NC1205 Meeting

Nov X, 2017

Denver, Colorado

Attendees:

Sue Blodgett, ISU
Pam Bachman, Monsanto
Myron Zalucki, Univ .Queensland, AU
Steve Bradbury, ISU
Kris Garber, USEPA
Rob Wiedenmann, Univ. Arkansas
Greg Zolnerowich, Kansas State Univ.
Chad Boeckman, DuPont-Pioneer
Terry Hurley, Univ. Minnesota
Doug Landis, Michigan State Univ.
Adam Baker, Univ. Kentucky
Daniel Potter, Univ. Kentucky
Kerri Carstens, DuPont-Pioneer
David Mota-Sanchez, Michigan State Univ.
Mary Purcell, USDA
Rick Hellmich, USDA-ARS
Anthony Zukoff, Kansas State Univ.
Sarah Zukoff, Kansas State Univ.
Seth Appelgate, ISU
Dana Schweitzer, ISU
Niranjana Krishnan, ISU
Teresa Blader, ISU
Tyler Grant, ISU
Kelsey Fisher, ISU

NC1205 Notes

Kansas State University faculty and staff have been working on the development of a state plan for monarch butterfly that includes industry, conservation, university. One of the state goals is a survey to determine current plant diversity and current state land use across state. The survey is being implemented through county extension offices and will inform target sites for further work. The survey is being contracted to MJV and is being coordinated with larger, regional sampling efforts. Another goal includes an educational component for farmers on how to identify prairie plants of interest, establishing, and maintaining habitat. One issues that has been identified is the development of a database of seed sources that farmers and agency professionals can use. In addition to milkweed species, nectar-producing species specific for Kansas are being identified, as a moisture gradient across that state may indicate seed mixes that are specialized for eastern and western Kansas. Further discussion suggested flexibility, keeping the seed mix simple and/or suggesting substitutions so that the goals of full-season nectar availability is met.

There was a discussion of using corners of center pivot irrigated fields for monarch habitat similar to what is underway in Nebraska. However, spray drift into potential habitat is a concern, especially in Kansas where wind sustained high winds are typical.

The Kansas effort has been organized by land-use habitat types with a sub-committee established for each including right-of way, rangeland, crop edges, hay meadows, grasslands, and public parks. Pheasants Forever is a partner on monarch efforts in both Kansas and Nebraska.

Other states that have been working on seed mixes including Iowa (published Seed Mix: High Diversity) and Kentucky is also developing a seed mix.

The Michigan DNR partnered with NFWF hosting a monarch symposium last September; seventy-five agencies, NGO's were represented. At this meeting, a 5 point conservation strategy was crafted. Sub-committees have been formed to work on the 5 strategy points.

Kentucky faculty and staff are examining predation rates, and monarch milkweed preference. There is a strong emphasis on urban habitat for monarchs

Minnesota is working on a farmer survey that is funded by BASF. Within the state they are planning to convene focus groups to discuss monarch habitat establishment. Some assistance may be available from industry for surveys and focus group meetings. There may be some additional assistance from Kerri Carstens, representing Pioneer suggested that

General observations for monarch habitat establishment: Establishment guidelines are needed, but more than likely will need adjustment by state due to cropping systems, predominant plant species and milkweed species preference or adaption. Adjustments may be made within states as was mentioned for Kansas that has a considerable east to west moisture gradient that will impact resident plant species and establishment success. In Kentucky it was noted that some native flowering plants are able to outcompete milkweed in diverse plantings.

Establishment tools and experiences

To increase milkweed habitat mowing is an important tool. Mowing can be used to stimulate regrowth that is attractive to monarchs but if mowing occurs when larvae are present it is also a source of mortality.

Tillage is another tool. For example, in Iowa it has been noted that establishing milkweed following a corn or soybean crop. There is 10% greater survival in tilled ground. Potentially disking existing habitat would knock down existing vegetation and increase milkweed. How would disking and tillage impact existing floral resources. Particularly where the goal is season-long nectar sources?

Tillage provides much more longer term knock down than mowing. The impact of mowing lasts only a few, three or so weeks. Another issue with mowing is removal of cut or choipped plant material. Otherwise it can act as a mulch and reduce smothered plant regrowth.

Monarchs prefer common milkweed for laying but the larvae often move to swamp milkweed if available

> Michigan report: Short milkweed plants are preferred for monarch egg lay. The majority 95-98% of milkweed plants do not survive, the survival rate in much higher when milkweed occurs in or adjacent to corn or soybeans. Ground squirrels were observed eating many milkweed plants.
>
> There is a concern that there is too much emphasis on incorporating milkweed into grasslands. In Michigan grassland the following were observed; myriads and snowy tree crickets, earwigs, grasshoppers, jumping spiders (eggs predators) and katydids (4^{th} and 5^{th} instars).

There is concern about herbicide use and its effect on monarch habitat. It was noted that volatile herbicides that are being used may offer challenges.

Dr. Mota-Sanchez noted that approximately 90% of monarchs migrated from Mexico overwinter habitat in 1 week.

Predation and Parasitism:

Ants are a major predator and are related to aphid population build-ups on milkweed plants. There was a discussion about aphids on milkweed; attracting and increasing predators (noted in Kentucky) that may then move to monarch eggs and small larvae.

Milkweed stem weevils were a serious problem for milkweed plants in Michigan; one evaluation noted that 90% of the plants were infested, however, did not appear to be killing the plants. e with milkweed stem weevils. ~90% of plants have stem weevils but they aren't killing the plants. In both Iowa and Kansas milkweed stem weevils were observed to be a serious problem, and caused plant death.

Pioneer, Kerri: Do we have talking points to discuss weed issues/palmer amaranth? To coordinate a single voice

- Wants something to use to point farmers to
- Monsanto, Pam: maybe we make an FAQ/10 point discussion
- **Work with commodities for document?**

General

Teresa Blader. Kelsey , Niranjana Krishnan, Seth Applegate, and Steve Bradbury provided an overview of ISU research.

Rich: overview of 4-H ag innovators grant

Monsanto, Pam: We must engage the act sector with a unified message or the farmers will tune them out.

- Has been working with Missiourians for Monarchs to develop habitat development initiatives and resources
  - Willing to share all these resources with this group. It's late draft at this time.
- Starting campaign called "Farmers for Monarchs"
  - **Logo**
  - Campaign would simply direct people to the state initiatives
  - Want to serve as a central site, a hub, to direct farmers to relevant info
  - Willing to take feedback
  - Does not plan to make this a Monsanto dominated initiative
  - Monsanto took all the major commodities/organizations down to the overwintering site to attempt to get them on board

Meron Zaluki indicated that in Australia milkweed are a roadside weed problem and not treated as something to be conserved. He is glad the US is doing field research and studies on monarch habitat.

Upcoming events of interest:

NCB-ESA meeting March , 2018. Steve Bradbury and Doug will be organizing a symposium.

Biology of Butterflies Meeting: may have a symposium at the 2018 meeting in Bangalore, India

Mary Purcell provided information on active or soon-to-be active funding opportunities. Dr. Purcell-Miramontes related that s AFRI received a $25M increase in this year and no additional cuts were expected at this time. Information on funding opportunities included:

- Pollinator Health Program
    - 2016-2017: Stand alone AFRI on pollinators. First time as stand alone.
    - Supports pollinator or monarch research
    - $1 million grants. 27% success rate.
    - 2018: there will be less funds. Proposals will be capped at $0.5 mil
- Other programs
    - Stand alone post doc and pre doc grants available
        - Covers salary for 2 year period
        - High rate of success in receiving grants
    - Undergraduate grants are available too (ELI)
        - $300,000 cap
        - Very broad
    - CARE Critical Ag Research and Extension
        - 30% success
        - Very broad, could likely include monarchs
        - $300,000 cap
    - Exploratory
        - Provides 2 years of funding
        - Pie in the sky or rapid response are common routes
        - Rolling deadline
        - Requires LOI
        - High success rates

Modeling Workshop

- Tyler: why would a monarch ever leave a good patch? We don't believe monarchs have memory.
    - We don't know their biology
- Michigan: what is the starting point? Does the model include trees for roosting?
- Meron: monarchs will also roost on grass
- Questions: Did you consider wind speed?
- Flockhart: How are you going to reconcile physical data with the model? A monarch will never fly the same path as the model.

- Tyler/Steve: attempt to get model to predict eggs/area…it's not completely necessary to know how it flies/moves. Get as close as possible with perception range
- Flockhart: is model able to be used across many different landforms in other areas of US? – Basically, yes

NC1205 Project objectives:

a. DEVELOP COST-EFFECTIVE METHODS TO ESTABLISH AND MAINTAIN HABITAT PATCHES THAT INCLUDE MILKWEED, NECTAR SOURCES, AND COMPANION PLANTS THAT ARE GEOGRAPHICALLY APPROPRIATE AND OFFER SEASON LONG BENEFITS FOR A VARIETY OF ARTHROPOD SPECIES.
b. DETERMINE OPTIMAL BREEDING HABITAT PATCH CHARACTERISTICS AND LANDSCAPE SPATIAL ARRANGEMENTS TO MAINTAIN AND PROMOTE MONARCH POPULATION VIABILITY AND DEVELOP A MODEL-BASED DECISION SUPPORT SYSTEM TO GUIDE CONSERVATION RECOMMENDATIONS ACROSS THE EASTERN MONARCH BUTTERFLY RANGE.
c. ESTABLISH SURVEY AND SAMPLING PROTOCOLS THAT CAN BE APPLIED REGION-WIDE TO EVALUATE BREEDING HABITAT QUALITY, MONARCH HABITAT UTILIZATION, AND LIFE STAGE ASSESSMENT FOR A REGION-WIDE MONARCH LIFE CYCLE BASELINE.
d. RESEARCH RESULTS WILL BE COMMUNICATED TO STAKEHOLDERS THROUGH A VARIETY OF EDUCATIONAL OUTREACH ACTIVITIES.
e. DETERMINE THE SOCIO-ECONOMIC CONSTRAINTS AND OPPORTUNITIES FOR PRIVATE LANDOWNERS TO ENGAGE IN CONSERVATION PRACTICES THAT MAINTAIN MONARCH BREEDING HABITAT INCLUDING MICRO- AND MACRO-LEVEL SOCIO-ECONOMIC FACTORS FOR BOTH INDIVIDUALS AND COMMUNITIES.