NATIVE HOSTS AND PARASITOIDS ASSOCIATED WITH *ANASTREPHA FRACTURA* AND OTHER *ANASTREPHA* SPECIES (DIPTERA: TEPHRITIDAE) IN THE BRAZILIAN AMAZON

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The Brazilian Amazon region comprises an exceptionally-high diversity of angiosperms, among which approximately 180 described species, both native and exotic that can be potential fruit fly hosts (Silva & Ronchi-Teles 2000). Currently, 60 *Anastrepha* species have been recorded in the Brazilian Amazon region, of which about 30 species are endemic (Trindade & Uchôa 2011; Zucchi et al. 2011).

Here we report on new host/fruit fly/parasitoid associations for some *Anastrepha* species for both Brazil and the Amazon region. A total of 4,137 fruit (73.9 kg) from 40 different native and introduced plant species in 19 families were collected from 2008 through 2011 in Manaus (S 03° 06' 07" W 60° 01' 30"), Maués (S 03° 23' 01" W 57° 43' 07"), Presidente Figueiredo (S 02° 02' 04" W 60° 01' 30"), and São Gabriel da Cachoeira (S 00° 07' 49" W 7° 05' 21") in the state of Amazonas; in Porto Velho (S 08° 45' 43" W 63° 54' 14") in the state of Rondônia, and in Boa Vista (S 02° 49' 11" W 60° 40' 24") in the state of Roraima. Fallen fruit, both ripe and ripening, were collected randomly from the ground under tree canopies within the forest. Cassava fruits were collected in an area adjacent to the forest in Manaus (Amazonas) and Porto Velho (Rondônia). Adult flies and parasitoids were reared from collected fruits following methods described in Ronchi-Teles et al. (2011). Voucher specimens were deposited at the Coleção de Invertebrados of the Instituto Nacional de Pesquisas da Amazônia.

A total of 3,470 fruit (63.3 kg) were infested yielding 7,662 puparia from which 3,073 *Anastrepha* adults (1,469 males and 1,604 females), 669 braconid parasitoids, and 17 figitid parasitoids emerged. We report *Anastrepha fractura* Stone infesting fruit of *Salacia* sp. (Celastrales: Celastraceae) in association with *Asobara anastrephae* (Muesebeck), *Doryctobracon brasiliensis* (Szépligeti), and *Opius bellus* Gahan parasitoids for the first time (Table 1). Previously, *A. fractura* had been reported solely from Guyana (Stone 1942) and Amazonas, and the only known host and associated parasitoid were *Maquira sclerophylla* (Ducke) C.C. Berg (Rosales: Moraceae) and *Doryctobracon areolatus* (Szépligeti) (Costa et al. 2009), respectively. We also report *Anastrepha distincta* Greene infesting *Inga cinnamomea* Spruce ex Benth (Fabales: Fabaceae: Mimosoideae) in Brazil for the first time (Table 1), but which was not attacked by any of the parasitoid species herein reported. The remaining 13 *Anastrepha* species recovered during sampling (Table 1) had previously been reported infesting the hosts from which they were recovered here (Zucchi et al. 2011).

We also report *O. bellus* and *Utetes anastrephae* (Viereck) associated with *Anastrepha coronilli* Carrejo & González, and *Aganaspis pelleranoi* (Brèthes) associated with *A. coronilli* and *Anastrepha striata* Schiner for the first time in Brazil. Our results indicate that native host plants in the Amazon forest in Brazil play an important role as reservoirs of native parasitoids and corroborate previous studies in forested areas (López et al. 1999; Aluja et al. 2003; Costa et al. 2009; Ronchi-Teles et al. 2011).

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TABLE 1. *ANASTREPHA* SPECIES, HOSTS, AND ASSOCIATED PARASITOIDS IN THE AMAZON REGION, BRAZIL.

Plant Family and Species	Hosts	Collection sites	Sample weight (kg)	Number of fruit	Number of pupae	*Anastrepha* species (n)	Parasitoid species (n)
ANARCARDIACEAE							
Anacardium occidentale L.	Native	Manaus	0.9	28	15	4 *A. obliqua*	2 *D. areolatus*
Mangifera indica L.	Introduced	Manaus	2.5	15	109	27 *A. obliqua*	5 *D. areolatus*
Spondias mombin L.	Native	Manaus	7.9	1,038	1,491	149 *A. obliqua*	88 *D. areolatus* 43 *O. bellus* 6 *U. anastrephae*
						9 *A. antunesi*	0
		Presidente Figueiredo	3.1	232	586	104 *A. obliqua* 8 *A. antunesi* ■	92 *O. bellus* 72 *A. anastrephae* 9 *D. areolatus* 1 *U. anastrephae* 1 *A. pelleranoi* 1 *A. nordlanderi*
		São Gabriel da Cachoeira	0.3	27	227	122 *A. obliqua* 8 *A. antunesi*	0 0
CELASTRACEAE							
Salacia sp. ♦	Native	Manaus	0.6	14	731	181 *A. fractura*	60 *D. areolatus* 3 *A. anastrephae* ◘ 1 *D. brasiliensis* ◘ 1 *O. bellus* ◘
COMBRETACEAE							
Terminalia catappa L.	Introduced	Manaus	4.9	162	300	77 *A. turpiniae*	41 *D. areolatus* ◘
EUPHORBIACEAE							
Manihot esculenta Crantz	Native	Manaus	2.2	213	393	109 *A. pickeli*	128 *D. areolatus* 1 *O. bellus* 2 *U. anastrephae*
						1 *A. manihoti*	3 *O. bellus* ◘
		Porto Velho	0.8	85	9	3 *A. pickeli*	0
FABACEAE (MIMOSOIDEAE)							
Inga edulis Mart.	Native	Manaus	2.1	8	17	3 *A. distincta*	0
		Maués	4.0	11	306	108 *A. distincta*	0
Inga cinnamomea Spruce ex Benth. ♦	Native	Maués	0.8	9	139	27 *A. distincta*	0

♦ New host record
◘ New *Anastrepha* parasitoid association
■ Not possible to associate parasitoids with *Anastrepha* species

TABLE 1. (CONTINUED) *ANASTREPHA* SPECIES, HOSTS, AND ASSOCIATED PARASITOIDS IN THE AMAZON REGION, BRAZIL.

Plant Family and Species	Hosts	Collection sites	Sample weight (kg)	Number of fruit	Number of pupae	*Anastrepha* species (n)	Parasitoid species (n)
MALPIGHIACEAE							
Malpighia glabra L.	Introduced	Manaus	1.3	43	79	17 *A. obliqua*	21 *D. areolatus* 12 *O. bellus*
MELASTOMATACEAE							
Bellucia grossularioides (L.) Triana	Native	Manaus	2.2	219	151	41 *A. coronilli*	13 *D. areolatus*
		Presidente Figueiredo	1.5	226	133	55 *A. coronilli*	11 *D. areolatus* 2 *O. bellus* ◘ 1 *U. anastrephae* ◘ 1 *A. pelleranoi* ◘
MORACEAE							
Pouroma cecropiaefolia Mart.	Native	Manaus	4.6	304	113	35 *A. bahiensis*	9 *D. areolatus* 1 *A. anastrephae* 1 *O. bellus* ◘
MYRTACEAE							
Eugenia stipitata McVaugh	Native	Manaus	3.3	31	244	52 *A. obliqua*	0
		Maués	0.3	8	52	4 *A. obliqua*	0
Psidium acutangulum D.C.	Native	Manaus	1.2	12	82	33 *A. striata*	0
Psidium guajava L.	Native	Manaus	0.7	47	254	51 *A. striata* 2 *A. obliqua*	0
		Maués	0.5	15	16	7 *A. striata*	0
		Presidente Figueiredo	2.7	73	210	51 *A. striata* 5 *A. turpiniae* ■ 6 *A. striata*	10 *Doryctobracon* sp.2 8 *A. pelleranoi* 6 *A. pelleranoi* ◘
		Porto Velho	0.9	49	53	3 *A. striata*	0
		São Gabriel da Cachoeira	0.8	16	46	20 *A. striata*	0
Psidium guineense Swart.	Native	Manaus	0.4	15	47	21 *A. striata*	0
		Porto Velho	0.3	11	23	1 *A. striata*	1 *D. areolatus*
Syzygium jambolanum (Lam.) DC.	Introduced	Manaus	0.1	50	2	0	2 *D. areolatus*
Syzygium malaccense L.	Introduced	Manaus	0.3	3	6	3 *A. obliqua*	0
OXALIDACEAE							
Averrhoa carambola L.	Introduced	Manaus	0.7	11	35	3 *A. obliqua*	3 *D. areolatus*
		São Gabriel da Cachoeira	0.5	65	37	19 *A. obliqua*	0

◆ New host record
◘ New *Anastrepha* parasitoid association
■ Not possible to associate parasitoids with *Anastrepha* species

TABLE 1. (CONTINUED) *ANASTREPHA* SPECIES, HOSTS, AND ASSOCIATED PARASITOIDS IN THE AMAZON REGION, BRAZIL.

Plant Family and Species	Hosts	Collection sites	Sample weight (kg)	Number of fruit	Number of pupae	*Anastrepha* species (n)	Parasitoid species (n)
PASSIFLORACEAE							
Passiflora nitida Kunth	Native	Manaus	3.4	63	205	42 *A. curitis*	0
RHAMNACEAE							
Ziziphus mauritiana Lam	Introduced	Boa Vista	1.3	194	4	1 *A. zenildae*	0
SAPOTACEAE							
Pouteria caimito (Ruiz & Pav.) Radlk.	Native	Manaus	5.2	160	1,484	105 *A. serpentina*	23 *D. areolatus*
						60 *A. leptozona*	1 *D. areolatus*
		Porto Velho	0.2	1	6	1 *A. leptozona*	0
		São Gabriel da Cachoeira	0.8	12	57	13 *A. serpentina*	0
						13 *A. leptozona*	

◆ New host record
◘ New *Anastrepha* parasitoid association
■ Not possible to associate parasitoids with *Anastrepha* species

SUMMARY

A new natural host for *Anastrepha fractura* Stone, *Salacia* sp., is reported for the first time in Brazil. Parasitoids attacking *A. fractura* are also reported. We also report *Anastrepha distincta* Greene infesting *Inga cinnamomea* in Brazil for the first time. New associations between *Anastrepha* species and parasitoids are also reported.

RESUMO

Um novo hospedeiro natural de *Anastrepha fractura* Stone, *Salacia* sp., é relatado pela primeira vez no Brasil. Parasitoides atacando *A. fractura* são também relatados. Nós também relatamos *Anastrepha distincta* Greene infestando *Inga cinnamomea* no Brasil pela primeira vez. Novas associações entre espécies de *Anastrepha* e parasitoides também são relatadas.

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