



## **Liverwort, *Monoclea gottschei* Lindb. (Monocleaceae), New Host Plant for Cryptic Geometridae Caterpillar in Mexico**

Author: Hernández-Baz, Fernando

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LIVERWORT, *MONOCLEA GOTTSCHKEI* LINDB. (MONOCLEACEAE),  
NEW HOST PLANT FOR CRYPTIC GEOMETRIDAE CATERPILLAR IN MEXICO

**Additional key words:** Geometridae, Inchworm, Parque Ecológico Macuiltepetl, plant-insect interactions, Caterpillar, Liver

Research on associations between insects and plants are frequently related to angiosperms (Hendrix 1980). However, interactions between insects and non-vascular bryophyte land plants, liverworts among them, are uncommon and virtually unknown in literature. Reports of some primitive Micropterygidae (Lepidoptera) feeding on liverworts exists (Gerson 1982). However, as

far as we know Geometridae has not been previously reported feeding on these non-vascular plants (Janzen & Hallwachs 2013).

Three caterpillars (Lepidoptera) were found among samples of hepatics or liverworts (Marchantiophyta) collected in a mountainous mesophyll forest in Xalapa's Ecological Park Macuiltepetl, Veracruz, México, at

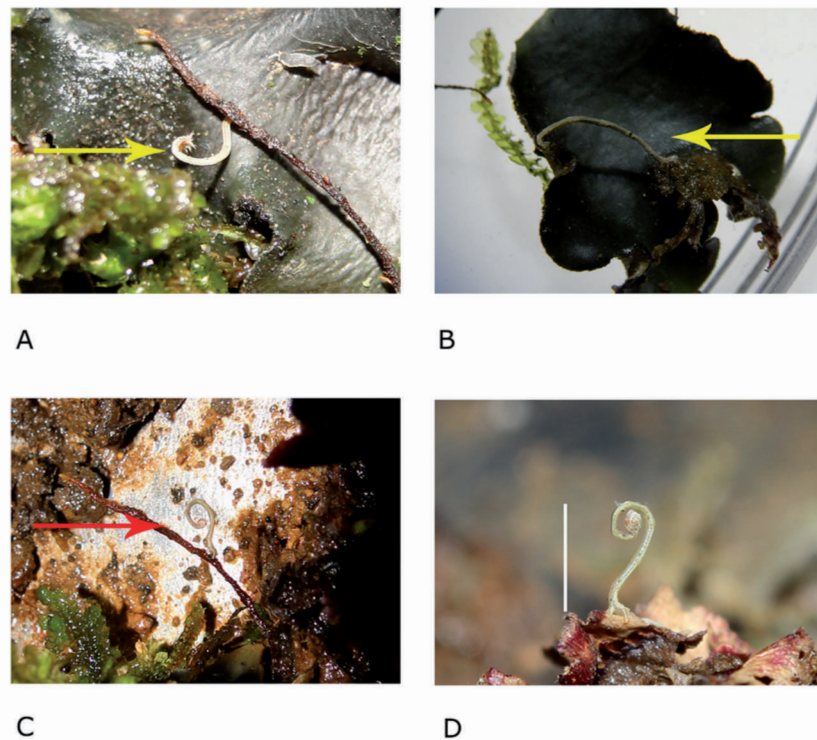


FIG. 1: **A & B.** Geometridae larvae (arrow) on liverwort *Monoclea gottschei* Lindb.; **C.** Cryptic Geometridae larvae in resting position on rhizoid; **D.** Cryptic Geometridae larvae resembling a sort of modified trichome. Scale bar: 5 mm.

1567m (N 19°32' 52.50" W 96° 55'09.22") on June 10, 2014. These larvae are 8 mm long and were found feeding on *Monoclea gottschei* Lindb, 1886, (Monocleales: Monocleaceae) *sensu* Gradstein et al. (2001). The plant species was corroborated by comparison with specimens deposited at the Facultad de Biología-Xalapa Universidad Veracruzana (XALU) herbarium. The polypod larvae were reared but died before pupating. They were studied in detail and compared with several sources and even though species could not be determined, they are clearly eruciform and belong to the family Geometridae (Lepidoptera) (Chen 1946; IMSS 1930, Stehr 1987; Ide & Costa 2006; Hill et al. 1987; Martins 2006, Stehr et al, 1987).

Geometridae is a lepidopteran family with up to 21,190 species worldwide, and about 2,500 known species are found in Mexico (Heppner 2002). Some 344 species of this family had been recorded from the state of Veracruz (Hernández-Baz & Iglesias 2001). However, the immature stages of this and most moth families are basically unknown, except for those of economic or agricultural relevance (Hernández-Baz 2012).

The three larvae arranged themselves on a straight line along the rim of the plant and moved in a sort of

simultaneous “dancing” for 30 seconds at 1 minute intervals during approximately 15 minutes. After this “dancing” ended they placed their body on a straight line, in an angle of 70 ° with regard to the rim of the plant.

The three larvae resembled the trichomes of hepatic plants thus when on the plant, the larvae were completely cryptic. Besides, mimicked the coloration of trichomes showing a very interesting homochromy. They also behaved as if they were trichomes moving slightly, as trichomes do when blown by the wind or breeze.

We observed the larvae feeding from the bottom region of the thallus (Figs. 1A, 1B). In laboratory conditions (~ 25 °C, 70 RH), at night, the larvae moved from the feeding area and hid either at the base of the plant which is brown, or on the cuticle of the plant giving the impression of a thallus gametophyte or even a trichome modified as young foliage of circinate veneration of a fern's new frond (Figs. 1B, 1C)

The larvae of Geometridae are known to feed on the foliage of deciduous trees, shrubs, some ferns, Pinophyta, and in some cases even their seeds (Stehr et al. 1987). Janzen and Hallwachs (2013) register 68

families of host plants for Geometridae, and as far as we know this report constitutes the first record of a liverwort species as a host plant for this lepidopteran family. The larvae mimicking a thrichome or sporophyte is also a clear example of an ecological interaction allowing the development of a favorable adaptation between moth and plant *sensu* Janzen (1980). Additionally, this accidental discovery of such a cryptic situation should motivate investigators to observe in detail the micro-fauna associated to this type of plants. As a result, new interesting interactions should be found.

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#### LITERATURE CITED

- CHEN, S. H. 1946. Evolution of the insect larva. *Trans. R. Entomol. Soc. Lond.*, London. 97:381-404.
- GERSON, U. 1982. Bryophytes and invertebrates. Pp. 291-331. *In* Smith A. J. E. (ed.) *Bryophyte Ecology*. Chapman and Hall, London-New York.
- GRADSTEIN, S. R., S. P. CHURCHILL & N. SALAZAR A. 2001. Guide to the bryophytes of tropical America. *Mem. New York Bot. Gard.* 86:1-577.
- HEPPNER, J. B. 2002. Mexican Lepidoptera biodiversity. *Insecta Mundi*. 16:171-190.
- HENDRIX, S. D. 1980. An evolutionary and ecological perspective on the insect fauna of ferns. *Am. Nat.* 115:171-196.
- HERNÁNDEZ-BAZ, F. 2012. Biogeografía y conservación de las polillas avispa de México (Lepidoptera: Erebidae: Arctniidae Ctenuchina y Euchromiina). Editorial Académica Española, Saarbrücken, Deutschland/Alemania. 328 p.
- HERNÁNDEZ-BAZ, F. & L. IGLESIAS A. 2001. La diversidad del orden Lepidoptera en el estado de Veracruz, México: Una síntesis preliminar. *Cuad. Biodiv.* 7:7-10.
- HILL, S. B., F. W. STEHR & W. R. ENNS. 1987. Key to orders of immature insects and selected Arthropods. Pp. 19-44. *In* Stehr F. W. (ed.) *Immature Insects*. Kendall/Hunt Publishing Company, Dubuque, Iowa.
- IDE, S. & C. COSTA. 2006. Clave de identificación para los principales órdenes. Pp. 49-52. *In* Costa C., S. Ide & C. Eestevão S. (eds.). *Insectos inmaduros, metamorfosis e identificación*. Soc. Entomol. Aragon. Cyted, Ribes, España.
- IMSS, A. D. 1930. A general textbook of entomology. Methuen and Company Ltd., London. 703 pp.
- JANZEN, D. H. 1980. When is it coevolution? *Evolution* 34:611-612.
- JANZEN, D. H. & W. HALLWACHS. 2013. Caterpillars, pupae, butterflies & moths of the ACG, San José de Costa Rica. <http://Janzen.sas.upenn.edu/caterpillars/database.lasso> (9 July, 2015)
- MARTINS, D. M. 2006. Lepidoptera. Pp. 163-191. *In* Costa C., S. Ide & C. Eestevão S. (eds.). *Insectos inmaduros, metamorfosis e identificación*. Soc. Entomol. Aragon. CYTED, RIBES, España.
- STEHR, F. W. 1987. Introduction. Pp. 1-18. *In* Stehr, F. W. (ed.) *Immature Insects*. Kendall/Hunt Publishing Company. Dubuque, Iowa.
- STEHR, F. W., P. J. MARTINAT, D. R. DAVIS, D. L. WAGNER, J. B. HEPNER, R. L. BROWN, M. E. TOLIVER, J. Y. MILLER, J. C. DOWNEY, D. J. HARVEY, N. MCFARLAND, H. H. NEUNZING, G. L. GODFREY, D. H. HABECK, J. E. APPLEBY, M. JEFFORDS, J. P. DONAHUE, J. W. BROWN & D. C. FRACK. 1987. Lepidoptera. Pp. 288-596. *In* Stehr, F. W. (ed.) *Immature Insects*. Kendall/Hunt Publishing Company. Dubuque, Iowa.
- FERNANDO HERNÁNDEZ-BAZ\*, *Facultad de Biología, Universidad Veracruzana, Zona Universitaria Circuito Gonzalo Aguirre Beltrán, s/n C.P. 91000, Veracruz, México/Apartado Postal 785, Xalapa, Veracruz, México; e-mail: fhernandez@uv.mx ; ferhbm@ yahoo.com.mx*, \*(Corresponding Author) JORGE M. GONZÁLEZ. *California State University, Fresno, Department of Plant Sciences, Fresno, CA 93740-8033 (Research Associate, McGuire Center for Lepidoptera & Biodiversity), USA*, and LUCIO G. JUÁREZ GUZMÁN. *Facultad de Biología, Universidad Veracruzana, Zona Universitaria Circuito Gonzalo Aguirre Beltrán, s/n C.P. 91000, Veracruz, México/Apartado Postal 785, Xalapa, Veracruz, México.*

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