

**FIRST RECORD OF THE PLANTHOPPER PARASITE MOTH  
*FULGORAECIA EXIGUA* (EDWARDS) (LEPIDOPTERA:  
EPIPYROPIDAE) IN CANADA, WITH NOTES ON ITS  
COLLECTION AND HOSTS**

S. M. PAIERO<sup>1\*</sup>, J. J. DOMBROSKIE<sup>2</sup>, G. PEKOR, T. PRENEY<sup>3</sup>,  
J. VANDERMEULEN<sup>4</sup>, AND B. CONLIN

<sup>1</sup>School of Environmental Sciences, University of Guelph,  
50 Stone Road E, Guelph, Ontario, Canada N1G 2W1  
email, paieros@uoguelph.ca

**Scientific Note**

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*Fulgoraecia exigua* (Edwards) is a widespread but localized species in the eastern United States occurring from New Jersey and Ohio south to Florida and west to Texas (Covell 1984; Summerville *et al.* 1999), with scattered specimens collected from as far west as Arizona (Edwards 1882). This species seems to be localized in habitat but when encountered can be numerous (JD pers. obs.). It is the sole Nearctic species of Epipyropidae, a family in the superfamily Zygaenoidea that consists of specialist ectoparasites and ectoparasitoids of Auchenorrhyncha and Sternorrhyncha that is most diverse in southeast Asia (Świerczewski *et al.* 2016; Liu *et al.* 2018). Specific information regarding the biology of *F. exigua* is limited, but in other epipyropids the female lays eggs on plants in the vicinity of potential hosts, and host selection is by the active first instar (e.g., Świerczewski *et al.* 2016, Liu *et al.* 2018, Sankararaman *et al.* 2020).

On 7 August 2020, GP photographed an individual of *Acanalonia conica* (Say) with its wings sitting irregularly as a result of a distinct white protuberance on the side of its abdomen, a caterpillar of *Fulgoraecia exigua* with its characteristic waxy coating (Figs. 1–3). After corresponding with SP, it was posted to iNaturalist (<https://www.inaturalist.org/>) (Table 1) and represents the first record of this family within Canada (Pohl *et al.* 2018). On 11–13 August 2020, a targeted survey was made to look for additional specimens in two sites (Ojibway Park and the adjacent Ojibway Prairie Provincial Nature Reserve) of the area generally referred to as the Ojibway Prairie complex (see Paiero *et al.* 2010 for map) in Windsor, Ontario. This area supports a diverse assemblage of insects, including elements of Carolinian forest and grassland habitats, and an effort was made to survey the local Fulgoroidea species for *F. exigua*. Searches focused specifically on detecting

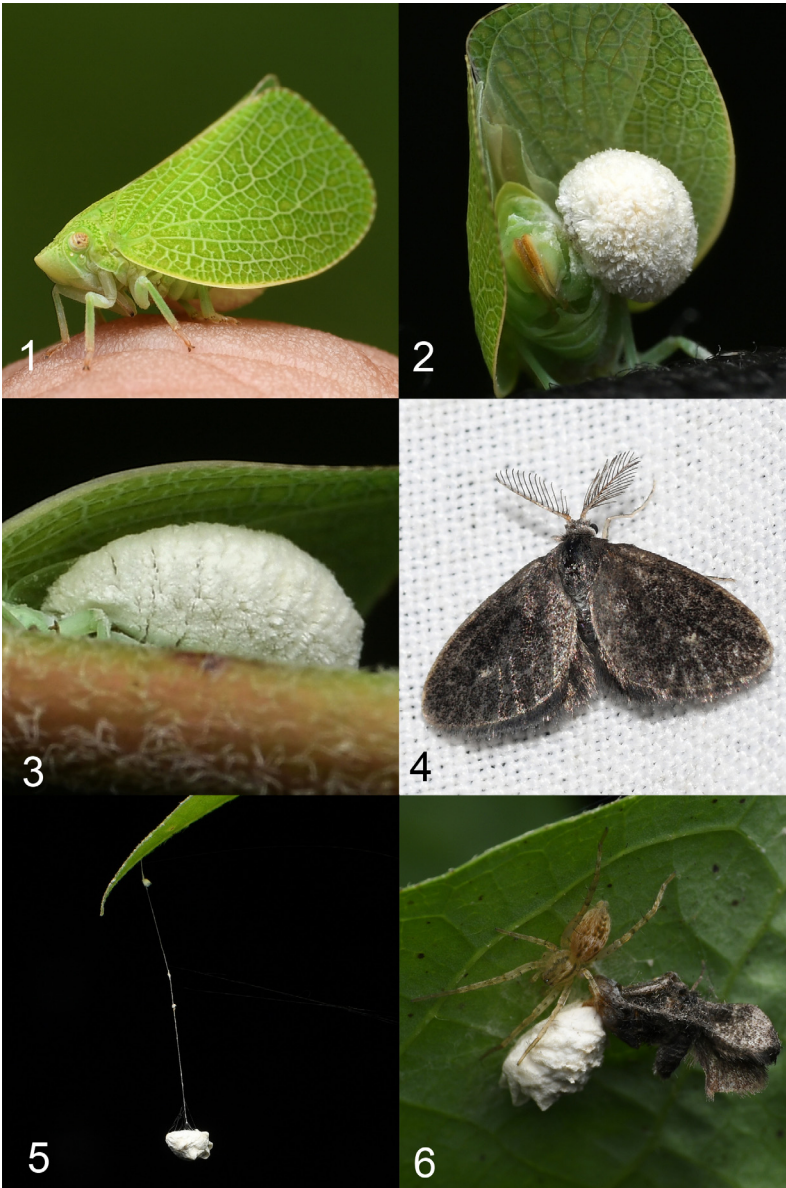
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\* Author to whom all correspondence should be addressed.

<sup>2</sup> Department of Entomology, Comstock Hall, Cornell University, Ithaca, New York, USA 14850

<sup>3</sup> Windsor Parks, 5200 Matchette Rd, Windsor, Ontario, Canada N9C 4E8

<sup>4</sup> 568 Myers Road, Cambridge, Ontario, Canada N1R 5S2



FIGURES 1–6. *In situ* observations. 1–3, *Acanalonia conica* (Say) with a *Fulgoraexigia exigua* (Edwards) caterpillar on the side of its wing, representing the first Canadian record of *F. exigua* and showing the wing ‘dysplasia’ of the host and white waxy coating of the caterpillar. 4, adult male *F. exigua* on a light sheet, representing the first Canadian record of an adult. 5, *F. exigua* pupa hanging on silken thread. 6, *F. exigua* pupa directly attached to a leaf with an unsuccessfully emerged adult of *F. exigua* and a passing spider. Images for Figs 1–3 and 5–6 by G. Pekor and Fig. 4 by J. Vandermeulen.

TABLE 1. Summary of posted iNaturalist observations of *Fulgoraacia exigua* (Edwards) from Ontario in 2020.

Date of Observation	Stage	Observer	iNaturalist Observation
7 August 2020	larva	G. Pekar	<a href="https://inaturalist.ca/observations/56085703">https://inaturalist.ca/observations/56085703</a>
22 August 2020	adult	J. Vandermeulen & B. Conlin	<a href="https://inaturalist.ca/observations/57591772">https://inaturalist.ca/observations/57591772</a>
26 August 2020	adult	G. Pekar, T. Preney	<a href="https://inaturalist.ca/observations/57711888">https://inaturalist.ca/observations/57711888</a> ; <a href="https://inaturalist.ca/observations/57932770">https://inaturalist.ca/observations/57932770</a>
30 August 2020	adult	T. Preney	<a href="https://inaturalist.ca/observations/58149000">https://inaturalist.ca/observations/58149000</a>
3 September 2020	adult	T. Preney	<a href="https://inaturalist.ca/observations/58519975">https://inaturalist.ca/observations/58519975</a>

TABLE 2. Summary of known Fulgoroidea host species of *Fulgoraacia exigua* (Edwards) from published accounts and online sources. Asterisks (\*) denote identifications made by the primary author.

Family	Species	Source
Acanaloniidae	<i>Acanalonia conica</i> (Say)	<a href="https://inaturalist.ca/observations/30990964">https://inaturalist.ca/observations/30990964</a> ; <a href="https://bugguide.net/node/view/427001/bgimage">https://bugguide.net/node/view/427001/bgimage</a> ; <a href="https://bugguide.net/node/view/1018279">https://bugguide.net/node/view/1018279</a> ; <a href="https://bugguide.net/node/view/460831/bgimage">https://bugguide.net/node/view/460831/bgimage</a>
	<i>Acanalonia servillei</i> Spinola	<a href="https://bugguide.net/node/view/532667/bgimage">https://bugguide.net/node/view/532667/bgimage</a> ; <a href="https://bugguide.net/node/view/745780/bgimage">https://bugguide.net/node/view/745780/bgimage</a>
	<i>Acanalonia</i> sp. (nymph)	<a href="https://bugguide.net/node/view/322761/bgimage">https://bugguide.net/node/view/322761/bgimage</a>
Flatidae	<i>Metcalfa pruinosa</i> (Say)	<a href="https://www.inaturalist.org/observations/56990206">https://www.inaturalist.org/observations/56990206</a> ; <a href="https://inaturalist.ca/observations/19460809">https://inaturalist.ca/observations/19460809</a> ; <a href="https://bugguide.net/node/view/1875221/bgimage">https://bugguide.net/node/view/1875221/bgimage</a>
	<i>Flatormenis proxima</i> (Walker)	<a href="https://bugguide.net/node/view/492031/bgimage">https://bugguide.net/node/view/492031/bgimage</a>
Issidae	<i>Aplos simplex</i> (Germar):	<a href="https://bugguide.net/node/view/682818/bgimage">https://bugguide.net/node/view/682818/bgimage</a> ; <a href="https://bugguide.net/node/view/817340/bgimage">https://bugguide.net/node/view/817340/bgimage</a>
	<i>Thionia bullata</i> (Say)	Wilson and McPherson 1979; Wheeler and Wilson 1988; * <a href="https://bugguide.net/node/view/213562/bgimage">https://bugguide.net/node/view/213562/bgimage</a> ; * <a href="https://bugguide.net/node/view/528157/bgimage">https://bugguide.net/node/view/528157/bgimage</a>
	<i>Thionia elliptica</i> (Germar)	Wheeler and Wilson 1987
	<i>Thionia quinquata</i> Metcalf	* <a href="https://bugguide.net/node/view/977752/bgimage">https://bugguide.net/node/view/977752/bgimage</a>
Tripiduchidae	<i>Neaethus maculatus</i> Melichar	* <a href="https://bugguide.net/node/view/1411541/bgimage">https://bugguide.net/node/view/1411541/bgimage</a>

the bright white wax that covers the caterpillar and characteristic wing dysplasia, but the wings of non-dysplastic specimens were also physically separated by hand to verify the absence of the parasite. Approximately 50–60 *A. conica* were observed, along with ~10–15 *A. bivittata* (Say), 5–10 *Flatormenis proxima* (Walker), and 5–10 *Metcalfa pruinosa* (Say); whereas *Ormenoides venusta* (Melichar) is known from the park, no individuals were encountered during our search efforts. Only *A. conica* was observed with the parasite, with six individuals noted as parasitized, five at Ojibway Park and one at Ojibway Prairie Provincial Nature Reserve. The individuals at Ojibway Park were all taken near the site of the original observation, so may all be from a single egg-laying event. All observed larvae were retained for study; however, despite the caterpillars pupating, adult moths were not successfully reared. Five pupae were retained and deposited at the University of Guelph Insect Collection (DEBU) in Guelph, Ontario, Canada. Subsequently, JV, TP, and GP observed adults at Brunet Park, LaSalle, Ontario, on 22 August (Fig. 4), 26 August, 30 August, and 3 September 2020 (Table 1). The 25 August specimen was retained by BC, and

the three adults observed by TP were deposited at DEBU. GP visually surveyed another local site, Devonwood Conservation Area, LaSalle, at night on 4 September 2020 using targeted surveys of foliage with a flashlight, which proved to be an effective method to locate the pupa based on the contrasting bright white colouration. Approximately 45–50 pupae were observed, including both hanging from silken threads of varying length (Fig. 5) and directly attached to leaves or branches (Fig. 6).

A review of the scientific literature and searches through the web portals BugGuide (<https://bugguide.net/>) and iNaturalist, where posted images of both host species and *F. exigua* caterpillars were examined, were carried out to provide an updated list of known hosts (Table 2) to aid in further searches. Several hosts were unidentified in the posts and are identified here (indicated by “\*”) using Bartlett (2020) and Doering (1938). The current hosts all fall within the families Acanaloniidae, Flatidae, Issidae and Tropicuchidae, which comprise all of the ‘higher Fulgoroidea’, except for Caliscelidae (Song and Liang 2013), which is the only family of higher Fulgoroidea that remains to be reported as a host, perhaps due to their comparatively small body size. Surprisingly, *A. bivittata* is not a known host, despite it being one of the most commonly observed planthoppers in northeastern North America, including the Windsor area, where it is abundant.

The Ojibway Prairie complex has been heavily sampled historically (e.g., Paiero *et al.* 2010), and directed efforts on certain taxa continue to find new additions to the site species list, so it is not unusual to find new records in the area; however, based on previous extensive search efforts in the area, we argue that *F. exigua* has only recently become established in Ontario. The area was sampled for Lepidoptera by John E. Pilkington (between 1974 and 1985) and, more recently, over 56 opportunistic night surveys have been conducted since 2014 (TP pers. obs.), using high powered mercury vapour or metal-halide lights to photo document moth and other invertebrate species in the “Biodiversity of Ojibway Prairie Complex” iNaturalist project, with 335 Lepidoptera species reported for the site (Ojibway Nature Centre 2021). Hemipterans were actively surveyed in Paiero *et al.* (2010). Additionally, GP has been actively photographing various arthropods in and around the Ojibway Prairie complex since 2019, both during the day and night, including numerous *A. conica* specimens in 2019 and 2020. Despite the sum of these efforts, it was not until 7 August 2020 that the first *F. exigua* was found. In 2020, a total of 20 light trapping efforts from 4 June to 23 September yielded four adults of *F. exigua*. Based on the extent of the effort to document both the host species and Lepidoptera in the complex during its active period, it is likely that *F. exigua* has only recently arrived in Ontario, possibly due to the movement of its hosts. Several of local planthopper species have expanded their range further into the province over the past few decades. Previously, *Acanalonia conica*, *Flatormenis proxima* and *Ormenoides venusta* were largely restricted to extreme southwestern Ontario, with the later two only recently recorded in Canada (Paiero *et al.* 2003), but they have now expanded their range into the Greater Toronto Area and beyond based on recent iNaturalist observations. Pechuman and Wheeler (1981) noted that *A. conica* had been expanding its range northward for many decades and appears to continue to do so; whereas *A. conica* has been established in Ontario for a longer period (the earliest known record is 1985 from Windsor), it too appears to have expanded into eastern Ontario and Quebec. With the apparent range expansion of its hosts, it is possible that *F. exigua* will soon be more widely distributed in southern Ontario.

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