS Award Amount:	$ 21,361
Recipient Organization:	Cornell University 341 Pine Tree Road Ithaca NY 14850
DUNS Number:	872612445
EIN:	15-0532082
Recipient Identifying Number or Account Number:	1538466 (OSP# 73081)
Project/Grant Reporting Period:	05/03/15-05/02/16
Reporting Period End Date:	05/02/16

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management Strategies to Reduce FHB and DON in New York.	$ 11,643
MGMT	Uniform Fungicide and Biological Trials in New York.	$ 9,718
	FY15 Total ARS Award Amount	**$ 21,361**

Gary C. Bergstrom 07/15/16
Principal Investigator Date

* MGMT – FHB Management
FST – Food Safety & Toxicology
GDER – Gene Discovery & Engineering Resistance
PBG – Pathogen Biology & Genetics
EC-HQ – Executive Committee-Headquarters
BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
HWW-CP – Hard Winter Wheat Coordinated Project
VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
SPR – Spring Wheat Region
NWW – Northern Soft Winter Wheat Region
SWW – Southern Soft Red Winter Wheat Region

Project 1: *Integrated Management Strategies to Reduce FHB and DON in New York.*

1. **What are the major goals and objectives of the project?**
   To provide more robust recommendations for management of Fusarium head blight.

2. **What was accomplished under these goals?**
   1) major activities
   Replicated field experiments were conducted to investigate the individual and combined effects of variety resistance and fungicide application on FHB and DON accumulation in winter wheat.

   2) specific objectives
   Timing of fungicide application was emphasized in 2015.

   3) significant results
   The impact of supplemental inoculation with *F. graminearum* was determined by comparing the non-inoculated and inoculum only treatment. Overall, inoculation resulted in significantly reduced yield and significantly increased FHB and DON as compared with the noninoculated plots. FHB and DON development in 2015 were attributed primarily to supplemental rather than background inoculum. Significant cultivar responses to inoculation were observed for yield, FHB and DON for the moderately susceptible variety Emmit and the susceptible variety Otsego, but only for FHB and DON for the moderately susceptible variety P25R40, and only for FHB for the moderately resistant variety Pioneer 25R46. These data support the current qualitative designations of varieties as moderately susceptible (Pioneer 25R40), moderately resistant (Pioneer 25R46). However, according to the results of this study, the quantitative susceptibility of Otsego, Emmit, and Pioneer 25R40 was indistinguishable. Under moderately low disease pressure, significant differences were detected in yield among varieties, with both Pioneer varieties yielding significantly higher than Otsego and Emmit, regardless of treatment. Otsego had significantly greater FHB incidence and FDK than all the other varieties, regardless of treatment, but had FHB index similar to that of Emmit and P25R40. P25R46 had significantly lower FHB incidence, FDK and DON than all the other varieties, regardless of treatment, but had similar FHB index to that of P25R40.

   4) key outcomes or other achievements
   When results of all the cultivars were combined, the overall impact of each of the two Prosaro application timings was to significantly decrease FHB incidence, index, FDK, DON, and to significantly increase yield, as compared with the inoculum only treatment. Though not statistically significant, the Prosaro application at 7 days after the initiation of flowering resulted in the lowest FHB incidence, index and DON as compared with the Prosaro application at FGS 10.5.1. But it is also worth noting that sufficient fungicide remained on spikes from the FGS 10.51 Prosaro application to give significant suppression of FHB and DON resulting from fungal spores deposited on plants at 7 days after 10.51.

3. **What opportunities for training and professional development has the project provided?** NA

4. **How have the results been disseminated to communities of interest?**
Through field days, winter grower meetings, email listserves, presentations at the FHB Forum, and publication in *Plant Disease Management Reports*.

Project 2: *Uniform Fungicide and Biological Trials in New York.*

1. **What are the major goals and objectives of the project?**
   To identify fungicide products and timings that will enhance the control of FHB.

2. **What was accomplished under these goals?**
   1) major activities
   Replicated field plots to evaluate fungicide products, timings, and progressions of multiple applications for optimal management of FHB and DON.

   2) specific objectives
   Some emphasis in 2015 on strobilurin treatments at flag leaf emergence followed by triazoles at flowering.

   3) significant results
   All treatments significantly reduced the severity of fungal leaf blotches on flag leaves and FHB index as compared with the non-treated control, though overall disease pressure was fairly low. All treatments, except Tebustar at FGS 10.51 significantly reduced DON as compared with the non-treated control. Caramba at 13.5 fl oz applied at FGS 10.51 resulted in significantly greater FDK than any other treatment, whereas Caramba at 17 fl oz applied at the same timing resulted in the lowest FDK. Early applications of Priaxor, Stratego YLD or TwinLine provided no additional reduction of leaf blotches than any treatments of Prosaro or Caramba alone at FGS 10.51. Whereas early application of Aproach did result in a significant reduction of leaf blotches as compared with treatments of Prosaro (6.5 fl oz) or Caramba (13.5 fl oz) alone at FGS 10.51. Caramba applied at the higher rate (17 fl oz) at flowering did not result in greater reduction in FHB, yield or DON than Caramba at the lower rate (13.5 fl oz). Prosaro applied at the higher rate (8.2 fl oz) at flowering or at the lower rate (6.5 fl oz) five days after flowering did not result in any significant differences in FHB, FDK, yield or DON than when applied at the lower rate (6.5 fl oz) at flowering. DON concentrations were not reduced further by addition of any other material to any Prosaro or Caramba application at flowering, thus providing further evidence that these are the materials and timing of choice for DON suppression. DON concentrations for all treatments, including the non-treated control were below the 2 ppm threshold. Yield was significantly greatest for plots treated with Aproach at FGS 9 followed by Prosaro (6.5 fl oz) at FGS 10.51, when compared with all other treatments that included Prosaro or Caramaba applications at FGS 10.51.

   4) key outcomes or other achievements
   There was no increase in DON when strobilurins were applied at flag leaf and followed by triazoles at flowering.

3. **What opportunities for training and professional development has the project provided?** NA

4. How have the results been disseminated to communities of interest?
Through field days, winter grower meetings, email listserves, presentations at the FHB Forum, and publication in *Plant Disease Management Reports*.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY15 award period. The term "support" below includes any level of benefit to the student, ranging from full stipend plus tuition to the situation where the student's stipend was paid from other funds, but who learned how to rate scab in a misted nursery paid for by the USWBSI, and anything in between.

1. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their MS degree during the FY15 award period?** No

   If yes, how many?

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY15 award period?** No

   If yes, how many?

3. **Have any post docs who worked for you during the FY15 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?** No

   If yes, how many?

4. **Have any post docs who worked for you during the FY15 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?** No

   If yes, how many?

Release of Germplasm/Cultivars

Instructions: In the table below, list all germplasm and/or cultivars released with full or partial support through the USWBSI during the FY15 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations. *Leave blank if you have nothing to report or if your grant did NOT include any VDHR-related projects.*

Name of Germplasm/Cultivar	**Grain Class**	**FHB Resistance** (S, MS, MR, R, where R represents your most resistant check)	**FHB Rating** (0-9)	**Year Released**

Add rows if needed.

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

Abbreviations for Grain Classes

Barley - BAR
Durum - DUR
Hard Red Winter - HRW
Hard White Winter - HWW
Hard Red Spring - HRS
Soft Red Winter - SRW
Soft White Winter - SWW

Publications, Conference Papers, and Presentations

Refer to the FY15-FPR_Instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY15 grant. If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Journal publications.

Cummings, J.A., G.C. Bergstrom, R.J. Richtmyer, and R.R. Hahn. 2016. Evaluation of foliar fungicides for control of Fusarium head blight and foliar diseases of winter wheat in New York, 2015. Plant Disease Management Reports 10: CF016.
Status: Published
Acknowledgement of Federal Support: Yes

Cummings, J.A., G.C. Bergstrom, R.J. Richtmyer, and R.R. Hahn. 2016. Evaluation of integrated methods for management of Fusarium head blight and foliar diseases of winter wheat in New York, 2015. Plant Disease Management Reports 10: CF017.
Status: Published
Acknowledgement of Federal Support: Yes

Cummings, J.A., G.C. Bergstrom, R.J. Richtmyer, and R.R. Hahn. 2016. Evaluation of integrated methods for management of Fusarium head blight and foliar diseases of spring malting barley in New York, 2015. Plant Disease Management Reports 10: CF018.
Status: Published
Acknowledgement of Federal Support: Yes

Cummings, J.A., G.C. Bergstrom, R.J. Richtmyer, and R.R. Hahn. 2016. Evaluation of conventional and OMRI approved foliar fungicides for control of Fusarium head blight and foliar diseases of spring malting barley in New York, 2015. Plant Disease Management Reports 10: CF029.
Status: Published
Acknowledgement of Federal Support: Yes

Books or other non-periodical, one-time publications.

Other publications, conference papers and presentations.

Conference Papers:

Cummings, J.A., and G.C. Bergstrom. 2015. Evaluation of integrated methods for managing FHB and DON in winter wheat in New York in 2015. In: S. Canty, A. Clark, S. Vukasovich, and D. Van Sanford (Eds.) *Proceedings of the 2015 National Fusarium Head Blight Forum*. East Lansing, MI/Lexington, KY: U.S. Wheat and Barley Scab Initiative. pp. 9-12.
Status: Published
Acknowledgement of Federal Support: Yes

Salgado, J.D., K. Ames, G. Bergstrom, C. Bradley, E. Bycamukam, J. Cummings, V. Chapara, M. Chilvers, R. Dill-Mackey, A. Friskop, P. Gautam, N. Kleczewski, L.V. Madden, E. Milus, M. Nagelkirk, J. Ransom, J. Stevens, S. Wegulao, K. Wise, D. Yabwalo, and P.A. Paul. 2015. Robust management programs to minimize losses due to FHB and DON: A multi-state coordinated project. In: S. Canty, A. Clark, S. Vukasovich, and D. Van Sanford (Eds.) *Proceedings of the 2015 National Fusarium Head Blight Forum*. East Lansing, MI/Lexington, KY: U.S. Wheat and Barley Scab Initiative. pp. 24-29
Status: Paper Published and Poster Presented
Acknowledgement of Federal Support: Yes, but not for this agreement.

Smith, M.E., A. Friskop, A. Arends, V. Chapara, S. Meyer, B Schatz, G.C. Bergstrom, J.A. Cummings, E. Byamukama, D. Yabwalo, B. Bleakley, N. Murthy, K. Ruden, C.A. Bradley, K. Ames, J. Pike, and R. Bellm. 2015. Uniform fungicide trial results for management of FHB and DON, 2015. In: S. Canty, A. Clark, S. Vukasovich, and D. Van Sanford (Eds.) *Proceedings of the 2015 National Fusarium Head Blight Forum*. East Lansing, MI/Lexington, KY: U.S. Wheat and Barley Scab Initiative. p. 33
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: Abstract: No; Poster: Yes

Extension presentations by Gary C. Bergstrom in 2015-16 that included updates on Fusarium head blight research:

Small grains management field day, Aurora, NY. (6/2/16)
Status: Presented
Acknowledgement of Federal Support: Not applicable for this type of presentation.

Micro-malting and Brewing Seminar at Farmhouse Malt and Brewery, Owego, NY. (2/16/16)
Status: Presented
Acknowledgement of Federal Support: Not applicable for this type of presentation.

Finger Lakes Soybean and Small Grains Congress, Waterloo, NY. (2/4/16)
Status: Presented
Acknowledgement of Federal Support: Not applicable for this type of presentation.

Western New York Soybean and Small Grains Congress, Batavia, NY. (2/3/16)
Status: Presented
Acknowledgement of Federal Support: Not applicable for this type of presentation.