

April 1990

Distribution of *Pelecinus Polyturator* in Wisconsin (Hymenoptera: Pelecinidae), With Speculations Regarding Geographical Parthenogenesis

Daniel K. Young
University of Wisconsin

Follow this and additional works at: <https://scholar.valpo.edu/tgle>



Part of the [Entomology Commons](#)

Recommended Citation

Young, Daniel K. 1990. "Distribution of *Pelecinus Polyturator* in Wisconsin (Hymenoptera: Pelecinidae), With Speculations Regarding Geographical Parthenogenesis," *The Great Lakes Entomologist*, vol 23 (1)
Available at: <https://scholar.valpo.edu/tgle/vol23/iss1/1>

This Peer-Review Article is brought to you for free and open access by the Department of Biology at ValpoScholar. It has been accepted for inclusion in *The Great Lakes Entomologist* by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.

**DISTRIBUTION OF *PELECINUS POLYTURATOR*
IN WISCONSIN (HYMENOPTERA: PELECINIDAE),
WITH SPECULATIONS REGARDING
GEOGRAPHICAL PARTHENOGENESIS**

Daniel K. Young¹

ABSTRACT

The geographical distribution of *Pelecinus polyturator* in Wisconsin is summarized. Only five males have been recorded; a recently collected male from the University of Wisconsin Field Station in Ozaukee County represents the first male collected in the state in over 40 years. Speculations on the possible significance and implications of geographical parthenogenesis relative to *Pelecinus* are offered.

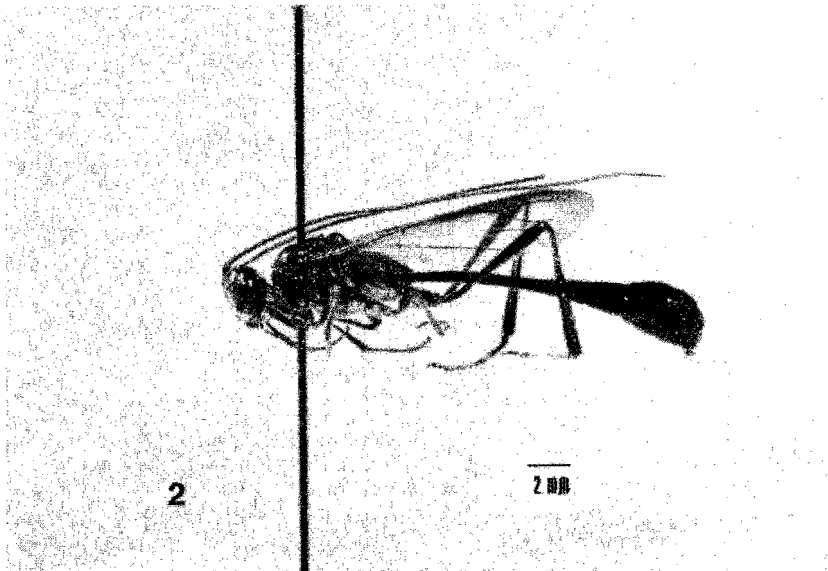
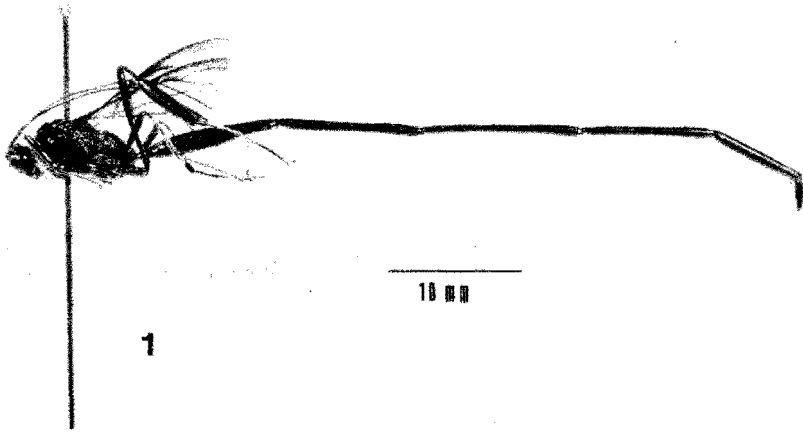
If one conjures up the image of a peleciniid wasp, a large, jet-black insect with a strikingly long, slender body probably comes to mind (Fig. 1). However, this description applies only to females. The male, which is exceedingly rare throughout most of North America, has a clavate metasoma (Fig. 2) and might be mistaken for a large ichneumonid wasp at first glance. Brues (1928) commented on the rarity of males and was apparently first to formally suggest that *Pelecinus polyturator* (Drury) reproduces primarily by thelytokous parthenogenesis in the United States.

During July and August of 1985 adult females of *Pelecinus polyturator* (Drury) were commonly observed at the University of Wisconsin-Milwaukee Field Station. In concordance with previous observations of *Pelecinus* made by the author in northwestern Michigan and Clausen's (1940) generalizations, virtually all specimens were associated with forested areas. Specimens at the Field Station were most commonly encountered along the edges of a mature beech-maple stand.

On 3 August, a single male was netted by Susan Mahr in the same area (WI: Ozaukee Co., UW Milwaukee Field Station). Only four other Wisconsin males are known to the author. Three of these are in the collection at the Milwaukee Public Museum. All were taken during August: one in 1908 (no specific locality), one from 1910 (Washington Co., Cedar Lake), and one in 1943 (Milwaukee Co.). A fourth male is deposited in the research collection at the UW Madison; it was collected in Madison on 3 August 1916. Although females have been collected throughout much of Wisconsin, and as far north and west as Washburn Co., males are known only from the extreme southcentral and southeastern part of the state (Fig. 3). The UW Milwaukee specimen represents a new county record, and is the first male collected in Wisconsin in over 40 years.

P. polyturator, a parasitoid of scarabaeid larvae (Hammond 1944, Lim et al. 1980), occurs from southern Canada throughout the eastern, southeastern and southwestern United States, southward well into Argentina (Krombein et al. 1979).

¹Department of Entomology, 1630 Linden Drive, University of Wisconsin, Madison, Wisconsin 53706



Figures 1-2. *Pelecinus polyturator* (Drury). (1) Female, lateral view; (2) Male, lateral view.

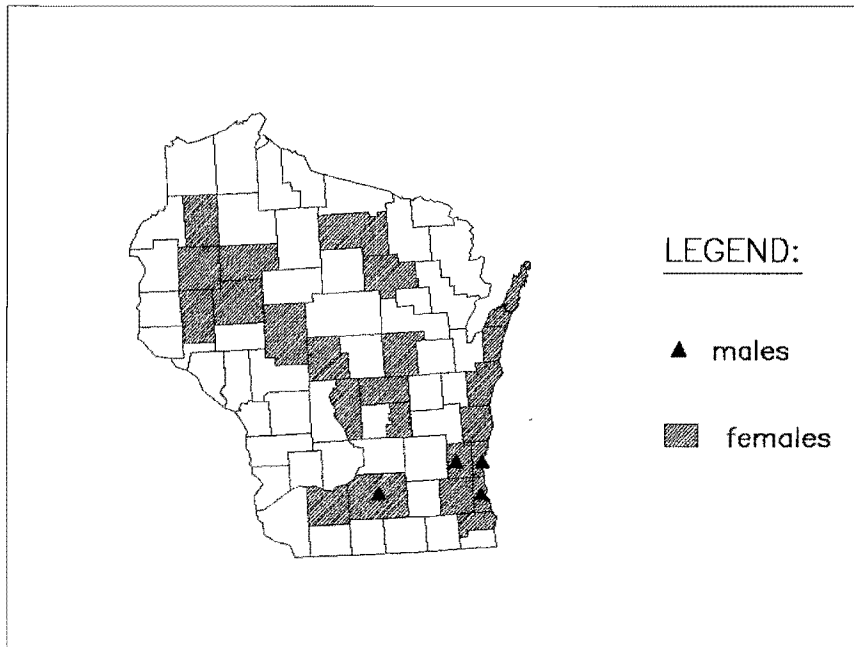


Figure 3. Wisconsin distribution of *Pelecinus polyturator* (Drury).

Toward the southern part of its distributional range the species becomes highly variable in size and coloration and may actually represent a complex of species (Krombein et al. 1979). Additionally, in the neotropics, males are well represented in collections. This led Brues (1928) to suggest that *Pelecinus* illustrates an example of "geographical parthenogenesis," a term coined by Vandell (1928) for a number of invertebrate species with bisexual tropical populations which are able to utilize parthenogenetic strategies in the northern, or more temperate, extensions of their ranges.

The geographical distribution of *Pelecinus* combined with its geographical parthenogenetic strategy suggest several interesting questions. In view of Wisconsin's geological history, is parthenogenesis a manifestation of Pleistocene events? Glesener and Tilman (1978) presented a scenario for animals in general, summarized from such sources as Suomalainen (1962) and Tomlinson (1966): "With the last glacial retreat, populations may have begun to colonize the recently unglaciated areas. In the populations where parthenogenesis was possible, all-female populations may have become established and, in the absence of males, become obligatorily thelytokous." Perhaps the parthenogenetic populations represent avant-garde colonizers, as Hubbell and Norton (1978) suggested for the cave cricket, *Hadenocercus cumberlandicus* Hubbell (Orthoptera: Raphidophoridae). Glesener and Tilman (1978) developed a paradigm to interpret "sexuality" (i.e., bisexually reproducing populations) in terms of environmental uncertainty, asserting that, "sexuality is favored under conditions of unpredictable biological interactions." They demonstrated that such conditions generally tend to be more characteristic of "lower latitudes and altitudes, in mesic rather than xeric areas, on the mainland as opposed to islands, and in undisturbed as opposed to disturbed habitats." Is the presence of males in southeast-

ern Wisconsin indicative of, or a prelude to displacement of a parthenogenetic population by a sexual deme? Furthermore, since males appear to be so exceedingly rare between the neotropics and Wisconsin, where did this bisexual deme come from and how is it maintained? Alternatively, since haplodiploidy determines sex in Hymenoptera, is it possible that thelotoky is not entirely obligate, in which case an unfertilized egg, albeit rare, might run its developmental course to generate a male?

My hope is that this report and the associated speculations might stimulate additional thought. Since the most recently encountered male was collected in a designated state scientific area, possibilities for long-term observation and field experimentation should be excellent.

ACKNOWLEDGMENTS

I am grateful to Susan Borkin for providing me with label data from specimens in the collection at the Milwaukee Public Museum, and to B. Jane Harrington and Steve Krauth for allowing me to examine the *Pelecinius* at the University of Wisconsin. Thanks are also extended to reviewers who stimulated additional thought relative to the possible significance of this discovery. The male *Pelecinius* is in the collection of Daniel and Susan Mahr.

LITERATURE CITED

- Brues, C. T. 1928. A note on the genus *Pelecinius*. *Psyche* 35:205-209.
- Clausen, C. P. 1940. *Entomophagous insects*. McGraw-Hill Book Co., New York 688 p.
- Glesener, R. R. and D. Tilman. 1978. Sexuality and the components of environmental uncertainty: Clues from geographic parthenogenesis in terrestrial animals. *Amer. Nat.* 112:659-673.
- Hammond, G. H. 1944. Economic importance and host relationship of *Pelecinius polyturator* Drury. *Can. Ent.* 76:150.
- Hubbell, T. H. and R. M. Norton. 1978. The systematics and biology of the cave crickets of the North American tribe Hadenocini (Orthoptera: Saltatoria: Ensifera: Rhaphidophoridae: Dolichopodinae). *Misc. Publ. Mus. Zool. Univ. Michigan* 155. 124 p.
- Krombein, K. V. et al. 1979. *Catalog of Hymenoptera in America north of Mexico*. Vol. 1: Symphyta and Apocrita (Parasitica), xvi + 1198 p.; Vol. 2: Apocrita (Aculeata), p. 1199-2209; Vol. 3: Indices, p. xxx + 2211-2735.
- Lim, K. P., W. N. Yule, and R. K. Stewart. 1980. A note on *Pelecinius polyturator* (Hymenoptera: Peleciniidae), a parasite of *Phyllophaga anxia* (Coleoptera: Scarabaeidae). *Can. Ent.* 112:219-220.
- Suomalainen, E. 1962. Significance of parthenogenesis in the evolution of insects. *Ann. Rev. Entomol.* 7:349-366.
- Tomlinson, J. 1966. The advantages of hermaphroditism and parthenogenesis. *J. Theoret. Biol.* 11:54-58.
- Vandel, A. 1928. La parthenogenese géographique. Contribution a l'étude biologique et cytologique de la Parthenogenese Naturelle. *Bull. biol. France et Belgique* 62:164-281, 11 figs., 2 pls.