

Western IPM Center Project Report Form

How to submit: Please submit this completed form electronically, as an attached Microsoft Word file, to Jane Thomas at jmthomas@tricity.wsu.edu. If you have questions, contact Linda Herbst, (530) 752-7010. **Content:** Complete each section below, and include responses to as many of the questions listed in Attachment A as are relevant to your project. *These are guidelines.* Provide your readers with enough detail that someone who is not familiar with your project can understand what you were trying to achieve, how you went about it, and what you accomplished, but please keep it concise.

A. Report Data

Date: July 27, 2011

Reporting Period: 2009/2010

Report Type (please check one):

Progress Report Final Report

B. Grant Data

- Grant Agreement #: 4w2251
- Title: An Electronic, Multi-entry key for Identifying Weedy Plant Species in Small Grain Fields
 - Grant Type: IPM Issues
 - Lead investigator:
 - Name: Fabian Menalled
 - Title: Associate Professor
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 - Fax: 406-994-3933
 - Email: menalled@montana.edu
 - Team members (name, title, institution): Fabian Menalled, Associate Professor, Montana State University. Ned Tisserat, Professor, Colorado State University. Ronda Koski, Research Associate, Colorado State University
 - State(s) involved: Colorado and Montana

C. Nontechnical Summary. An overview of the project, briefly outlining the problem(s), how your project addresses them, and your results, *written to a lay audience*. (500 words)

Rapid and accurate weed identification is at the core of an integrated pest management approach. A major limitation hindering weed identification is the decreasing availability of taxonomic services available to crop producers, crop management advisors, county extension agents, diagnosticians, and others associated with crop production. To fill this gap, we developed an electronic multi-entry key for identifying weedy plant species in small grain fields. The key was built using commercially available software (Lucid Builder™) and is available at the High Plains IPM Wiki! web site (http://wiki.bugwood.org/HPIP:Small_Grains).

Field-based characters used in the key include habitat, plant growth habit, current life stage, life cycle, leaves characteristics, inflorescences morphology, presence and type of fruits, lower stem and underground structures, and helpful resource to ID more than 300 weed species. Photos and drawing are included as an aid to identification. Illustrated fact sheets provide detailed ecological and biological descriptions as well chemical and non-chemical management recommendations for many of the weedy plant species featured in the key.

We conducted several training sessions targeted towards extension specialists, diagnosticians, crop advisors, and growers to demonstrate how to use this key. By proving an easy to use diagnostic tool with links to up-to-date IPM recommendations, user of the key will be more likely to adopt and implement integrated management practices that specifically target the problematic weedy plant species.

D. Objectives and Progress. List your objectives and describe your progress for each objective.

Objective 1: Develop a multi-entry key to aid the in the identification of weedy plant species that occur in small grain production fields.

A total of 343 weed species belonging to 41 families were included in the multi-entry key. In the key, these weed species can be identified utilizing 50 morphological and phonological features groped in 8 categories (a. Location in which plant was collected, b. Current life stage of the plant, c. general description of the plant, d. life cycle, e. botanical family, f. stem characteristics, g. lower stem and underground characteristics, h. inflorescence characteristics). Additionally, we included a “helpful resources” category that provides links to many useful on-line sites including the Montana Cropland Weed Management web site, eFlora.org, Weedometer, and numerous weed identification keys.

Objective 2: Integrate the multi-entry weed identification key with web-based weed management information.

With funds provided by WIPM, we coordinated 22 authors from 7 states (Table 1) to produce fact sheets containing information on the biology, ecology, and integrated management of agricultural and rangeland weeds. Contents of these fact sheets included information on 1) Identification and Life Cycle, 2) Habitats, 3) Impacts, 4) Biology and Ecology, 5) Management Approaches, 6) Biological Control, 7) Mechanical and Cultural Control, 8) Chemical Control, 9) Examples of herbicides that can be used, and 10) References. Photos and line drawings were also included to ease weed identification. These fact sheets (Table 2) were web-published using the wiki format in the Bugwood HPIPM web site (http://wiki.bugwood.org/Main_Page). Finally, these fact sheets were linked to a Lucid Key to identify common agricultural and rangeland weed species.

Objective 3: Conduct training sessions to train extension specialists, diagnosticians, crop advisors, and growers to use the multi-entry weed identification key

We conducted several training session targeted towards producers and extension specialists to demonstrate how to use multi-entry weed identification key. We intend to continue conducting training sessions as part of our regular extension activities.

E. Outputs. List your project’s outputs, which might include publications, information, data, meetings held, attendance at meetings held, etc.

The multi-entry weed identification key is a powerful, user-friendly and informative resource that allows stakeholders across the region identify weedy plant species identification. This information is enhanced with figures, photos and information on the biology, ecology, and current chemical and non-chemical management recommendations. This resource provides growers, crop advisors, extension agents, diagnosticians and others associated with crop production with an easy to use aid to identify and manage small grains weeds.

F. Impacts and Potential Impacts. The “impacts” and “potential impacts” sections of your report will help the Western IPM Center highlight the value of IPM research and education by detailing the real-world impacts of Center-funded projects. We will use the information in news articles, reports, and informational brochures to showcase the impacts of projects that our program supports. *See Attachment A at end of form for questions to assist you in describing the impacts of your project.*

1. Impacts. Describe any impacts of your work. *Impacts* are specific changes in condition for those affected by your work. Impacts include adoption of technology, creation of jobs, reduced cost to the consumer, less pesticide exposure to farmers, access to more nutritious food, and a cleaner environment and healthier communities.

The development of an easy to use electronic weed identification key provides an opportunity to crop producers, crop management advisors, county extension agents, diagnosticians, and others associated with crop production with a tool to conduct rapid and accurate plant identification, a required step in the development of an integrated management program. It also provides easy access to weed biological and ecological information as well as biological, cultural, mechanical, and chemical management recommendations. The integration of the electronic key with weed fact sheets has enhanced the development of IPM strategies. Users across the High Plains Region can use this HPIPM web site to obtain information on reduced-risk pest approaches and adapt this knowledge to the specifics of where they live or work. Additionally, the weed information enhances the High Plains IPM Guide by providing users with a single starting point for pest management for all regionally important pests.

2. Potential impacts. Describe your project's potential impacts. *Potential impacts* are the ways that your project's outputs could directly lead to changes in condition that will unfold in the future.

G. Leveraged Funds. List *additional funding* you have acquired because of the data and results yielded in this WIPMC-funded project.

Additional Funding Award #1:

Date of Award: 6/2008

Dollar Amount: \$79,512

Grant Period Duration: 6/2008 - 5/2010

Name of Granting Entity: USDA -WIPM

Name of Grant Program: Expansion of the online High Plains IPM Guide to include agricultural, rangeland, and wildland weed recommendations

Additional Funding Award #2:

Date of Award:

Dollar Amount:

Grant Period Duration:

Name of Granting Entity:

Name of Grant Program:

Additional Funding Award #3:

Date of Award:

Dollar Amount:

Grant Period Duration:

Name of Granting Entity:

Name of Grant Program:

H. Appendices

1. With your report, please attach *at least two (2) photographs* that illustrate your project. Please describe the photo and indicate the name and institution of the person who took the photo. (If you submit more than two photographs, please include those additional descriptions and photo credits under "I. Additional Information," below.)

Photo #1 description:

This web-based project did not involve any field activity. Therefore, we do not have field photos available to report. Nevertheless we provide a screen shoot of the electronic weed id key.

Photo #1 credit (photographer's name and institution):

Photo #2 description:

Photo #2 credit (photographer's name and institution):

2. Also attach any printed fact sheets or other publications resulting from your work that will enhance our understanding of your project and its impacts. Please provide a description of each attached publication below.

Document #1 description:

Table 1. Names and affiliation of authors contributing to the weed fact sheets published at the Bugwood HPIPIM web site (http://wiki.bugwood.org/Main_Page)

Author	Affiliation
Evette Alison	Montana State University
Terry Angvick	Sheridan County Extension, Montana State University
George Beck	Colorado State University
Elizabeth Brown	Colorado Natural Areas Program, Colorado State Parks
Jeff Edwards	Goshen County Extension, University of Wyoming
Sandra Frost	Big Horn Area (Park and Powell Counties), University of Wyoming
Melissa Graves	Montana State University
Jim Jacobs	NRCS, Montana
Joe Julian	Douglas County, Colorado State University
Drew Andrew Hulting	Oregon State University
Steve Lackman	Yellowstone County Extension, Montana State University
Drew Lyon	University of Nebraska-Lincoln
Jane Mangold	Montana State University
Mark Major	Teton County Extension, Montana State University
Michael Moechnig	South Dakota State University
Hilary Parkinson	Montana State University
Tim Prather	University of Idaho
Mary Rumph	Powder River County Extension, Montana State University
Lowell Sandell	University of Nebraska-Lincoln
Rachel Soto	Meagher County Extension, Montana State University
Jack Stivers	Lake County Extension, Montana State University
Cheryl Wilen	University of California, Davis

Document #2 description:

alfalfa	dogbane, hemp	nightshade, black
barley, foxtail	dyer's woad	nightshade, hairy
barnyard grass	falseflax, small seeded	nightshade, silverleaf
bedstraw, common	fiddleneck, coast	pepperweed, perennial
bindweed, field	filaree, red stemmed	pigweed, redroot
bluegrass, annual	flixweed	pineappleweed
bluegrass, bulbous	foxtail, green	prickly lettuce
brackenfern	foxtail, yellow	puncturevine
brome, downy	garlic, wild	purple loosestrife
brome, Japanese	goatgrass, jointed	purslane, common
brome, ripgut	goldenrod	quackgrass
buckwheat, wild	groundsel, common	rye, cereal
buffalobur	hawkweed, orange	ryegrass, annual
burdock, common	hemlock, water	salt cedar
bursage	henbit (dead nettle)	shepherd's purse
buttercup, bur	houndstongue	sorrel, red
camas, death	jimsonweed	sowthistle, annual
canarygrass, littleseed	johnsongrass	sowthistle, perennial
carrot, wild	knawweed, diffuse	sowthistle, spiny
chamomile, false	knawweed, Russian	speedwell
chamomile, mayweed	knawweed, spotted	spurge, leafy
cheat	knotweed, prostrate	sulfur cinquefoil
chickweed, common	Kochia	thistle, Canada
chickweed, mouse-ear	lambsquarters, common	thistle, musk
chicory	mallow, common	thistle, plumeless
cockle, cow	mallow, Venice	thistle, Russian
cockle, white	meadow hawkweed	toadflax, Dalmatian
cocklebur	milkweed, common	toadflax, yellow
common St. Johnswort	millet, wild proso	velvetleaf
crabgrass	mullein, common	whitetop (hoary cress)
daisy, oxeye	mustard, blue	witchgrass
dandelion, common	mustard, tumble	wormwood, absinth
dock, curly	mustard, wild	yarrow, common
yellow starthistle		

Document #3 description:

I. Additional Information

Credit: Some of the language about impacts and potential impacts was adapted from a PowerPoint presentation by H. Michael Harrington, Executive Director, Western Association of Agricultural Experiment Station Directors, Colorado State University.

Attachment A

Questions to Help in Reporting Impacts and Potential Impacts

Below are some questions that will guide you in assessing and then describing the impacts and potential impacts of your project. The relevance of each question may vary depending on whether yours is a research or extension project. Please answer as many as you can to the best of your ability, and feel free to describe any additional types of impacts not mentioned below. Remember to identify any potential impacts.

1. Innovations in IPM:

Are there new IPM practices that have been (impacts) or could be (potential impacts) adopted as a direct result of your project? What is the total number of acres (or homes, schools, greenhouses, nurseries) on which these practices could realistically be implemented?

2. Safeguarding human health and the environment:

- a. Has the project reduced risk (or could it potentially do so) by changing the use of pesticides on farms, in homes, in schools, etc.? For example, could it result in fewer sprays per season or a switch to lower-risk pesticides? If possible, quantify the changes in condition. (Since there is no unanimous definition of *high* and *low risk*, investigators selecting this indicator are asked to categorize the pesticides they are reporting on as *high* or *low risk* according to the particular situation [e.g., lower risk to natural enemies]).
- b. Are there any other impacts or potential impacts on human health or the environment as a result of your project?

3. Economic benefits:

- a. What is (or could be) the economic benefit (e.g., dollars saved) for clientele who adopt IPM strategies and systems you studied? Do you envision potential commercialization or mass production of these systems?
- b. How many clients are satisfied with IPM results (such as improved yield, improved quality of yield, reduced pest populations, more effective pest control, greater preservation of nonpest species)?
- c. Are there other financial benefits that might be realized (potential impact) as a result of your project?

4. Implementation of IPM:

- a. How many IPM strategies and systems have been validated through this project (e.g., through on-farm trials, large plot tests, or other methods used to confirm efficacy)?
 - b. How many educational materials were delivered? To whom? And what are the impacts or potential impacts?
 - c. What is the number of growers/personnel trained? And what are the impacts or potential impacts?
 - d. For a Web site, what volume of traffic and type of use has the site experienced? (For example, number of visitors per day or month; number of page views; number of unique user sessions; change in volume during growing season; average viewing time.) And what are the impacts or potential impacts?
 - e. How many more people adopted IPM practices as a direct result of your project, or how many people adopted new IPM practices?
 - f. Are there other ways in which your work will result in improved use or increased implementation of IPM strategies in your region or across the West?
5. Has your project or study increased collaboration among stakeholders interested in the development and implementation of improved IPM strategies and systems?