DISTRIBUTION OF THE MOTH EAR MITE (*MYRMONYSSUS PHALÆNODECTES*)

by ASHER E. TREAT

For the three years since its discovery in Tyringham, Massachusetts, the gamasine mite *Myrmonyssus phalænodectes* Treat, a parasite in the tympanic organs of noctuid moths, has been known only from the type locality and from Bergen County, New Jersey. The wide variety of hosts, however, and the high incidence of infestation in some species made it seem probable that the mite was more widely distributed, and that it could be found in museum collections of Lepidoptera. Through the kindness of Dr. F. H. RINDGE of the American Museum of Natural History, Dr. J. G. FRANCLEMONT and Dr. W. T. M. FORBES of Cornell University, and Dr. E. L. TODD of the United States National Museum, permission was obtained to examine the specimens of *Pseudaletia, Leucania,* and related genera in those institutions. This paper presents evidence that the range of the mite is nearly worldwide.

The description of the mite, together with notes on its biology and ecology, has recently appeared elsewhere (Treat, 1954). Among known parasites of adult Lepidoptera, *M. phalænodectes* is unusual if not unique in that at least during the warmer parts of the year it lays its eggs and completes its life cycle entirely upon or within the body of its host. It has thus far been reported only from adult noctuid moths, chiefly those of the genera named above, though several others are occasionally infested. Colonies of the mites develop unilaterally in the tympanic air sac and associated cavities, destroying the auditory function of these parts but sparing the corresponding structures of the opposite side. Since the tympanic organs are generally acknowledged to be at least partly auditory in character (Schaller & Timm, 1959; Treat, in press), it seems appropriate to use the name Moth Ear Mite for this parasite, despite the obvious lack of homology between the tympanic organ and a vertebrate ear. The usage may gain some authority from the opinion of Imms (1947) that "These [tympanic] organs may with some justice be regarded as ears."

Evidence of infestation is easily detected even in pinned specimens, provided that the wings have been properly spread and that the legs do not conceal the external tympanic recess. If the mite colony was moderately or well advanced when the moth was captured, slight displacement of the setæ with a fine needle under the binocular microscope will usually reveal either the mites or their eggs. The dried mites are yellowish brown and much flattened. To the casual glance they might be mistaken for dermestid feces. The eggs, when dry, are shrivelled and yellowish. They are usually attached to the conjunctiva ("accessory" or "false" tympanal membrane of Richards, 1933, and other authors), which may also be pitted and discolored by older egg scars. Although the eggs are not distinctive as compared with those of other mites of similar size, their presence together with rupture or perforation of the

tympanic membrane may be taken as tentatively diagnostic for the Moth Ear Mite. If the pinned specimen can be dissected to the extent of removal of the first abdominal tergite on the side of the suspected infestation, the mites can usually be found in the tympanic air sac or countertympanic cavity. Mites and eggs, either fresh or dried, may be mounted directly in Hoyer's medium (Baker & Wharton, 1952). They can be cleared and relaxed by gentle heating of the slide after the coverslip has been placed.

The table includes records from all of the chief biogeographical regions, obtained from the study of specimens chiefly of *Leucania* and related genera in the three collections mentioned above. In the American Museum, Nearctic as well as exotic material was examined. In the other two collections, only exotic forms were studied, and in the U. S. National Museum the investigation was limited to Palearctic, African, Oriental, and Hawaiian specimens. Host names are given as they appear in the various collections. The scarcity of Palearctic records may perhaps be explained by the comparatively small amount of material available for study.

Seasonal distribution follows the expected pattern, with the highest incidence for the temperate regions of both northern and southern hemispheres in midsummer, and with scattered records in the tropics throughout the year. In northeastern New Jersey, infested moths have been taken as early as June 9 and as late as October 23. The winter quarters of the mite remain to be discovered. The present data increase the number of recorded host species from 23 to 48.

Records of *Myrmonyssus phalænodectes* from Specimens Chiefly of *Leucania* and Related Genera in the American Museum of Natural History [AMNH], Cornell University [CU], and the United States National Museum [USNM].

Locality	Date	Host Species
NEARCTIC		
Rangeley, Me.	24 Aug. 1949	*Pseudaletia unipuncta* Haw. [AMNH]
Cohasset, Mass.	19 July	*Leucania i. insueta* Gn. [AMNH]
Cohasset, Mass.	3 Sept.	*Scotogramma t. trifolii* Rott. [AMNH]
Dorchester, Mass.	10 July 1901	*Leucania commoides* Gn. [AMNH]
New Windsor, N.Y.	9 July 1891	*L. pseudargyria* Gn. [AMNH]*
New Rochelle, N.Y.	24 Aug. 1949	*Pseudaletia unipuncta* Haw. [AMNH]
Mendham, N.J.	20 Aug. 1935	*L. phragmatidicola* Gn. [AMNH]*
Mendham, N.J.	29 Aug. 1952	*L. multilinea* Wlk. [AMNH]*
Dumont, N.J.	23 Oct. 1954	*Sunira bicolorago* Gn. [author's coll.]
Chester, N.J.	17 Aug.	*L. multilinea* Wlk. [AMNH]
Newark, N.J.		*L. extincta flabilis* Grt. [AMNH]
Pennsylvania		*L. pseudargyria* Gn. [AMNH]
Washington, D.C.	16 Aug. 1882	*L. scirpicola* Gn. [AMNH]
Iowa City, Iowa	4 Aug. 1898	*L. phragmatidicola* Gn. [AMNH]
Volga, S.Dak.		*Aletia o. oxygala* Grt. [AMNH]
Ft. William, Ont.	15 Aug. 1953	*A. oxygala luteopallens* Smith [AMNH]
near Hattiesburg, Miss.	1-11 Oct. 1944	*L. e. extincta* Gn. [AMNH]
New Orleans, La.	4 Oct. 1951	*L. linita* Gn. [AMNH]

Locality	Date	Host Species
Lake Okechobee, Fla.	30 April 1912	*Leucania* sp. (undet.) [AMNH]
Harris County, Texas		*Leucania* sp. (undet.) [AMNH]
near Forestburg, Texas	24 Sept. 1950	*L. phragmatidicola* Gn. [AMNH]
Wichita Falls, Texas	7 Oct. 1950	*L. phragmatidicola* Gn. [AMNH]
Minnehaha, Yavapai Co., Ariz.	4 Oct.	*L. imperfecta* Smith [AMNH]
Malibu, Calif.	10 Aug. 1941	*L. oaxacana* Schaus [AMNH]
Rancho La Sierra, Riverside Co., Calif.	23 Sept. 1940	*L. oaxacana* Schaus [AMNH]
Berkeley, Calif.	3 Sept. 1941	*L. oregona* Smith [AMNH]
San Mateo, Calif.	14 Sept. 1941	*L. oregona* Smith [AMNH]
NEOTROPICAL		
Jalapa, Mexico		*Pseudaletia sequax* Francl. [AMNH]
Punta Prieta, Baja Cal., Mexico	27 March 1935	*Trichoclea e. edwardsi* Smith [AMNH]
El Volcano, Chiriqui, Panama	3 March 1936	*P. unipuncta antica* Wlk. [AMNH]
Jamaica, Br. W. Indies	1953	*P. sequax* Francl. [AMNH]
Cabanas, Cuba	5-8 Sept. 1913	*P. sequax* Francl. [AMNH]
Moengo, Surinam	17 May 1927	*Cirphis humidicola* Gn. [CU]
Pelotas, Brazil	27 Aug. 1951	*P. sequax* Francl. [CU]
La Estanzuela, Uruguay	Jan. 1953	*P. adultera* Schaus [CU]†
La Estanzuela, Uruguay	7 Jan. 1953	*Cirphis* (= *Faronta*) *albilinea* Hübner [CU]
ETHIOPIAN		
Umtali, Southern Rhod.		*Borolia micropis* Hampson [CU]*
Umtali, Southern Rhod.		*Borolia torrentium* Gn. [CU]*
ORIENTAL		
Tjibodas, Mt. Gede, Java	15 Aug.	*Cirphis lasiomera* Hampson [USNM]
Mt. Makiling, Luzon, P.I.		*Borolia aspersa* Snell [USNM]
Arisan, Formosa	3 June 1932	*Cirphis albicosta* Moore [CU]
Suisha, Formosa	1 June 1934	*C. albicosta* Moore [CU]
PALEARCTIC		
Yachow, China		*Cirphis sinuosa* Moore [USNM]*
near Mupin, China		*Leucania* sp. (undet.) [USNM]
AUSTRALASIAN		
Ninay Valley, Dutch New Guinea	Nov. 1908 to Jan. 1909	*Cirphis leucosphenia* Bethune-Baker [CU]
Victoria, Australia		*Pseudaletia australis* Francl. [AMNH]
OCEANIC		
Kauai, Hawaii	May	*Cirphis amblycasis* Meyr. [USNM]

*Diagnosis of *Myrmonyssus phalænodectes* made from eggs and host damage only.
†Incidence of infestation 54 percent (82 out of 152 specimens).

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AN APPARATUS FOR WEIGHING SMALL INSECTS

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The writer recently presented (1953) a short article pointing out the existence of correlations between the wing-radii and the weights of certain butterflies. Since weighing small butterflies such as *Pieris rapæ* L. on a beam balance is tedious, the apparatus described below was devised whereby each insect can be weighed in a few seconds. The apparatus is shown diagrammatically in the figure, at the scale of ½ inch to 1 inch.

Two separate wooden blocks form the framework of the apparatus; they are free to be moved for slight adjustments in distance or angle. A length of wire was removed from copper window-screening. The wire is about 15 inches long, half of it forming the balance wire and the remainder being coiled in a loop behind the fulcrum point shown on the left-hand block in the diagram. At the free end the wire was twisted through a right-angle and coiled in a small loop, as in the first stage of making a simple knot. The loop is about one-half of an inch is diameter, with the ultimate two or three bends serving as the pointer.