Trader's Dispatch
SEPTEMBER 2016
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Watch out for a new pest in Montana - pea weevil

A new pea pest in Montana, pea weevil, has been confirmed by researchers at WTARC in Conrad from samples submitted from the Highline area. Damage was first noticed in 2014 and follow-up samples were sent to the lab at the Western Triangle Agricultural Research Center for analysis. The peas were gently crushed and the extracted adults were positively identified as pea weevils. This insect is not to be confused with the wide spread pest in peas with a similar name, the pea leaf weevil.

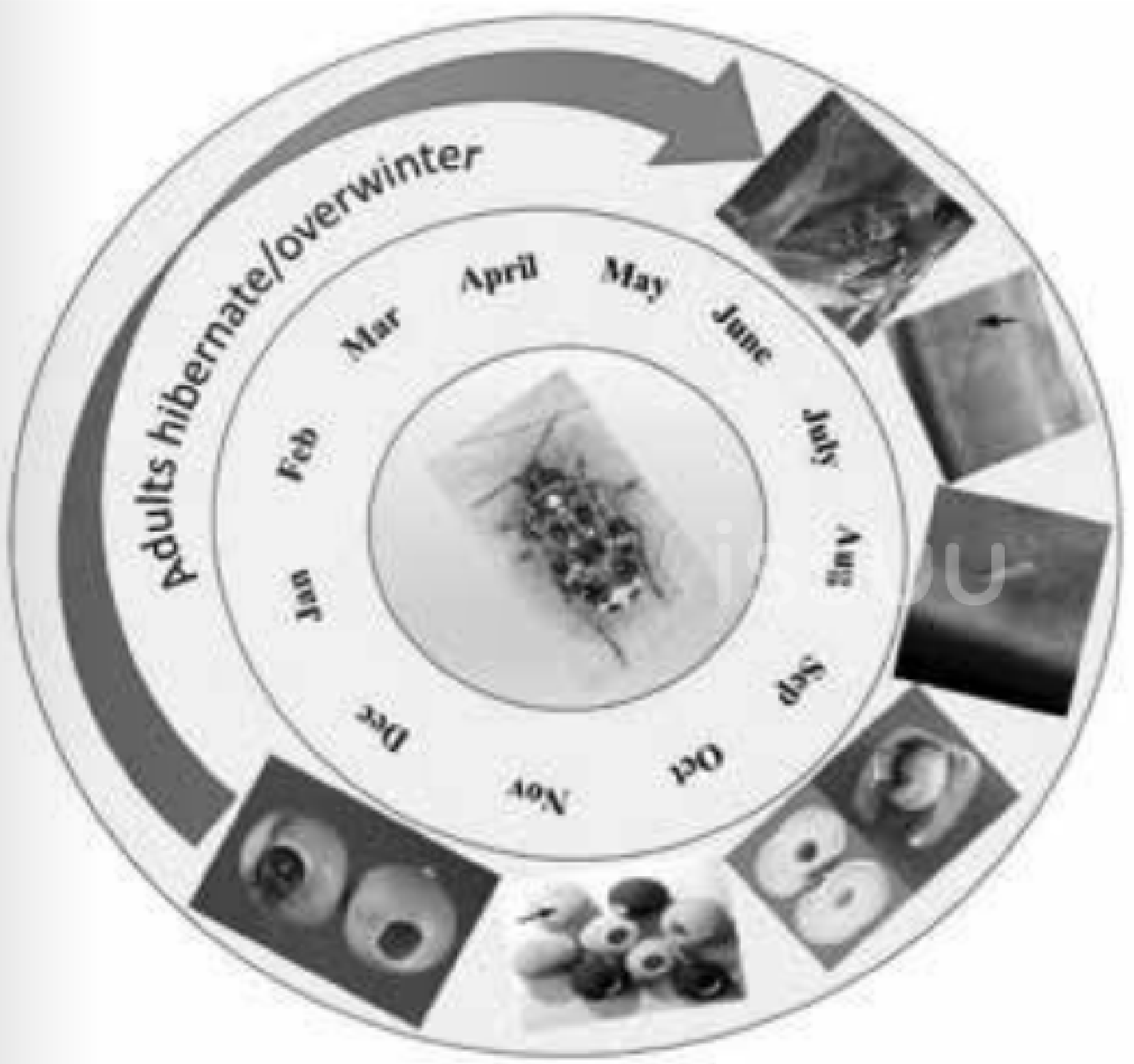
The pea weevil is one of the most damaging insects on peas in the Pacific Northwest of US. This pest damage comprises the direct loss of seed contents consumed by the insect, decreased germination capacity and diminished market value. The seed damage in that region ranges from 42-82%. However, pea weevil is a very new pest in Montana. Pea weevil feeds only on green peas in which the larva devours the inner content of the seed. The adult is gray or brownish gray, marked with black and white spots, and is about 1/5 inch long. Females attach their eggs to the outsides of green pea pods. They lay about 100 eggs, either singly, or in batches of up to 12 eggs. Inside the pods, the larvae develop in the growing seeds and pupate inside the pea seeds. Feeding results in large, stout exit holes with a diameter of 2.5 mm. Pupation typically occurs as much as one month after harvest. Pupae develop while the grain is being stored. After pupation, adults chew an exit hole through the seed coat. Adults emerge starting in mid-December and overwinter with the stored peas and in the field. Adults fly to hibernation sites at the end of summer or at beginning of fall (e.g. under loose shingles, cracks in buildings, under loose bark, debris under trees, alfalfa/other perennial legumes crops). They remain in hibernation throughout winter until late spring or early summer emerging and migrating to pea fields to mate and lay eggs. The typical lifecycle of the pea weevil takes 4-5 months to complete. There is only one generation per year.

The economic impact from this pest includes damage to seed and loss of seed contents along with loss of germination rates. The damage is reflected through discounts at the elevator which is passed on to the grower.

Thresholds and management recommendations have been developed for this pest at other areas and that information is available at, http://agresearch.montana.edu/wtarc/producerinfo/index.html

Now that pea weevils have been reported in Montana, the next step is to identify the areas infested and assess the extent of the damage in order to implement the necessary control methods. Management strategies can then be optimized to prevent further spread to other areas.

The USA Dry Pea & Lentil Council and American Pulse Association has funded a survey to determine the weevil population distribution, abundance and pea damage assessment for Montana. The MSU WTARC is conducting a survey this fall and are asking help from Montana pea growers and pea handlers. Please assist by submitting one to two pounds of suspected pea weevil damaged seeds to Gadi VP Reddy, Western Triangle Ag Research Center, 9546 Old Shelby Rd., P. O. Box 656, Conrad, MT 59425. For more information or asistance with sample pickup contact Gadi V.P. Reddy at 278-7707; 406-450-0375, reddy@montana.edu or Govinda Shrestha, govinda.shrestha@montana.edu, 406-450-3052.



Pea Weevil life cycle

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Ten Habits of Highly Successful Entomologists

August 3, 2016 by Entomology Today 1 Comment

By Josh Lancette

What makes a successful entomologist? Undoubtedly, there are many factors, including intelligence, a hard work ethic, educational opportunities, relationships, character, perhaps even luck, just to name a few.

Josh Lancette

However, while these things might be replicable to some degree, we wanted to dig a bit deeper. What do successful entomologists do day in and day out? What are their consistent practices and habits?

So we decided to ask some people who would know: successful entomologists. We talked to folks from all kinds of areas of entomology and asked them if they had any habits that they thought helped them to be successful. Some clear trends emerged.

Without further ado, here are 10 habits of successful entomologists:

1. Start the morning right

- "I begin each day with several minutes of meditation, which helps to focus my mind on positive thoughts and gives me courage to face the challenges of the day." – Eric Riddick, PhD; Research Entomologist, Biological Control of Pests Research Unit, USDA-ARS
- "Daily, set specific goals for yourself to succeed, then strive to exceed those expectations. As much as possible, don't let others define your success. Attempting to satisfy the expectations of others can cause frustration, anxiety, and disappointment." – Marlin Rice, PhD; Senior Research Scientist, Pioneer; Professor (Collaborator), Iowa State University
- "I begin the day by building a to-do list. This organizes the tasks and goals for the day and provides me an outline to follow, keeping me on track as unexpected objectives arise." – Travis Prochaska, PhD; Crop Protection Specialist, North Dakota State University

2. Make time to think

- "I have a habit of tinkering with ideas for difficult-to-solve problems while I'm falling asleep. This usually puts me to sleep rather quickly, but my brain seems to go into auto-pilot mode and continues to work on the problem even as I sleep. Interestingly, I usually wake up with some ideas on how to solve the problem. These may not be the final solutions, but they are something to move forward with." – Nan-Yao Su, PhD; Distinguished Professor, Urban Entomology, University of Florida
- "I spend 20 minutes or so each day just thinking, while sitting at my

Biodiversity Program

The Bug Chicks

desk in my office. I write down any career related ideas—regardless of how silly they may seem at the time—that pop into my mind, determine what projects I need to concentrate on today rather than tomorrow, and decide who I need to consult (colleagues, technicians, etc.).” – Eric Riddick

3. Find a mentor, be a mentor

- “Find a mentor and be a mentor, both in and out of science.I have my non-scientist community and my scientist community, and some relationships fall in between. Almost everything I learn from a friend in business is something I could not have learned in academia or from a fellow entomologist. That can give you a career advantage. At least once a month I’m sitting down for lunch or coffee with someone with a career I admire and seeing how they do what they do. Likewise, helping those who are just starting their careers helps you really pinpoint what got you to where you are today, both the mistakes and the good decisions.” – Phil Torres, Science Correspondent, Science Communication Consultant, and Television Presenter
- “Find a mentor or mentors at various levels of the organization that you trust and that you can turn to in order to help advise, provide feedback, generate examples, and provide perspective when you encounter situations that you’ve not had to deal with before.” – Floyd Shockley, PhD; Collections Manager (Acting), Department of Entomology, National Museum of Natural History, Smithsonian Institution
- “Seek advice from trusted mentors. Run your ideas and concerns by knowledgeable people who’ve had experiences similar to what you are facing. Mentors will help you think things through, and you’ll be building your network, which is also important.” – Carol Anelli, PhD; Professor and Associate Chair, Department of Entomology, Ohio State University

4. Get some exercise

- “To manage life’s curveballs (whether work or home), I find it helpful to walk or get some sort of moderate exercise. I prefer outdoor walks to help me reconnect with why I became a biologist. If circumstances don’t permit, I’ll settle for a treadmill type thing. Walking clears my head, gets rid of nervous energy, and allows me to sort through tangled thoughts. When a colleague needs to talk through a difficult situation, I’m about as likely to suggest going for a stroll as suggest going for a cup of coffee.” – Susan Weller, PhD; Director of the University of Nebraska State Museum of Natural History
- “Each day, I attempt to save time for an activity. I may use this time to go for a run, to go for a bike ride, or to just take a break. This provides a short period of time to de-stress and provides the brain a short break.” – Travis Prochaska
- “After leaving work for the day, I often spend 60 minutes in the gym. Physical exercise helps me eliminate work-related stress and condition my body.” – Eric Riddick

5. Value relationships

- “Align with positive, supportive folks as a student, and thereafter with positive folks professionally. I had the great pleasure of working with lepidopterists at the National Museum of Natural History who were always there to answer my questions and to make positive suggestions for projects and/or solutions that were results oriented. Ask questions and more questions. Graduate school is an opportunity to act like a sponge that will not come again.” – Alma Solis, PhD; Research Entomologist, Systematic Entomology, USDA-ARS
- “Spending time with family is very important. During challenging times in my career, the support and encouragement I received from family (e.g., my wife) was invaluable.” – Eric Riddick
- “Cultivate friendships. My friends inspire me to stay dedicated to my work and profession.” – Gadi Reddy, PhD; Superintendent and Associate Professor of Entomology/Insect Ecology at Montana State University WTARC
- “Treat other people the way you would like to be treated. Everyone has value even if you don’t initially recognize it. Put others ahead of

yourself. That respect often will translate into more opportunities someday down the road, for both of you." – Marlin Rice

- "Be kind and respectful to EVERYONE you work with. Custodial staff, clerical staff, IT staff. These are often overlooked groups of people in the workplace, but being kind and respectful to them can make so many other issues that arise easier to handle. Plus, it has the benefit of just being the right thing to do." – Floyd Shockley

6. Follow your passion, flexibly

- "Careers and scholarly endeavors in our discipline can take many forms. If you find you have an affinity for some ancillary area—e.g., public engagement, teaching, history of science (the last two are two passions I discovered in grad school)—start developing those interests. They may open future career doors. (Warning: Don't lose focus on your thesis/dissertation!)" – Carol Anelli
- "Be flexible and open to new ideas for areas of study. Life is not linear, but a series of forks in the road that lead you down paths that are surprising. I was an English major, until I discovered the organismal world as an undergraduate in college, and changed my major two years in to biology. In graduate school I was very interested in Hymenoptera and pollination, but during my first field course to Costa Rica, I discovered that I was allergic to bee stings, so I was gently pushed into Lepidoptera by my major professor. I went from ecology to systematics when I discovered that the diversity of neotropical moth fauna was practically unknown." – Alma Solis
- "I love entomology. I am committed to all my work related to my profession, making sure to always work hard and make entomology a priority." – Gadi Reddy

7. Step outside entomology

- "Nurture your non-scientific interests. Many entomologists have interests outside of their specialty areas. Continue to develop and enjoy those—they feed your soul, keep you sane, and make you a more well-rounded, interesting individual." – Carol Anelli
- "Practice explaining your research (or another scientific concept) to people outside of your field, all the time. I make it a point to try different analogies, different order of ideas, different assumptions about starting points of knowledge in the person I'm talking to. Observe the reactions. I've had reactions ranging from boredom to disgust to fascination. Obviously, I prefer fascination and work to get that result nine times out of 10. Honing the craft of communication allows you to write better papers, apply for better grants, impact more of society, and spread the good word about insects." – Phil Torres
- "Take every opportunity to learn something you don't know so that you understand all of the moving parts of whatever organization you are working with. This nearly always is the hardest thing to do, but very quickly you become "the go-to person for logistics," which makes you indispensable and helps grow your responsibilities. So long as you can manage, always say yes to opportunities when they present themselves, especially those that offer you access to network with people outside of your immediate department. Some may not seem very important in terms of their scope, but they often serve as a pathway to other greater opportunities later and in directions you never expected." – Floyd Shockley

8. Stay organized and pay attention to details

- "Pay attention to details. Learn to criticize your own work, always looking for improvement and giving attention to the small things, especially in writing and presentation. Be meticulous." – Marlin Rice
- "Time management is critical, and developing a method of keeping track of appointments is key, especially if you are heavily overprogrammed or understaffed. It doesn't really matter if you do this electronically (I live and die by my Outlook calendar) or via a paper calendar. But keeping your time organized is critical to success." – Floyd Shockley
- "Create project calendars with intermediate goals 'with good to achieve by date' and 'drop-dead' deadlines. In a constant quest to stay on top of work and home demands, I create project calendars (typically sketched out by hand) that, in a glance, can help me keep projects on track or recognize when they are off track. These are

especially important for me when working with colleagues so I get my deliverables delivered! (And rewarding yourself with a small treat when you hit a 'good to achieve by' date is positive reinforcement.)" – Susan Weller

9. Get outside your comfort zone

- "Getting outside your comfort zone is hard for introverted people like me, and I had to make an effort to become more extroverted when I entered graduate school. The gradual change began with the support of my major professor, who first encouraged me to give talks at ESA Eastern Branch meetings, then at ESA Annual meetings. Many years later when I became Research Leader of the Systematic Entomology Laboratory, I could quickly gauge interests and become a chameleon at will. I could interact with different groups of people and organizations as needed." – Alma Solis
- "ESA has a plethora of opportunities where you can serve, which allows you to return back something to your fellow entomologists. Committee membership, student competition judging, and volunteering at annual or branch meetings are great ways to meet others and develop leadership and teamwork skills. Volunteering introduces you to others outside your universe, many of whom will become lifelong acquaintances, and often friends. We are, all of us, like bees. Success is sweeter when we work together." – Marlin Rice

10. Harness the power of social media

- "Tweet, blog, Instagram, Facebook, Reddit, Tumblr … Use these! Often. It is hard to pinpoint exactly how social media has helped my career, but in just the last 24 hours I've had a turtle ID'd, a publication process explained, and seen important discussions happen about issues like equality in academia. Those interactions add up and help shape your professional community, and therefore your career." – Phil Torres

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Josh Lancette is Manager of Publications at the Entomological Society of America.

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Francis C. Bosah (@FrancisCBosah) says:
August 3, 2016 at 12:58 pm

Successful Entomologists should serve as a bridge between the

academia, the society and technology.

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Parasitoids to manage wheat midge continues in Montana during 2016

The wheat midge (formally called the orange wheat blossom midge) can cause significant damage to spring wheat and is widely distributed throughout Montana. A state-wide monitoring effort has been ongoing since 2014 and the results have been posted on Pestweb (https://pestweb.montana.edu/). The information supplied on this website shows that counties in the Northwest, Northcentral, and northeastern parts of the state have the highest levels of infestation. Fortunately, other insects may hold part of the solution for controlling the wheat midge.

A small parasitic wasp, Macroglenes penetrans, attacks the wheat midge, helping to regulate populations. This parasitoid is credited with controlling about 25 to 40 percent of the midge population in parts of Canada and North Dakota. In some instances, parasitism rates of greater than 75 percent have been documented.

Efforts to introduce the parasitic wasp into Montana are on-going. This effort is a continuation of work that began in 2008 at the Northwestern Agricultural Research Center (NWARC) in Kalispell to address a serious infestation of wheat midge in the Flathead and Lake Counties. The parasitoid was supplied by entomologists from North Dakota State University and released at a single sight in Flathead County. After the initial release, the parasitoid population slowly increased, and by 2014, high numbers of the wasp could be found throughout Flathead County. In July of 2014 a new collection of the parasitoid was collected from the Lethbridge area and released in both the Kalispell and Conrad-Valier areas. The good news for the spring wheat growers is that Macroglenes penetrans populations have been slowly establishing in Pondera and Flathead Counties, and as of 2015, parasitoids counts were dramatically higher in these regions.

In 2015, another trip was made by into Saskatchewan to collect two different species of parasitoids know to be active on the wheat midge (Euxestonotus error and Platygaster tuberosula). Wheat heads containing the parasitoids were brought back to the Western Triangle Agricultural Research Center (WTARC) in Conrad for rearing and the eventual release of these new parasitoids in July of 2016.

At the same time, sweep net surveys conducted during 2015 in Flathead County found that one of these parasitoids was already present. Euxestonotus error was identified at eight different sights in Flathead County. This indicates that these other parasitoid species should survive and multiply in Montana and provide additional help in managing the wheat midge.

The MSU Wheat Midge Biological Control Team members include Brooke Bohannon, NWARC, Dr. Erik Echegaray, NWARC, Dr. Gadi VP Reddy, WTARC, Conrad, Dr. Govinda Shrestha, WTARC, Dr. Bob Stougaard, NWARC and Dan Picard, WTARC. The Montana Wheat and Barley committee has provided support for this project. For more information on the biological control program or wheat midge contact any of the team members at WTARC (406-278-7707) or NWARC (406-755-4303).

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all-day 223 Grant Deadline (http://macdnet.org/blog/event/223-grant-deadline/?instance_id=45768)

JAN 16 Mon (http://macdnet.org/calendar/action~oneday/exact_date~16-1-2017/)

7:00 pm Regular Board Meeting @ Madison Valley Public Library (http://macdnet.org/blog/event/regular-board-meeting/?instance_id=353329)

JAN

all-day Winter Grazing Seminar @ Cottonwood Inn (http://macdnet.org

17 Tue (http://macdnet.org/calendar/action~oneday/exact_date~17-1-2017/)

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Glacier County Crop Tour

July 9, 2016

WHEN: July 26, 2016 @ 5:00 pm – 7:00 pm

WHERE: Cut Bank
Cut Bank
MT 59427
USA

COST: Free

CONTACT: Belinda Knapton, Glacier CD
Email (mailto:Glaciercountycd@gmail.com)

WORKSHOPS, SEMINARS & TRAININGS (HTTP://MACDNE

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5:00 p.m.— Meet at Cut Bank City Park and Civic Center parking lot to convoy to Bradley Farms

5:30 p.m.— Variety Trials Update at Bradley Farms with John Miller and Pest Management with Gadi V.P. Reddy both with MSU Western Triangle Research Center

6:45 p.m.— BBQ and beverages at Cut Bank City Park, sponsored by CHS

7:00 p.m.— Plant Diseases on Wheat and Pulse Crops with Dr. Jessica Rupp, Montana State University

8:30 p.m. – Rainfall Simulator, NRCS

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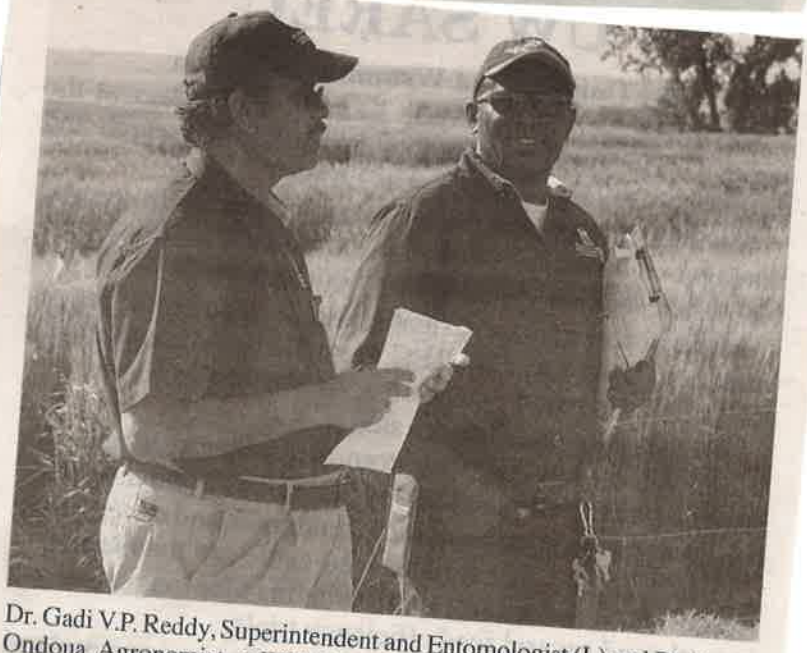
Trader's Dispatch

The 2016 Western Triangle Research Center located near Conrad kicked off their Field Day on June 23rd with an industry sponsored breakfast for all attendees. Special guests included representatives of various departments and colleges at MSU, WTARC Advisory Committee Members and Ag retailers and growers. Photo courtesy of Govinda Shrestha, WTARC.

Dr. Mary Burrows, Extension Plant Pathologist, was one of 12 speakers for the Field Day on June 23rd. Mary, pictured at the exhibit table, shared actual disease samples for growers to view and updated everyone on current showing up in small grains and pulse crops in this region. Recommendations for management were also presented. Photo courtesy of Govinda Shrestha.



Dr. Gadi V.P. Reddy, Superintendent and Entomologist (L) and Dr. Roger Ondoua, Agronomist, at WTARC welcome 2016 Field Day participants to the first stop where Roger discussed current agronomy research projects on going at the center. Photo courtesy of Govinda Shrestha, WTRAC.

Western Triangle Agricultural Research Center's annual Field Day offers area producers immersive experience

By KRISTI CALVERY For the Valierian | Posted: Wednesday, June 29, 2016 6:00 am

On Thursday, June 23, Dr. Gadi V.P. Reddy, Superintendent of the Western Triangle Agricultural Research Center (WTARC), and Dr. Charles Boyer, Vice President of Agricultural at Montana State University, welcomed over 200 agro-interested participants to the 2016 WTARC Field Day.

This annual event impressively surpassed PowerPoint presentations, statistics and pie charts, and instead allowed participants an immersive experience viewing cutting edge research in the areas of agricultural practices, new grain varieties, and pest management problem solving.

The sunny day started with breakfast sponsored by several agricultural retailers and consultants from Cut Bank, Valier, Brady, Conrad, and Ledger.

Dr. Reddy gave a brief introduction, where he explained that the agricultural research centers are satellites of Montana State University, charged with providing assistance for farmers and ranchers in the Western Triangle including: Glacier, Pondera, Teton, Toole, and western portions of Liberty, Choteau, and Cascade counties.

VA_N2

Dr. Darrin L. Boss, Superintendent of the MSU-Northern Agricultural Research Center, explains to producers how to develop other economic streams while implementing cover crops. Also pictured is Dr. Gadi V.P. Reddy, Superintendent of the Western Triangle Agricultural Center.

Dr. Boyer said the WTARC was the seventh of the seven research centers strategically placed in diverse regions of the state, each with its unique features like temperature, moisture levels, and soil composition. Boyer also announced in 2015 the Montana Legislature approved $2.5 million to improve facilities of the seven Montana Agricultural Experiment Station Research Centers because of the importance of the research to the state. Attendees were able to see the new Pesticide Handling and Storage facility that was made possible by this appropriation.

After breakfast, field-day explorers climbed on hay bale trailers to tour the 75 acres of experimental farmland.

The tour trailers stopped at 12 different land plots, where various researchers showcased and explained their projects. Research projects focused on solving problems like herbicide resistance, orange blossom wheat midge, pea weevil and wheat stem sawfly and several other pests, and the research focused on development of new varieties of wheat and barley that have potential for increased profit and quality in the region. Research projects also focused on farming practices like using pulse crops for crop rotation, cover crops verses fallow, and new developments in technology.

Dan Picard, WTARC Special Projects Manager, showed an orange blossom wheat midge trap at one stop, and explained how detrimental midge larva can be to crops. Tiny orange midge can cause significant yield loss for farmers, and Picard warned, Flathead farmers didn't know they had a problem until it was too late. "These little guys are like thieves. You don't know they are there until harvest," Picard said. Although midge hasn't been a large problem in the region so far, there are some in Pondera County and a small number in Teton County.

At another field destination, Roger Ondoua, WTARC Assistant Professor of Agronomy and Nutrient Management, showed and explained a research project with pulse crop rotations. Pulse crops like peas, lentils, and garbanzo beans have become so popular that the United Nations declared 2016 the International Year of Pulses.

Ron de Young, who works as the Director for the Montana Department of Agriculture, said one benefit is that "pulse crop rotations are helping the microbiology of the soil." De Young said that pulse crops have become popular in the region especially in the last three years because of their economic and environmental benefits. Pulse crops, which are leguminous crops that are harvested solely for the dry seed, have shallow roots and leave moisture in the ground for next year's crop rotation.

Field day attendee, Mark Suta from Cut Bank, agreed that pulse crops are primarily beneficial by adding nitrogen to the soil. However, he said he has not planted any pulse crops because in the 1990s he planted a pea crop that didn't make it past July. The year he planted peas, they were wearing winter coats while shooting off fireworks, so the pea crop did not survive.

The WTARC tries to find long-term sustainable solutions for farmers like Suta. Dr. Reddy said that the research focus is "based on the problems of the growers." Dr. Reddy spends much of his time writing grants and finding money for projects that are important to farmers in the area.

Shelby's John Miller, a research associate at the WTARC, has worked at the facility since 1998. He said having the research center in the region is important to farmers in the area because the region has distinctive qualities. If the research was done elsewhere, the results would differ. "The area covered by the WTARC has a pretty unique climate with a tendency toward cool nights, warm days and, of course, the wind. We also have deep soils for water retention," Miller said.

Besides the benefit the WTARC has to Montana farmers, the research sites also offer employment and summer internships to several local youth. Dr. Reddy said the WTARC currently has 15 regular employees, and nine student summer research interns.

One intern, Kendall Franks, will be a senior at Montana State University, where she is focusing her studies on Sustainable Foods and Agro-Ecology. Franks is working on one of Dr. Reddy's newest projects researching Pea Leaf Weevil. A Weevil is a tiny beetle that can destroy crops such as peas, and she said the research is important to crops in the area. "We drive 200 miles a day checking fields sometimes," Frank said.

According to Dr. Barry Jacobsen, Associate Director and Montana Agricultural Experiment Station Head, Frank's paid internship, along with eight other MSU students, was sponsored by an anonymous donor. "We want to get young people to see what happens as the research center because it is important work," Dr. Boyer said.

Mikayla Connelly graduated in May from Valier High School, and this is her first year interning at the WTARC. She grew up on a farm and ranch, Connelly Angus, north of Valier, and she conveniently entered the internship with some experience. Her favorite part of her job is simply being outside. "It's hard work, but I enjoy it a lot," she added.

Connelly spends most of her day on weed management and irrigation. Because they don't like to use many herbicides and pesticides, she and other interns use hoes to get rid of the weeds. "I'm learning a lot about the large variety of crops," said Connelly.

Connelly and Franks along with other interns helped facilitate the field day. When the hay bale trailers returned to the main building, the day's activities concluded with a lunch sponsored by Stockman Bank and Dr. Jacobsen speaking about the future of the agricultural research center.

Over the next few years, future plans include increasing the current research abilities by adding a green house and laboratory building. Dr. Jacobsen said the research facility is worth the taxpayer's support not only for the environmental benefit, but also for the economic advantage. "Economic research studies show that Montana's economy directly gets back $6-8 for every dollar of state taxpayer support. Research at WTARC is a major contributor to this economic return," he explained.

Dr. Reddy thanked everyone for attending and adjourned the field day.

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Montana statewide Wheat Midge monitoring continues

By Dan Picard, WTARC Special Projects Coordinator

The State-wide Montana Wheat Midge Monitoring Project will be in full force again this June and July. Twenty eight MSU Extension agents, 6 MSU Ag Research Centers, growers, and consultants will place monitoring traps in spring wheat and durum fields this June to monitor for Wheat Midge. Orange Wheat Blossom Midge are now being called Wheat Midge to correspond to with terminology used by the Entomological Society of America. Wheat Midge may cause substantial yield losses when high populations are present and this project will allow growers to be proactive in regards to a relatively new pest to much of Montana.

Wheat Midge traps are comprised of a plastic trap, a sticky liner, and a pheromone lure that will attract the male wheat midge. Researchers monitor where the midge populations are present in the state and determine if they are spreading to counties not currently known to have the pest. Growers also use traps to check for the level of midge presence in order to determine if fields need to be scouted. Producers use infield scouting techniques to determine if an insecticide application is warranted.

Wheat Midge counts are reported on the Montana Pestweb. This provides everyone with a real time picture of the Wheat Midge infestation at each trap location reported throughout the state. Growers can access this free site at http://pestweb.montana.edu and view trap count data from 2014, 2015 and daily reports from cooperators this year.

Wheat Midge may cause heavy losses in fields when they are present at economic levels and the crop is in a vulnerable stage. More information on Wheat Midge, management strategies, and current trap counts can be found at the Pestweb site mentioned. Growers can also contact their local MSU Extension agent for more information.

The Montana Wheat Midge Monitoring Project is headed up by Brooke Bohannon and Dr. Bob Stougaard, Northwestern Ag Research Center near Kalispell and Dan Picard and Dr. Gadi V. P. Reddy at Western Ag Research Center near Conrad. The Montana Wheat and Barley Committee provides funding for the monitoring project.

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Agriculture professionals learning about biological controls

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By: Margaret DeMarco

GREAT FALLS - Agriculture professionals from across Montana are learning more about the benefits of Biological Controls.

The Western Sustainable Agriculture Research and Education group is hosting the two-day workshop in Great Falls.

The Western Sustainable Agriculture Research and Education group is hosting the two-day workshop in Great Falls.

The purpose is to enhance the understanding of using biological control techniques instead of pesticides.

Montana Agricultural Experiment Station associate director Dr. Barry Jacobsen says it's a more environmentally-friendly way to battle weeds and pests, and it's more economical.

"And today for pesticides to develop into a new one costs about three hundred million dollars but to develop a new biological control is somewhere between a half a million to million dollars. because of pest resistance even the major agri chemical companies are now seeing the importance of having this biological control and how biological control products will add stability to that system," Jacobsen said

The workshop features speakers who are currently working on biological control projects in Montana and Canada.

Bioinsecticides, drought, drowning all could attack wheat stem sawfly

By SUE ROESLER
The Prairie Star

SIDNEY and CONRAD, Mont. – Wheat stem sawfly research is taking some amazing high tech steps – including finding fungal bioinsecticides.

The sawfly pest has not yet been stopped by extensive work by scientists over the decades, although numerous tools to manage the pest have been discovered, according to Tatyana Rand, USDA Northern Plains Agriculture Research Lab-ARS research entomologist in Sidney, Mont.

"The wheat stem sawfly is actually spreading into new regions – Wyoming, Colorado, Nebraska and Kansas," Rand said.

Gadi V.P. Reddy, superintendent and entomologist of MSU's WTARC in Conrad, Mont., talks about expanding the work on biological controls to deal with pests in several crops.

At the Sidney Agricultural Research Service's (ARS) dryland field days last summer, some of the new high-tech research under way was the topic of the day.

"We want to increase our ability to predict wheat stem sawfly outbreaks so we can provide growers added tools to guide and improve management decisions," Rand said.

Inside tents all over the field, the hard red spring wheat variety Reeder, one of the varieties the wheat stem sawfly is most attracted to, was being subjected to excess precipitation through little tubes on top of the soil surface that delivered water. Rand called it "drip irrigation."

Outside the tents, Reeder was growing in plots and subjected to severe drought.

"We are trying to find out if drought or moisture influences the wheat stem sawfly," Rand said, adding research has shown the wheat stem sawfly does not do well in years of high rainfall or in severe drought.

As of January 2016, Rand said the ARS scientists are still splitting the stems from the experiment, and don't have results yet. It was the first year of the trials last summer.

Splitting the stems will show them if wheat stem sawfly larvae had "drowned" due to excessive sap or if the larvae was killed by the severe drought conditions.

At the same time, NPARL scientists are studying what happens to the parasitoid wasp Bracon cephi, (a natural enemy of the wheat stem sawfly, in particular) in drought or excess precipitation.

"The sawfly has one generation a year but the parasitoid wasp has two generations a year," Rand said.

However, the parasitoid's second generation may be reduced during hot years when the wheat matures early and the sawfly cuts the stem before the wasp can complete its second generation, she said.

Meanwhile, Stefan Jaronski, research

WHEAT STEM SAWFLY:
Continued on page 24A

WHEAT STEM SAWFLY: Continued from page 23A

entomologist at NPARL, talked about some "exciting new possibilities" with Beauveria, a fungal pathogen of insects, including the wheat stem sawfly.

"Can we attack the wheat stem sawfly inside the stem with a fungal pathogen?" Jaronski asked. "We may be able to use Beauveria as an insecticide."

Jaronski and Gadi V.P. Reddy, superintendent and entomologist of Montana State University's Western Triangle Agricultural Research Center in Conrad, discovered wheat stem larvae with infections caused by Beauveria in the lab.

How did Beauveria attack the wheat stem sawfly?

Jaronski and Reddy think that it was already growing inside the wheat as an "endophyte" (an organism that lives harmlessly inside the plant) and attacked the sawfly larvae as they grew.

Endophytic Beauveria is known to have been a fungal pathogen of many insects both inside and outside of the plant in crops like corn, coffee, sorghum, banana, tomatoes, pine and grapes.

Beauveria could be made endophytic in wheat just as well as these other crops, Jaronski said.

"We are looking at the Beauveria fungus as a 'seed treatment' that would be planted in furrow with the seed," Jaronski said. "This is very exciting – we need to research the possibilities and practicality of this approach."

He added it might also be applied as a spray onto plants after emergence.

Jaronski and Reddy are looking at the most efficient ways to colonize wheat with some of the new fungal strains.

"Last year, we successfully established several of the new strains in wheat," Jaronski said.

Reddy has been expanding the work on biological controls, such as with the insect fungal pathogen, Beauveria, to other Montana pest insects such as orange wheat blossom midge, flea beetles, alfalfa weevil, pea leaf weevil and canola insect pests.

In these cases the spores of the fungus would be sprayed like a chemical.

Strains of Beauveria, and a related fungus, Metarhizium, have already been registered by the Environmental Protection Agency since the fungus does not hurt – and actually protects – the plant.

Reddy said many insect pathogens are commercially available for application in the field to control insect pests. In some cases, application of the pathogen alone provides insufficient control.

"Entomopathogens like Beauveria can be applied in conjunction with other control methods," Reddy said, adding that research shows promising results when they are used as part of an integrated pest management (IPM) plan.

"Interestingly, many growers are interested in knowing about the benefits and the use of biologicals," he said.

He explained the biological fungus can recycle, so it may not be necessary to apply every year.

"For example, another biocontrol fungus Beauveria brongniartii isolates were recovered 14 years after their application in Switzerland," he said. "This is one of the areas we would like to conduct research in Montana."

Reddy and Jaronski are unsure if Beauveria could be hurt by fungicide applications. However, Jaronski said some fungicides do not affect Beauveria.

"Beauveria could be like a probiotic for the plants to increase the plant's health. Endophytes have an effect on the overall health of the plant," Jaronski said.

The scientists believe there is a possibility that wheat stem sawfly populations could be reduced by the use of the fungal pathogen, Beauveria. Only time and additional research will tell.

"There is a lot going on with biological controls of the wheat stem sawfly," Jaronski said. ★

Tatyana Rand, left, and Stefan Jaronski, both research entomologists at USDA-ARS NPARL in Sidney, Mont., discuss new high-tech wheat stem sawfly research.

Grant obtained to conduct research on pea leaf weevil

By Gadi V.P. Reddy, Ph.D., Superintendent & Associate Professor of Entomology/ Insect Ecology, Montana State University, Western Triangle Ag Research Center

Montana is the number one pulse producer in the United States. Forty-six percent of the country's lentil production occurs in Montana. Growing pulse crops in crop rotations benefits soil productivity by creating macropores in the soil and through nitrogen fixation. As the acreage of pulse crop increasing, the damage caused by pea leaf weevil is also increasing many pulse growing areas in Montana. The larvae of the weevil damages particulalry the root nodule damage affects nitrogen fixation. The pea leaf weevil, Sitona lineatus is emerging as a serious pest of pulse crops in Montana. Lentils, peas and beans have increased in acreage in the last 7 years in this area. Larval damage to N-fixing nodules can reduce yields by as much as 30% and further damage legume benefits as a crop rotation by reducing N-fixation in the soil.

Adult of the Pea leaf weevil

The Montana Speciality Crop Block Grant of $92,000 was awarded to Dr. Gadi V.P. Reddy, the Principle Investigator of the project to develop pheromone attractants into a monitoring systems for pea leaf weevil. The project has started October 2015 and will end by June 2018. A pheromone lure discovered in 1988 in England by Blight et al. (1984) and used for pea leaf weevil monitoring in 1999 by Quinn et al (1999) in Washington state shows promise for a development of an early warning system and mating disruptor. This pheromone has not been developed for extensive monitoring and trapping programs in peas despite its potential and the relative ease of optimization required. Testing of different trap types, trapping distance, timing, and lure concentration are the next steps toward development of this system into a quantifiable easy to use tool for farmers. Current management strategies rely on accurate monitoring of pest populations. Pheromone baited traps will help in monitoring and mass trapping the weevil population.

This project is timely because, although many Montana, North Dakota, Saskatchewan pulse growers are initiating control methods for the pea leaf weevil based on the sweep nets, this method has not been reliable for timing of insecticidal applications. Second, there is no current monitoring for the pea leaf weevil that allows growers to make decisions about their timing of insecticidal applications. Without monitoring and raised awareness now, we are highly likely to lose yield levels due to pea leaf weevil in pulse crops. The beneficiaries of this project are the pulse industry growers and agricultural professionals in Montana. This includes businesses that provide consulting and pesticide sales.

Characteristic 'scalloped' damage to pea leaves

Dr. Reddy hired Debbie Miller from Brady to work on this project. She is very interested in working with growers and setting up traps and taking observations as needed. Growers that have experienced problems with pea leaf weevil damage and would like to cooperate with with a off station research project on their land are asked to call Dr. Reddy or Debbie at 278-7707 for more details.

Winter doesn't stop WTARC's fight against sawfly

By SUE ROESLER
And WTARC news

There might be snow on the ground but the wheat stem sawfly larvae are lying quietly in wait in the wheat stubble – though not yet active.

Dr. Gadi Reddy, superintendent of Montana State University's Western Triangle Agricultural Research Center, calls the wheat stem sawfly the "million dollar pest" that MSU scientists have been researching for years.

Over the upcoming winter, while the sawfly is in its lying-in-wait (diapausing) state inside the stem of the stubble – a team of WTARC scientists will be continuing its work on biological controls that could help in the fight against wheat stem sawfly.

Inside the stem, the larvae are different sizes. Why? WTARC scientists suspect it may have to do with gender, nutrition level, and wheat stem diameter, and are studying the factors that may contribute to larval growth.

"The problem is the sawfly larvae goes inside the stem to feed. Whatever we apply to try and control the sawfly has to go inside the stem, too," Reddy said.

That's why insecticides applied outside the stem really haven't worked. While the sawfly does fly, the timeline has been difficult to peg down, he added.

Wheat stem sawfly larvae, called diapausing or inactive larvae, lie in wait during winter in wheat stubble. WTARC scientists are working on the reasons why they are different sizes. Photo by Scott Portman, WTARC.

In the fall, the sawfly moves to the bottom of the stem, and before the crop can be harvested, the larvae chew around the inside of the stem, Reddy explained.

As a result, the wheat stalk falls to the ground and the producer is left with the challenge of having to swath and pick up his crop to bring it to market.

Here's what scientists will be working on this winter, with reports coming at next summer's field days:

Dr. Scott Portman, a postdoctoral research associate, has been conducting research on applying predatory nematodes (roundworms) to the wheat stubble. Nematodes are small naturally-occurring roundworms that live in the soil.

"The worms find their prey by sensing carbon dioxide release, vibration, and chemical cues from the insects," Reddy said. "Many nematode species have been successfully used as environmental friendly bio-pesticides in insect control programs."

The good news about using predatory nematodes to fight pests is they are considered environmentally safe and have been exempted from the Environmental Protection Agency's pesticide registration process.

Amber Ferda, research associate, is studying using insect fungal pathogens.

Reddy said he plans to expand the work on biological controls to other Montana pest insects such as orange wheat blossom midge and canola insect pests.

Drs. Brian Thompson and Frank Antwi, postdoctoral researchers, have also been working on these projects.

"The research being carried out at WTARC is very beneficial to growers in Montana because it focuses on finding safe and practical solutions to agricultural insect pest problems in the region," Reddy said.

More reports will be coming from WTARC scientists about the pesky "million-dollar" pest as the winter goes on. ★

Research efforts to control insect pests after harvest

By Gadi V.P. Reddy

MSU-Ag Research Center

One might wonder what field research work can be done after crops have been harvested in the fall — especially in Montana. The Entomology/Insect Ecology team at the Montana State University of Western Triangle Agricultural Research Center (WTARC) is actively working on biological control methods against wheat stem sawfly. In Montana, and other neighboring states, the wheat stem sawfly causes millions of dollars worth of wheat crop loss each year. Wheat stem sawfly larvae feed internally within the stem. Come fall, they move to the bottom of the stem to diapause (state of physiological inactivity). However, before the crop can be harvested, the larvae chew around the inside of the stem causing the wheat stalk to fall to the ground. The diapausing larvae remain in the wheat stubble until the following spring. Dr. Scott Portman, a Postdoctoral Research Associate, has been conducting research on applying predatory nematodes (round worms) to the wheat stubble. Ms. Amber Ferda, a Research Associate is focusing her research work on using insect fungal pathogens such as Beauveria bassiana and Metarhizium brunneum. Dr. Gadi V.P. Reddy, Superintendent and Principle Investigator, plans to expand the work on biological controls to other Montana pest insects such as orange wheat blossom midge and canola insect pests. Drs. Brian Thompson and Frank Antwi, postdoctoral researchers have been working on these projects as well.

Entomopathogenic (insect killing) nematodes are small naturally occurring round worms that live in the soil. The worms find their prey by sensing carbon dioxide release, vibration, and chemical cues from the insects. Many nematodes species have been successfully used as environmental friendly bio-pesticides in insect control programs. These tiny predatory worms do not pose a danger to humans and other beneficial organisms. Moreover, they only prey on a small number of specific target insects. Because they are environmentally safe, predatory nematodes have been exempted from the pesticide registration process set by the United States Environmental Protection Agency (US EPA).

Insect pathogens (entomopathogens) such as bacteria, fungi, protozoans, and viruses cause sickness and death in insects. Many insect pathogens are commercially available for application in the field to control insect pests. In some cases, application of the pathogen alone provides insufficient control. However, entomopathogens can be applied in conjunction with other control methods and research shows promising results when they are used as part of an integrated pest management (IPM) plan. Researchers at WTARC are currently working on methods to improve the effectiveness of entomopathogens for controlling insect pests in Montana. Overall the research being carried out at WTARC is very beneficial to growers in Montana because it focuses on finding safe and practical solutions to agricultural insect pest problems in the region.

Editor's note: Dr. Gadi V.P. Reddy, Superintendent & Associate Professor of Entomology/ Insect Ecology,

Montana State University, Western Triangle Ag Research Center, 9546 Old Shelby Rd., P. O. Box 656, Conrad, 59425, Phone: office: 406-278-7707; cell: 406-450-0375. Fax: 406-278-7797; Email: reddy@montana.edu

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Wheat midge predators find new home in Montana

U.S. researchers collect parasitoid wasps during Sask. field trip

Posted Aug. 7th, 2015 *by* William DeKay 2

The orange wheat blossom midge Sitodiplosis mosellana is found in most areas of the world, including the Canadian Prairies and the northern United States. | Gilles San Martin/Flickr photo

A wheat midge outbreak in Montana recently sent two entomologists on a cross-border hunting trip into Saskatchewan.

Gadi Reddy and Brian Thompson of Montana State University were collecting parasitoid wasps in Saskatchewan wheat fields to take back and release in the state's wheat producing areas.

"Around six years ago we started to get wheat midge inside the golden triangle wheat production area of Montana," said Thompson.

"Previous to that, wheat midge had entered the Flathead Valley and caused major economic losses to that wheat."

He said producers see natural predators as a good alternative to using chemicals.

"Our growers in the Montana Wheat and Barley Committee are very interested in projects like these natural biocontrol programs for reasons like reducing pesticide use, reducing environmental impact of pesticides," he said.

A wheat midge looks like a small orange fly. It emerge from the pupae stage in late June and early July.

Female insects lay their microscopic eggs during the evening in newly emerged wheat heads when conditions are humid. The larvae feed on the developing wheat kernels when the eggs hatch.

Parasitoids are insects the size of flakes of pepper that kill their wheat midge hosts. They lay even smaller eggs inside the midge larvae and eggs and devour their hosts when they hatch.

Timing is key in controlling wheat midge, said Owen Olfert, a research scientist with Agriculture Canada in Saskatoon, because wheat heads are susceptible to wheat midge only between heading and flowering.

"If farmers control the wheat midge during that narrow window, they are able to conserve the parasitoid populations out there as well," he said.

"On average, the main parasitoid controls 30 to 40 percent of the wheat midge population every year in Saskatchewan."

"That means a lot less insecticide is required during wheat midge outbreaks, and that implies less environmental impact as well."

This is the second consecutive year that Reddy and Thompson have made field trips in Saskatchewan collecting the beneficial insects to take home and establish.

The first year they collected a population of macroglenes penetrans, the predominant parasitoid of wheat midge found in Saskatchewan.

This year they extracted a second complementary parasitoid insect, the Platygaster tuberosula species, which was successfully released in Saskatchewan at three locations 25 years ago.

"This year we came up to take what was released back in the 1990s and try to establish that parasitoid as well," said Thompson.

"The idea is more parasitoids may cause synergism and control more of the midge population."

The Montana researchers visited 25 fields in three regions of the province during their two-day trip, including Langenburg, where an abundance of parasitoids was found and collected. One particular field has not been sprayed with pesticides since the program began in the early 1990s.

The researchers dragged sweep nets across the wheat canopy for about 15 minutes per field, picking up parasitoids and all manner of insects.

"There's a lot of insects in a wheat field: spiders, lygus bugs, flies like you wouldn't believe," said Thompson.

While Gadi drove to the next field, Thompson sat in the back seat with a cage and pooter (collection bottle), aspirating parasitoids from other insects.

Thompson said a major challenge was figuring out how to keep parasitoids alive between capture in one country and release in another.

"Even the dry air the air conditioning creates is catastrophic to the insect samples," he said.

"It took a lot of trial and error to keep them alive."

Another difficult task was finding crops that were just starting to head so that wheat midges and parasitoids were present at the same time.

"We have the added problem that our crops are further along in Montana than they are here because of the latitude," said Thompson.

"We had to find (Montana) farmers who had planted their crops late so they would be at the right stage to match up with the crops here.… They also had to have midge in their fields, which isn't as big a problem as you think because the midge are pretty much everywhere down there now."

Olfert said farmers are gradually reaping more benefits as parasitoids spread across Saskatchewan.

"There was a study in the 1990s that estimated farmers during those 10 years saved about $240 million by not having to spray (pesticides)," he said.

"If the wheat midge parasitoid diminishes the population below an economic level, farmers get a higher grade for their wheat."

Added Thompson: "That's not factoring in beneficial insects. Pesticides will kill just about anything… It's hard to quantify how much that costs the farmers."

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Markets at a glance

Symbol	Month	Open	Chg	%Chg	Last
ICE Canola	Mar	501.00	-2.20	-0.44%	500.10s
ICE Canola	May	508.80	-2.10	-0.41%	507.10s
ICE Wheat	Mar	0.00	+2.00	+0.83%	243.00s
ICE Durum	Mar	0.00	unch	unch	317.00s
ICE Barley	Mar	0.00	unch	unch	139.00s
MGEX Wheat	Mar	573-2	+8-6	+1.52%	582-6s
KCBT Wheat	Mar	444-4	+4-2	+0.96%	449-0s
CBOT Wheat	Mar	426-2	-0-2	-0.06%	426-0s
CBOT Corn	Mar	357-4	+0-2	+0.07%	358-4s
CBOT Oats	Mar	234-6	+6-6	+2.86%	242-4s
CBOT Soybeans	Mar	1037-4	+6-0	+0.58%	1046-2s
Soybean Meal	Mar	326.7	+6.0	+1.83%	333.9s
Soybean Oil	Mar	36.01	-0.47	-1.30%	35.60s
CME Feeder Cattle	Jan	130.100	+0.125	+0.10%	130.450s
CME Live Cattle	Feb	117.175	+1.050	+0.89%	118.525s
CME Lean Hogs	Feb	66.100	-0.350	-0.53%	65.600s

CME Canadian Dollar	Mar	0.76215	-0.00055	-0.07%	0.76205

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FLEA BEETLES

North Dakota, Montana producers report canola flea beetles emerging

Brian Thompson

An adult canola flea beetle feeds on the leaf of a canola plant. Photo courtesy of Texas A&M University and MSU.

June 25, 2015 9:15 am • Sue Roesler, The Prairie Star (0) Comments

The cool, wet spring this year may help to keep canola flea beetles in check this year, according to Jan Knodel, North Dakota State University Extension entomologist. However, scouting should still be first on producers' minds.

Most canola hybrids are treated with a seed treatment that protects the young plants up to the four-leaf stage, and that is probably the stage where the first planting of canola is at in the middle of June, Knodel said. However, with the wet, cool weather this spring, seed treatments aren't working as well as in a normal year because the plant isn't actively growing and not able to take up the insecticide.

"In the wet, cool weather, the seed just sits in the ground." Knodel said, adding that seed treatments only protect for the first 25 days, and then the plant becomes vulnerable to flea beetle feeding injury.

"At that point, we would need to get on top of it with a foliar application," Knodel said.

Knodel pointed out there was a lot of canola replanting due to frost in many areas, including from Minot to Langdon, both in North Dakota, and in other areas that caused some poor plant stands.

And now North Dakota and Montana producers are reporting finding canola flea beetles in their replanted canola crop. However, recent cool weather may keep the flea beetles in check. In cool weather, the insects don't fly and feed actively in those weather conditions, Knodel said.

"It is always a good idea to scout your crops to ensure that your insecticide seed treatment is working on your replanted canola crops," Knodel said.

"Flea beetles prefer sunny weather in the 70s-80s," she said, adding the flea beetle population usually begins to decline at the end of June.

If the weather suddenly warms up significantly, flea beetle adult populations could become very

active again.

“The insecticide seed treatment should work to protect the second planting of canola since the ground is warmer and the plants are growing actively and can take up the insecticide,” Knodel said.

With canola flea beetle activity, some years are worse than others. The insects survive throughout winter as adults, and emerge in the spring to injure canola seedlings. If the weather conditions in the spring are warm, the beetles come out “hungry” and start feeding on leaves and, sometimes, stems.

The USDA-NASS is reporting some 7 percent of the canola planted in North Dakota is blooming, along with 96 percent emerged, which is 81 percent ahead of last year.

In Montana’s canola growing region, there has also been significant canola flea beetle activity, according to Gadi Reddy, superintendent and entomologist at Montana State University’s Western Triangle Ag Research Center in Conrad, Mont.

Reddy said they have had reports of flea beetle damage to canola at the threshold level of 14-20 percent this spring.

“Flea beetles are one of the most difficult to manage canola pests,” Reddy said.

MSU research in the Golden Triangle has demonstrated that threshold levels of 15-20 percent damage indicate the need for insecticide treatment.

“Insecticide should be applied when 15-20 percent of the seedling leaf area is damaged and the pest is present,” Reddy said.

In 2013, there was 80 percent damage to canola seedlings in the Montana canola-growing regions, he said.

“The adult beetles feed on canola leaves, causing many small holes that stunt growth and reduce yield,” Reddy said. “There is evidence that when flea beetles emerge in large numbers, they can quickly destroy a young canola crop.”

At WTARC, Reddy said their current research is aimed at biological control measures aimed at controlling populations of overwintering adult flea beetles to add to the seed treatment tools most canola producers use.

USDA-NASS is reporting some 43 percent of the canola planted in Montana is blooming, which is way ahead of last year and the five-year average at 10 percent. Some 96 percent of canola in Montana has emerged.

Tags Canola Flee Beetles, Jan Knodel

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