

## NOTA CIENTÍFICA

## Geographic distribution and hosts of *Zaprionus indianus* (Diptera: Drosophilidae) in North-Eastern Argentina

LAVAGNINO, Nicolás J., Valeria P. CARREIRA, Julián MENSCH, Esteban HASSON and Juan J. FANARA

Laboratorio de Evolución. Departamento de Ecología, Genética y Evolución. Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires. Pabellón II. Ciudad Universitaria. C1428HA. Buenos Aires, Argentina; e-mail: nlavagnino@ege.fcen.uba.ar

### Distribución geográfica y hospedadores de *Zaprionus indianus* (Diptera: Drosophilidae) en el noreste de Argentina

■ **RESUMEN.** El primer registro publicado de la especie africana *Zaprionus indianus* Gupta 1970 en el continente Americano se refiere a individuos observados en frutos caídos de «caqui» (*Diospyros kaki* Linnaei) en la ciudad de São Paulo, (Brasil) en Marzo de 1999. Desde esa fecha, esta especie ha colonizado ambientes naturales y perturbados en todo el continente. En el presente trabajo, confirmamos la presencia de *Z. indianus* en el noreste de Argentina y mostramos que, en algunas localidades, representa una alta proporción entre las especies de drosophilidos colectados. Nuestra investigación reveló que esta especie invasora es capaz de criarse y alimentarse en un amplio rango de plantas hospedadoras tanto nativas como cultivadas.

**PALABRAS CLAVE.** Distribución geográfica. Bioinvasión. *Zaprionus indianus*. Argentina.

■ **ABSTRACT.** The first published record of the African drosophilid *Zaprionus indianus* Gupta 1970 in the Americas refers to individuals observed on fallen persimmon (*Diospyros kaki* Linnaei, «caqui») fruits in São Paulo city (Brazil) in March 1999. Since that date, this species colonized altered and natural environments across the continent. In the present work we report new records for *Z. indianus* in north eastern Argentina. Moreover, our results showed that this species represents a fairly high proportion among collected drosophilids in some sampling sites. Our survey also revealed that this invading species has the ability to breed and feed in a wide range of native and cultivated host-plants.

**KEY WORDS.** Geographic distribution. Bioinvasion. *Zaprionus indianus*. Argentina.

*Zaprionus indianus* Gupta 1970 (Diptera: Drosophilidae), commonly known as «the African fig fly», is an afrotropical drosophilid (Chassagnard & Kraaijeveld, 1991; Chassagnard & Tsacas, 1993) first collected in the American continent in São Paulo, Brazil in 1999 (Vilela, 1999). After this first report, it has been found in other

areas of South America (De Toni *et al.*, 2001; Goñi *et al.*, 2001, 2002; Santos *et al.*, 2003; Tidon *et al.*, 2003), Central and North America (van der Linde *et al.*, 2006). This widespread distribution of *Z. indianus* is an indication of its great colonizing ability (Santos *et al.*, 2003; Yassin & Abou-Youssef, 2004), which could be related to the large

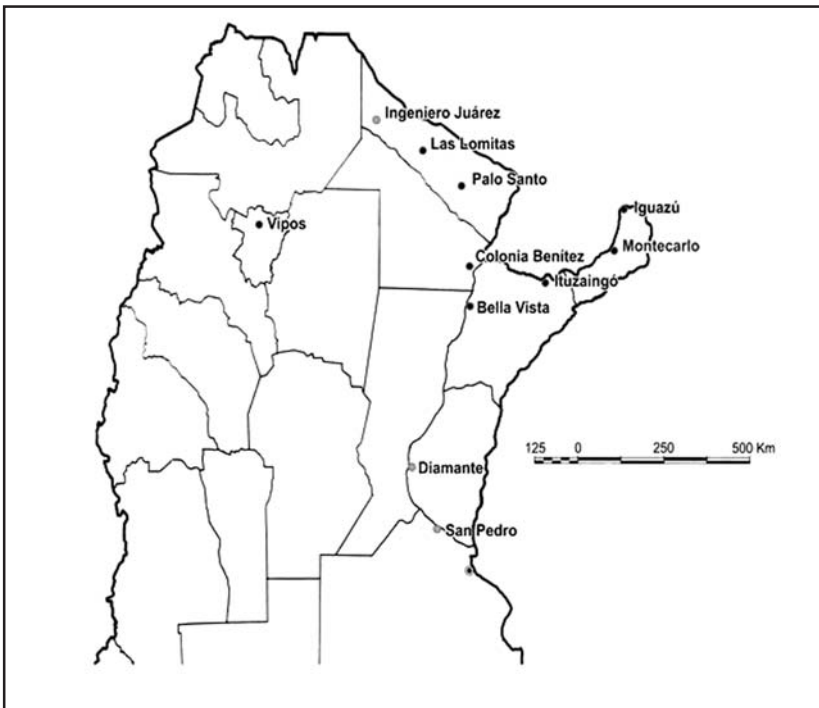


Fig. 1. Location of the 11 collection sites. Black and grey points indicate the presence and the absence of *Zaprionus indianus*, respectively.

number of fruit-producing plant species used as breeding and feeding sites by this species (Lachaise & Tascas, 1983; Goñi *et al.*, 2002; Raga, 2002; van der Linde *et al.*, 2006). *Z. indianus* not only uses decaying fruit as breeding sites, it also infests early-ripening fruits (Vilela *et al.*, 2001; Raga *et al.*, 2003).

After the first record of this species in Argentina (Soto *et al.*, 2006), we increase our knowledge by describing its distributional range and the resources used as breeding and feeding sites in several localities of north-eastern Argentina. Eleven localities distributed along the Paraná River Basin were sampled between February 21<sup>st</sup> and March 5<sup>th</sup> 2007 (Fig. 1, Table I). We applied two methods to quantify the relative abundance of *Z. indianus*: i) net sweeping over fermented banana baits or rotting fruits laying on the ground (collected flies); and ii) fruit collection in locations where decaying fruits were available on the ground. Collected fruits were stored in plastic containers and transported to the lab. All flies emerging during the following two weeks were aspirated daily and

determined into species whenever possible (emerged flies). We identified *Z. indianus* by its overall yellowish thorax and abdomen and the narrow silver bands bordered by black bands along the head, thorax and scutellum (van der Linde, 2006).

Adult flies of *Z. indianus* were collected in 8 out of the 11 localities surveyed (Table I). The abundance of *Z. indianus* relative to other drosophilids was low (less than 20 %) except in Montecarlo (40%) and Las Lomitas (90%). *Z. indianus* emerged from the decaying fruits of 7 different species (Table I): *Psidium guajava* Linnaei («guava»), *Opuntia ficus indica* Miller («prickly pear»), *Carica papaya* Linnaei («mamón» or «papaya»), *Mangifera indica* Linnaei («mango»), *Diospyros sp.* («caqui») (we are unsure of the specific status of the specimens collected in the field; they are most likely either *D. virginiana* Linnaei, *D. chinensis* Blume or *D. kaki* Linnaei), *Averrhoa carambola* Linnaei («carambola») and *Prunus persica* Linnaei («peach»). We also collected it from immature «guava» fruits; this

**Table I.** Geographic coordinates and potential hosts of *Zaprionus indianus* at study sites. For collected and emerged samples, relative abundance of *Z. indianus* is also shown, calculated as the percentage of *Z. indianus* over a total of flies sampled.

Locality (Province)	Coordinate	Presence of <i>Z. indianus</i>	Host	Relative abundance	
				Collected	Emerged
San Pedro (Buenos Aires)	33° 44' 45,2'' S 59° 43' 51,2'' W	No	"Apple", "Pear"	-	-
Diamante (Entre Ríos)	32° 2' 49'' S 60° 35' 11,4'' W	No	<i>Opuntia cordobensis</i>	-	-
Bella Vista (Corrientes)	28° 26' 59,4'' S 58° 59' 12,6'' W	Yes	"Guava", "Prickly pear", "Mamon o Papaya"	NA	-
Ituzaingó (Corrientes)	27° 34' 45,9'' S 56° 29' 30,1'' W	Yes	"Mango"	10%	-
Iguazú (Misiones)	25° 40' 47'' S 54° 26' 57'' W	Yes	"Guava", "Carambola"	10%	14.6%
Montecarlo (Misiones)	26° 33' 43,2'' S 54° 40' 15,4'' W	Yes	"Guava", "Caqui", "Prickly pear"	40%	47.3%
Colonia Benítez (Chaco)	27° 19' 6,6'' S 58° 56' 58,4'' W	Yes	"Mango"	20%	-
Palo Santo (Formosa)	25° 33' 8'' S 59° 17' 2,7'' W	Yes	"Guava"	10%	73.7%
Las Lomitas (Formosa)	24° 39' 59,8'' S 60° 33' 41,7'' W	Yes	"Guava"	90%	-
Ingeniero Juárez (Formosa)	23° 53' 58,6'' S 61° 51' 3,7'' W	No	<i>Opuntia quimilo</i>	-	-
Vipos (Tucumán)	26° 29' 5,6'' S 65° 19' 5,6'' W	Yes	"Peach"	NA	4.2%

infestation of immature fruits occurs probably because fruits were previously damaged. Until this report, infestation of immature fruits was reported only in figs; but in this case as a consequence of figs' particular morphology in the ostiole region of their infructescences (Raga *et al.*, 2003). Furthermore, Gomes *et al.* (2003) demonstrated the presence of the yeast *Candida tropicalis* Berkhout in figs infested by *Z. indianus*, which increased the decaying process of the fruit, thus attracting

adults flies to lay eggs and feed (Raga, 2002). As a result of this process, the fig commercial production in Brazil was reduced by 50% and *Z. indianus* is considered a pest in Brazil (Vilela *et al.*, 2001; Raga, 2002). Therefore, attention should be paid to *Z. indianus* invasion in Argentina because of possible negative effects on commercial fruit cultivations.

Several collecting trips have been performed by the authors to the area surveyed

in this study in the last 20 years, and the presence of *Z. indianus* has never been detected (E. Hasson and J. J. Fanara field notes and unpublished results), suggesting that this species expanded rapidly in north-eastern Argentina. In a recent collecting trip (April 2008) *Z. indianus* was found in Ituzaingó (Corrientes) and Montecarlo (Misiones), confirming that this species is still present in north-eastern Argentina after two years of its first record. In conclusion, our survey shows a persistent presence of *Zaprionus indianus* in north-eastern Argentina and reveals the diversity of fruits that this species can use as hosts.

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