NCERA 220 Minutes from June 5, 2012 in Lincoln Nebraska

Secretary, Mary Gardiner

Members Present:

Matt Grieshop, Michigan State University
Matt O'Neal, Iowa State University
Steve Yaninek, Purdue University
Bob Wright, University of Nebraska
Brian McCornack, Kansas State University
Kelley Tilmon, South Dakota State University
Ben Puttler, University of Missouri
Deirdre Prischmann-Voldseth, North Dakota State University
Debbie Finke, University of Missouri
Jen White, University of Kentucky
Julie Peterson, University of Kentucky
Megan Carter, University of Minnesota
Wendy Johnson, Kansas State University

Ben Puttler motioned to approve minutes from 2011, Debbie Finke Seconded. Minutes approved unanimously

Old Business

Website – Symposium to generate ideas on revitalizing the website. Can we make the website easier to update for the group, with each person able to update their own content? What types of content should we have on the site? Where should we host the website? State reports? List of graduate faculty conducting biocontrol research?

Brian McCornack suggested hosting the website with a private company for $300-400. URL for the website midwestbiocontrol.org. Brian suggested Druple for the website. Making the website cost be part of the registration fee was suggested by Steve Yaninek. The state reports could also be put in a certain format that would be consistent. Google docs or Google drive could be used to input state reports (Grieshop and Yaninek).

Brain McCornack demonstration of lab website. His "Bytes" section allows you to upload information and send it to particular users or open access. You can set sections open and keep others password protected. We could establish a fillable form for the state reports sections.

Matt Grieshop suggests an NC IPM Mini-grant to fund the website.

The value of state reports was discussed. Record of your institute is doing. Inform peers.
We decided on the "Impacts, Outcomes, CRIS report format" format to enter state reports onto the website.

For future state reports the following information will be required:

Required: Key words*, Project Description (Abstract)*, Key personnel/Investigators*,

Optional: Presentations, students, funded grants (agency), publications (PDF), supporting images/figures (upload), hyperlinks.

Deadline due at the end of July. Deidre Prischmann-Voldseth motions for end of July, Matt O'Neal seconds. Approved.

The group discussed the need for a biocontrol survey. What are the educational needs of this group? Biocontrol was not taught sufficiently at some home institutions which led to the creation of the biocontrol institute. Matt O'Neal will put together a 10-12 question survey to gauge learning needs of the committee. Need for distance education/ training courses. Is classroom courses needed in biocontrol? What would the region need if training needs to be added? Platform to share lesson plans? Need for biocontrol training is topic of survey. Matt O'Neal will use google format and send out a first pass of survey. We will make sure to note sections, students/faculty, etc.

Midwest biocontrol institute does have a website, it was last updated in 2000.

Steve Yaninek presented the administrative advisor report. 2012 budget: climate change, renewable energy, global food security, etc are priorities. Sonny Ramaswamy hired as Director of NIFA in May. Presentation given to introduce himself and talk about how his background influences his thoughts on importance of food production to our country. His presentation is available online. The concentration of resources in a few strategic areas to try and get additional funds. When programs were implemented certain areas were left out, feedback was more foundational grants and less aggregated funding. 2012 funding levels, SCRI will be cut by 100 M but Organic Agriculture will increase. NIFA had a 1% cut in current budget, flat budget in 2011. ARS was 3.4% cut from last year's budget.

2013 budget: Senate has approved agriculture spending proposal, small increases to USDA and NIFA would get 3% and AFRI by 13%. House expected to cut this budget. RIPM, CAR, RAMP, PMAP, Alternatives to Methyl Bromide were not terminated and will hopefully remain in 2013. Strong support in senate to keep this funding available. Regional IPM centers will stay at the same level. Senate suggests keeping budget lines at 2012 levels. Farm Bill, senate approved farm bill with 5 program areas started in 2008 organic ag, specialty crops, beginning farmer/rancher, biomass education, biomass R and D. Organic ag research in last farm bill will top out at 16 M. SCRI program will be cut to 163 M. Aphis also has farm bill funding used to develop tools to safeguard American agriculture. 250 M to allocate from APHIS.

Expect to hear from NIFA in the fall. Foundational programs coming out in the fall most likely, and hard to say the size.

Update on Midwest biocontrol institute. Matt O'Neal presentation.

Topics for upcoming offerings:

John Lungren will offer carabid course this year. Email John for the dates.

Insect Pathology – Lee Souter at U Illinois teaches 1 week course. Students can stay at university and attend course. 2013

Symbiont Bootcamp for Ecologists – Jen White. Biocontrol practioners and students. People would bring their insects and examine symbionts. One week course 2014 best case for this course.

Pollinator course by Matt O'Neal.

Logistics for upcoming meeting. Next meeting is in June in Rapid City, SD. Is a half day long enough to do what we need to do? Logistics of meeting time were discussed. Safer to schedule when not other things not going on but may be difficult for students and some reps to stay longer. Chair will work with local arrangements committee to arrange 2013 meeting. Kelley Tilmon is the program chair (June 16-19). Matt Grieshop will be the new secretary and Mary Gardiner will be the Chair for 2013.

Planning symposium for 2013. Suggestion for 2013 weed biocontrol. Kelley Tilmon will be the organizer. Several potential speakers were suggested to Kelley. Group discussed ideas to bring in people from the west for the branch meeting. Matt O'Neal will be the co-chair of symposium. W2185 that is the western counterpart to our group, they may have interest in participating. We need to remember to add our group name and number to symposium.

In 2013 we hope to have a larger room, where students can hear state reports. We will start state reports at particular time. We discussed having 10 min power point reports after symposium. Maybe give ½ states more time.

Meeting Adjourned (State Reports Follow Minutes)

2012 Annual report

NCERA 220

Nebraska

Submitted by Robert Wright

Title: Biological Control of Western Bean Cutworm with *Trichogramma ostrinae*

Principle investigator: Jeff Bradshaw, University of Nebraska, Panhandle Research & Extension Center, Scottsbluff; jbradshaw2@unl.edu

Trichogramma ostrinae, a tiny wasp, is a native parasitoid of the Asian corn borer. In the early 1990s it was introduced into the eastern United States for control of the European corn borer in sweet corn. The Scottsbluff study was intended to find out whether *Trichogramma* would parasitize the eggs of western bean cutworm in corn and dry beans.

Cages were set up around corn and dry bean plots at two separate locations at the Panhandle Research and Extension Center at Scottsbluff. Four of the cages (two on corn and two on beans) were infested with both female western bean cutworm moths and parasitoids. Another two cages were infested with moths, but no parasitoids, as controls. After about 10 days of exposure, the western bean cutworm egg masses were evaluated. The project was carried out in 2011 by Fernanda M. Pelegrinotti, an intern from Brazil (UNESP, Universidade Estadual Paulista), under Bradshaw's supervision. *Trichogramma* were supplied by Dr. Mike Hoffman, Cornell University.

They found that the wasp will parasitize western bean cutworm eggs, and in fact the parasitism rate was higher in dry beans than in corn. In addition, some of the cutworm eggs were victims of other mortality factors. The conclusion is that an augmentative release could significantly increase the mortality rate of western bean cutworm in dry beans.

Future research questions include--How does this treatment work in upright bean plants compared to viney? How large is the effective area of control — how far the parasitoids would spread from the release point? How long does it take for parasitoid eggs to emerge from cutworm eggs after they've been laid into the eggs, and how does that match up with the cutworm life cycle? For additional information see http://go.unl.edu/wzg

Kentucky

State Representative: Jen White

University of Kentucky

jenawhite@uky.edu

Part I

(complete for your program only

Accomplishments

1. Advance the science of biological control through fundamental research on the biology of natural enemies and their application in pest management.

a. List the titles, participants, and funding sources of your externally-funded biological control research

1) **Molecular characterization of the microbial symbiont community of invasive arthropods**

PI: Jennifer White

Kentucky Science and Engineering Foundation

2) **Ecological ramifications of defensive symbiosis in an invasive aphid pest**

PI: George Heimpel, University of Minnesota

Co-PIs: Mark Asplen, University of Minnesota

Kerry Oliver, University of Georgia

Keith hopper, USDA-ARS, Newark DE

Jennifer White, University of Kentucky

USDA AFRI

3) **The effect of an aphid bacterial symbiont on interactions among soybean aphid, resistant soybean, and parasitoids**

PI: Jen White, University of Kentucky

USDA AFRI

b. List citations for your peer-reviewed publications (published this year) on biological control-related research. (Other types of publications will be included below)

White, J. A., C. Hurak, J. A. Wulff, M. S. Hunter, and S. Kelly. 2011. Parasitoid bacterial symbionts as markers of within-host competitive outcomes: superparasitoid advantage and sex ratio bias. **Ecological Entomology** 36: 786-789**.**

White, J.A., S. E. Kelly, S. N. Cockburn, S. J. Perlman, M. S. Hunter. 2011. Costs and benefits of endosymbiont infection in a doubly-infected parasitoid. **Heredity** 106: 585-591

2. Facilitate the implementation of biological control in production and natural systems.

a. Please list your accomplishments that helped facilitate the *implementation* of biological control.

3. Educate stakeholders, students, extension personnel and the general public on the principles and practices of biological control.

a. List biological control-related talks, symposia, workshops, etc. you gave or organized for the education of other scientists

White, J. A. 2011. Parasitoid bacterial symbionts as markers of within-host competitive outcomes: superparasitoid advantage and sex ratio bias. Entomological Society of America, Reno NV, Nov 13-16.

b. List publications or other educational opportunities on biological control you provided for producers, extension educators, and other stakeholders (e.g., extension publications or talks, biological control workshops or training sessions, etc.)

c.

Extension publication

White, J. A. and D. Johnson. 2012. Vendors of microbial and botanical insecticides and insect monitoring devices. **Entfact 124**, UK Cooperative Extension Service.

Extension talks

White, J.A. Recent Developments in Greenhouse Pest Control, Jan 27, 2012. Kentucky Landscape Industry Winter Conference.

White, J. A. Greenhouse Pests. Greenhouse 101 Workshop, January 19, 2011, Covington, KY.

c. List number of graduate students, postdocs, and undergraduate researchers you trained in the science of biological control.

5 graduate students, 1 undergraduate student

d. List biological control-related publications and other communications to the public (e.g., radio interviews, newspaper articles, etc. Summarize as appropriate, such as "three radio interviews")

1 newspaper interview

1 magazine interview

4. Contribute to national dialog about regulatory issues of biological control.

a. List any accomplishments related to regulatory issues

Impacts

The goal of NCERA-125 is to coordinate biological control research, education, and implementation in the North Central Region. Our stakeholders – the benefactors of our collaborative work on biological control – include farmers, land managers, homeowners, green industries, regulatory agencies, commodity groups, and the broader scientific community.

Where impact data are available for your accomplishments listed above, please list them below. Impact statements should show the concrete evidence of results or benefits of a given project.

Part II

State Project Summaries

Please list the biological-control related projects being conducted by you, and by other colleagues in your state, including other institutions when applicable (for example, projects at your local ARS lab). This part of the report is similar to the older State Report format, but you only need to supply project titles, investigators. You may include project descriptions, links to project websites, results, etc. if you wish, but this is optional.

1. **Project title:** The defensive potential of the bacterial endosymbiont *Arsenophonus* in the soybean aphid.
   Investigators: Jason Wulff and Jen White, University of Kentucky

2. **Project title:** Molecular characterization of the microbial symbiont community of invasive aphids
   Investigators: Jen White and Cheryl Lindsay, University of Kentucky.

3. **Project title:** Ecological ramifications of defensive symbiosis in an invasive aphid pest

   Investigators: George Heimpel, Mark Asplen (University of Minnesota), Kerry Oliver (University of Georgia), Keith Hopper (USDA-ARS, Newark, DE), Jennifer White (University of Kentucky).

4. **Project title:** The effect of an aphid bacterial symbiont on interactions among soybean aphid, resistant soybean, and parasitoids.

   Investigator: Jen White, University of Kentucky

5. **Project title:** Foraging activity of a dominant agrobiont predator: molecular evidence for the effect of prey abundance on consumption. *Oikos*, in pr**ess.**

   Investigators: Schmidt, J.M., Harwood, J.D., Rypstra, A.L.

6. **Project title:** Molecular characterization of the differential role of immigrant and agrobiont generalist predators on pest suppression. *Biological Control*.

   Investigators: Opatovsky, I., Chapman, E.G., Weintraub, P.G., Lubin, Y., Harwood, J.D.

7. **Project title:** Molecular DNA-based techniques allow unprecedented resolution of prey selection by a common forest-dwelling bat (*Myotis septentrionalis*). *Journal of Mammalogy*,

   Investigators: Dodd, L.E., Chapman, E.G., Harwood, J.D., Lacki, M.J., Rieske, L.K.

8. **Project title:** Functional responses to food diversity: the effect of seed availability on the feeding behavior of facultative granivores. *Journal of Entomological Science*

   Investigators: Lundgren, J.G., Harwood, J.D.

9. **Project title:** Evidence for biological control of the Russian Wheat Aphid with spiders in winter wheat. *Journal of Arachnology*, 40, 71-77

   Investigators: Kerzicnik, L.M., Chapman, E.G., Harwood, J.D., Peairs, F.B., Cushing, P.E.

10. **Project title:** Predator-pathogen interactions: synergy between mortality causes and failure of the healthy herds hypothesis. *Functional Ecology*, 25, 943-944

    Investigators: Welch, K.D., Harwood, J.D.

11. **Project title:** Evidence for utilization of Diptera in the diet of field-collected coccinellid larvae from an antibody-based detection system. *Biological Control*, 58, 248-254

    Investigators: Moser, S.E., Kajita, Y., Harwood, J.D., Obrycki, J.J.

12. **Project title:** Successional dynamics of web-building spiders in alfalfa: implications for biological control. *Journal of Arachnology*, 39, 244-249.

    Investigators: Welch, K.D., Crain, P.R., Harwood, J.D.

13. **Project title:** Interactions of transgenic *Bacillus thuringiensis* crops with spiders (Araneae). *Journal of Arachnology*, 39, 1-21.

    Investigators: Peterson, J.A., Lundgren, J.G., Harwood, J.D.

14. **Project title:** Molecular identification of predation by carabid beetles on exotic and native slugs in a strawberry agroecosystem. *Biological Control*, 56, 245-253.

    Investigators: Eskelson, M.J., Chapman, E.G., Archbold, D.D., Obrycki, J.J., Harwood, J.D.

North Dakota

State Representative: Deirdre A. Prischmann-Voldseth

North Dakota State University, Entomology Dept.

Deirdre.Prischmann@ndsu.edu

(report covers October 2011 to August 2012)

Accomplishments

1. Advance the science of biological control through fundamental research on the biology of natural enemies and their application in pest management.

a. List the titles, participants, and funding sources of your externally-funded biological control research

Title: Impact of nitrogen on soybean aphid densities and parasitization by *Binodoxys communis*.
Investigators: Prischmann-Voldseth DA, RJ Goos.
Funding Source: North Dakota SBARE, North Dakota Soybean Council

Title: Using environmental variables to predict soybean aphid problems
Investigators: Prischmann-Voldseth DA, Harmon JP
Funding Source: North Dakota Soybean Council

Title: Soybean aphid: management, resistance, and outreach in the North Central Region

Investigators/Institutions: Tilmon KT, Hodgson E, O'Neal M, Bonning B, McCornack B, Reese J, Wang D, Prischmann DA, Harmon JP, Knodel J, Mian R, Michel A, Krupke C, Diers B, Hudson M, Hill C, Giordano R, Voegtlin D, Heimpel G, Potter B, Hunt T, Heng-Moss T, Hogg D, Cullen E, Mitchell P, Hopper K, Hesler L.

Organization: North Central Soybean Research Program (NCSRP)

Title: Who's eating spider mites? Molecular tracking of mite predation in Washington potatoes
Investigators: Snyder WE, Harwood JD, Prischmann-Voldseth DA
Funding Source: Washington State Potato Commission and Washington State Commission on Pesticide Registration

Title: Efficacy of *Ceutorhynchus litura* for biological control of Canada thistles.

Investigators: Prischmann-Voldseth DA, Gramig G, Burns E

Funding Source: North Dakota Department of Agriculture, NCR-SARE.

b. List citations for your peer-reviewed publications (published this year) on biological control-related research. (Other types of publications will be included below)

Prischmann-Voldseth DA, Lundgren JG. 2011. Tracking predation of subterranean pests: digestion of corn rootworm DNA by a generalist mite. Biocontrol Sci. Techn. 21(12): 1507-1510.

Ghising K, Harmon JP, Beauzay PB, **Prischmann-Voldseth DA**, Helms TC, Ode PJ, Knodel JJ. 2012. Impact of *Rag1* aphid resistant soybeans on *Binodoxys communis* (Hymenoptera: Braconidae), a parasitoid of soybean aphid (Hemiptera: Aphididae). Environ. Entomol. 41(2): 282-8.

2. Facilitate the implementation of biological control in production and natural systems.

a. Please list your accomplishments that helped facilitate the *implementation* of biological control.

3. Educate stakeholders, students, extension personnel and the general public on the principles and practices of biological control.

a. List biological control-related talks, symposia, workshops, etc. you gave or organized for the education of other scientists

Burns EE, Gramig G, Prischmann-Voldseth DA. 2012. Integrating weevil herbivory, a native cover crop, and soil nutrients for Canada thistle (*Cirsium arvense* L.) control.

Student competition talk. Weed Science Society of America annual meeting, Waikoloa, HI, Feb 6-9 2012.

Burns EE, Gramig G, Prischmann-Voldseth DA. 2012. Integrated Pest Management of Canada thistle. Wild World of Weeds Workshop, Fargo ND, Jan 24 2012.

Ballman ES, Ghising K, Prischmann-Voldseth DA, Harmon JP. Hard Times for Parasitoids? Factors Contributing to the Poor Performance of the Soybean Aphid Parasitoid *Binodoxys communis* on a Resistant Soybean Cultivar. Entomological Society of America North Central Branch Meeting, Lincoln NE, June 3-6 2012.

Prischmann-Voldseth DA, Swenson S, Brunner S, Goos RJ. Effect of nitrogen source on parasitization of soybean aphids by *Lysiphlebus testaceipes*. Entomological Society of America North Central Branch Meeting, Lincoln NE, June 3-6 2012.

b. List publications or other educational opportunities on biological control you provided for producers, extension educators, and other stakeholders (e.g., extension publications or talks, biological control workshops or training sessions, etc.)

Burns EE, Gramig G, Prischmann-Voldseth DA. 2012. Integrating weevil herbivory, a native cover crop, and soil nutrients for Canada thistle (*Cirsium arvense* L.) control. Proc. Weed Sci. Soc. Am. 52:50.

a. List number of graduate students, postdocs, and undergraduate researchers you trained in the science of biological control

3 graduate students

b. List biological control-related publications and other communications to the public (e.g., radio interviews, newspaper articles, etc. Summarize as appropriate, such as "three radio interviews")

4. Contribute to national dialog about regulatory issues of biological control.

a. List any accomplishments related to regulatory issues

2011

NCERA 220

MISSOURI

Ben Puttler

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Accomplishments: Monitoring Biological Control Organisms

Soybean Aphid (*Aphis glycines*)

In 2011 soybean aphid populations in central Missouri were not detected in soybean fields until mid-August and remained below the economic threshhold (250/plant) throughout the rest of the season. Even with these relative small infestation migration of aphids returning to its overwintering host buckthorn was observed beginning in mid-September and continued until mid-October. During this period aphid colonies were decimated by syrphid larvae to the extent that no overwintering eggs could be detected in periodic searches extending until mid-April 2012. At that time a small colony of soybean and cotton/melon aphid was observed. They were both parasitized by *Lysiphlebus testaceipes*.

The parasite and syrphid larvae have been present in past soybean aphid infestations on buckthorn. To the best of our knowledge no soybean fields throughout the State were treated for the aphid (with W. Bailey, baileyw@missouri.edu)..

Milky Disease (*Paenibacillus lentimorbus*)

There has been a significant decline in the number of milky diseased grubs mostly masked chafers from the turfgrass surface while cris-crossing the 11th fairway of a golf course that has been monitored for the last 11 years. From a high of 241 infected grubs collected in 2004 to 1 in 2010 and none in 2011. Climate conditions in October of those years cool-dry or hot-dry may have contributed to the decline or perhaps the 11th fairway was not infested those years.

Japanese beetles have been encountered for the first time in the rough of the 11th fairway but none has been found diseased.

Elm leaf beetle (*Xanthogaleruca luteola*)

Co-authorship on a manuscript on the history of the elm leaf beetle with Steven H. Dreistadt of the University of California-Davis has been completed and would be published shortly in “SAVING TREES AND SAVING FORESTS (Use of Biological Control to Preserve Native US and Canadian Forests).

In essence the egg parasite of the beetle *Oomyzus gallerucae* has contributed significantly to the reduction of the beetle in the Midwest and especially in Missouri where it represents an undocumented case of classical Biological Control.

Lee Solter, University of Illinois

At least three species of microsporidia occur in five species of coccinellid and derodontid beetles that have been imported from China and the western US for control of the hemlock woolly adedgid. These microsporidia impact colony health of beetles being mass-reared for the USDA Forest Service biological control program. The microsporidia have been genetically characterized and field studies are on-going to determine whether the pathogens impact field releases. (L. Solter and W.F. Huang, INHS, U of Illinois; B. Onken, USDA Forest Service, Morgantown, WV; N. Havill, USDA Forest Service, Hamden, CT; J. DeSio, NJ Dept. of Agric.; C. Jubb, Virginia Tech and State Univ.; L. Burgess, Clemson Univ.)

NCERA 220 State Report – Ohio State University

Representative Mary Gardiner

1. Project Title: Increasing the Services of Soil Invertebrates in Agroecosystems.

Investigators: Hoy, C.W., and Grewal, P.S., Ohio State Univ., Dept. of Entomology, Wooster, OH.

2. Project Title: Belowground biocontrol in urban ecosystems.

Investigators: Yadav, P., Duckworth, K. & Grewal, P. S, Ohio State Univ., Dept. of Entomology, Wooster, OH.

Publication: Yadav, P., Duckworth, K. & Grewal, P. S. 2012. Habitat structure influences below ground biocontrol services: A comparison between urban gardens and vacant lots. Landscape and Urban Planning 104, 238-244.

3. Project Title: Modeling the Biological control of *Bemisia tabaci* with *Delphastus catalinae* in tomato greenhouses: Scaling up from individual behavior to population-level responses..

Investigators: Rincon-Rueda, D., Cañas, L.A., Hoy, C.W., Ohio State Univ., Dept. of Entomology, Wooster, OH.

4. Project Title: Using biological control and biopesticides to manage Western flower thrips in Ohio.

Investigators: Cañas, L.A., Rios, A., Kuniyoshi, C.H., Ohio State Univ., Dept. of Entomology, Wooster, OH.

5. Project Title: Lessons from lady beetles: accuracy of monitoring data from the US and UK. Frontiers in Ecology and the Environment.

Investigators: Gardiner, M.M., L.L. Allee, P.M.J. Brown, J.E. Losey, H.E. Roy, and R. Rice Smyth.

6. Project Title: Quantifying the impact of natural enemies on egg predation and adult parasitism of cucumber beetles and squash bug in pumpkins.

Investigators: B.W. Phillips and M.M. Gardiner

7. Project Title: Testing an interference competition hypothesis to explain the decline of native lady beetles in Ohio.

Investigators: C.W. Smith, and M.M. Gardiner

8. Project Title: Examining the richness, abundance, and diet of spider communities in vacant lots, community gardens, and wildlife refugia in the urban landscape of Cleveland, OH

Investigators: Burkman, C.E. and M.M. Gardiner

9. Project Title: Identifying and Enhancing natural enemies in vegetable crops Extension curriculum.

Investigators: Mary Gardiner, Jim Jasinski, Celeste Welty, Zsofia Szendrei, Abby Seaman, Alexandria Bryant, Brett Blaauw, Megan Woltz, Caitlin Burkman, Ben Phillips, Scott Prajzner, Sarah Rose and Chelsea Smith