

Seasonality of *Pelecinus polyturator* (Drury) (Hymenoptera, Pelecinidae) in the Atlantic Rainforest of São Paulo State, Brazil

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ABSTRACT. Seasonality of *Pelecinus polyturator* (Drury) (Hymenoptera, Pelecinidae) in the Atlantic Rainforest of São Paulo State, Brazil. A survey of the parasitoid wasp *Pelecinus polyturator* (Drury, 1773) (Hymenoptera, Pelecinidae) was carried out with five Malaise traps/area in five areas in the Atlantic Rainforest of São Paulo State, Brazil, between November 2009 and October 2010. The sampling effort in each locality amounted to 1,825 trap-days. Data were obtained from a total of 317 exemplars of *P. polyturator*, corresponding to 108 females and 209 males. The average sex ratio of the studied population was 0.52. The highest occurrence of *P. polyturator* was observed between November and March with frequency peak in January; about 95% of the specimens studied were captured at altitudes close to 1,000 m above sea level.

KEYWORDS. Insecta; Neotropical; *Phyllophaga*; population fluctuation; Proctotrupeoidea.

Pelecinus Latreille, 1800 (Hymenoptera, Pelecinidae) is the only genus of Pelecinidae, a morphologically unusual group of wasps characterized by the female's slender and strikingly long body. The genus is restricted to the continental New World and contains only three extant species: *P. thoracicus* Klug, 1841, *P. dichrous* Pert, 1833 and *P. polyturator* (Drury, 1773). The latter species is the most widely distributed in the genus, with its range extending from southern portions of the eastern provinces of Canada (about 51° N), the USA (North Dakota, Colorado and New Mexico) and southern Mexico to Argentina (about 38° S) (Johnson & Musetti 1998, 1999).

Brues (1928) stated that *P. polyturator* presents geographic parthenogenesis. In North America, the species reproduces primarily by thelytokous parthenogenesis – males are rarely collected and are restricted to certain areas – while the same is not observed in tropical areas farther south, where the species presents bisexual populations.

The biology and behavior of *P. polyturator* are poorly known; they act as solitary koinobiont endoparasitoids of larvae of *Phyllophaga anxia* (LeConte, 1850), *P. inversa* (Horn, 1887), *P. drakei* Kirby, 1837, *P. rugosa* (Melsheimer, 1846) (Coleoptera: Scarabaeidae, Melolonthinae) and *Podischnus agenor* Olivier, 1789 (Coleoptera: Scarabaeidae, Dynastinae) (Lim *et al.* 1990; Johnson & Musetti 1998; Masner 2006). The females oviposit into larvae that sometimes reach the pupal stage before dying (Clausen 1940).

Despite its large size and relatively common occurrence in areas of Atlantic Rainforest, little has been documented about seasonal and/or population fluctuations of *P. polyturator*. The main goal of this study was to provide information on the sea-

sonality of *P. polyturator* in five areas in the Atlantic Rainforest of São Paulo State, Brazil.

MATERIAL AND METHODS

Specimens of *Pelecinus* were sampled from five areas of the Atlantic Rainforest of São Paulo State, Brazil (Fig. 1), between November 2009 and October 2010: *Estação Ecológica Juréia-Itatins* (EEJI) (24°31'14.6"S/47°12'5.7"W), Iguaçu municipality; *Parque Estadual Intervales* (PEI) (24°16'28.0"S/48°25'14.8"W), Ribeirão Grande municipality; *Parque Estadual do Morro do Diabo* (PEMD) (22°36'17.0"S/52°18'05.8"W), Teodoro Sampaio municipality; *Parque Estadual da Serra do Mar, Núcleo Santa Virgínia* (PESM/NSV) (23°19'24.8"S/45°05'40.1"W), São Luiz do Paraitinga municipality, and *Núcleo Picinguaba* (PESM/NP) (23°19'59.3"S/44°49'57.8"W), Ubatuba municipality. The surveys were authorized by the *Sistema de Autorização e Informação em Biodiversidade* (SISBIO), license #10632-1. Five Malaise traps (Townes 1972) were used in each area, distant 50 meters apart, with Dietrich solution as a preservative, operated continuously. The biological material was removed monthly, and corresponded to one sample. The total sampling effort in each locality amounted to 1,825 trap-days.

The identifications of *Pelecinus* were carried out using the key proposed by Johnson & Musetti (1999) and the specimens were deposited at the *Coleção Entomológica do Laboratório de Sistemática e Biocologia de Parasitoides e Predadores* (LRRP) of APTA Ribeirão Preto, Ribeirão Preto, SP, Brazil (N.W. Periotto, curator).

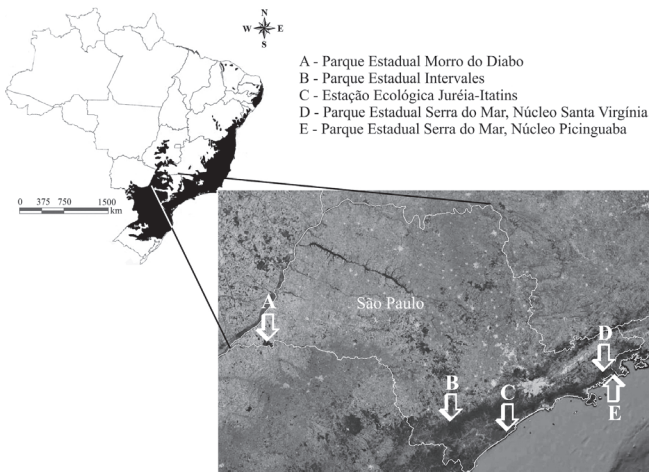


Fig. 1. Study sites in the Atlantic Rainforest of São Paulo State, Brazil. Image sources: www.wwf.org.br and Google Earth.

RESULTS AND DISCUSSION

Data were obtained from a total of 317 exemplars (108 females/34.1% and 209 males/65.9%) of *P. polyturator*, of which 175 exemplars (55.2% of the total) were collected at PESM-NSV, 131 (41.3%) at PEI, 10 (3.2%) at PESM-NP and, one (0.3%) at EEJI. No specimens were collected at PEMD (Table I).

The female:male sex ratio was on average 0.52:1.00 (0.43–0.54:1.00). These findings agree with those of Brues (1928) and Johnson & Musetti (1998), which stated that the average sex ratio for southern populations was 0.36:1.00 (0.20–0.60:1.00).

The highest occurrence of *P. polyturator* (307 exemplars, 96.8% of the total) was observed between November and March with frequency peak in January (102/32.2%) (Table I, Fig. 2). As males and females had similar population fluctuations it is plausible to assume that their flight activities

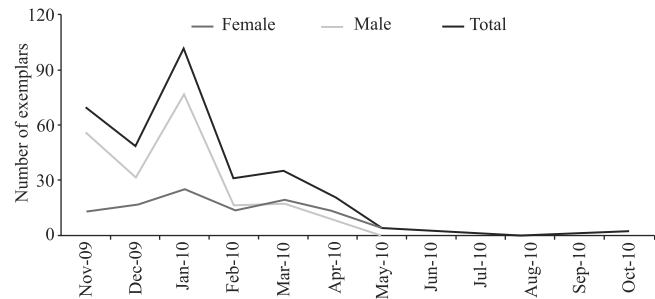


Fig. 2. Seasonality of *Pelecinius polyturator* (Drury, 1773) (Hymenoptera, Pelecinidae) collected with Malaise trap in five areas of Atlantic Rainforest at São Paulo State, Brazil, between November 2009 and October 2010.

are concomitant in the studied areas, which corroborates the data of Johnson & Musetti (1998).

The observed abundance of *P. polyturator* was low, but it was expressive regarding the sampling effort employed. The species was more frequent at PESM-NSV (1,030 m above sea level – asl) where the sampling effort to catch each specimen was 10.4 trap-days, followed by PEI (880 m asl) with 13.9 trap-days/specimen, PESM-NP (215 m asl) with 182.5 trap-days/specimen, and EEJI (16 m asl) with 1,825 trap-days/specimen. It should be noted that at PESM-NP and EEJI, the sampling effort to trap one specimen of *P. polyturator* was almost 30 times greater than at PESM-NSV and PEI. Johnson & Musetti (1999) stated that *Pelecinius* seems to be largely absent from the lowlands in the tropics and commonly seen at mid elevations (1,000 ± 3,000m). The data obtained in areas of Atlantic Rainforest of São Paulo State confirm those observations since about 95% of the exemplars studied were captured at altitudes close to 1,000 m asl.

Several authors have reported the inability of Malaise traps in sampling the fauna of Hymenoptera in a given environment (Noyes 1989; García 2003; Campbell & Hanula 2007; Aguiar & Santos 2010) and that, at least for some groups, it

Table I. Number of specimens of *Pelecinius polyturator* (Drury, 1773) (Hymenoptera, Pelecinidae) collected with Malaise traps at Estação Ecológica Jurêia-Itatins (EEJI), Parque Estadual Intervales (PEI), Parque Estadual do Morro do Diabo (PEMD), Parque Estadual da Serra do Mar: Núcleo Santa Virgínia (PESM/NSV) and Núcleo Picinguaba (PESM/NP), São Paulo State, Brazil, between November 2009 and October 2010.

Month/year	PESM/NSV			PEI			PESM/NSV			EEJI			PEMD			TOTAL		
	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ
November-09	11	25	36	2	31	33	0	0	0	0	0	0	0	0	0	13	56	69
December-09	16	15	31	1	17	18	0	0	0	0	0	0	0	0	0	17	32	49
January-10	16	46	62	6	25	31	3	6	9	0	0	0	0	0	0	25	77	102
February-10	14	15	29	0	2	2	0	0	0	0	0	0	0	0	0	14	17	31
March-10	3	8	11	15	9	24	0	0	0	0	0	0	0	0	0	18	17	35
April-10	1	5	6	12	3	15	0	0	0	0	0	0	0	0	0	13	8	21
May-10	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	4	0	4
June-10	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	2	0	2
July-10	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1
August-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September-10	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
October-10	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	1	1	2
Total	61	114	175	43	88	131	3	7	10	1	0	1	0	0	0	108	209	317
%			55.2			41.3			3.2			0.3			0.0	34.1	65.9	100.0

F = female; M = male; Σ = total of female and male.

captures differentially determined sex (Aguiar & Santos 2010). However, the results obtained in this study indicate that *Pelecinius polyturator* can be collected in great number with Malaise traps in high-altitude areas, if used for long periods and with multiple repetitions.

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