USDA-ARS | U.S. Wheat and Barley Scab Initiative

FY21 Performance Progress Report

Due date: July 26, 2022

Cover Page

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Fiscal Year:	2021
USDA-ARS Agreement ID:	59-0206-0-147
USDA-ARS Agreement Title:	Development of Scab Resistant Soft Red Winter Wheat Germplasm Adapted to the US Southeast
FY20 USDA-ARS Award Amount:	$96,752
Recipient Organization:	University of Georgia Department of Crop and Soil Sciences 1109 Experiment St., 0260 Redding Bldg., CAES Griffin Campus Griffin, GA 30224
DUNS Number:	00-431-5578
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Project/Grant Period:	6/21/21 - 6/20/23
Reporting Period End Date:	6/20/2022

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SWW	Developing Scab (FHB) Resistant Wheat Germplasm Adapted to GA and the Southeast	$82,364
VDHR-SWW	Double Haploids to Expedite Development of FHB Resistant Soft Winter Wheat Varieties	$14,388
	FY21 Total ARS Award Amount	$96,752

I am submitting this report as an: ☒ Annual Report ☐ Final Report

I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the award documents.

M. Mergoum

Principal Investigator Signature

06/24/2022

Date Report Submitted

‡ BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
EC-HQ – Executive Committee-Headquarters
FST-R – Food Safety & Toxicology (Research)
FST-S – Food Safety & Toxicology (Service)
GDER – Gene Discovery & Engineering Resistance
HWW-CP – Hard Winter Wheat Coordinated Project
MGMT – FHB Management
MGMT-IM – FHB Management – Integrated Management Coordinated Project
PBG – Pathogen Biology & Genetics
TSCI – Transformational Science
VDHR – Variety Development & Uniform Nurseries
NWW –Northern Soft Winter Wheat Region
SPR – Spring Wheat Region
SWW – Southern Soft Red Winter Wheat Region

Project 1: Developing Scab (FHB) Resistant Wheat Germplasm Adapted to GA and the Southeast

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1. **What are the major goals and objectives of the research project?**
Fusarium Head Blight (FHB) or scab is a major disease that threatens wheat in many US wheat growing regions including the Southeast (SE) region. In GA and SE, scab epidemics can result in significant loss revenue due to low grain production and unacceptable don toxin levels in grains. The problems is being solved by UGA breeding program by developing and releasing adapted soft red winter wheat (SRWW) varieties and germplasm with improved FHB resistance and evaluating them in FHB and regional nurseries for agronomic performance and FHB reaction. The specific objectives of this project include (1) increase acreage planted to wheat varieties with improved FHB resistance; (2) generate SRWW germplasm with high yield and improved pests resistances including FHB; (3) improve efficiency of coordinated project breeding programs to develop and release FHB resistant varieties; and (4) Implement new breeding technologies to further enhance short-term and long-term improvement of FHB resistance and to efficiently introgress effective resistance genes into new germplasm. This project is a collaborative effort with SUNGRAINS and many USDA-ARS labs including the Genotyping Center at Raleigh NC (Dr. Gina Brown-Guedira and her team).

2. **What was accomplished under these goals or objectives?** *(For each major goal/objective, address these three items below.)*

Objective 1: Increase acreage planted to wheat varieties exhibiting improved FHB resistance

a) **What were the major activities?**
FHB evaluation of our HRSW germplasm is conducted on elite germaplsm, particularly on recently released and major commercial cultivars in the Georgia Official Variety Testing trial. Similarly, seed samples of major growing cultivars and elite lines included the state variety trial and regional nurseries are collected and sent to USDA-ARS lab in the University of MN for DON testing.

b) **What were the significant results?**
Data on the reaction to FHB and other pests of the major commercial grown cultivars; recently released cultivars; and elite lines were published in the Georgia Wheat Performance Bulletin and /or GA 2020-2021 Small Grain Performance Tests. Similarly, information on the DON levels in grain were disseminated and made available to end-users including flourmills in the state. Additionally, **we have released 4 cultivars in 2021; 3 in 2020, 4 in 2019 and one in 2018…** (See Table: Release Germplasm/ cultivars). Some of these have *Fhb1* or/and multiple genes. Released cultivars have much improved FHB resistance and are being widely grown and contributing to this objective.

c) **List key outcomes or other achievements.**
Data on FHB reaction and DON/FDK levels of major commercial grown cultivars and recently released or potential releases cultivars are made available to wheat growers and

industry in GA and the SE. This will encourage growers to grow those wheat cultivars with improved FHB resistance. In 2021, we released FOUR cultivars licensed: GA18-E26, GA18LE23, GA18LE43 licensed to AGS (AGS 3026, 4023 and 4043, respectively) and GA 18E35 to UniSouth Genetics (USG 3725) companies. These, in addition to the THREE cultivars released in 2020 and licensed to companies under the names of AP 1983 (GA10407-17E8); AGS 2021 (GA11656-17E11); and PGX 20-15 (GA10268-17LE16). Prior, in 2019 four releases (Blanton, Rutledge, AGS 3015 and GA09436-16-E120) with improved FHB resistance were also released and licensed to JoMar and AGS companies. All these cultivars with improved FHB will enhance the wheat acreages grown to FHB resistant cultivars.

Objective 2: Generate SRWW germplasm with high yield and improved diseases resistances including FHB

a) What were the major activities?

We continue to introgress and/or pyramid FHB resistance into SRWW elite and cultivars adapted to GA and the SE region. For that purpose, about 800 bi-parental, backcrossing and 3-way crosses were made in 2021. These were between GA elite breeding lines/cultivars from different sources of FHB resistance and most adapted grown cultivars in the region. Among these, crosses between elite breeding lines and adapted new sources of FHB resistance with Fhb1 are among our top priority. The derived segregating breeding populations from the above crosses were evaluated, selected and advanced to identify advanced lines with improved over-all agronomic performance and pests resistances including FHB, rusts, hessian fly and soil-born mosaic virus. About 1000, 150, and 20 best performing lines including those with FHB resistance, were included respectively, in PYTs, Elite, state and regional yield trials in 2021-22 crop cycle.

b) What were the significant results?

Among the 7 cultivars released by UGA in 2020 and 2021 (3 from the 17 series and 4 from the 18 series), most have improved resistance and low FDK and DON level. Two of the 4 released in 2021, two have Fhb1 resistance genes. Thirty elite lines potential for release with improved FHB resistance were entered in the GA State trial, regional SUGRAINS and Uniform regional trials. The 30 lines entered in the 2021 GA and regional OVTs (GA 19, 20 and 21 series), have improved FHB resistance and some of them have *Fhb1* gene alone or in combination with other QTL including *Fhb1B-JT, 1A-Neuse, 4A-Neuse*.... While these elite lines are tested in the State, SUNGRAINS and regional trials, they also increased in Plains, GA. The five lines from the 19 series are potential for release in 2022 and are increased on lager scale by the Georgia Seed Development. Three of them have good resistance to FHB with two of them (GA19E32 and GA19E38) have *Fhb1B*_JT gene and one (GA19LE16) has Fhb1 in addition to the *Fhb1_JT* gene.

c) List key outcomes or other achievements.

In 2021, we released and licensed to private companies FOUR cultivars. These are GA18-E26, GA18LE23, GA18LE43, and GA 18E35. These were licensed to AGS (AGS 3026, 4023 and 4043) and to UniSouth Genetics (USG 3725) companies, respectively. Similarly, in 2020, we

released THREE cultivars: AP 1983 (GA10407-17E8); AGS 2021 (GA11656-17E11); and PGX 20-15 (GA10268-17LE16). Among the four 2021 release, two of them have good FHB resistance due to Fhb1 genes.

Objective 3: Improve efficiency of coordinated project breeding programs to develop and release FHB resistant varieties

a) What were the major activities?

The SUNGRAINS Universities (UGA, LSU, UF, Texas A&M, NCSU, U of AR, and Clemson U.) and Virginia Tech collaborative group has been very successful for all programs involved in it. It allows a smooth movement and exchange of elite and adapted germplasm with FHB resistance among collaborative programs. This collaborative group also includes many of the USDA-ARS labs. In particular, the Genotyping Center, Raleigh, NC contributes significantly in GS and MAS of elite germplasm. We also included in our crosses sources of FHB resistance from Northern germplasm with an Rht-b1 background to transfer it into Rht-D1 background for better adaptation to the Southeast germplasm.

b) What were the significant results?

A well established and successful cooperative evaluation of nurseries including the Southern Uniform Scab, the Uniform Eastern and bread Wheat, the Winter Barley Uniform nursery, SUNWHEAT nurseries including the regional GAWN.

An exchange of resistance germplasm, crosses, and double haploid lines and joint evaluation over locations of these germplasm sources is well established.

c) List key outcomes or other achievements.

The collaborative coordinated project allowed exchange and selection of elite and DH lines with pyramided QTL for FHB resistance from different sources. This germplasm attributes its FHB resistance to various QTL/genes from Jamestown, Hilliard, MD03W61-09-7 (*Fhb1*), MD08-26-H2-7 (*Fhb1* 5AS 2DL), MD08-29-E9-26 (*Fhb1* 5AS 2DL) as FHB resistance parent donors. In addition, lines from potential releases 19 series in 2022 (GA19E32, GA19LE38, GA19LE12); previously developed 18 series elite lines in 2021 (GA15VDH-FHB-MAS23-18LE43F, 15VDH-FHB-MAS23-18LE45F, 15VDH-FHB-MAS30-18ESc43F, 15VDH-FHB-MAS22-18ESc41F, 15VDH-FHB-MAS10-18LEDH16F, 15VDH-FHB-MAS27-07-18ADH33F) and GA14E45 and GA16E55, are added to this list. All elite lines developed in this collaborative work are evaluated for their performance and FHB reaction 2022.

Objective 4: Implement new breeding technologies to further enhance short-term and long-term improvement of FHB resistance and to efficiently introgress effective resistance genes into new germplasm

a) What were the major activities?

Crosses to pyramid and combine FHB resistant QTLs coupled with good field and consistent screening test is facilitating well the development and release new cultivars that are adapted to GA and the US Southeast region with improved and effective FHB resistance. Genomic (GS), Marker Assisted Selection (MAS) and Backcrossing (MABC) methods to select/advance elite lines and introgress many known FHB QTL (*Fhb1*, 2DL, 5AS (Ning 7840), and 3BL (Massey), 1B (Jamestown), 1A, 4A (Neuse), and 2B, and 3B (Bess)) into SRWW background are performed. Elite from crosses with *Fhb1* and other QTLs sources are evaluated among elite lines and backcross populations. Adapted and recently released cultivars are used as recurrent parents to develop novel adapted lines with FHB combinations of QTL such as Fhb1, 2DL, 5AS, and other QTL for improved FHB resistance. A strong cooperation with the USDA Genotyping Centers, (Dr. Gina Brown –Guedira) has been established to evaluate populations with Fhb1 and other FHB QTLs sources that combines genes for leaf and stripe rust, Hessian fly and other diseases genes.

b) What were the significant results?

Promising lines included in different levels of yield trials including PYTs, Elite, State and regional trials were identified with high yield and FHB resistance. These lines were selected with aid of GS/MAS for FHB QTL including Fhb1, Fhb1B-JT, 1A and 4A_Neuse,… QTL. 25 Elite lines are being increased for release or potential release. These lines are also tested in GA and regional OVTs, SUNGRAINS and Uniform regional trials. Additionally, many DH promising lines with various levels of FHB resistance and having multiple FHB QTL, including *Fhb1* are tested.

c) List key outcomes or other achievements.

Three lines among the five 19 series potential release for 2022 have FHB resistance. Two of them have Fhb1B-JT and one has Fhb1 and Fhb1B-JT QTL. In addition, among the four lines 18 series were released in 2021 (GA12505B14-18LE23Fand GA15VDH-FHB-MAS23-18LE43F) have good yield with the QTL *Fhb1*. These are the FIRST SRWW cultivars that will be released with *Fhb1* gene. Moreover, many other DH lines (including, GA15VDH-FHB-MAS23-18LE43F released in 2021) and many 20 series lines were identified with Fhb1 QTL and good performance.

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

We have trained three graduates and several undergraduate students in screening and evaluating germplasm for scab resistance. They were also involved in all FHB research operations including preparing samples for FDK and DON testing.

4. How have the results been disseminated to communities of interest?

A poster was presented one at the 2021 Annual Forum of the Wheat and Barley Scab Initiative (see publications section). Many lab/field tours was given to 17 graduate students and teachers involved in the PBGG 6000 practicum course in 2021 highlighting the importance of scab, research being conducted and achievements made. Reactions to FHB collected on released cultivars and elite lines, potential for release, were published in reports. This report includes GA Statewide variety trial, OVTs of the

Southeast states including SUNGRAINS States; Uniform South Wheat (USW) regional trials; Gulf Atlantic Wheat nursey (GAWN) and other SUNGRAINS trials.
A new demonstration nursery called “SUNSHOW” was initiated and launched in 2021-2022. This includes elite wheat trial developed by the SUNGRAINS breeding programs. The purpose of this demonstration trial is to disseminate the results, including FHB data, for released and elite potential releases developed by SUNGRAINS breeding program. SUNSHOW is excellent demonstration trails used for field days including wheat growers, stakeholders and private companies.

Project 2: Double Haploids to Expedite Development of FHB Resistant Soft Winter Wheat Varieties

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1. What are the major goals and objectives of the research project?

The main goal of developing double haploid (DH) is to increase the efficiency of coordinated project breeding programs to breed and release FHB-resistant varieties using this technology. It is well known that developing new adapted cultivars with resistances to pests and other stresses is a long-term (12-15 years) research goal. Therefore, shortening the time for wheat cultivar development is warranted. DH technique allows hastening breeding processes to develop new cultivars by approximately 2-4 years. In recent years, with USWBSI and other sources of funding, we are expanding the use of this technique for the whole Southern Winter Wheat region. This done through a coordinated effort by generating at least five breeding populations through DH production followed by collaborative phenotyping across the region once the DH lines are developed and seed is increased for testing. The DH production is currently sourced to the Heartland/Plant Innovations Facility at Kansas.

2. What was accomplished under these goals or objectives? *(For each major goal/objective, address these three items below.)*

a) What were the major activities?

Using DH technique in our breeding program allows us to generate rapidly homozygous lines with many QTL of FHB resistance from various sources. About 500 DH were planted as head-rows in each of Plains and Griffin, GA. These includes UGA and SUNGRAINS shared DH. Among these 91 were selected and included in PYTs for 2021-2022 crop cycle. From previously selected DH that were included in different yield trials, 15 were advanced to elite and 17 were included in GA Statewide, SUNGRAINS, and regional trials in 2021-22. Among these, TWO (GA 18E35 and GA18LE43) were released and licensed to USG and AGS companies. GA18LE43 has excellent FHB resistance. Other DH included in states OVTs and regional trials, 3 (19 series), 6 (20 series) and 5 (21 series) lines will be for potential release in 2022, 2023 and 2024, respectively. Sources of resistance for FHB in DH are related to various sources and different breeding programs in the region. Among these, sources with Fhb1 and QTL from our UGA and regional programs, derivatives from Jamestown; Hilliard; MD09W272-8-4-14-8 and MD03W61-09-7, 15VDH-FHB-MAS23-17 and 15VDH-FHB-23-16 (Fhb1), MD08-26-H2-7 (Fhb1 5AS 2DL), MD08-29-E9-26 (Fhb1 5AS 2DL), AGS 3030 (GA JT141-14E45), AGS 3015(GA 09129-16E55), AGS 4043 (GA15VDH-FHB-MAS23-18LE43F), and AGS 4023 (GA12505B14-18LE23F).

b) What were the significant results?

Many of the 15 UGA elite DH with FHB resistance are tested in Elite, GA State or regional trials. This includes GA15VDH-FHB-MAS23-18LE43F released in 2021 and licensed to AGS company under the name 0f AGS4043. Another DH UGA line GA131246LDH-18E35 was also released in 2021 and licensed to UniSouth Genetics as USG3725. Additionally, among the potential releases in 2021, two lines from the 19 series lines (GA 151313-LDH224-19E38 GA 151254-LDH071-19E32) are DH. Among UGA selected DH lines with high yield coming in our breeding pipeline, many DH lines with a wide array of pyramided scab QTL (Fhb1, 2DL, 5AS, 1B, 1A, 4A and 3B) were found also to have good resistances to other foliar disease and Hessian fly. These include five DH lines from the 20th series; three were included in 2022 USW (GA151313-LDH-192 -20E48, GA161137LDH-23 -20LE3, and GA161240LDH-113 -20LE6) and two in 2022 GAWN (GA151313-LDH-53 -20E18 and GA151313-LDH-95 -20E19). In other SUNGRAINS regional wheat trials, three DH from the 21 series (GA131246LDH-86-21E2, GA17324DH-17-21E31, and GA17634DH-08-21E36) were included in SUNWheat. Additionally, six DH of the 22nd series were included in SPE (SPE: GAGA17393DH-42 -22E1, GALA16020LDH-22 -22E3, GA17393DH-166 -22E4, and GA181103-135NCDH -22E33) and SPL (GA151313-LDH-115--22LE1 and GAAR160389LDH-80--22LE8).

c) List key outcomes or other achievements.

Well-adapted elite DH lines were released in 2021 and 2020. In 2021, FOUR cultivars were released; GA18-E26, GA18LE23, GA18LE43 licensed to AGS (AGS 3026, 4023 and 4043, respectively) and GA 18E35 to UniSouth Genetics (USG 3725) companies. Among these TWO, GA18E35 (USG3725) and GA18LE43F (AGS4043) are DH. In addition, among the FIVE (19 series) that are increased for potential release in 2022 (GA 151313-LDH224-19E38; GA 111055-19LE12; GA 121012-19LE8; GANC 12642-19LE16F; and GA 151254-LDH071-19E32), TWO of them are DH.

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

We have trained three graduates and several undergraduate students in screening and evaluating germplasm for scab resistance. They were also involved in all FHB research operations including preparing samples for FDK and DON testing.

4. How have the results been disseminated to communities of interest?

A poster was presented one at the 2021 Annual Forum of the Wheat and Barley Scab Initiative (see publications section). Many lab/field tours was given to 17 graduate students and teachers involved in the PBGG 6000 practicum course in 2021 highlighting the importance of scab, research being conducted and achievements made. Reactions to FHB collected on released cultivars and elite lines, potential for release, were published in reports. This report includes GA Statewide variety trial, OVTs of the Southeast states including SUNGRAINS States; Uniform South Wheat (USW) regional trials; Gulf Atlantic Wheat nursey (GAWN) and other SUNGRAINS trials.
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The purpose of this demonstration trial is to disseminate the results, including FHB data, for released and elite potential releases developed by SUNGRAINS breeding program. SUNSHOW is excellent demonstration trails used for field days including wheat growers, stakeholders and private companies.

Publications, Conference Papers, and Presentations

Please include a listing of all your publications/presentations about your FHB work that were a result of funding from your FY21 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period** should be included.

Did you publish/submit or present anything during this award period?

☒ Yes, I've included the citation reference in listing(s) below.
☐ No, I have nothing to report.

Journal publications as a result of FY21 grant award

List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Include any peer-reviewed publication in the periodically published proceedings of a scientific society, a conference, or the like.

Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published [include DOI#]; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

1. **Mergoum Mohamed**, Jerry W. Johnson, James W. Buck, Steve Sutton, Benjamin Lopez, Daniel Bland, Z. Chen, G.D. Buntin, Daniel J. Mailhot, Md A. Babar, Richard E. Mason, Stephen A. Harrison, J. Paul Murphy, Amir M. H. Ibrahim, Russell L. Sutton, Bryan E. Simoneaux, Harold E. Bockelman, Byung-Kee Baik, David Marshall, Christina Cowger, Gina L. Brown-Guedira, James A. Kolmer, Yue Jin, X. Chen, Sue E. Cambron. **2021**. 'GA JT141-14E45': A New Soft Red Winter Wheat Cultivar Adapted to Georgia and the South East US Environments. **Journal of Plant Registrations**. **https://Doi.org/10.1002/plr2.20070;** acknowledgment of federal support: no.
2. Ghimire, B., J. W. Buck, **M. Mergoum**, A. D. Martinez-Espinoza. **2021**. Fusarium Head Blight Epidemics in Soft Red Winter Wheat Fields in Georgia from 2018 to 2019. **Plant Health Progress.** **https://doi.org/10.1094/PHP-08-21-0111-RS;** acknowledgment of federal support: no.
3. **Mergoum Mohamed**, Jerry W. Johnson, James W. Buck, Steve Sutton, Benjamin Lopez, Daniel Bland, Z. Chen, G.D. Buntin, Daniel J. Mailhot, Md A. Babar, Richard E. Mason, Stephen A. Harrison, J. Paul Murphy, Amir M. H. Ibrahim, Russell L. Sutton, Bryan E. Simoneaux, Harold E. Bockelman, Byung-Kee Baik, David Marshall, Christina Cowger, Gina L. Brown-Guedira, James A. Kolmer, Yue Jin, X. Chen, Sue E. Cambron. **2021**. A New Soft Red Winter Wheat Cultivar, 'GA 07353-14E19', Adapted to Georgia and the US South East Environments. **Journal of Plant Registrations. http://doi.org/10.1002/plr2.20113;** acknowledgment of federal support: no.
4. **Mergoum Mohamed**, Jerry W. Johnson, James W. Buck, Steve Sutton, Benjamin Lopez, Daniel Bland, Z. Chen, G.D. Buntin, Daniel J. Mailhot, Md A. Babar, Richard E. Mason, Stephen A. Harrison, J. Paul Murphy, Amir M. H. Ibrahim, Russell L. Sutton, Bryan E. Simoneaux, Harold E. Bockelman, Byung-Kee Baik, David Marshall, Christina Cowger, Gina L. Brown-Guedira, James A. Kolmer, Yue Jin, Richard Boyles, X. Chen, Sue E. Cambron. **2021**. 'GA 051207-14E53' Soft Red Winter Wheat, an Adapted Cultivar to Georgia and the South East US Region. **Journal of Plant Registrations.** **https://doi.org/10.1002/plr2.20102;** acknowledgment of federal support: yes.
5. Amir M.H. Ibrahim, Russell Sutton, Jerry W. Johnson, **Mohamed Mergoum**, Bryan Simoneaux, Stephen A. Harrison, J. Paul Murphy, R. Esten Mason, Md A. Babar, Clark Neely, Geraldine Opeña, Yue Jin, Jim Kolmer, Richard Boyles, Sue E. Cambron, Byung-Kee Baik, Gina L. Brown-Guedira, David Marshall, and Myron O. Fountain. **2021**. Registration of 'GA06343-13E2 (TX-EL2)' Soft Red Winter Wheat. **Journal of Plant Registrations. https://acsess.onlinelibrary.wiley.com/doi/full/10.1002/plr2.20031;** acknowledgment of federal support: no.

Books or other non-periodical, one-time publications as a result of FY21 grant award

Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like.

Identify for each one-time publication: Author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (book, thesis or dissertation, other); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

N/A

Other publications, conference papers and presentations as a result of FY21 grant award

Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication.

1. Bikash Ghimire, **Mohamed Mergoum**, Alfredo D. Martinez-Espinoza, Md Ali Babar, and James W. Buck. **2021**. Genome-Wide Association Studies for Fusarium Head Blight Resistance in Soft Red Winter Wheat. *In* ASA-CSSA-SSSA International Annual Meeting Abstracts 2021 [CD-ROM], November 7-10, 2021, Salt Lake City, Utah, USA.
2. Bikash Ghimire, **Mohamed Mergoum**, Anthony E. Glenn4, Kira L. Bowen, Alfredo D. Martinez-Espinoza, and James W. Buck. **2021**. Population Diversity of Fusarium Species Causing Fusarium Head Blight in Wheat and Greenhouse Pathogenicity Tests of F. poae Isolated from Georgia. *Proceedings of the 2021 National Fusarium Head Blight Forum*; Virtual. December 6-7, 2021. Retrieved from: https://scabusa.org/forum/2021/2021NFHBForumProceedings.pdf