



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

MICHIGAN STATE UNIVERSITY



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2018 ANNUAL REPORT

(January 1 – December 31, 2018)

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 FY18 at same level as FY17. The starting date for the FY18 funding was August 15, 2018.

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 two “process improvement” exercises, one focusing on the field program and the other on the laboratories. The field exercise was completed with a primary product of revising the IR-4 Operational handbook. The laboratory exercise led to each lab identifying areas of improvement, which are expected to improve productivity and help eliminate the backlog. The NC region lab largely eliminated the remaining study backlogs in 2018, thus meeting the 2018 completion timeline.

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.

The 2016 Organization Assessment, which led to the “process improvement” exercises, has helped identify efficiencies and cost savings for the program at large. In the July 2017 PMC meeting a new HQ-targeted exercise was initiated for the OrnHort/BioPest/Food (performance) programs, with emphasis on simplification, integration and reduction of financial and time burdens to all involved.

F. Personnel Changes/Additions and Awards in 2018

Dr. Satoru Miyazaki retired on January 1, 2018, after 30+ years of service to the region as NC Regional Field Coordinator (RFC). Dr. Anthony VanWoerkom, a former NC Region FRD was hired as his replacement in July 2018. Dr. Eina Abouzied retired as a laboratory analysts and Ms. Robin Chinnery and

Mr. Rick Othoudt left the laboratory group to pursue other opportunities. Mr. Brad Arnold was hired to start in the laboratory in January of 2019.

Dr. Michael Chen was awarded the 2018 NCR Meritorious Service Award for his leadership in the NC Region’s Quality Assurance unit, his contributions to field and lab activities, and commitment to specialty crop registrations through the IR-4 Project. Dr. Anthony VanWoerkom was awarded the 2018 NCR Technical Service Award For his service as Field Research Director in the NC Region, conducting GLP field residue trials on fruit crops, and contributing expertise in airblast sprayer applications and post-harvest washing procedures.

G. Regional IR-4 Activities:

Field Research

(Dr. Anthony VanWoerkom)

Food Uses: As a result of the 2018 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, 73 (68 NIFA funded) food use field studies (59 GLP food crop field residue trials and 14 efficacy/ crop safety studies) were assigned in 2018. See Table 1 of this report for the distribution of the funded 2018 field research projects and the projects completed during this period.

Table 1. 2018 NCR FOOD GLP AND EFFICACY/CROP SAFETY PROJECTS

2018 Studies	FRD
9 GLP	Chapman, Scott (WI)
1 E/CS	Chapman, Scott
4 GLP	Clay, Dr. Sharon (SD)
3 E/CS	Clay, Dr. Sharon
2 GLP	Doohan, D. (OH)
1 E/CS	Doohan, D.
6 GLP	Hausbeck, Mary (MI)
1 E/CS	Hausbeck, Dr. Mary
9 GLP	Heider, Daniel J. (WI)
3 E/CS	Heider, Daniel J.
2 GLP	Howatt, Kirk (ND)
6 GLP	Jenks, Dr. Brian (ND)
2 E/CS	Miller, Dr. Sally Ann (OH)
10 GLP	Van Woerkom, Anthony (MI)
11 GLP	Zandstra, Dr. Bernard H. (MI)
3 E/CS	Zandstra, Dr. Bernard H.

Ornamental Horticulture: As a result of the 2017 Ornamentals Prioritization workshop, in 2018 NCR cooperators conducted 50 trials to assess the safety of pesticides on ornamental crops and 45 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. 2018 NCR ORNAMENTAL HORTICULTURE PROJECTS

Project Title	Protocol	State	Cooperator
Foliar Feeding Beetle Efficacy (10)	18-008	IN	Sadof
Non Oomycete Efficacy (9)	18-005	IL	Beckerman
New Disease Products Crop Safety - Foliar (5)	18-006	IL	Beckerman
Post-emergent Herbicide Crop Safety (in season)(3)	18-012	IA	Cochran
Pre-emergent Herbicide Crop Safety (In season)(7)	18-012	OH	Doohan
Thrips Efficacy (6)	18-014	MI	Hotchkiss
Non Oomycete Efficacy (9)	18-005	OH	Hand
New Disease Products Crop Safety - Foliar (2)	18-006	OH	Hand
New Disease Products Crop Safety -Soil (3)	18-007	OH	Hand
Botrytis Efficacy: Greenhouse Crops (7)	18-001	MI	Hausbeck
New Disease Products Crop Safety: Foliar (3)	18-006	MI	Hausbeck
Pathogen Products Crop Safety – Soil (2)	18-007	MI	Hausbeck
Pre-emergent Herbicide Crop Safety - (in season)(9)	18-012	OH	Mathers
In Season Post Herbicide Crop Safety	18-013	OH	Mathers
Pests Products Crop Safety	18-020	OH	Persad
Pre-emergent Herbicide Crop Safety (in season) (9)	18-012	OH	Persad
NCR Regional Nematode Efficacy (3)	18-015	MI	Quintanilla
In Season Post Herbicide Crop Safety (5)	18-013	OH	Siefer

Biopesticides: As a result of the 2016 Biopesticide Prioritization Workshop, in 2018 NCR cooperators conducted 5 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 2018

Title	Principal Investigator
Efficacy and Phytotoxicity of Biopesticides on Organic Apple for the Control of Fire Blight	George Sundin, Michigan State University
Efficacy of Biopesticides on Blueberry for the Control of Stem Gall Wasp (<i>Hemadas nubilipennis</i>)	Rufus Isaacs, Michigan State University
Mitigation of residues of export concern in blueberry through the utilization of biopesticides for end of season management of Spotted Wing Drosophila (SWD).	John Wise, Michigan State University
Efficacy and Phytotoxicity of Biopesticides on Cabbage for the control of Black Rot on Cabbage in Organic Production Systems	Sally Miller, Ohio State University
Efficacy of Biopesticides on Greenhouse Tomato and Cucumber for the Control of <i>Agrobacterium rhizogens</i> .	Chris Taylor, Ohio State University

Outreach and Collaborative Activities:

Canadian Biopesticides and Minor Use Pesticides Priority Setting Workshops: John Wise participated in the 2018 Canadian Biopesticides and Minor Use Pesticides Priority Setting Workshops in Gatineau, Quebec, March 20-21, 2018. Over 190 participants attended including many growers from Canada and the U.S. Much of the NC Region is contiguous with Canada and we have many pest management problems in common and IR-4 was often asked for input to assist in reaching a final determination, as needed. They prefer registration candidate products to be developed jointly with IR-4.

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 March 17, 2018, along with MSU’s Mary Hausbeck, Department of Plant, Soil and Microbial Sciences and John Wise attended the 2018 Spring 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 120 trials while reporting 97 of these for a total of 19 reports in 2018. As of November of 2018 we had 3 projects backlogged down from a total of 11 earlier in the year. 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. We currently have

Quality Assurance Program

(Dr. Zhongxiao Michael Chen)

The Quality Assurance Unit (QAU) in 2018 monitored 75 field trials and 88 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 2018 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	ND/SD Field Sites
Ms. Eileen Nelson	UW-Madison IR-4 Research Center

QAU Performance in Last 5 Years including current year (January 1 – December 31, 2018): In 2018, the QAU performed a total of 190 inspections and audits (Table 4). This workload had steady increases since 2009 after the closure of the Cornell University analytical lab. In 2014, the draft final report audits dropped considerably due to uncontrollable external reasons. For 2018, the number of analytical report audits was the highest among last five years as indication of reduction of the backlog. Overall, 2018 was a productive and successful year and our QAU went smoothly. We overcame the more frequent extreme weather/rains during the season that caused many schedule cancellations/changes for field in-life inspections.

Table 4. Numbers of Quality Assurance Reports Accomplished in Last 5 Years.

Inspections or Audits	2014	2015	2016	2017	2018
Draft Final Report Audit	4	14	9	16	15
Analytical Raw Data & Report Audit	23	33	34	34	40
Field Data Book Audit	76	74	117	76	78
Lab and Field In-life Inspection	40	63	59	56	52
Facility Inspection	4	10	6	5	6
Total QA Reports	147	194	225	187	190

EPA Inspection: We had one EPA inspections in NCR in 2018. On August 16, 2018, EPA notified us for an upcoming inspection led by Inspector, Mr. Mark Lehr, and selected the studies of PR10472.12-ND01 (Flonicamid/pea (edible potted & succulent shelled)), PR11126.13-ND08 & 11126.13-ND09 (Ethofumesate/Beet (sugar), which were conducted by the previous FRD, Mr. Mark Ciernia. The actual arrival and inspection date occurred on August 29, 2018. On the site, Mr. Lehr selected the trial of

PR12064.17-ND259 (Diquat/ Sunflower), conducted by the current FRD, Dr. Kirk Howatt, as the on-going study inspection. There were no findings after the inspections. Up to date, our region has received 35 EPA inspections in total. There are no compliance issues reported by EPA inspectors since 2000.

International Activities: (Drs. Wayne Jiang, Michael Chen and John Wise)

Wayne Jiang had been involved in USDA FAS funded international capacity building efforts in 2018. Wayne Jiang had three GLP laboratory trainings in the Ghana Standards Authority Laboratory (GSA), Accra, Ghana, Kenya Plant Health Inspectorate Service (KEPHIS) – Nairobi, Kenya and Servicio Fitosanitario del Estado (SFE), San Jose, Costa Rica. Throughout the year of 2018, together with Mr. Joe DeFrancesco (Study Director, OR State U.), Dr. Michael Braverman (Rutgers U.), and Dr. Jason Sandahl (USDA FAS), Wayne had worked with GSA and KEPHIS labs to complete sample analyses. A USDA government delegation (including Wayne Jiang) visited China in June 2018. This was the USDA FAS' Scientific Cooperation Exchange Program (SCEP) that worked on the MRL issues between the USA and China. The Chinese government officials and professors/researchers in universities and academy institutions showed strong interest in working with the US SCEP team. Starting September 2018, Drs. Steven Haggblade (MSU professor) and Wayne Jiang have been working on the project of Fraudulent Pesticides in West Africa.

The NCR Leader Laboratory hosted two Chinese visiting scholars, Dr. Xuesheng Li and Ms. Honghong Li, Guangxi University, Nanning, China. Dr. Xuesheng Li completed his study with IR4 and return to China in March 2018. Ms. Honghong Li continued working pesticide related research under supervision of Dr. Zach Huang (MSU professor) and Wayne Jiang throughout 2018.

QAU hosted a visiting scholar, Dr. Gang Wu, from Inspection and Quarantine Technology Center, Hangzhou, P. R. China, for three months starting on June 1, 2018. He engaged in residue field trials and quality assurance in pesticide registration. He did great jobs and enjoyed his stay at MSU and departed as scheduled by the end of August 2018.

NCR State Researchers Participating in the IR-4 Program for 2018

(* indicates State Liaison Representative)

ILLINOIS Open*	MICHIGAN T. Davis M. Hausbeck	MINNESOTA A. Robinson*	OHIO D. Doohan* H. Mathers A. Persad	WISCONSIN D. Heider* S. Chapman R. Groves*
INDIANA D. Egel* C. Sadof	J. Wise A. VanWoerkom B. Zandstra R. Isaacs G. Sundin D. Fulbright	NEBRASKA S. Kamble*	F. Hand J. Siefer S. Miller	SOUTH DAKOTA S. Clay*
IOWA R. Hartzler* D. Cochran		NORTH DAKOTA A. Robinson* K. Howatt B. Jenks		
KANSAS R. Cloyd *	MISSOURI Open*			

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
E. Gooma - Research Assistant
R. Fader - Laboratory Technologist
R. Othoudt - Part time Analyst
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