To celebrate National Moth Week, people attract moths through the use of lights and/or bait. People can choose to host events where they collect or just photograph moths. After the event, participants are encouraged to upload their photos or species lists to internet sites. These sites include Moth Photographers Group, Butterflies and Moths of North America, Project Noah, BugGuide, and Discover Life. Submissions are screened to ensure accuracy, and they remain available for public examination.

Dave had seen an article about the curation of the late Dr. Ken Philip's Arctic Lepidoptera collection at the University of Alaska Museum. Dr. Philip avidly supported National Moth Week each year by collecting specimens and had also served as one of the National Moth Week Science Advisory board members. He had intended to contact Senator Murkowski himself to ask for her support for this resolution but sadly, Dr. Philip died before this could be done. Dave suggested that perhaps Senator Murkowkski would be interested in co-sponsoring SR-70 in honor of Dr. Philip and his phenomenal work with Alaskan Lepidoptera.

It would be a fitting commemoration. In 1970, he founded the Alaska Lepidoptera Survey to organize volunteers across the state to collect butterflies and moths for him. He obtained grants to purchase all the needed supplies to send to anyone who was interested, along with instructions on how to collect these insects in a responsible, scientifically useful manner. He ended up orchestrating over 600 diverse volunteers to collect for him, including Alaskan Native villagers, pipeline workers, children, retirees, and even researchers conducting field work in remote locations. Through this effort, he was able to document the presence of hundreds of species of moths in Alaska. He was one of the authors on the "Checklist of the Moths of Alaska" (Ferris et al., 2012), which lists 710 known species of Alaskan moths. He recognized that in order to gain an accurate understanding of the diversity of Lepidoptera in Alaska, it was essential to find engaged citizens to help him.

A letter to Senator Murkowski was drafted by myself and Dr. Sikes where we highlighted the importance of moths within ecosystems, the need for citizen science initiatives, and described Dr. Philip's Alaska Lepidoptera Survey. We also extended an invitation for her to tour Dr. Philip's collection at the Museum, if she should have the time and interest when next she visits Fairbanks. I emailed the letter to her office and received a response from her legislative correspondent. He encouraged me to place a call to his office to speak more about the issue. I called to speak with him and was pleased to find that he had already talked briefly with Senator Murkowski about this resolution. He told me that they had both been previously unaware of National Moth Week, but that she felt it was a useful and interesting resolution, and that she would "give this matter the consideration it deserves." He said he would contact me if she decides to support SR-70. I will share any news on this resolution as I learn it!

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Two new Lepidoptera host plant relationships

by Matt Bowser[1]

Clepsis persicana (Tortricidae) on *Oplopanax horridus* (Araliaceae)

Observations

In past summers I had seen curious patterns of damage on leaves of devil's club (Araliaceae: *Oplopanax horridus* (Sm.) Miq.) in the woods around the headquarters building of the Kenai National Wildlife Refuge in Soldotna. There were repeated, symmetrical patterns of holes on the leaves reminiscent of patterns in paper snowflakes (Figures 1-2). Something had apparently been eating holes in the leaf buds, the leaves of devil's club having a pleated, radial pattern of folding (ptyxis) similar to paper snowflakes. Unfortunately, by the time the patterns were apparent, the artists were long-gone.

As I harvested new buds of devil's club last May for stir-frying, making ranch dip, etc., I came across many small, green caterpillars that were feeding on them (Figures 3-4). Later, as the leaves unfolded, the larvae could be found on the dorsal surfaces of the leaves near the petioles (Figure 5).

I collected some of the caterpillars and kept them alive on developing devil's club leaves in petri dishes, the petioles cut cleanly and wrapped in dampened paper towels to keep the leaves alive and fresh.

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Figure 1: Damage to leaf of devil's club, May 19, 2014.

Figure 2: Damage to leaf of devil's club, May 19, 2014.

Figure 3: Caterpillar on bud of devil's club, May 14, 2014.

Figure 4: Caterpillar on bud of devil's club, May 14, 2014.

Figure 5: Caterpillar on leaf of devil's club, May 19, 2014.

Figure 6: Adult *C. persicana* (KNWR:Ento:10489), May 28, 2014. Original image: `http://arctos.database.museum/media/10436177`

After two weeks, the caterpillars had eclosed. Jim Kruse identified them as *Clepsis persicana* (Fitch,1856) (Tortricidae), the White Triangle Tortrix, based on a photograph (Figure 6).

Specimens records: USA: Alaska: Soldotna. Ski Hill Road, vicinity of Kenai National Wildlife Refuge headquarters building, just down the hill to the southeast, 60.46376°N, 151.07401°W ±100m. 14 May 2014. Matt Bowser. Caterpillar collected from developing bud of *Oplopanax horridus*. (KNWR:Ento:10489); 19 May 2014. Matt Bowser. Caterpillar collected from developing bud of *Oplopanax horridus*. (KNWR:Ento:10490, KNWR:Ento:10491, KNWR:Ento:10492).

Discussion

Among the Lepidoptera, *Agonopterix rosaciliella* (Busck, 1904) (Elachistidae) is the only other species that is known to feed on *O. horridus*; its other hosts are in the family Apiaceae (Robinson et al., 2015). *Agonopterix rosaciliella* is present in Alaska from west-central Alaska eastward (Ferris et al., 2012).

C. persicana is a widely polyphagous moth with at least 50 other hosts in 23 plant families, listed below with references. This is the first record of *C. persicana* feeding on a member of the Araliaceae.

Aceraceae
Acer negundo (Gilligan and Epstein, 2015)

Apiaceae
Osmorhiza berteroi (Gilligan and Epstein, 2015)

Araceae
Syngonium angustatum (Robinson et al., 2015)

Asparagaceae
Maianthemum canadense (Gilligan and Epstein, 2015)

Asteraceae
Aster (Robinson et al., 2015)
Bellis perennis (Robinson et al., 2015)
Solidago (Gilligan and Epstein, 2015)
Taraxacum officinale (Robinson et al., 2015)

Betulaceae
Alnus incana (Gilligan and Epstein, 2015)
Alnus viridis (Gilligan and Epstein, 2015)
Betula nana (Gilligan and Epstein, 2015)
Betula papyrifera (Gilligan and Epstein, 2015)
Corylus (Gilligan and Epstein, 2015)
Ostrya virginiana (Robinson et al., 2015)

Brassicaceae
Raphanus (Robinson et al., 2015)

Cornaceae
Cornus canadensis (Gilligan and Epstein, 2015)

Ericaceae
Rhododendron canadense (Gilligan and Epstein, 2015)

Vaccinium (Gilligan and Epstein, 2015)

Fabaceae
Trifolium (Robinson et al., 2015)

Fagaceae
Fagus grandifolia (Robinson et al., 2015)

Gentianaceae
Frasera fastigiata (Gilligan and Epstein, 2015)

Grossulariaceae
Ribes (Gilligan and Epstein, 2015)

Myrtaceae
Comptonia peregrina (Gilligan and Epstein, 2015)

Oleaceae
Fraxinus (Gilligan and Epstein, 2015)

Pinaceae
Abies balsamea (Gilligan and Epstein, 2015)
Abies concolor (Gilligan and Epstein, 2015)
Abies lasiocarpa (Gilligan and Epstein, 2015)
Larix laricina (Robinson et al., 2015)
Larix occidentalis (Gilligan and Epstein, 2015)
Picea engelmannii (Gilligan and Epstein, 2015)
Picea glauca (Gilligan and Epstein, 2015)
Pinus banksiana (Gilligan and Epstein, 2015)
Pseudotsuga menziesii (Gilligan and Epstein, 2015)

Poaceae
Elymus repens (Robinson et al., 2015)
Phleum pratense (Robinson et al., 2015)

Polygonaceae
Polygonum (Robinson et al., 2015)
Rumex acetosella (Robinson et al., 2015)

Ranunculaceae
Ranunculus (Robinson et al., 2015)

Rhamnaceae
Ceanothus (Gilligan and Epstein, 2015)

Rosaceae
Amelanchier alnifolia (Robinson et al., 2015)
Fragaria (Robinson et al., 2015)
Malus pumila (Gilligan and Epstein, 2015)
Prunus persica (Gilligan and Epstein, 2015)
Prunus virginiana (Gilligan and Epstein, 2015)
Rosa (Gilligan and Epstein, 2015)
Rubus (Gilligan and Epstein, 2015)

Salicaceae
Populus balsamifera (Gilligan and Epstein, 2015)
Populus tremuloides (Gilligan and Epstein, 2015)
Salix (Gilligan and Epstein, 2015)

Ulmaceae
Ulmus (Gilligan and Epstein, 2015)

Amblyptilia pica (Pterophoridae) on *Comarum palustre* (Rosaceae)

Observations

On July 14, around the edge of Headquarters Lake in Soldotna, I observed a number of larvae feeding on inflorescences of *Comarum palustre* L. The larvae had eaten holes through the bases of the sepals (Figure 7). Some larvae could be found inside of the inflorescence between the sepals and the seeds where they fed on seeds while being concealed by the sepals (Figure 8). Other larvae remained on the stem of the plant, boring holes through the sepals and reaching their heads through the holes to get at the seeds. The caterpillars chewed through the seed coat and ate out the contents.

Figure 7: Holes in sepals of *C. palustre*.

I brought a handful of infested inflorescences into the laboratory and placed this in a plastic container. By July 29, one adult had eclosed (Figure 9). Two more eclosed by August 8. Adults were sent to Deborah Matthews, who determined that they were *Amblyptilia pica* (Walsingham, 1880), the Geranium Plume Moth.

Specimen records: USA: Alaska: Soldotna, Headquarters Lake, floatplane dock, 60.462265°N, 151.074852°W

±15m. 17 Jul 2014. Matt Bowser. On fruits of *Comarum palustre*. (KNWR:Ento:10638, KNWR:Ento:10642, KNWR:-Ento:10643).

Figure 8: *A. pica* larva consuming a seed of *C. palustre*.

Figure 9: Adult *A. pica* (KNWR:Ento:10638). Original image: `http://arctos.database.museum/media/10441795`.

Discussion

Amblyptilia pica is a widely polyphagous pterophorid feeding on at least 34 species of plants in 13 plant families, listed below. Most of its hosts are in the Orobanchaceae in genera placed until recently in the Scrophulariaceae. On *Castilleja* and *Pedicularis*, *A. pica* is a seed specialist (Menges et al., 1986; Adler, 2002; Matthews and Lott, 2005), consuming seeds and other floral parts, consistent with the observed behavior on *C. palustre*.

Asteraceae
Calendula (Matthews and Lott, 2005)
Cynara scolymus (Matthews and Lott, 2005)
Eriophyllum confertiflorum (Matthews and Lott, 2005)
Silybum (Robinson et al., 2015)

Boraginaceae
Phacelia imbricata (Matthews and Lott, 2005)

Caprifoliaceae
Lonicera involucrata (Robinson et al., 2015)

Fabaceae
Trifolium (Matthews and Lott, 2005)

Geraniaceae
Geranium (Matthews and Lott, 2005)
Pelargonium hortosum (Matthews and Lott, 2005)

Lamiaceae
Mentha (Matthews and Lott, 2005)
Stachys bullata (Matthews and Lott, 2005)
Stachys chamissonis (Matthews and Lott, 2005)
Stachys palustris (Matthews and Lott, 2005)

Orobanchaceae
Castilleja affinis (Matthews and Lott, 2005)
Castilleja angustifolia (Matthews and Lott, 2005)
Castilleja hispida (Matthews and Lott, 2005)
Castilleja integra (Matthews and Lott, 2005)
Castilleja latifolia (Matthews and Lott, 2005)
Castilleja linariifolia (Matthews and Lott, 2005)
Castilleja lutescens (Matthews and Lott, 2005)
Castilleja miniata (Adler, 2002; Matthews and Lott, 2005)
Castilleja rhexifolia (Matthews and Lott, 2005)
Castilleja sessiliflora (Matthews and Lott, 2005)
Castilleja sulphurea (Matthews and Lott, 2005)
Pedicularis bracteosa (Matthews and Lott, 2005)
Pedicularis furbishiae (Menges et al., 1986; Matthews and Lott, 2005)

Phrymaceae
Mimulus (Matthews and Lott, 2005)

Plantaginaceae
Antirrhinum (Matthews and Lott, 2005)
Penstemon virens (Matthews and Lott, 2005)
Penstemon whippleanus (Matthews and Lott, 2005)

Primulaceae
Dodecatheon meadia (Matthews and Lott, 2005)

Ranunculaceae
Aquilegia (Matthews and Lott, 2005)

Rosaceae
Prunus emarginata (Matthews and Lott, 2005)

Scrophulariaceae
Scrophularia californica (Matthews and Lott, 2005)

Acknowledgments

I thank Jim Kruse and Deborah Matthews for identifying the moths. Deborah Matthews also provided helpful comments to improve this article.

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The DNA barcoding UAMU Project: Testing the insect identification power of DNA barcoding technology

by Sarah Meierotto[1] *and Derek S. Sikes*[1]

In 2014 the University of Alaska Museum Insect Collection (UAM) had funds from the Alaska Department of Fish and Game to pay for identifications. We used this opportunity to compare two methods of identification—traditional versus DNA barcoding. The goal was to maximize the number of specimens identified to species level. Because UAM had funds from the United States Fish and Wildlife Service Alaska Region NWRS Inventory and Monitoring Initiative to build a DNA barcode library of non-marine arthropods for Alaska we thought we'd see how useful the library currently is. At the time of this work we had loaded the DNA Barcode of Life Database (BOLD) with DNA barcodes for over 1,000 species of Alaskan non-marine arthropods. This is about 1/8th of the total state fauna, and because this library is intermixed with the full complement of all DNA barcodes available in BOLD, much of which is of Canadian species that also occur in Alaska, we expected the number of species available for identification-matching to be greater than the ∼1,000 we had submitted. Thus, we expected, *a priori*, to obtain species level matches for more than 1/8th of the species represented by the specimens we submitted.

SM, the first author, was given responsibility for managing the workflow of specimen tissue submission to the Canadian Centre for DNA Barcoding (CCDB) in Guelph, Ontario, and for interpretation of the results obtained. SM gained valuable experience using molecular methods in entomology and wrote a procedure for the interpretation of DNA barcode results. We were able to improve the identification of over half of the specimens in the project and more IDs will be possible as the DNA barcode library grows. However, at this stage, DNA barcoding is not a cost effective method of insect identification, but looks promising for the future.

The purpose of the University of Alaska Museum Insect Collection Unidentifieds (UAMU) project was to make use of the BOLD barcode library as an identification resource and to test its precision and cost

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