



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

MICHIGAN STATE UNIVERSITY



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2016-2017 ANNUAL REPORT
(August 1, 2016 – July 31, 2017)

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 FY17 at similar level as FY16. The starting date for the FY17 funding is August 15, 2017.

D. Overview of Productivity in 2016 -2017

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 lab has made significant progress in overcoming the backlog associated with unexpected problems and difficult studies. 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. There were 3 EPA compliance inspections conducted in the NC Region in fall 2016, and all were closed without adverse findings. This illustrates the continuing effectiveness of our region’s FRDs, Laboratory and Quality Assurance personnel. More details of these results are provided below.

E. Future Challenges

The IR-4 program continues to face significant challenges in relation to the budgetary constraints on completing its mission. Based on projections from the US Congressional Agriculture committee, we again are anticipating flat funding for this next year’s NIFA grant proposals. This will add continued pressures on the NC Region for maintaining our facilities, field and lab personnel, while providing the highest possible outputs to the specialty crop growers of the region.

In 2016 the IR-4 Project underwent an Organization Assessment to review their existing organizational structure and its operational efficiencies within the organization. This led to the initiation of “process improvement” exercises to help identify efficiencies and cost savings for the program at large. The PMC met in Fall 2016 and established an aggressive goal to eliminate laboratory study backlogs within two years. The field and laboratory exercises are either complete or well under way. 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 in 2016/2017

Dr. Kirk Howatt, Fargo, ND is a new FRD for ND. He is an NDSU weed science professor and has been assisting IR-4 GLP field trials for FRD Mr. Mark Ciernia who retired at the end of 2016.

Dr. Doug Doohan and Chengsong Hu, OARDC, OH started IR-4 GLP field trials for herbicides. They have been previously conducting IR-4 performance (efficacy/phytotoxicity) studies, but now are added GLP trials for their repertoire. Doug is also the NC IR-4 Ohio liaison.

G. Regional IR-4 Activities:

Field Research

(Dr. Satoru Miyazaki)

Food Uses: As a result of the 2016 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, 76 food use field studies (64 GLP residue trials and 12 Efficacy/Crop safety studies) were assigned in 2017 while 77 field studies (69 GLP and 8 Efficacy/Crop safety) were conducted in 2016 (down 1%). Michigan and Wisconsin field research centers are conducting the trials about 30% below the optimal project capacity. From 8/1/2016 through 7/31/2017 the region completed and sent to IR-4 HQ the field data packages for 76 food use field trials (67 GLP trials and 9 Efficacy/Crop safety trials). See Table 4 of this report for the distribution of the funded 2017 field research projects and the 2016 projects completed during this period. Fig. 1 provides a graph of all projects completed for the 2007-2016 period as a 3-year moving average (food, ornamentals and lab) as of July 31, 2017.

Ornamental Horticulture: NCR has been conducting 86 efficacy/crop safety trials in the area of controlling insects, diseases and weeds. In the ornamentals program conducted in 2016, 81 studies of pesticide efficacy and crop safety were completed and the reports were forwarded to IR-4 HQ. See the Table 4 for details.

Table 1. 2016 NCR ORNAMENTAL HORTICULTURE PROJECTS

ProjectTitle	Protocol	#PR	State	Cooperator
Foliar Feeding Beetle Efficacy	16-007	5	KS	Ray Cloyd Kansas State University
New Pest Products Crop Safety: Foliar Applications	16-008	5	KS	Ray Cloyd Kansas State University
Pre-emergent Herbicide Crop Safety	16-010	9	IA	Diana Cochran Iowa State University
Ornamental Grasses Herbicide Crop Safety	16-011	1	IA	Diana Cochran Iowa State University
Thrips Efficacy	16-006	3	MI	Terry Davis, Michigan State University

New Pest Products Crop Safety: Foliar Applications	16-008	7	MI	Terry Davis, Michigan State University
Botrytis Efficacy: Greenhouse Crops	16-001	9	OH	Francesca Hand, Ohio State University
Fungicide Crop Safety	16-004	5	OH	Francesca Hand, Ohio State University
Botrytis Efficacy: Greenhouse Crops	16-001	9	MI	Mary Hausbeck, Michigan State University
New Disease Products Crop Safety: Foliar Application	16-004	5	MI	Mary Hausbeck, Michigan State University
Pre-emergent Herbicide Crop Safety	16-010	12	OH	Hannah Mathers, Mathers Environmental Science Service
Ornamental Grasses Herbicide Crop Safety	16-011	6	OH	Hannah Mathers, Mathers Environmental Science Service
New Pest Products Crop Safety: Foliar Applications	16-008	5	OH	Anand Persad, Davey Tree Experts Co. Ltd
Pre-emergent Herbicide Crop Safety	16-010	5	OH	Anand Persad, Davey Tree Experts Co. Ltd

Biopesticides: In 2016, the NCR conducted the following biopesticide projects (Table 2). These projects seek to advance the registration and demonstrate the efficacy of naturally occurring pest management agents. These materials often have particular importance for organic growers.

Table 2. Biopesticide Research Projects in the NC Region in 2016

Title	Principal Investigator
Efficacy and Phytotoxicity of Bio pesticides for management of Spotted Wing Drosophila (SWD) in blueberry	Rufus Isaacs, Michigan State University
Efficacy and Phytotoxicity of Bio pesticides on Apple for the Control of Fire Blight	George Sundin, Michigan State University
Efficacy and Phytotoxicity of Hypovirulent CHV3-GH2 on Chestnut for the control of Chestnut blight.	Dennis Fulbright, Michigan State University
Efficacy and Phytotoxicity of Biopesticides on tomato for the control of Clavibacter	Sally Miller, Ohio State University
Root and Foliar Disease of Ginseng	Mary Hausbeck, Michigan State University

The IR-4 2017 National Education Conference

The IR-4 2017 National Education Conference (NEC) was held on February 28 through March 2017 in Orlando, FL. A total of 108 people of attended the NEC. From NCR 17 participants involving the field,

lab and QA areas contributed to the meeting. At the regional breakout sessions, NCR discussed various topics and issues of field research. The topics included use of smart phone for GPS coordinates of plot corners, calculation verification alternatives, field maps, test substance amounts sent, options for controlling pests, facility files, maintenance log, and training for NCR. Dan Heider submitted the summary.

Outreach and Collaborative Activities

Canadian Biopesticides and Minor Use Pesticides Priority Setting Workshops: Satoru Miyazaki participated in the 2017 Canadian Biopesticides and Minor Use Pesticides Priority Setting Workshops in Gatineau, Quebec, March 21-23, 2017. 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.

Interactions with specialty crop growers:

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. To date through IR-4 14 fungicides are labeled for ginseng since the research started in 2002. On-going ginseng research includes 10 fungicides and one biopesticide demonstration project. On April 2, 2017, along with MSU's Mary Hausbeck, Department of Plant, Soil and Microbial Sciences and Satoru Miyazaki attended the 2017 Spring Wisconsin Ginseng Growers' meeting to present ginseng research results as well as provide information on the petition status of fungicides for ginseng. The ginseng growers are awaiting new labels for ginseng disease control and are very active in getting the word out to the Wisconsin federal and state legislators.

The 2016 Ginseng Research Field Day was held on August 6 in Marathon County, Wisconsin. Over 90 growers, industry representatives, policy makers, and researchers were in attendance. Wisconsin Secretary of Agriculture Ben Brancel made comments on Wisconsin ginseng that can show an appellation of origin, i.e., Wisconsin that serves to designate ginseng that originates from that area. The quality and characteristics of ginseng are exclusively due to Wisconsin. As an example he used Mexican tequila for geographical indications. Mary Hausbeck and her staff highlighted the ongoing research trials in the various ginseng gardens of the cooperating growers. Satoru Miyazaki presented a progress report of the IR-4 ginseng research on new product registrations. Mary Hausbeck showed the evaluation results of various new and experimental products for control of ginseng diseases. They could see and hold the infected samples and learned the most important aspect of having a healthy ginseng crop for their gardens.

Iowa Neutraceutical Crops Growers: Kemin Industries, Des Moines, Iowa is very active in the neutraceutical ingredient manufacturing from specialty crops like monarda, marigold, rosemary, oregano, Chinese lantern, etc. They may be a largest grower of these crops in Iowa. Satoru Miyazaki visited their facility and the fields to familiarize with the pest problems in September. They need help of IR-4 and sent a representative to the food-use workshop in Orlando, FL. A Pendimethalin /monarda field project is conducted in 2017.

Michigan Blueberry Growers: Through Dave Trinka, Michigan Blueberry Growers Association and cooperation with MSU entomologists, IR-4 has approved a biopesticide project for 2017 on controlling the blueberry stem gall wasp for which currently there is no effective means to control (PPWS).

Great Lakes Fruit, Vegetable and Farm Market Expo, Grand Rapids, MI, December 8-10, 2016:

The NCR IR-4 program joined the MSU AgBioResearch and Extension as exhibitor at the Great Lakes Expo to promote and publicize the IR-4 Project to fruit and vegetable growers, farm marketers and greenhouse operators. With the cooperation of IR-4HQ, a poster was set up depicting how the IR-4 project helps specialty crop growers with emphasis on Michigan and other NCR crops. The IR-4 brochure, “How IR-4 Helps Michigan Growers” was well received.

Laboratory Program

(Dr. Susan Erhardt)

Since the last NRPM meeting in October of 2016, the emphasis for the lab has been to meet the 30 month turn around while at the same time maintaining overall quality. The laboratory as part of a national effort requested by the Organizational Evaluation (October 2016), underwent an efficiency evaluation consisting of three parts. The lab was first led through a series of questions to determine what was holding us back. The second phase was implementation of improvements and finally, a review of the program by Debbie Carpenter in June of 2017. Similar issues were found between the labs which contributed to the overall backlog, which included poor analytical methods with poor support from registrants resulting in excessive method development time. While out of our control, clear lines of communication amongst the laboratory members, along with the QAU have facilitated improvements in turnaround time. The schedule is reviewed between the QA and the analyst along with estimated dates of completion of draft reports and prioritization of studies in the pipeline. The expectation is that by the end of the year, we will have completed 19 reports representing 119 trials by the end of 2017, a full year ahead of schedule. This should eliminate the remaining backlog allowing us to meet our 30 month timeline at >85% of the time. Thus far, we have generated 14 reports describing the results of 87 field trials, with at least 5 more studies awaiting report completion.

Quality Assurance Program

(Dr. Zhongxiao Michael Chen)

The Quality Assurance Unit (QAU) in 2016 monitored 86 field trials and 91 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 2016 are:

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

QAU Performance in Last 4 Years with current update (January 1 – August 10, 2017):

In 2016, the QAU performed a total of 225 inspections and audits (Table 1). 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 calendar year of 2016, we completed the highest number of inspections and audits in last 5 years with a tally of 225 QA reports generated in our region. So far in 2017, our Regional QAU has audited a total of 14 draft final reports which is an outstanding number.

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

Inspections or Audits	2013	2014	2015	2016	2017
Draft Final Report Audit	14	4	14	9	14
Analytical Raw Data & Report Audit	42	23	33	34	28
Field Data Book Audit	76	76	74	117	64
Lab and Field In-life Inspection	52	40	63	59	41
Facility Inspection	8	4	10	6	5
Total QA Reports	192	147	194	225	148

EPA Inspection: We had EPA inspections in NCR. On September 9, 2016, we received a notification of upcoming EPA inspections at Dr. Sharon Clay’s field site at SDSU, Brookings, SD, scheduled for the week of September 26, 2016. The inspection would be led by Mr. Mark Lehr and follow the old-school scheme which meant that all raw data would be reviewed on site. In the letter EPA selected the studies of PR10472.13-SD01 (Flonicamid/pea (edible potted & succulent shelled)), 10473.12-SD02 (Flonicamid/ pea(dry)), and 10932.13-SD03 (Pyroxasulfone/ sunflower). Mr. Lehr completed the listed audits plus one on-going trial, PR09777.16-SD442 (Novaluron/Pea), on September 29, 2016. There were also no findings after the inspections.

Up to date, our region has received 34 EPA inspections in total. There are no compliance issues reported by EPA inspectors since 2000.

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International Activities:

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

Several NC IR-4 personnel have been involved in USDA FAS and TASC-funded international capacity building efforts in 2016.

Dr. Wayne Jiang continued his 2015 work with the Central Laboratory Pesticide Laboratory (CAPL), Cairo by completing initial GLP training, helping CAPL to set up storage stability samples, and completed the method validation GLP training.

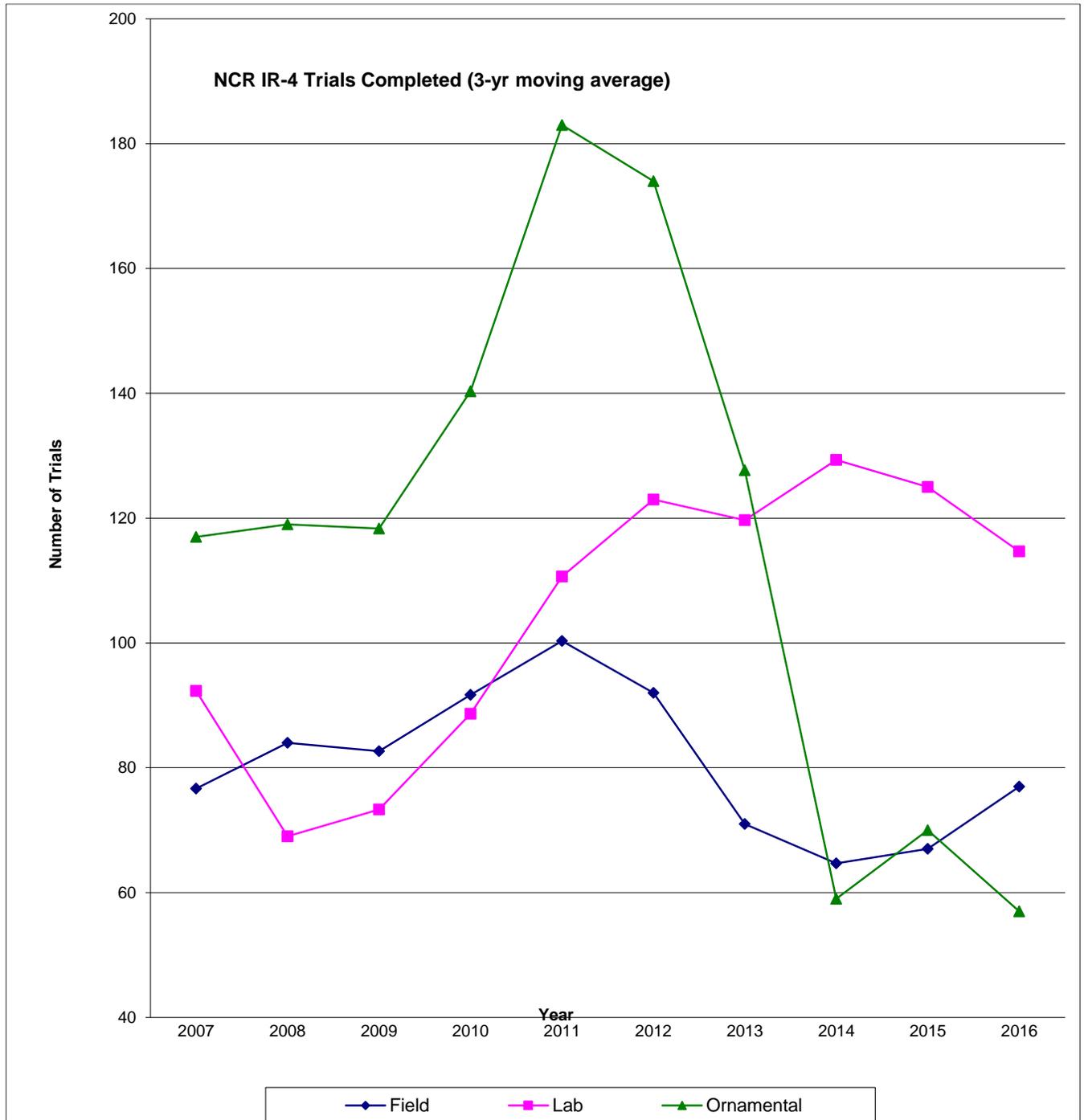
MSU IR-4 hosted three Egyptian scientists, and one post-doc to attend a field and laboratory GLP training at Michigan State University in East Lansing, MI. Dr. Wayne Jiang worked with NC IR-4 personnel, including Dr. Sue Erhardt and Mrs. Lisa Latham, and Ms. Nicole Soldan the training in July 2016 at MSU.

Table 4. Distribution of 2017 and Status of 2016 Projects (Initiated/Completed*)

State	Food Use			Ornamental Use		
	Field	Efficacy	Lab	Fungicide	Herbicide	Insecticide
IL						
IN						6/0
IA		2/			10/9	
KS						/0
MI	23/31	3/6	90/87	20/17		12/11
MN						
MO						
NE						
ND	11/14	1/				
OH	3/	0/3		16/15	10/10	13/0
SD	9/8	1/				
WI	18/14	5/				
TOTAL	64/67	12/9	90/87	36/32	20/19	31/11

*For 8/1/16 – 7/31/17 In some cases, the year of project initiation was not 2016.

Figure 1. Record of Project Completions in the NC Region*



**as of July 31, 2017

NCR State Researchers Participating in the IR-4 Program for 2016

(* indicates State Liaison Representative)

ILLINOIS

D. Williams*

MICHIGAN

S. Miyazaki*

T. Davis

M. Hausbeck

J. Wise

A. VanWoerkom

B. Zandstra

R. Isaacs

G. Sundin

D. Fulbright

MINNESOTA

V. Krischik *

NEBRASKA

S. Kamble*

NORTH DAKOTA

R. Zollinger*

M. Ciernia

B. Jenks

OHIO

D. Doohan*

H. Mathers

A. Persad

F. Hand

J. Siefer

S. Miller

WISCONSIN

D. Heider*

S. Chapman

R. Groves*

SOUTH DAKOTA

S. Clay*

INDIANA

D. Egel*

C. Sadof

IOWA

R. Hartzler*

D. Cochran

KANSAS

R. Cloyd *

MISSOURI

Open*

NC Liaison Committee Officers

J. Wise - Chairperson

D. Heider - Vice Chairperson

S. Clay - Secretary

NC Region Administrative Advisor

D. Buhler - Administrative Advisor

MSU Leader Lab

J. Wise - NC Region Director

S. Miyazaki - 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. Othoutd - Part time Analyst

Z. Chen - QAU Coordinator

L. Latham - QAU associate

Field Research Center Directors

MI: B. Zandstra (15 veg. and tree fruit crop use trials)

MI: A. VanWoerkom (13 tree fruit use trials)

WI: S. Chapman and D. Heider (14 veg. crop use trials).

Field QA

Z. Chen, MI/L. Latham

D. Killilea, ND

E. Nelson, WI