First Record of *Anastrepha zacharyi* Norrbom (Diptera, Tephritidae) in Brazil, and Notes on Its Host Plant and Parasitoid

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NOTE

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The state of Amapá has the best preserved original vegetation of the Brazilian states located in the tropical zone with 10,476,117 ha (72% of its total territory) assigned to Conservation Units and Amerindian Reservations (Valle 2007). It therefore is a favorable area for investigating the biology, ecology, and evolution of fruit flies in areas with high numbers of native species and minimally altered vegetation (Aluja 1999, Aluja et al. 2003).

Studies on fruit flies in Amapá have intensified over the past 10 years, and a considerable amount of information on *Anastrepha* Schiner diversity, distribution, host plants, and parasitoids has been gathered (Norrbom and Uchôa 2011, Silva et al. 2011a, Deus and Adaime 2013).

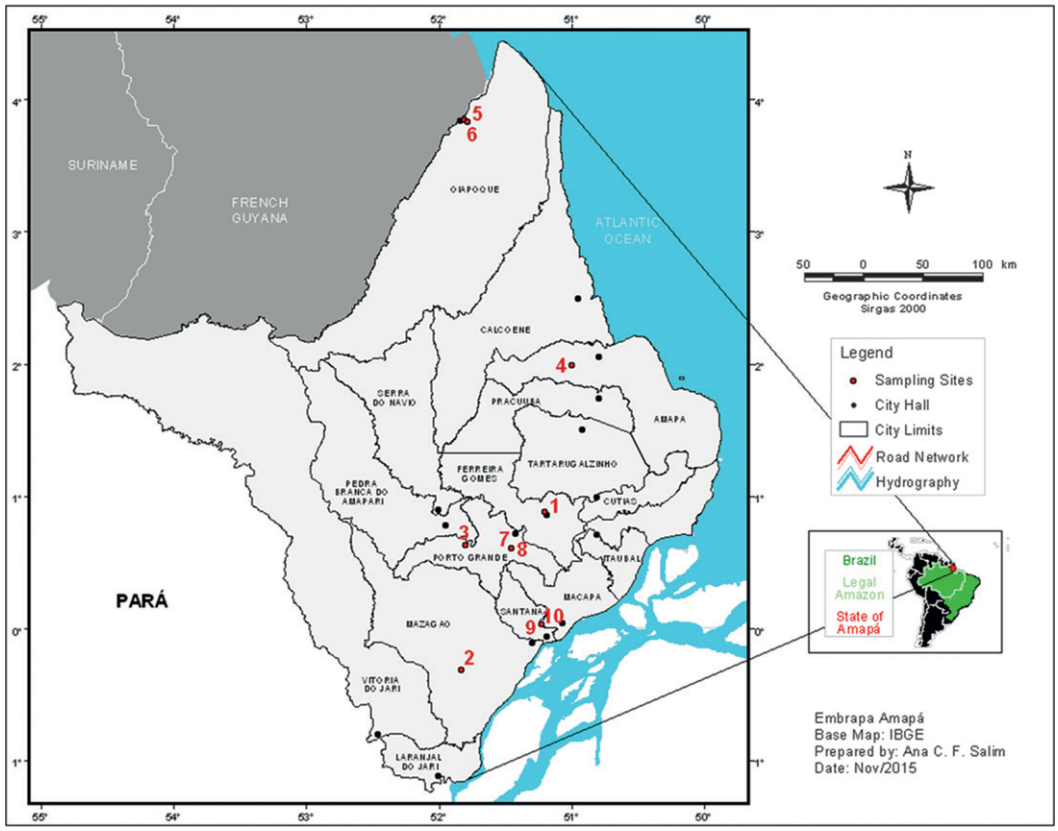

Fig. 1. Sampling sites of *Anastrepha zacharyi* in the state of Amapá, Brazil, from May 2007 to June 2012 (numbers correspond to the samples shown in Table 1).

Table 1. Specimens of *Anastrepha zacharyi* and *Doryctobracon areolatus* reared from *Bellucia egensis* collected in seven municipalities in the state of Amapá, Brazil, from May 2007 to June 2012.

Samples	Dates	Municipalities	Fruits (n)	Fruit weight (g)	Puparia (n)	*Anastrepha zacharyi* (n)	*Doryctobracon areolatus* (n)	Parasitism (%)
1	5/16/2007	Ferreira Gomes	114	450.0	69	2♀ 6♂	25	36.2
2	4/13/2010	Mazagão	21	69.3	12	4♀ 8♂	0	0
3	4/14/2010	Porto Grande	40	73.5	19	4♀ 8♂	4	21.1
4	4/14/2010	Amapá	26	76.6	12	3♀ 3♂	0	0
5	1/25/2011	Oiapoque	80	64.9	5	1♀ 3♂	0	0
6	5/25/2011	Oiapoque	56	250.8	35	4♀ 6♂	15	42.9
7	4/20/2012	Porto Grande	15	47.6	11	4♀ 1♂	3	27.3
8	5/17/2012	Porto Grande	15	47.6	3	1♀	1	33.3
9	5/18/2012	Santana	15	41.5	10	3♀ 3♂	0	0
10	6/15/2012	Santana	15	43.8	15	4♀	5	33.3
Total	-	-	397	1,165.6	191	30♀ 38♂	53	27.7

In a survey of host plants of *Anastrepha* from 2007 to 2012, 10 samples (397 fruits, 1,165.6 g) of *Bellucia egensis* (Mart. ex DC.) Penneys, F.A. Michelangeli, Judd and Almeda (Melastomataceae) collected in seven municipalities of the state of Amapá were infested (Fig. 1 and Table 1). This plant, native and endemic to Brazil, is a colonizer of disturbed areas (Díaz and Elcoro 2009), and found in the northern (Amazonas, Amapá, Pará, Rondônia and Roraima) and northeastern (Maranhão) states (Lima and Baumgratz 2015). A total of 191 puparia were obtained from grouped fruit samples (Silva et al. 2011b), out of which 68 specimens of *Anastrepha* emerged (30♀♀ and 38♂♂). These specimens were stored in glass vials containing 70% ethanol for later identification. An additional 21 females were collected in McPhail traps in Porto Grande, Amapá, in 2002. All specimens obtained were identified as *Anastrepha zacharyi* Norrbom, which was recently described and placed in the *fraterculus* group. The original description was based

Fig. 2. *Anastrepha zacharyi* wing. Specimen caught in McPhail trap in Porto Grande, Amapá, Brazil.

on specimens from central eastern and southeastern Peru (Cusco, Huánuco, Madre de Dios) and contained no information on the host plant(s) of the species (Norrbom et al. 2015). The new records from Amapá indicate that this species is likely to be much more widely distributed, probably across the Amazon and perhaps also in the Guyanas. It differs from other species in the *fraterculus* group by the following combination of characters: Mediotergite brown laterally, but subscutellum entirely orange; oviscape 2.36–2.72 mm long, 0.79–0.85 times as long as mesonotum; aculeus 2.16–2.56 mm long; tip 0.20–0.27 mm long, 0.16–0.19 mm wide, 1.18–1.43 times as long as wide; in ventral view gradually narrowed, distal 0.56–0.70 triangular, serrate, with 10–13 medium sized serrations. When we ran *A. zacharyi* adults through the identification key of Brazilian species of *Anastrepha* by Zucchi (2000), the specimens were misidentified as *A. sororcula* Zucchi, which differs in having the subscutellum brown laterally, and shorter terminalia (aculeus less than 1.75 mm long). *Anastrepha zacharyi* is also similar to *A. coronilli* Carrejo and González, which has been reared from other species of *Bellucia* (Deus et al. 2013), and to which it is perhaps closely related, but differs in having a broader and more serrate aculeus tip. Specimens from Amapá (Figs. 2–3) are generally smaller, with mesonotum length: 2.55–3.00 mm; wing length: 5.37–6.60 mm; oviscape length: 2.04–2.40 mm; ratio to mesonotum length: 0.7–0.8; aculeus length: 1.78–2.17 mm; tip length: 0.20–0.24 mm; serrate part/tip length: 0.52–0.61; tip length/aculeus length: 0.10–0.12.

Voucher specimens of *A. zacharyi* are deposited at the collection of the Departamento de Entomologia e Acarologia, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ), Universidade de São Paulo, Piracicaba, SP, Brazil.

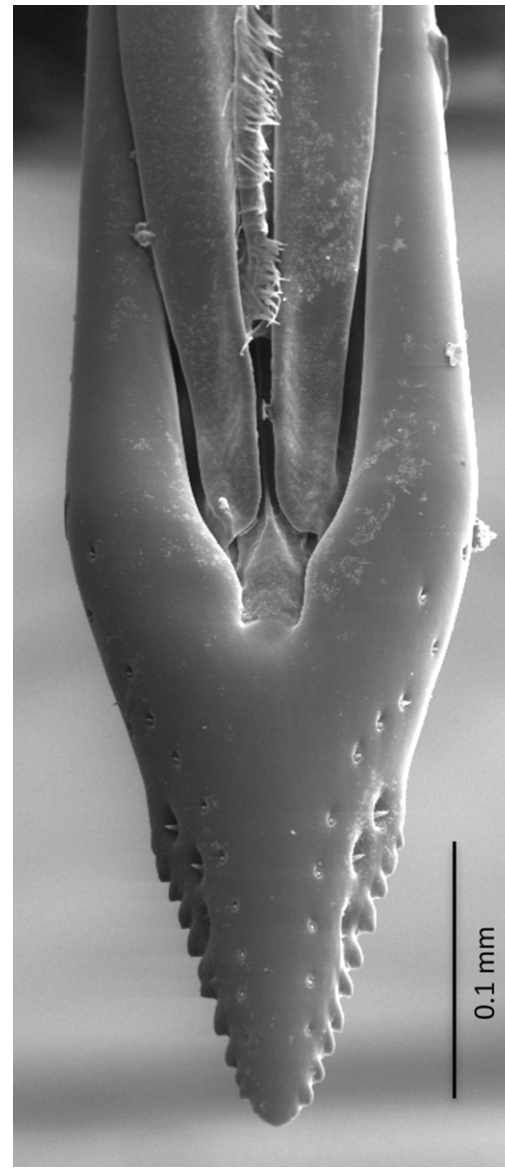

Fig. 3. *Anastrepha zacharyi* aculeus tip, ventral view, SEM. Specimen caught in McPhail trap in Porto Grande, Amapá, Brazil.

From six of the 10 samples, 53 specimens of *Doryctobracon areolatus* (Szépligeti) emerged (Table 1), with a maximum parasitism rate of 42.9% in one sample from Oiapoque. This braconid is the predominant parasitoid species

found in Amapá, representing over 50% of all parasitoids collected in several surveys (Silva et al. 2011a, Jesus-Barros et al. 2012).

This is therefore the first report of *A. zacharyi* in Brazil and the first report of its host plant and associated parasitoid. Seven other species of *Anastrepha* have been reported to use species of *Bellucia* as host plants (Zucchi 2008, Jesus-Barros et al. 2012, Vayssières et al. 2013), however, this is the first record of a species of *Anastrepha* in *B. egensis*. Considering the relative ease of collecting *A. zacharyi* from its host in the state of Amapá, additional research on its biology and host plant phenology should be pursued, as well as investigations in other states where this plant species is known to occur to further determine the geographic distribution of *A. zacharyi*.

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