



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

**MICHIGAN STATE UNIVERSITY**



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## **2021 ANNUAL REPORT**

(January 1 – December 31, 2021)

### **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 \$2,042,215 for FY20. The starting date for the FY20 funding was August 15, 2020.

### **D. Overview of Productivity in 2020**

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. State and institutional restrictions related to the COVID19 pandemic challenged all aspects of work in the NCR, but because of outstanding efforts by all no trials were lost. Even with travel restrictions, the prioritization workshops were accomplished by utilizing virtual event platforms in 2020.

### **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 10% IDC).

### **F. Personnel Changes/Additions and Awards in 2021**

NC Field: Reid Smeda of Missouri has agreed to be a state Liaison.

Awards:

**G. Regional IR-4 Activities:**

**Field Research**

(Dr. Anthony VanWoerkom)

**Food Uses:** As a result of the 2021 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, 48 (38 NIFA funded) food use field studies (40 GLP food crop field residue trials and 8 efficacy/ crop safety studies) were assigned in 2021. See Table 1 of this report for the distribution of the funded 2021 field research projects and the projects completed during this period.

Table 1. 2021 NCR FOOD GLP AND EFFICACY/CROP SAFETY PROJECTS

2021 Studies	FRD
10 GLP	Chapman, Scott (WI)
1 E/CS	Chapman, Scott (WI)
3 GLP	Robinson, A. (OH)
2 E/CS	Robinson, A. (OH)
6 GLP	Hausbeck, Dr. Mary (MI)
3 E/CS	Hausbeck, Dr. Mary
10 GLP	Heider, Daniel J. (WI)
1 E/CS	Heider, Daniel J. (WI)
5 GLP	Reicks, Graig (SD)
2 E/CS	Reicks, Graig
1 GLP	Jenks, Dr. Brian (ND)
2 E/CS	Meyers, Stephen L. (IN)
3 GLP	VanWoerkom, Dr. Anthony (MI)
10 GLP	Chaudhari, Dr. Sushila (MI)
7 E/CS	Chaudhari, Dr. Sushila (MI)

**Ornamental Horticulture:** As a result of the 2020 Ornamentals Prioritization workshop, in 2021 NCR cooperators will be conducting 39 trials to assess the safety of pesticides on ornamental crops and 36 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. 2021 NCR ORNAMENTAL HORTICULTURE PROJECTS

Project Title	Protocol	State	Cooperator
New Disease Products Crop Safety - Foliar	21-011	MI	Saha
New Disease Products Crop Safety - Soil	21-012	MI	Saha
Pythium Root Rot Efficacy	21-006	IN	Beckerman
New Disease Products Crop Safety - Foliar	21-011	IN	Beckerman
New Disease Products Crop Safety - Soil	21-012	IN	Beckerman
Regional Bio Nematode Efficacy	21-016	MI	Quintanilla
New Disease Products Crop Safety - Foliar	21-011	MI	Hausbeck

Bio Fungicide Powdery Mildew Efficacy	21-015	MI	Hausbeck
In-Season Pre Herbicide Crop Safety	21-013	OH	Mathers
Non Oomycete Root Rot Efficacy - Rhizoctonia	21-008	OH	Hand
Insecticide Miticide Crop Safety - Foliar	21-005	OH	Robinson
New Disease Products Crop Safety - Foliar	21-011	OH	Robinson
New Disease Products Crop Safety - Soil	21-012	OH	Robinson
In-Season Pre Herbicide Crop Safety	21-013	OH	Robinson
Insecticide Miticide Crop Safety - Foliar	21-005	MI	Hotchkiss
Regional Thrips Efficacy	21-019	MI	Hotchkiss

**Integrated Solutions:** As a result of the 2020 Integrated Solutions Prioritization Workshop, in 2021 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 2020

Title	Principal Investigator
Thrips/ Green Onion	Allison Robinson, Ohio State University
Powdery and Downy Mildew/ Organic Cucurbits	Mary Hausbeck, Michigan State University

**Outreach and Collaborative Activities:**

Extension and outreach activities included increasing awareness of IR-4 to stakeholders through zoom calls, phone calls, and email. We gained several new IR-4 stakeholders that want to be involved for the North Central Region. We have gained a new Missouri State Liaison and have received many positive feedbacks from valuable stakeholders that our efforts are very much appreciated.

**Laboratory Program**

(Dr. Susan Erhardt)

The laboratory was able to complete the analysis of over 61 trials and reporting the same for a total of 9 reports in 2020. 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. However, with the pandemic, productivity has been significantly reduced from previous years by approximately 50%. We have had to innovate along with our QA auditor a new way of conducting critical phase inspections in the lab in order to minimize the potential exposure of personnel to COVID 19 and meet safety requirements established by MSU for opening the laboratory. For 2021, our laboratory has taken on fewer studies to help eliminate the backlog of 2018 through 2020 studies. By the end of 2021 I anticipate that we should have most of the back log eliminated following this path.

2021 Projects for NCR Laboratory at MSU

PR#	CHEMICAL	MATRIX
11811	BENZOVINDIFLUPYR	CRANBERRY
12810	PARAQUAT	STEVIA
13057	ACETAMIPRID	DRAGON FRUIT (PITAYA)
13062	FLUMETSULAM	CLOVER (SEED CROP)
13105	AZOXYSTROBIN	TOMATO (GH TRANSPLANT)
13107	AZOXYSTROBIN	BASIL (GH TRANSPLANT)
13157	FLUOXAPIPROLIN	GINSENG

## Quality Assurance Program

(Dr. Zhongxiao Michael Chen)

The Quality Assurance Unit (QAU) in 2020 monitored 79 field trials (including 21 ARS field trials in Wooster, OH) and 83 laboratory analytical trials that were conducted in the region. 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 2020 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. Stephanie Bruggeman	SD Field Sites (new QA in 2020)
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 (January 1 – December 31, 2020):** In 2020, the QAU performed a total of 136 inspections and audits (Table 1). This included a few draft final reports and field data books audits that our region helped HQ QAU. Michael also picked up a few field in-life inspections during the season to meet the overall inspection requirements nationwide when other regions encountered difficulties. Additionally Michael provided the extensive/comprehensive QA trainings to Dr. Bruggeman in SD to address the QA coverage at SDSU due to Covid-19 travel restrictions. Michael also contributed and led the roundtable discussion with 12 field GLP topics at IR-4 National Education Conference in San Diego, CA, February 2020. It was a very

challenging year in 2020 due to Covid-19. The overall productivity was down to multiple years low. But the difficulties and efforts went up dramatically to overcome the stress and distress caused by Covid-19. The bright spot was the field QA program that Michael was responsible remained strong and outstanding. In last two years, the lab QA activities were down significantly, mainly due to lab analytical issues. Our QAU was successfully meeting both the field/lab needs without any delays or backlogs.

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

Inspections or Audits	2016	2017	2018	2019	2020
Draft Final Report Audit	9	16	15	17	7
Field Data Book Audit	117	76	78	99	71
Field In-life Inspection	36	35	33	29	34
Lab In-life Inspection	23	21	18	8	6
Analytical Raw Data & Report Audit	34	34	40	26	18
Facility Inspection	6	5	6	5	0
<b>Total QA Reports</b>	<b>225</b>	<b>187</b>	<b>190</b>	<b>184</b>	<b>136</b>

**EPA Inspection:** There was no EPA inspections in our region in 2020 due to Covid-19. There were total 37 successful EPA inspections in our region from 2000 - 2020. I organized/ supported the decommissioning of the field site led by Dr. Brian Jenks, NDSU, Minot, ND, as part of the reorganization of the regional field program.

**National Education Conference/QA Trainings:** Dr. Chen led the roundtable discussion session at the National Education Conference held in San Diego, CA, February 25 – 26, 2020. He worked with Dr. Janine Spies, University of Florida, and Ms. Marylee Ross, University of Maryland and successfully developed 12 discussion topics for the attendees. The topics cover a wide range of field activities: including sprayer calibrations, greenhouse trials, seed treatments, post-harvest treatments, non-typical applications, phytotoxicity, drying samples, planning for the season, sample modification, and TS Measurement, etc. It was well received and got high ratings from the attendees at the conference.

Dr. Chen developed the QA training program and provided the comprehensive GLP/QA trainings to Dr. Stephanie Bruggeman in the busiest months of June – July, 2020. Due to Covid-19 travel restrictions, it was crucial to have the local QA in SDSU to support the field trials. It was a success to bring Dr. Bruggeman to the QA program such that the field trials in SD could be conducted successfully to meet GLP requirements. It was very fortunate that both field trials and field QA ran successfully in such a challenging year.

### **International Activities:**

(Drs. Wayne Jiang and John Wise)

Dr. Wayne Jiang had been involved in USDA FAS funded international capacity building efforts in 2020. Dr. Jiang’s outreach efforts are related to the FAS grants, for which in 2020 he continued informal training (mostly online venues following COVID restrictions) to developing countries to help establish their capacities for the minor uses and registration programs; and trained international lab chemists with EPA

and OECD GLP standards, as in Capacity Building, sponsored by USDA FAS, STDF, IR-4 Projects, and GMUF. He actively participating in USDA FAS Capacity Building Program, Tropical Fruit Studies are selected in ASEAN, North African, Central and South American countries. Wayne also traveled to Colombia in January 2020 on the USDA FAS's Capacity Building mission.

**NCR State Researchers Participating in the IR-4 Program for 2020**

(\* indicates State Liaison Representative)

<b>ILLINOIS</b> Open*	<b>MICHIGAN</b> M. Hausbeck J. Wise A. VanWoerkom	<b>MINNESOTA</b> A. Robinson*	<b>OHIO</b> D. Doohan* H. Mathers F. Hand Allison Robinson	<b>WISCONSIN</b> D. Heider* S. Chapman R. Groves*
<b>INDIANA</b> J. Beckerman S. Meyers	B. Zandstra E. Hotchkiss M. Quintanilla S. Chaudhari D. Saha	<b>NEBRASKA</b> A. Jhala*		
<b>IOWA</b> R. Hartzler*		<b>NORTH DAKOTA</b> Andy Robinson* B. Jenks	<b>SOUTH DAKOTA</b> S. Clay* G. Reicks	
<b>KANSAS</b> Open*	<b>MISSOURI</b> Reid Smeda*	<b>INDEPENDENT CONTRACTORS</b> 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