CATERPILLAR MAKES THE COVER OF SCIENCE

by George J. Balogh

An excellent color larval photograph of spring brood Nemoria arizonaria (Geometridae: Geometrinae), an oak catkin mimic, made the cover of a recent issue of Science (A Diet-Induced Developmental Polymorphism in a Caterpillar by Erick Greene, Science 243:643-6,3 February, 1989). The resemblance of the larva to its oak catkin food is impressive in itself but this species of Geometrid lives a different lifestyle during the summer with a corresponding dramatic morphologic change in the larva.

Both spring and summer brood eggs of Nemoria arizonaria hatch into larvae that look initially the same. In nature the spring brood larvae develop into catkin mimics that are yellow in color with reddish stamen-like markings. Their rugose integument is ornamented with large dorsolateral processes. In contrast, the summer brood larvae develop into mimics of first year oak twigs and feed on leaves after catkins have fallen from the trees. These larvae are greenish-grey. Their integument is less rugose and the dorsolateral processes are smaller. Side by side color photographs of both the spring and summer brood larvae are included in the article.

If the change in appearance isn't remarkable enough, consider that the two larval forms differ in behavior and head and jaw size. Spring brood larvae have small jaws, feed on soft catkins, and choose catkins to rest on. Summer brood larvae have larger mouth parts and larger heads to accommodate the more massive jaw musculature needed to feed on tough oak leaves and these summer larvae show preference for twigs as resting sites.

Laboratory rearing experiments outlined in Green's article indicate the spring/summer polymorphism is determined by the tannin content of larval food. Eggs reared on tannin poor catkins develop into the spring (catkins) morph, those reared on tannin rich oak leaves develop into the summer (twig) morph. This is further verified using artificial diets of catkins mixed with leaves and catkins enriched with tannins. These diets induce young larvae to develop primarily into the summer (twig) morph. Temperature and photoperiod do not influence larval morphology in experimental rearings.

This work certainly gives us much to think about. As Greene points out, diet induced polymorphism could be more widespread than previously appreciated. Just imagine what conclusion you would reach if shown samples of spring and summer brood larvae of Nemoria arizonaria without knowledge of the full life cycle. Different species of course! If larval differences were not enough to convince you that two species are involved, nature has laid another trap for the unwary taxonomist. until as recently as the MONA checklist.
spring and summer brood adults of this Nemoria were considered distinct species. The moths differ considerably in appearance and the male genitalia show differences in proportions of certain structures. It was Noel McFarland's rearing of summer brood moths (now form aestatoria) from a spring brood female (form arizonaria) that convinced Douglas Ferguson that the two are seasonal morphs of one species. (See recent MONA fascicle on the Green Geometridae).

Certainly the effects of foodplant species, plant biochemistry, geography, and climate need to be taken into account when larval comparisons are made. In some situations, only rearings under controlled conditions will provide answers to complex life history problems.

I would like to invite anyone who has knowledge of similar environmentally induced larval polymorphisms to summarize them for this newsletter.

[Copies of the subject article are available on request - Editor]

AN ABERRANT MALE Speyeria diana (Nymphalidae) FROM KENTUCKY

by Leroy C. Koehn

The Society of Kentucky Lepidopterists held a field meeting in the Big Black Mountain area of Harlan County, Kentucky on the weekend of July 13, 14 and 15, 1984. Collecting forays were made to the top of Black Mountain, along SR 160 from Appalachia, Virginia to Cumberland, Kentucky, and at Kingdom Come State Park.

The primary objective of the trip was Erora laeta; however, only two individuals of this species were seen. General collecting was excellent, however, and many species were common, including Speyeria diana. Wherever a stand of flowering common or purple milkweeds (Asclepias syriaca and A. purpurascens) were located, several male and female S. diana could be found visiting the blooms. While collecting at a stand of milkweed in Kingdom Come State Park, I observed an aberrant male of S. diana visiting the flowers. With a quick sweep of the net, I collected the individual (figured below).

In place of the bright orange color was a pale whitish tan, and the dark brown was a very washed out milky brown. The butterfly appeared normal in every other way. It appeared to be several days old and was in fresh condition.

There have been many reports of aberrant individuals of Speyeria, (Clark, 1932, McCabe, 1977, Marrone, 1981) The author has collected several aberrant individuals of Speyeria cybele and S. aphrodite in the mountains of Virginia. This is the first known report of an aberrantly colored male Speyeria diana.

Showalter & Drees (1980) reported on a bilateral gynandromorphic S. diana. S. diana can be a difficult species to locate, an aberrant individual even more so.

I would like to thank Dr. Charles V. Covell, Jr. for photographing the specimen and reviewing the article.
Literature Cited


SUGAR BATING

by Don Ennis

Although I first took an interest in moths during 1981, it was not until the spring of 1987 that I began using light and bait traps to lure new species. Some days those lures really work, with scores of a single species showing up at once! As the cold temperatures set in, I decided to put the traps up for a couple months. My journal was devoid of January moth records for southwest Indiana.

During January and February, we gather maple syrup here, so I started tapping maple trees in late December. It turned out that January 1989 was the warmest since 1950, temperatures in the 30s at night, 60s during the days for a couple of weeks. One day I went to collect sap and was surprised to find five moths in the sap bag, with eight others yet to visit! To summarize, I found eighteen moths (4 species) in one day that otherwise would not have been noticed.

The sugar content of these trees is in the five to six percent (5-6%) range. While I had done some reading about nectar extraction from flowers, it never occurred to me that maple trees acted as a sugar source during winter for moths and other insects. The bags that I use to collect sap are designed to prevent falling matter from mixing with the collected sap. Insects that are attracted by the sugar in the sap must crawl or fly horizontally through a metal corridor to reach the sap.

NOTICES

I. Field Trip

We plan a July 4th butterfly count at Horner Sanctuary, Brownsboro, KY, on Saturday, June 17, beginning at 9:30 AM and running through the day. Bring a picnic and friends. Those who wish may collect moths that night. Write or phone Covell for maps and details.

[Our planned trip to Red River Gorge was cancelled to avoid a conflict with the butterfly count. Details on a late summer/fall field trip will be in Volume 3 of the newsletter. Editor]

II. Endangered Species Act:

Paul Opler graciously provided a Fish and Wildlife Service "Notice of Review" that concerns 50 CFR 17, Endangered and Threatened Wildlife and Plants; Animal Notice of Review. I have included that portion of the notice which addresses "Insects, Order Lepidoptera". The purpose of this notice is to solicit comments as to whether the listed taxa should receive protection pursuant to the Endangered Species Act of 1973. A "Category" Key follows.

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Service has substantial information on hand to support a proposal to list as endangered or threatened.</td>
</tr>
<tr>
<td>2</td>
<td>Conclusive data on biological vulnerability and threat are not currently available.</td>
</tr>
<tr>
<td>3A</td>
<td>Service has persuasive evidence of extinction.</td>
</tr>
</tbody>
</table>
BUTTERFLIES & MOTHS (Insects, Order Lepidoptera)

1A Chestnut ermine moth
1B Green heteromoea carposii moth
1C Luna's alyce's moth
1D Mealworm casemaking moth
1E Late silvers moth
1F Lescmen silvers moth
1G Northwestern casemaking moth
1H Oleander moth
1I Glaucous giant looper moth
1J Giant looper moth
1K Yucca giant looper moth
1L Giant looper moth
1M Giant looper moth
2A "Cla's" peppermint looper moth
2B Beaver pine borer moth
2C Eucalyptid moth, no common name
2D Eucalyptid moth, no common name
2E "Can't fly" looper moth
2F "Can't fly" looper moth
2G "Can't fly" looper moth
2H "Can't fly" looper moth
2I "Can't fly" looper moth
2J "Can't fly" looper moth
2K "Can't fly" looper moth
2L "Can't fly" looper moth
3A Soda skipper
3B Soda skirted skipper
3C Soda skipper
3D Soda skipper
3E Soda skipper
3F Soda skipper
4A Laponea butterfly
4B Aloua butterfly
4C Aloua butterfly
4D Aloua butterfly
4E Aloua butterfly
4F Aloua butterfly
4G Aloua butterfly
4H Aloua butterfly
4I Aloua butterfly
4J Aloua butterfly
5A Arboria blue butterfly
5B Arboria blue butterfly
5C Arboria blue butterfly
5D Arboria blue butterfly
5E Arboria blue butterfly
5F Arboria blue butterfly
5G Arboria blue butterfly
5H Arboria blue butterfly
5I Arboria blue butterfly
5J Arboria blue butterfly
6A Arboria blue butterfly
6B Arboria blue butterfly
6C Arboria blue butterfly
6D Arboria blue butterfly
6E Arboria blue butterfly
6F Arboria blue butterfly
6G Arboria blue butterfly
6H Arboria blue butterfly
6I Arboria blue butterfly
6J Arboria blue butterfly
7A Arboria blue butterfly
7B Arboria blue butterfly
7C Arboria blue butterfly
7D Arboria blue butterfly
7E Arboria blue butterfly
7F Arboria blue butterfly
7G Arboria blue butterfly
7H Arboria blue butterfly
7I Arboria blue butterfly
7J Arboria blue butterfly
8A Arboria blue butterfly
8B Arboria blue butterfly
8C Arboria blue butterfly
8D Arboria blue butterfly
8E Arboria blue butterfly
8F Arboria blue butterfly
8G Arboria blue butterfly
8H Arboria blue butterfly
8I Arboria blue butterfly
8J Arboria blue butterfly
Note: Species in categories 1 and 2 are candidates; species in category 3 are not (see text for explanation of categories).
<table>
<thead>
<tr>
<th>CATEGORY AND COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>FAMILY</th>
<th>HISTORIC RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2° Nectuid moth, no common name</td>
<td>Luperus trigona</td>
<td>Nectuidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>2° Nectuid moth, no common name</td>
<td>Papilio xuthus</td>
<td>Nectuidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>2° Battlerams-water moth</td>
<td>Papilio xuthus</td>
<td>Nectuidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>2° Decodon horser moth</td>
<td>Papilio xuthus</td>
<td>Nectuidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>2° Ceramica nectuid moth</td>
<td>Schinia indiana</td>
<td>Schiniidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>2° Decodon horser moth</td>
<td>Rana serrata</td>
<td>Ranaidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>2° Florida leaflet butterfly</td>
<td>Schinia indica</td>
<td>Schiniidae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Unscopariae frillarilaryl butterfly</td>
<td>Helicona tropicola</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Alisma satyr moth</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Stellula wood nymph butterfly</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Oso Flaco patch butterfly</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Hardie's chesemorter butterfly</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Noror chesemorter butterfly</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Wright's chesemorter butterfly</td>
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<td>Heliconiinae</td>
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</tr>
<tr>
<td>1° Erinus arboreus butterfly</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Mitchell satyr butterfly</td>
<td>Heliconia troplolita</td>
<td>Heliconiinae</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Chrysar axis arctic butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Towny creuset butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Minea chesemorter butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Chevy eyeless moth</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Unidentified frillarilaryl butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Atoma frillarilaryl butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<td>1° Cimonis frillarilaryl butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<td>1° Calliste frillarilaryl butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Sillitera satyr moth</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>1° Benne's satyr moth</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° San Francisco tree looper moth</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>1° Subala satyr moth</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>1° Apache silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>1° Blue silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
</tr>
<tr>
<td>1° Blacksilver moth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>1° Mountain silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>2° Yellow banner silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>2° Behrens's silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<td>2° Carrie's silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<td>2° Hyatt's silvermoth butterfly</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
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<td>2° Benne's satyr moth</td>
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<td>Zephyrini</td>
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<td>2° San Francisce tree looper moth</td>
<td>Zephyra chrysar axis</td>
<td>Zephyrini</td>
<td>Tp, Tp, M<em>N, Canada</em></td>
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<tr>
<td>2° Subala satyr moth</td>
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<td>Zephyrini</td>
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<td>2° Apache silvermoth butterfly</td>
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<td>2° Blue silvermoth butterfly</td>
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<td>2° Hyatt's silvermoth butterfly</td>
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</tbody>
</table>

*Note: The above list is partially redacted for privacy purposes.*
Under current taxonomic understanding, these names do not represent taxa that meet the Endangered Species Act's definition of a species.

Taxa that are now considered to be more widespread and/or abundant than previously thought.

Copies of the complete notice may be obtained from either Paul Opler or the Xerces Society.

III. Xerces Society - 16th Annual Meeting

June 2-5, 1989 Woodland Altars, Peebles, Ohio Approximate cost: $57.00/person

Agenda includes business meeting, presentation of papers, and field trips

To attend: RSVP The Xerces Society, 10 SW Ash Street, Portland, OR 97204, (503) 222-2788 by May 1, 1989

REPORT FROM THE SECRETARY-TREASURER

C. V. Covell, Jr.

Kentucky collecting has been good at the Bearcamp Road site in Bullitt County, so far, although some days have been cool and cloudy to rainy. Covell took a male Celastrina edenina on April 6. He and others on that date and through April 16 have recorded the following from that site: Brynnis brizo, E. juvenalis, Papilio glaucus (including females with striking mixed yellow and black scaling), P. glaucus (Apr. 16), Eurytides marcellus (Common since Apr. 6), Pieris virginiensis (modest numbers this year), Anthocharis midea (Common), Euchloe olympia (first record from this site, second from Bullitt Co., taken by Denise Hellman on April 12.), Incisalia henrici, Celastrina ladon, C. edenina (most common on Apr. 16, so far), Nymphalis antiopa, Polygonia interrogationis, P. comma, Vanessa cardui (Apr. 12.), V. atalanta, and Phyciodes tharos. In nearby open areas, P. rapae, C. philodice, and C. eurytheme have been seen. Moths at Bearcamp have included Psychomorpha epimenis (Noctuidae), and geometrids Xanthorhoe ferrugata and Trichodezia albovittata, among others.

Loran Gibson and Don Wright report early moth collecting good in the Red River Gorge, Powell Co. (Tunnel Ridge), March 4: Eutolype grandis, Psaphida thaxteriana, Copianolis styracis; Xystoepus rufago, Feralia jocosca, and P. major (all Noctuidae). On March 11, they returned there to record some of the same, plus Lithophane guerquera and Eutolype rolandi (Noctuidae) and Rhyacionia buerkana and Sereda tautana (Tortricidae, Olethreutinae).

Some of you have not yet sent in your $5 dues for 1989. Consult your mailing label to see if that is so, and if not, please remit to Covell as soon as possible.

Eric Metzler and Reed Watkins visited Louisville April 15-16 to train Covell and Kelly Thompson in recording Ohio Geometridae data on a DBASE program. While there, Eric identified some specimens in the University of Louisville collection, and found three species not on our list. They are Halisidota harrisii, Welch (Arctiidae), Symmerista leucitys, Franclemont and S. canicosta, Franclemont. Some Olethreutinae sent to Dr. William E. Miller recently resulted in three new state records: Eucaesma pediasios, Miller, Cydia candida (Forbes), and Pelochrista womanana (Kearfott).

Identifications by Dr. Miller are done on a low-cost basis, the funds payable not to him but the University of Minnesota. I am looking for "angels" to provide some additional money to send more specimens to him for identification. The value of his help is great, and the cost reasonable. For
example, two slide preparations were $12, and twenty-two identifications were $88, with $40 deducted because we loan material to him for his research. However, at this time, we need some money in the amount of about $200 to send more material to him for identification.

**SOCIETY MEMBER WINS REGIONAL SCIENCE FAIR**

M. L. McInnis

Mark Monroe has captured the top prize in the life sciences division of the Louisville Regional Science Fair. His project involved the discovery of a putative new species in the *Erynnis persius* complex. Mark will next compete in the International Science and Engineering Fair, May 8-14, in Pittsburgh.

Mark's project "What Are the Species Limitations In the *Erynnis Persius* Complex?" was based on his collecting activities in Eastern Kentucky. He has been collecting butterflies since 1983 and dissecting specimens for the past couple of years. Mark's fascination with biology comes naturally as his father, Dr. Burt Monroe, is a professor of biology at the University of Louisville (and a Ky. Leps. member).

**NEW MEMBERS**

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Holly Rigby
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