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Further Notes on the Cimbicid Sawfly *Trichiosoma triangulum* in Southern Oregon (Hymenoptera: Cimbicidae) *text and accompanying photos by Ron Lyons*

Last year I wrote about the cimbicid sawfly *Trichiosoma triangulum*, presenting my observations of its activity in my yard near Bandon in Coos County, Oregon (Lyons 2014). Based on specimens held in the collections at the Oregon Department of Agriculture (Salem), the Oregon State Arthropod Collection (Corvallis) and the collection at Southern Oregon University (Ashland), this sawfly had been found in Oregon from April 12 through August 16. In Washington, earlier (March 27, Chris Looney [priv. comm.]) and later (September 5, Oregon State Arthropod Collection) dates have been recorded.

Last year I found *Trichiosoma triangulum* individuals in my yard from April 10 to June 2. After a rather mild winter this year, two wasps showed up on March 26 in the same area of the yard as last year. The last time I found multiple wasps in the area this year was on April 29 (excluding the mating on May 2), and the last wasp I saw in the area was on May 16.

My coverage was not as complete as last year. The maximum daytime temperatures tended to be in the low 70s. The maximum number of wasps I saw at any one time was around 5. The action seemed more subdued than last year, perhaps owing to the generally lower temperatures.

Early on, the wasps favored a young willow at the edge of the small *Spiraea douglasii* (Hardhack or Steeplebush [Pojar and MacKinnon 2004: p. 81] thicket they used extensively last year. It wasn't so much that they abandoned the thicket but the fact that the plants in the thicket had not yet leafed out. During the time period when the

wasps were present, they used the same general area as last year, including the same small lilac and plants in the nearby garden. At one point while taking photographs near the thicket, one of the wasps adopted me as a suitable perch, circling me and landing several times on my yellow jacket.

I found or encountered mating wasps on 4 occasions: March 29, April 12 (2) and May 2. The first mating occurred on a catkin of the young willow. The matings on April 12 were in the area of the thicket favored last year. The mating on May 2 took place on leaves of the young willow.



Figure 1a–1f. Female-male encounter on willow catkin after the completion of mating March 29, 2015. In Figure 1a the female is partly hidden by the catkin while the male looks over the end of the catkin.

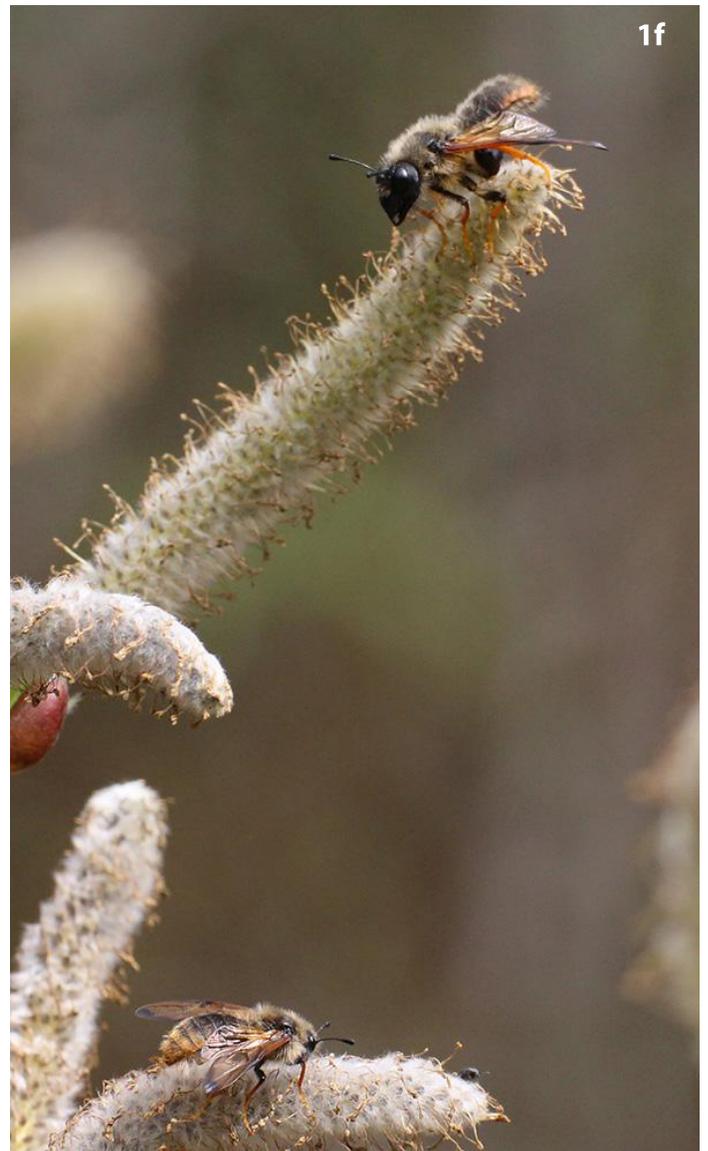


Figure 1b–1f. Female-male encounter on a willow catkin after the completion of mating March 29, 2015. In 1d the female is close to, or is touching, the leg of the male. In 1e the male turns and the female falls off the catkin. In 1f the male watches the female from his perch on the catkin in the upper corner of the frame.

Last year I had not recorded any significant interaction after mating. The first mating on March 29 was just breaking up as I approached. In this case (Figure 1), both wasps stayed on the willow catkin after separating, the male looking off over the end of the catkin and the female behind him down a bit on the side. To my surprise, rather than flying off, the female turned around, coming back up to the top of the catkin and approached the male. At one point, perhaps because the leg of the female touched his, the male began to turn. The female just fell off the catkin and ended up on another catkin a short distance below. She stayed there for a short period; the male watched her but took no further action. She eventually flew off without further contact with the male. These post-mating events took just over 2 minutes. On April 12, both females flew away right after the couples separated. The male flew away right after separation in one of the matings on April 12 as well as the mating on May 2.

Last year, I had not observed much in the way of any physical interaction between insects on different leaves. (Sitting males often watched each other when they were on the same sight lines, but flying males generally left sitting insects alone. I discussed the one notable exception in my previous article—the one male who seemed curious about a mating pair.) This year, I saw two wasps land, about the same time, on separate leaves about a foot apart. The male flew over to the other leaf and the two insects proceeded to mate. This mating lasted about 3.75 minutes. The female flew off almost immediately upon separation leaving the male on the branch.

Larvae

Around June 14 high winds caused a branch on one of the willows in the yard to break. I pulled it out of the tree and examined it for insect activity. At that time I photographed a sawfly larva that was feeding on one of the end leaf clusters. During the course of the next few days, I came across other sawfly larvae of various sizes at different times. As the branch dried, the larvae were harder to find among the drying leaves, but I managed to save 3 of them, transferring them to a branch placed in a bucket of water in the

garage. The inside of the garage is illuminated during the daytime by light coming through some north facing windows which look out on the lawn.

The two larger larvae were identified as cimbicid larvae using Chu and Cutkomp (1992: p. 245–253). Based on their relative sizes the cimbicid larvae represented 2 different instars, possibly separated by more than 1 instar. The smallest larva, as yet unidentified, was from a different sawfly family. As of June 30, all 3 larvae had made the transition to leaves from several different willows, the leaves of the original having pretty much dried out.

The smallest larvae (Figure 2) is green and feeds continuously along the edge of the willow leaf, scooping out the space between leaf veins. It remains stretched out pretty much along the edge of the leaf.

The cimbicid larvae generally remain inactive during the daytime, curled up on a leaf although they don't always curl the same way. However, they will move/relocate during the daytime if needed. While the larvae tend to be nocturnal feeders, I have found them feeding in the late afternoon. The cimbicid larvae I encountered initially were covered by wax (Figure 3)—the white bloom can make them rather conspicuous on the leaves when illuminated at night. In the areas where the wax is thin or absent (front of the face, underside of the body including the appendages, areas between the muscles, etc.) the larvae are pale green (Figure 4). The larvae have well-developed thoracic legs and tarsal claws. The antennae are inconspicuous (Figure 8).

I have come across 2 larvae while they were molting. An early instar larva was molting on June 15 around 4 pm in the late afternoon. The larger larva in captivity was in the midst of molting on June 25 when I saw it around 7:30 am (Figure 5). Larvae which have just molted lack the white waxy coating and are pale green. During the young larva's molt, some of the wax from the exuvia got transferred to the fresh skin. The larvae does not eat its exuvia—it may be left on the leaves or dropped.



Figure 2. Unidentified small green sawfly larvae eating willow leaf.



Figure 3: Resting cimbicid larva (*Trichiosoma triangulum*) with white wax coating curled on willow leaf.

Early on, I assumed that the cimbicid larvae were those of *Trichiosoma triangulum*, since, for a time at least, it has been common in the yard the past two years. However, a few years ago I found one female *Cimbex pacifica* on a willow in the yard and since I have not seen any description of its larva, I could not rule this species out. Unfortunately, with their white coating, my larvae did not look much like the pictures of *Trichiosoma triangulum* larvae I have seen. However, after the larger larva in captivity had molted and aged a bit, it did not develop any wax coating and appeared very much like the larvae shown in pictures (Figures 6, 7), confirming my assumption. It appears to be in the final instar.

Cimbicid larvae have winged spiracles—they look kind of like pointed ears (Figure 8; see also the illustration in Lindquist and Miller 1976: Figure 12). The top part of this structure contains a small gland from which they secrete fluid (reflex bleeding) as a defense mechanism (Codella and Raffa 1993: p. 274). I accidentally squeezed the smaller larva while searching amongst the leaves for it one day and could see a couple of drops of moisture in the right areas, but did not otherwise provoke it. The white waxy coating is also presumably a defense mechanism (Eisner 1994).



Figure 4 (above). *Trichiosoma triangulum* larva feeding on willow.



Figure 5 (right top and bottom). *Trichiosoma triangulum* larva molting. In the lower picture, the empty white wax-encrusted exuvia still clings to the green larva. This larva is the last instar but it is not fully colored.

Competitors

I found a number of other phytophagous insects on the willows around my place but the most important are probably the numerous chrysomelid beetle larvae.

Photography

All the pictures of the sawflies shown here were taken with a Canon T5i digital camera equipped with a Sigma 180 mm macro lens. The on-camera flash was used for the pictures of the larvae.

Those interested in studying sawfly larvae should visit Tom Murray's photo gallery of sawfly larvae at http://www.pbase.com/tmurray74/sawfly_larvae.

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Figure 6 (above). Fully colored final instar larva of *Trichiosoma triangulum* in curled resting position.



Figure 7 (top right). Face of the final instar larva shown above. Note the very small antenna sticking out near the lower right hand edge of its visible eye.



Figure 8 (bottom right). Winged spiracles of the final instar larva. The glands are visible as darkened areas above the spiracles (rectangular orange-brown features).

Western Monarch Butterfly—Habitat Suitability Assessment and Modeling Project—Observations Wanted

Xerces Society

Objective

Western Monarch Butterflies, like those in the east, have shown significant and precipitous population declines over the last two decades. The US Fish and Wildlife Service (USFWS) and partners are attempting to reverse this trend, but there are major data gaps regarding the summer distribution and breeding locations of western Monarchs. These data gaps limit the ability of the USFWS and its partners to identify priority areas for Monarch habitat restoration and for surveys of Monarchs and milkweeds (the Monarch's host plant).

A team of biologists and GIS analysts from the USFWS and the Xerces Society will address these gaps by producing habitat suitability models for key milkweed species and for western Monarchs. The project will build off methods currently being developed by the USGS for the eastern Monarch population, but significant differences in data quality, quantity and limiting environmental factors will require a different approach.

Scope

- ▶ High resolution milkweed and Monarch occurrence data, which is lacking for much of the western United States, will be gathered through a partnership with the Xerces Society, as well as through independent efforts. Other species-relevant biotic and abiotic spatial data will also be collected and compiled.
- ▶ Using GIS software, a coarse-scale habitat model and suitability index will be created. This initial model will highlight potential migratory pathways and breeding season distribution, and can help agencies and organizations prioritize survey areas.
- ▶ Mid-scale or fine-scale models will be created for some regions and will allow for further prioritization and targeted ground-based habitat projects and surveys. The Xerces Society will lead the creation of a Natural Lands Pollinator Habitat Assessment Tool, which will provide necessary inputs for these refined models. In addition, they will contribute records of milkweeds and Monarch breeding. It is critical to

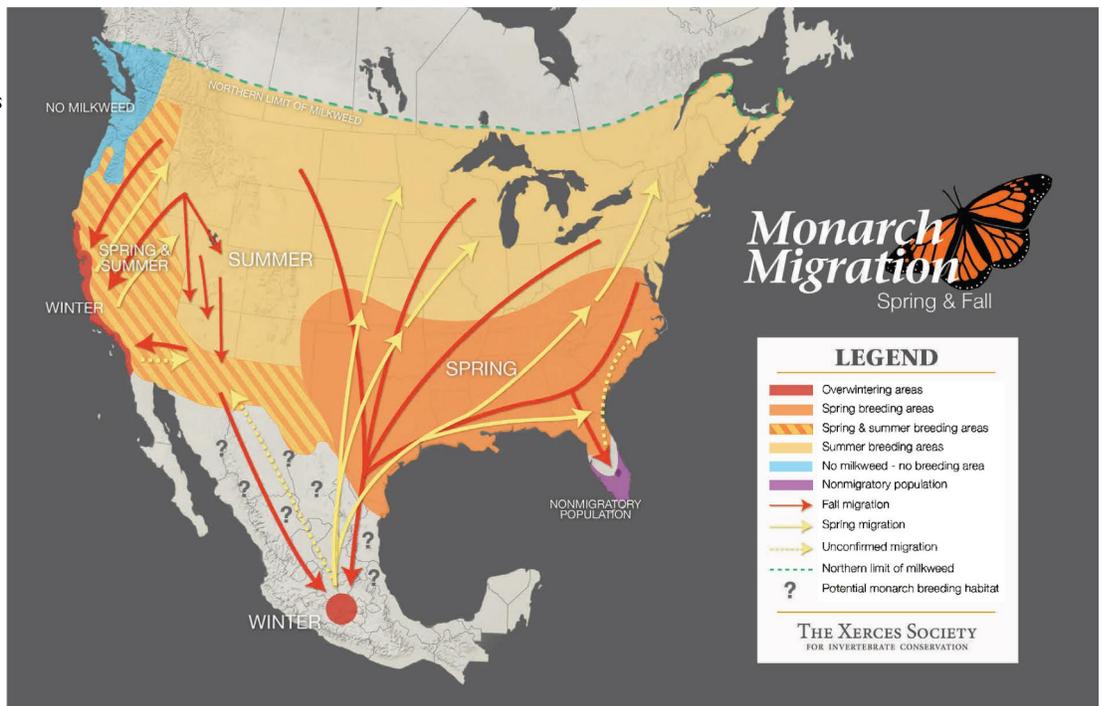
this analysis to have fine resolution occurrence data for both Monarchs and milkweed plants to effectively validate, populate, and refine the model, as well as for prioritization of on-the-ground projects and surveys.

- ▶ An emphasis will be placed on making all resulting data easy to discover and access online. Data layers resulting from the analysis will be accessible through an online geodata portal, along with a report detailing the project and findings.

How You Can Help

You can report your data with the Xerces Society's online survey (use the survey link at <http://www.xerces.org/milkweedsurvey/>), or your Monarch data to either Journey North (<http://www.learner.org/jnorth/monarch/>) or eButterfly (<http://www.e-butterfly.org/#/>), as these organizations have agreed to share their data. If you have a lot of data you can use the Excel spreadsheet, https://www.sciencebase.gov/catalog/file/get/5548d8f0e4b0b4e4207c9a5d?f=__disk__99%2F87%2Fe9%2F9987e98fc4df424fe55b010da12fd78b8505789f, and send it to Ashley Taylor (ashley.taylor@xerces.org) and/or Madeline Steele (madeline_steele@fws.gov). The spreadsheet is also available at <http://www.xerces.org/milkweedsurvey/>.

Note: There is an illustrated guide to the different species of milkweeds on the Xerces Society's milkweed survey site.



7th Annual Student Research in Entomology Symposium

This symposium, held on Saturday April 4, gives students conducting entomology-related projects in different departments at Oregon State University a chance to present their research and solicit feedback in an informal setting. In some cases they can practice the talks that they will give at upcoming meetings. The following papers were presented:

Next-Generation Sequencing of *Coleomyia* (Diptera: Asilidae)

Chris Cohen

Entomopathogenic fungi as potential biological control agents for unique bark beetle (Coleoptera: Curculionidae: Scolytinae) field crop pest

Anis Lestari (presenter) and Sujaya Rao

Bees associated with Linden (*Tilia* spp.) trees and their susceptibility to toxic sugars in nectar

Adriana Argoti (presenter) and Sujaya Rao

Oviposition Periodicity for Spotted Wing *Drosophila*

R. York (presenter), V. Walton and N. Wiman

Azalea Lace Bug in Oregon

Michael Flores

Exploring the dynamics of *Nosema ceranae* infection at the colony level

Cameron Jack (presenter) and Ramesh Sagili

Effects of Commonly Used Agrochemicals on Honey Bee Colony Health: Do Cage Data and Field Data Agree?

Stephanie Parreira (presenter) and Ramesh Sagili

By way of clarification:

The bark beetle referred to in Lestari's talk was the Clover Root Borer (CRB).

The Spotted Wing *Drosophila* (SWD) is *Drosophila suzukii*. The Azalea Lace Bug is *Stephanitis pyrioides*.

Nosema ceranae is a gut pathogen affecting European Honey Bee colonies.

If you are interested in learning more about some of the graduate research being carried out at OSU, look through the theses on the library website, <<http://oasis.oregonstate.edu/>>. Many of these theses are available as PDF files which can be downloaded from the website. Some of the very recent ones may be embargoed for a period of time to give the writer time to prepare and publish the results. Embargoed theses are still available in print form in the library.

Upcoming Events and Classes in 2015

Butterfly Count Date for Northern California

Please contact Joe Smith, <foxglove1785@yahoo.com>, for more information if you want to participate in the count July 18 in Lassen Volcanic National Park. Thank you.

Butterfly Count Dates for Oregon

Sue Anderson has a *Metolius* count on July 10. The NABA Eugene-Springfield Chapter has a Eugene count on July 5 and a Browder Ridge/Iron Mountain count on July 25. Sign up by email at <NABA-ES.trips@gmail.com> to participate in any of these counts. Visit the chapter website at <<http://www.naba.org/chapters/nabaes/>> for more information.

37th Northwest Lepidopterists' Workshop

The Northwest Lepidopterists' Workshop will be held at Oregon State University in Corvallis on the weekend of October 17–18.

The groups of emphasis will be:

- ▶ Butterflies: *Callophrys* sensu lato (Green Hairstreaks, Elfins, Cedar and Mistletoe Hairstreaks), *Limenitis* (Admirals)
- ▶ Moths: *Catocala*, Saturniidae, overview of micromoths

Siskiyou and Malheur Opportunities

The Siskiyou Field Institute is offering Dragonflies of Siskiyou County on July 18–19. For more information on the organization or to download their course catalog, please visit <<http://www.thesfi.org>>.

For information on programs and opportunities at the Malheur Field Station, please visit <<http://www.malheurfieldstation.com/>>.

Xerces Society Classes

The following classes offered by the Xerces Society will be held in Oregon:

- Mussel Re-colonization Monitoring – Portland on July 10
- Mussel Survivorship Monitoring – Portland on July 13
- Macroinvertebrate Training and Monitoring
Milwaukie on August 20 and Portland on August 23

Please check out their website, <<http://xerces.org/event/>>, for a full listing of their offerings around the country, class descriptions and registration information.

Recent Publications of Interest

Field Guide to the Biological Control of Weeds in the Northwest (FHTET-2014-08)

This publication will be useful for anyone who wants to identify the various biocontrol agents involved in the control of certain undesirable weeds. This document can be downloaded from <http://www.fs.fed.us/foresthealth/technology> (search for the FHTET number indicated above). There are a number of other publications available through this website that people might find interesting.

A Field Guide to the Tiger Beetles of the United States and Canada (2nd edition)

The second edition of this field guide by David Pearson, Barry Knisley, Daniel Duran, and Charles Kazilek was recently published by Oxford University Press, <http://ukcatalogue.oup.com/product/9780199367177.do>). The authors have also added a section on tiger beetles to the Arizona State University's Ask A Biologist website, <http://askabiologist.asu.edu/explore/tiger-beetles>. While this section is primarily for young people, it will have a part dedicated to providing updates for the new field guide—new range maps, taxonomic changes, etc. This way people can access the latest information.

A Lot of Ladybirds *Cary Kerst*

I recently returned from a trip to Costa Rica with a group of odonate enthusiasts and naturalists. The group was surveying Odonata at the biological field stations at La Selva and Palo Verde operated by the Organization for Tropical Studies. We began and ended the trip at a hotel near San Jose. The hotel had extensive gardens where we photographed many things including this aggregation of ladybird beetles on a tree in the garden. Just over a hundred large larvae, pupae, and adults were present but there were no eggs or small larvae. We returned at the end of the trip, and this group had doubled in size from 11 days earlier.

These appear to be *Epilachna mexicana*, a leaf-eating member of the ladybird beetles (Family Coccinellidae). It is related to the economically important Mexican Bean Beetle, *Epilachna varivestis*. While many beetles in the family are beneficial predators, these are among a group that feed on plants. The Mexican Bean Beetle is known to pupate in aggregations similar to that in the photograph so I assume that this is what is happening with *E. mexicana*. The larvae must be feeding nearby and clustering to pupate to the adult stage.

