



**IR-4 NORTH
CENTRAL REGION
RESEARCH CENTER**

MICHIGAN STATE UNIVERSITY



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2019 ANNUAL REPORT

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A. Mission and Goals of the North Central Region IR-4 Program

The mission of the NC Region IR-4 program is to ensure that safe and effective pest management tools are available for growers of specialty crops, including ornamental crops, and for minor uses on major crops through the generation of high quality field and laboratory data.

The goals of the program are to identify pest management needs for these crops in the region, to participate in the prioritization of these needs at the national level, to conduct field research and analytical studies that develop the information to obtain clearances and label additions from USEPA to meet these needs, and, finally, to make information available on the status and progress of these studies and their final outcome to growers and other interested parties.

B. Background and Justification

The IR-4 Minor/Specialty Crop Pest Management Project (IR-4 Project) is a comprehensive, national program that consists of six units working together on a common mission to meet the nationally defined goals and objectives presented above. The national program is currently comprised of: IR-4 National Headquarters (IR-4 HQ), four Regional IR-4 Centers (Northeast, North Central, Southern and Western), and the USDA Agricultural Research Service (USDA-ARS) Office of Minor Uses. The North Central Region (NCR) program is responsible for the operations of the program in the 12 states of the region (IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD and WI) and has been located at Michigan State University (MSU) since the inception of the regional programs in 1967. The NCR program, while located at MSU, has developed three field research centers in Michigan and Wisconsin, and works with other field research cooperators around the region, has established an advanced laboratory unit at MSU, and, in response to the Good Laboratory Practice (GLP) requirements of EPA, has developed a group of Quality Assurance personnel to serve the region. The NC program also works co-operatively with the USDA-ARS IR-4 field research unit located at Wooster, OH. Each of the 12 states of the Region (with the current exception of Missouri) has one or more State Liaison Representatives who identify research needs in their state and transmit back the activities of the program to interested parties within their state.

In the NCR program, needs are identified and prioritized by research and extension personnel, farmers, grower organizations and others at a regional meeting, and prioritized at a National Food Use Workshop. Field trials in which pest management chemicals are applied to food crops are conducted and crop samples

are collected and analyzed for the magnitude of residues. All food use research is conducted under the requirements for Good Laboratory Practice issued by the USEPA. The analytical reports, after Quality Assurance checks, are forwarded to USEPA as petitions for the development of clearances for these materials. Efficacy (performance) studies on key pests that are currently difficult to control are also funded where this is deemed necessary to obtain later clearances for these pests. Like food uses, ornamental projects are prioritized at a specific workshop and assigned to collaborators in the NCR. The ornamentals projects focus on efficacy and crop safety (phytotoxicity) with primary emphasis on pests for which no satisfactory controls currently exist. The reports are sent to the registrants of the chemicals to assist in obtaining label amendments to include new crops and pests. Projects to conduct research and efficacy demonstrations with biopesticides are also solicited and prioritized nationally at the annual Biopesticide Workshop.

The plant protection industry has limited economic incentive to conduct the research necessary to obtain registrations for most specialty crops. To fill this pest management gap, IR-4 develops the data that provide legal, effective, safe and IPM-compatible pest control agents. Without this program, many specialty crops could no longer be produced in the USA with severe economic implications for American agriculture, food processors, and consumers. Specialty crop growers and food processors are the primary beneficiary of the IR-4 Project by having legal access to effective pest management products, but the general public also benefits by having a safe, healthy, and reasonably priced food supply.

C. Budget

Funding for the NCR IR-4 program comes primarily from USDA/NIFA as an annual competitive research grant. We received \$1,978,284 for FY19. The starting date for the FY19 funding was August 15, 2019.

D. Overview of Productivity in 2018

This was a productive year for the IR-4 North Central Region. Field Research Directors (FRD) effectively worked around weather-related events, such as frosts and flooding, to carry out field trials to completion. The NC region participated in the national effort to implement “efficiencies” with our laboratory and field programs, and achieved the goal of overcoming the backlog problem in 2019. This effort included restructuring the IR-4 Food, Biopesticide and Environmental Horticulture programs as a means of reducing costs and thus balancing budgets under flat NIFA funding trends. This restructuring resulted in fully integrating the Biopesticide grants program into the Food and Environmental Hort programs and implemented a new Integrated Solutions line within the Food program. The prioritization events were also integrated into a common time and location venue in 2019.

E. Future Challenges

The IR-4 program continues to face significant challenges in relation to the budgetary constraints on completing its mission. The continued flat funding in the NIFA grant will add continued pressures on the NC Region for maintaining its facilities, field and lab personnel, while providing the highest quality outputs for the specialty crop growers of the region.

While recent restructuring of the IR-4 Food, Biopesticide and Ornamental programs will reduce costs and help us balance budgets under flat NIFA funding, the trend of host universities demanding indirect costs (IDC) is yet another uncertainty for the sustainability of IR-4. In 2019, IR-4 moved its headquarters from Rutgers to NC State, in part because of excessive costs associated with remaining at Rutgers. With concern that other “host universities” may follow suit, IR-4 is taking action to shift our NIFA funding from a “special research grant” (not allowing IDC) to a “cooperative agreement” model (allowing up to 15% IDC).

F. Personnel Changes/Additions and Awards in 2018

NC Lab: Mr. Brad Arnold was hired and started in the laboratory in January of 2019. Ms. Diane Haddad was hired and started in July of 2019 in the laboratory as well.

NC QA: Due to no field trials at two NDSU field sites, Fargo, ND and Minot, ND in 2019, Dr. Derek Killilea would only conduct field in-life inspections at SDSU, Brookings, SD for the year. Beginning in 2020, he would not continue doing IR-4 QA activities. He served as the site QA for ND and SD since 1990s. He provided critical QA supports in Dakotas that were difficult to reach from Michigan regional office. He did excellent job and made tremendous contributions to the NCR QA program. We greatly appreciate his services and wish him all the best. Our regional office would take over the SD QA works from now on.

Additionally, Ms. Stacy Gieck helped QA inspections and audits at Midwest Research Inc., York, NE. The site had one IR-4 field trial in Region VII in 2019. She was the site QA and audited the field data book. We appreciated her services and looked forward to more collaboration in coming years.

NC Field: Allison Robinson was hired as a new technician in Doug Doohan's lab at Ohio State University, replacing Chengsong Hu.

Awards: Dr. Sally Miller was awarded the 2019 NCR Meritorious Service Award for her leadership in the NC Region's Biopesticide program out of Ohio State University, her contributions to field and lab activities, and commitment to specialty crop registrations through the IR-4 Project. Chengsong Hu was awarded the 2019 NCR Technical Service Award for his service as Field Technician in the NC Region out of Ohio State University, conducting GLP field residue trials on sorghum, dry bean, corn, and flax. He has also contributed expertise in Standard Operating Procedures and lab equipment maintenance.

G. Regional IR-4 Activities:

Field Research

(Dr. Anthony VanWoerkom)

Food Uses: As a result of the 2019 NC Regional IR-4 Advisory Committee Meeting in East Lansing, MI, the subsequent IR-4 Food Use Workshop, and the National Research Planning Meeting followed by inevitable adjustments, 49 (45 NIFA funded) food use field studies (38 GLP food crop field residue trials and 11 efficacy/ crop safety studies) were assigned in 2019. See Table 1 of this report for the distribution of the funded 2019 field research projects and the projects completed during this period.

Table 1. 2019 NCR FOOD GLP AND EFFICACY/CROP SAFETY PROJECTS

2019 Studies	FRD
4 GLP	Chapman, Scott (WI)
2 E/CS	Clay, Dr. Sharon (SD)
5 GLP	Doohan, D. (OH)
2 GLP	Hausbeck, Mary (MI)
4 E/CS	Hausbeck, Dr. Mary
7 GLP	Heider, Daniel J. (WI)
8 GLP	Reicks, Graig (SD)
2 E/CS	Reicks, Graig
1 GLP	Spotanski, Jess J. (NE)

1 E/CS	Quintanilla, Dr. Marisol (MI)
2 GLP	Van Woerkom, Dr. Anthony (MI)
9 GLP	Zandstra, Dr. Bernard H. (MI)
2 E/CS	Zandstra, Dr. Bernard H.

Ornamental Horticulture: As a result of the 2018 Ornamentals Prioritization workshop, in 2019 NCR cooperators conducted 43 trials to assess the safety of pesticides on ornamental crops and 30 efficacy studies (may contain multiple trials each). The outcomes of these projects will help to deliver new pesticide registrations in ornamentals, expand registrant labeling through positive performance data, and enhance their adoption through demonstration of their effectiveness in controlling pests. See the Table 2 for details.

Table 2. 2019 NCR ORNAMENTAL HORTICULTURE PROJECTS

Project Title	Protocol	State	Cooperator
Non-Oomycete Root & Crown Rot Efficacy - Rhizoctonia (10)	19-004	IL	Beckerman
New Disease Products Crop Safety - Foliar (3)	19-006	IA	Cochran
New Disease Products Crop Safety - Soil	19-007	IA	Cochran
Pre-emergent Herbicide Crop Safety (In Season) (3)	19-012	IA	Cochran
Post-emergent Over-the-top Herbicide Crop Safety (In Season)	19-013	IA	Cochran
Pre-emergent Herbicide Crop Safety (In Season) (5)	19-012	OH	Doohan
Non-Oomycete Root & Crown Rot Efficacy - Thielaviopsis (10)	19-005	OH	Hand
New Disease Products Crop Safety - Foliar (2)	19-006	OH	Hand
Botrytis Efficacy: Greenhouse Crops (10)	19-001	MI	Hausbeck
New Disease Products Crop Safety - Foliar (6)	19-006	MI	Hausbeck
New Pest Products Crop Safety (4)	19-011	MI	Hausbeck
NCR/WSR Regional Thrips Efficacy (10)	19-014	MI	Hotchkiss
Pre-emergent Herbicide Crop Safety (In Season) (12)	19-012	OH	Mathers
Post-emergent Directed Herbicide Crop Safety (In Season)	19-021	OH	Mathers
Pre-emergent Herbicide Crop Safety (In Season) (2)	19-012	MI	Persad
Post-emergent Over-the-top Herbicide Crop Safety (In Season) (3)	19-013	OH	Persad
Non-Oomycete Root & Crown Rot Efficacy - Rhizoctonia (10)	19-004	IL	Beckerman

Biopesticides: As a result of the 2018 Biopesticide Prioritization Workshop, in 2019 NCR cooperators conducted 3 Biopesticide projects. The outcomes of these projects will help to deliver new Biopesticide registrations in specialty crops, expand registrant labeling through positive performance data, and enhance their adoption into mainstream production systems through demonstration of their effectiveness in controlling pests.

Table 3. Biopesticide Research Projects in the NC Region in 2019

Title	Principal Investigator
Downy Mildew on Basil	Mary Hausbeck, Michigan State University
Efficacy of Biopesticides on Tomato for the Control of Bacterial Speck, Spot, or Canker	Sally Miller, Ohio State University
Weed Screening	Doug Doohan, Ohio State University

Integrated Solutions: As a result of the 2018 Integrated Solutions Prioritization Workshop, in 2019 NCR cooperators conducted 2 Integrated Solutions projects. With the outcomes of these projects we expect to better service the needs of the IR-4 stakeholders by integrating products. It will take advantage of the considerable increase in development of efficacious biopesticides that are increasingly playing a more significant role in both conventional and organic agricultural production systems.

Table 4: Integrated Solutions Projects in the NC Region in 2019

Title	Principal Investigator
Damping-off / Hemp	Burton Johnson, North Dakota State University
Downy mildew / Organic basil	Mary Hausbeck, Michigan State University

Outreach and Collaborative Activities:

Wisconsin Ginseng Growers: The NCR is home to a unique specialty crop, ginseng. Marathon County, Wisconsin, produces 90% of the cultivated American ginseng grown in the United States. On August 7-9, 2019, along with MSU’s Mary Hausbeck, Department of Plant, Soil and Microbial Sciences and Tony VanWoerkom attended the 2019 Fall Wisconsin Ginseng Growers’ meeting to present ginseng research results as well as provide information on the petition status of pesticides for ginseng.

Laboratory Program
(Dr. Susan Erhardt)

The laboratory was able to complete the analysis of over 100 trials while reporting 74 of these for a total of 11 reports in 2019. As of November of 2019 we had 10 projects backlogged up from a total of 11

earlier in the year. Due to the loss of personnel, laboratory productivity dropped but is currently trending upwards again. Even with the changes in personnel, the emphasis continues to be reduce the backlog of projects so that overall turnaround for projects comes more consistently closer to the 30 month turnaround time where ever possible while maintaining data quality.

Quality Assurance Program

(Dr. Zhongxiao Michael Chen)

The Quality Assurance Unit (QAU) in 2019 monitored 50 field trials and 100 laboratory analytical trials that were conducted in the region including the USDA ARS facility at Wooster, OH. QAU conducted periodic in-life inspections of the GLP studies to assure the management that the study protocol and appropriate Standard Operation Procedures (SOPs) were followed in compliance with the EPA GLP standards (40 CFR 160), and audited the field data books, analytical raw data, analytical summary report, and draft final report of each study to assure the data quality and integrity for GLP compliance. As part of the GLP requirements, QAU also conducted facility inspections to assure that the personnel, equipment, and test facilities were properly set up and adequate for conducting the requested GLP studies.

The personnel in the QAU that were involved in NCR studies in 2019 are:

<u>Quality Assurance Officers</u>	<u>Area of Responsibility</u>
Dr. Zhongxiao Michael Chen	Regional QAU management, inspections, and audits
Ms. Lisa Latham	Analytical Lab Inspections and audits
Dr. Derek Killilea	SD Field Sites
Ms. Eileen Nelson	UW-Madison IR-4 Research Center
Ms. Stacy Gieck	NE Field Site/Midwest Research Inc.

QAU Performance in Last 5 Years including current year: In 2019, the QAU performed a total of 184 inspections and audits (Table 1). This included quite a few audits that our region helped HQ QAU in auditing draft final reports, analytical raw data and reports, and field data books. We also picked up a few field in-life inspections during the season to meet the overall inspection requirements nationwide when other regions encountered difficulties. QAU also provided the critical GLP trainings to personnel at OH field site when the field technician left the job in middle of the season and the new replacement was lacking of formal GLP training. In 2019, lab QA activities were slightly down due to lab personnel changes that influenced productivities. We also experienced extreme wet early season that caused considerable schedule conflicts in late season when all activities fired on all cylinders. Overall, 2019 was a productive and successful year and our QAU performed very well.

Table 1. Numbers of Quality Assurance Reports Accomplished in Last 5 Years.

Inspections or Audits	2015	2016	2017	2018	2019
Draft Final Report Audit	14	9	16	15	17
Analytical Raw Data & Report Audit	33	34	34	40	26
Field Data Book Audit	74	117	76	78	99
Lab and Field In-life Inspection	63	59	56	52	37
Facility Inspection	10	6	5	6	5
Total QA Reports	194	225	187	190	184

EPA Inspection: We had two EPA inspections in NCR in 2019. On June 14, 2019, EPA notified us for an upcoming inspection at TNRC, Fennville, MI, led by Inspector, Mr. Elmer Griffin, scheduled for

the week of June 24, 2019. The letter selected the studies of PR11284.14-MI244 and MI246 (Spinetoram/Blueberry) and PR11501.15-MI262, MI503 and MIR01 (Fenpyroximate/ Blueberry). Tammy noticed that a lab ID MIR01 was listed and contacted Elmer for clarification and received confirmation that the MSU analytical lab was not on the targeted list. The actual arrival and inspection dates occurred on June 27 - 28, 2019. Mr. Griffin focused on the selected studies and no additional on-going trials were chosen. At the end, he wrote in the Inspection Observation: “No adverse findings were observed during the Compliance Review. One finding was note for Study 11284.14-MI244. Incorrect value for the number of passes for the application of the test substance. Raw data indicated 8 passes; final report indicated 2 passes.” On August 29, 2019, Dr. Jerry Baron took the corrective action to address the finding by sending the amended final report to Ms. Francisca E. Liem, Office of Compliance, EPA.

On August 9, 2019, EPA notified us for an upcoming inspection at NDSU, Minot, ND, led by Inspector, Mr. Mark Lehr, scheduled for the week of August 19, 2019. The letter selected the studies of PR 10932.13-ND04 and ND05 (Pyroxasulfone/Sunflower) and PR 11126.13-ND10 (Ethofumesate/Beet (Sugar)). The field site had no on-going trials in 2019 and was scheduled for decommissioning in near future. The inspections occurred on August 22, 2019. At the end, Mr. Lehr wrote in the Inspection Observation: “Instances of overwriting or scribing over the original entry 40 CFR 160.130 (e)”.

Since 2000, our region has a total of 37 successful EPA inspections. All of them went well.

International Activities:

(Drs. Wayne Jiang and John Wise)

Wayne Jiang had been involved in USDA FAS funded international capacity building efforts in 2019. Wayne Jiang had six international trips to West Africa and South America. The countries were Ghana (twice), Ivory Coast, Senegal, Colombia, and Peru. Throughout the year of 2019, together with Mr. Joe DeFrancesco (Study Director, OR State University), Drs. Dan Kunkel and Michael Braverman (Rutgers University), and Dr. Jason Sandahl (USDA FAS), Wayne had worked on sample shipping between the countries, sample analyses in local labs, data reviewing and report preparation with the field and lab researchers in Ghana, Senegal, Uganda, and Kenya to successfully submit the final report (Sulfoxaflo/Mango, including multiple years of study, and multiple field research locations, multiple analytical laboratories, and multiple analytical summary reports) to JMPR. Drs. Steven Haggblade, Veronique Theriault (MSU professors), and Wayne Jiang have been working on the project of fraudulent pesticides in West Africa. Then, this MSU team had been working on pesticide risk projects in Mali, Ghana, and Ivory Coast in the past two years and will continue the work in the following years. Wayne Jiang also analyzed the glyphosate samples collected from Mali.

The NCR Leader Laboratory hosted a Chinese visiting scholar, Dr. Honghong Li, Guangxi University, Nanning, Guangxi Province, China. Dr. H. Li had worked on pesticide-pollinator related research under supervision of Dr. Zach Huang (MSU professor) and Wayne Jiang between March 2017 and March 2019. Ms. Li completed her study with MSU and returned to China in March 2019. The NCR Leader Laboratory hosted an Egyptian postdoc, Dr. Ehab Abdelraheem, Central Analytical Pesticide Laboratory, Ministry of Agriculture, Egypt. Dr. Abdelraheem is currently working on pesticide field and laboratory research under supervision of Drs. John Wise and Wayne Jiang. Ehab was one of the key field and laboratory researchers who had completed the Azoxystrobin+Difenoconazole/Guava study in Egypt in 2016 - 2018. JMPR published the MRL for Azoxystrobin/Guava in 2019 and the data of Difenoconazole/Guava is being reviewed by JMPR. This Guava project was sponsored by USDA FAS.

NCR State Researchers Participating in the IR-4 Program for 2019

(* indicates State Liaison Representative)

ILLINOIS Open*	MICHIGAN M. Hausbeck J. Wise A. VanWoerkom	MINNESOTA A. Robinson*	OHIO D. Doohan* H. Mathers A. Persad	WISCONSIN D. Heider* S. Chapman R. Groves*
INDIANA J. Beckerman	B. Zandstra E. Hotchkiss M. Quintanilla	NEBRASKA A. Jhala*	F. Hand S. Miller	
IOWA R. Hartzler* D. Cochran	NORTH DAKOTA A. Robinson*		SOUTH DAKOTA S. Clay* G. Reicks	
KANSAS Open*	MISSOURI Open*	INDEPENDENT CONTRACTORS J. Spotanski		

NC Liaison Committee Officers

G. Reicks - Chairperson
T. Van Woerkom - Vice Chairperson
W. Jiang - Secretary

NC Region Administrative Advisor

D. Buhler - Administrative Advisor

MSU Leader Lab

J. Wise - NC Region Director
A. VanWoerkom - Regional Field Coordinator
S. Erhardt - Regional Lab Coordinator
W. Jiang - Associate Regional Lab Coordinator
L. Geissel - Research Assistant
S. Kumar - Research Assistant
D. Haddad - Research Assistant
R. Fader - Laboratory Technologist
B. Arnold - Research Assistant
Z. Chen - QAU Coordinator
L. Latham - QAU associate

Field Research Center Directors

MI: B. Zandstra
MI: A. VanWoerkom
WI: S. Chapman and D. Heider

Field QA

Z. Chen, MI/L.Latham
D. Killilea, ND
E. Nelson, WI