

GEOGRAPHIC DISTRIBUTION OF THE PHLEBOTOMUS SANDFLIES OF CENTRAL AMERICA (DIPTERA: PSYCHODIDAE)¹

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ABSTRACT

Fifty-four named species are listed from the area between Panama and the United States, and the species are further listed by political divisions.

The *Phlebotomus* sandfly fauna of Central America has until recently been very little known. Barretto (1951) was able to list only nine species as occurring north of Panama. A few years later, Vargas and Diaz Najera (1953) summarized the records from Mexico, giving a list of 29 species as occurring in that country. A year later Rosabal (1954) published an account of the Costa Rican species, listing 12 named species and 18 others probably undescribed. Aside from mention of an unnamed species taken at Prieta, Honduras, by Bequaert (1924), there seem to have been no *Phlebotomus* recorded from Nicaragua, Honduras, El Salvador, or British Honduras until very recently.

Beginning in 1951, staff members of the Gorgas Memorial Laboratory were enabled to make collections of biting arthropods in a number of localities in Central America during their studies of sylvan yellow fever. Especially significant collections were made in the Mexican State of Chiapas (Fairchild 1953a), in the vicinity of Tela, Honduras, and at Villa Somoza, Nicaragua (Galindo and Trapido 1957). Smaller collections were also made during shorter visits to additional localities in Nicaragua, El Salvador, and Mexico. Collections were made in Costa Rica by Hertig, Trapido, and Galindo and we were privileged to examine much of the material collected by Rosabal. From these collections and some small lots sent us for identification, we are able to record the presence of 46 described species from the area between Panama and the United States. In addition, there are about a

dozen apparently undescribed species, mostly represented by very few or single specimens. The Mexican list of Vargas and Diaz Najera contains 8 additional species not taken by us, giving a total of 54 named species for Central America.

A check-list of the species is given below, together with the geographic distribution by countries in Central America and the range outside of this area in parentheses. In the section following this list, the species are listed by countries and localities, with references to previously published occurrences.

- aelydiferus* F. & H. Costa Rica, Nicaragua, Honduras, Mexico, (Panama).
anduaei Rozeb. Costa Rica, (Panama, Venezuela, French Guiana).
anthophorus Addis, Mexico, (U. S. A.).
apicalis F. & A. Honduras, Mexico, (Panama, French Guiana).
arborealis F. & A. Honduras, (Panama, French Guiana).
barrettoi Man. Nicaragua, (Panama, French Guiana, Brasil).
beltrani V. & D. N. Mexico, Honduras.
bispinosus F. & H. Nicaragua, Honduras, (Panama).
camposi Rodr. Costa Rica, (Panama, Ecuador).
carpenteri F. & H. Costa Rica, (Panama).
cayennensis F. & A. Costa Rica, El Salvador, Mexico, (Panama to French Guiana).
cayennensis maciasi F. & H. Mexico, Guatemala.

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- chiapanensis* Dampf. Costa Rica, El Salvador, Mexico, (Panama).
- cruciatu* Coq. Costa Rica, Nicaragua, Honduras, Guatemala, Mexico, (Panama).
- clenidophorus* F. & H. Mexico.
- cunhai* Mang. Honduras, (Brasil).
- deleoni* F. & H. Honduras, Guatemala, Mexico.
- del pozoi* V. & D. N. Mexico.
- diabolicus* Hall. British Honduras, Mexico, (U. S. A.).
- dodgei* V. & D. N. Mexico.
- durani* V. & D. N. Mexico.
- dysponetus* F. & H. Costa Rica, (Panama, Ecuador).
- evansi* N. T. El Salvador, Nicaragua, (Venezuela).
- galindoi* F. & H. Costa Rica, Honduras, Mexico, (Panama, Ecuador).
- gomezi* Nitz. Costa Rica, Nicaragua, (Panama to Brasil).
- hardisoni* V. & D. N. Mexico.
- intermedius* L. & N. Mexico, (Venezuela to Paraguay).
- Reported by Vargas and Diaz Najera (1935). We suspect an error of identification.
- longipalpis* L. & N. Costa Rica, El Salvador, Mexico, (Panama to Paraguay); *almazani* Gall. is a synonym (Fairchild and Hertig 1958).
- oppidanus* Dampf. Mexico.
- ovallesi* Ortiz, Nicaragua, Honduras, Mexico, (Panama, Venezuela).
- panamensis* Shann. Costa Rica, Nicaragua, Mexico, British Honduras, (Panama to Venezuela).
- paraensis* C. L. Honduras, (Panama, Brasil).
- permirus* F. & H. Mexico.
- pilosus* D. & C. Costa Rica, (Panama, Brasil).
- rosabali* F. & H. Costa Rica, (Panama).
- runoides* F. & H. Costa Rica, (Panama).
- sanguinarius* F. & H. Costa Rica, Honduras, (Panama).
- saulensis* F. & A. Costa Rica, (Panama, French Guiana).
- pinacalis* F. & A., is a synonym (Fairchild and Hertig 1958).
- shannoni* Dyar, Costa Rica, Nicaragua, Honduras, Mexico, (U. S. A. to Paraguay).
- steatopygus* F. & H. Mexico.
- stewarti* Mang. and Galindo, Mexico, (U. S. A.).
- texanus* Dampf. Mexico, (U. S. A.).
- trapidoi* F. & H. Costa Rica, Honduras, (Panama, Ecuador).
- trinidadensis* Newst. Costa Rica, Nicaragua, Honduras, Mexico, (Panama to Brasil).
- undulatus* F. & H. Honduras, Guatemala, Mexico, (Panama).
- vesiciferus* F. & H. Costa Rica, Nicaragua, (Panama).
- vespertilionis* F. & H. Costa Rica, (Panama).
- vexator* Coq. Mexico, (U. S. A.).
- vindicator* Dampf. Mexico.
- viriosus* F. & H. Costa Rica, (Panama).
- wirthi* V. & D. N. Mexico.
- ylephiletor* F. & H. Costa Rica, Nicaragua, Honduras, Mexico, (Panama).
- Hertigia hertigi* Fairch. Costa Rica, (Panama).
- Warileya rotundipennis* F. & H. Costa Rica, (Panama).

COSTA RICA

Rosabal (1954) has discussed the ecology of many of the Costa Rican species, their distribution within the country and their relationships to areas of high leishmaniasis endemicity. Along with collections made by Gorgas Memorial Laboratory personnel in Costa Rica, we had the privilege of examining many of the specimens collected by Rosabal. Most of the species reported by him as unidentified have now been either described or identified by us, so that we can list 26 named species. There remain at least two as yet unnamed species of which we have Costa Rican material.

aclydiferus. Guapiles; Turrialba; Jimenez de Guapiles; Suerre de Guapiles; Pacuare, Moravia. All localities on the Atlantic slope. Taken by both Rosabal and ourselves. A paratype is from Guapiles. The species is listed by Rosabal (1954) as No. 1.

anduzei. Valle Hermoso, San Carlos. A single female taken 9 Jan. 1952 in a tree buttress by Rosabal and reported by him as No. 17.

camposi. Guapiles; Suerre de Guapiles; Jimenez de Guapiles; Wauchope; Turrialba. All on Atlantic slope. Taken by Rosabal and ourselves. This is species No. 4 of Rosabal's list.

carpenteri. Suerre de Guapiles, 22 July 1951, in armadillo burrow. Rosabal coll. This appears to be species No. 2 of Rosabal's list.

cayennensis. Boca de Barranca and Finca Socorrito, Puntarenas (Rosabal).

chiapanensis. Barranca, H. W. Kumm coll. (Rosabal).

cruciatu. Anita Grande, Roxana; Turrialba; Lagartos; (Rosabal; Fairchild and Hertig 1953b).

dysponetus. Suerre de Guapiles; Pacuare; Turrialba. A paratype from Suerre. This is species No. 3 of Rosabal's list.

evansi. Lagartos, Guanacaste, 13 Dec. 1951, Rosabal coll. Probably species No. 8 of Rosabal.

galindoi. San Juan Miramar (Rosabal); Finca la Josefina, San Carlos, 23 June 1955, Rosabal coll.

gomezi. Turrialba; Pacuare; Sta. Cruz, Guanacaste; Valle Hermoso, San Carlos (Rosabal); Rio Seco; Puerto Jimenez (Fairchild and Hertig 1948b, 1953b).

longipalpis. Barranca, Kumm coll. (Rosabal).

panamensis. Suerre de Guapiles; Jimenez de Guapiles; Turrialba; Valle Hermoso, San Carlos (Rosabal); Wauchope, Limon Prov., Galindo and Trapido colls.

pilosus. Wauchope, Limon Prov., Galindo and Trapido colls.

rosabali. Finca Socorrito, Barranca, paratypes. This is species No. 9 of Rosabal.

runoides. Suerre de Guapiles, Rosabal coll.

sanguinarius. Turrialba, paratypes. Fairchild and Hertig 1956, San Miguel, G. M. L. Coll.

saulensis. Suerre de Guapiles (Rosabal as *pinacalis*; Fairchild and Hertig 1958b).

shannoni. Rosabal reports the species from 17 localities on both coasts and up to 1100 metres altitude, and we have specimens from a few additional localities.

trapidoi. Vicinity of Turrialba (Fairchild and Hertig 1953a). Rosabal lists the species, as his No. 7, from nine localities.

trinidadensis. Rosabal lists from five localities.

vesiciferus. Listed from four localities by Rosabal.

vespertilionis. Taken by Rosabal at six localities. We have it also from San Miguel. Rosabal's males, reported as No. 12, are true *vespertilionis* (Fairchild and Hertig 1958a).

viriosus. La Roca de Guapiles; Pacuare; paratypes (Fairchild and Hertig 1958a). This is probably species No. 13 of Rosabal.

ylephiletor. Listed, as species No. 14, from nine localities by Rosabal. We have it also from Palmar and Esquinas, Puntarenas Prov., paratypes (Fairchild and Hertig 1953a).

Hertigia hertigi. Pacuare; La Roca (Fairchild 1953b).

Warileya rotundipennis. Pacuare, 6 Feb. 1952, Hertig and Rosabal colls.

NICARAGUA

The bulk of our material was collected near Villa Somoza, Prov. Chontales, in the south central part of the country, where a light trap and human bait were used, as well as the searching of daytime resting places. Three additional unnamed species have also been taken, for a total of fifteen species. All listed species are new records except *vesiciferus*.

- aclydiferus*. Villa Somoza, 11 June, 14 July 1953.
barrettoi. Guapinolar, Carrazo, 21 Oct. 1953.
bispinosus. Villa Somoza, 11, 15 June 1953.
cruciatatus. Upper valley of Rio Pantasma 21 May 1953; Villa Somoza, 27 May, 22 Sept., 14 July 1953; Casa Colorada, Dec. 1953; Guapinolar, 21, 27, 29 Oct. 1953.
evansi. Guapinolar, 21-29 Oct. 1953, 3♂ 4♀.
gomezi. Villa Somoza, 14 July 1953.
ovallesi. Upper valley of Rio Pantasma, 21 May 1953.
panamensis. Villa Somoza, 1-15 June 1953.
shannoni. Villa Somoza 27 May, 30 July, 2 Sept. 1953; Casa Colorada, near Managua, Dec. 1953.
trinidadensis. Villa Somoza, 25 May 1953.
vesiciferus. Villa Somoza, 2 Sept. 1953, Fairchild and Hertig (1958a).
ylephiletor. Villa Somoza, 27 May, 15 June 1953.

HONDURAS

Collections made in the Lancetilla Valley, near Tela, in connection with the Gorgas Memorial Laboratory's yellow fever investigations have provided all that is known of the *Phlebotomus* sandfly fauna of Honduras, so that all the species listed below are from this locality. A few species have been reported previously by us. This station was operated from April 1953 to May 1954, and collections were made with human bait at ground level and in the forest canopy, with light traps, and by searching daytime resting places. In addition to the 17 named species listed below, we have material of 8 undescribed species.

- aclydiferus*. 2 Sept. 1953 to 21 April 1954.
apicalis. 2 Sept. 1953 to 29 April 1954.
arboresalis. 2 Sept. 1953 to 8 Feb. 1954.
beltrani. 16 Sept. 1953 to 21 April 1954. Fairchild and Hertig (1958a).
bispinosus. 17 Sept 1953 to 18 March 1954.
cruciatatus. 26 June 1953 to 14 June 1954.
cunhai. 19 Feb. 1954.
deleoni. 24 July 1953 to 18 March 1954. Fairchild and Hertig (1958a).
galindoi. 24 July 1953 to 2 March 1954.
ovallesi. 24 Feb. 1954.
paraensis. 25 November 1953.
sanguinarius. 23 Sept. 1953 to 21 Apr. 1954. Fairchild and Hertig (1957).
shannoni. 26 June 1953 to 14 June 1954.
trapidoi. 26 Aug. 1953 to 21 April 1954.
trinidadensis. 26 June 1953 to 14 June 1954.
undulatus. 20 Jan. 1954 to 10 Feb. 1954.
ylephiletor. 26 June 1953 to 14 June 1954.

EL SALVADOR

Very little collecting has been done in this country and our few records are due to Dr. H. W. Kumm, and to a single collection made by two of our staff.

- cayennensis*. La Libertad, 14 June 1953, Trapido and Galindo colls.
chiapanensis. La Libertad, 14 June 1953, Trapido and Galindo, colls. Fairchild and Hertig (1957).
evansi. La Libertad, 14 June 1953, Trapido and Galindo colls. A single female.
longipalpis. Hacienda Ostia, Sept. 1941, H. W. Kumm coll.

GUATEMALA

Our knowledge of the Guatemalan species is still scanty and limited to a single collection made

by Fairchild in hollow trees and buttresses along the road from Esquintla to San José, plus a species sent us by Dr. De Leon and the recent report of the finding of *longipalpis*.

- cayennensis maciasi*. Esquintla to San José, paratypes. (Fairchild and Hertig 1949).
cruciatatus. Trece Aguas, Alta Vera Paz, types; Esquintla to San José (Fairchild and Hertig 1948b).
deleoni. Canchacan, Peten, types (Fairchild and Hertig 1948a).
evansi. Esquintla to San José, 3 June 1945, Fairchild coll.
longipalpis. El Jicarillo, Progreso (Figueroa Garcia 1959).
undulatus. Esquintla to San José, types (Fairchild and Hertig 1951).

BRITISH HONDURAS

We have been able to find published mention of but one species of *Phlebotomus* from British Honduras. Our colleagues, Drs. Trapido and Galindo, secured a single female of another species on a brief visit to Belize. Recent collecting, as yet unpublished, by Drs. D. J. Lewis and P. C. C. Garnham will certainly add a number of species.

- panamensis*. Listed by Vargas and Diaz Najera (1953) as having been taken by Dampf in 1925, but without specific locality.
diabolicus. 35 mi. S.E. of Belize on road to Roaring Creek, attacking man in low forest, 17 Oct. 1955. We believe this specimen to be *diabolicus* rather than *cruciatatus*, though the two species are uncomfortably similar.

MEXICO

We are able to add only a few species to the impressive list of Mexican species compiled by Vargas and Diaz Najera (1953). Our material was secured on a brief trip to Chiapas in 1951 (Fairchild 1953) and on yellow fever reconnaissance trips by our colleagues Drs. Trapido and Galindo in 1953 and 1955. Only localities additional to those given by Vargas and Diaz Najera are detailed below.

- aclydiferus*. Vargas and Diaz Najera; Fairchild and Hertig (1953a).
anthophorus. Vargas and Diaz Najera. Gruta de Garcia, Nuevo León, Fairchild and Hertig (1956).
apicalis. Ocosocautla, Palenque, and Sta. Maria, Chiapas, 8, 11 April, 30 March 1951, Fairchild and Hartmann colls.; Teapa, Tabasco, 16 Dec. 1953, Trapido and Galindo colls.
beltrani. Vargas and Diaz Najera, Sta. Maria, Palenque, Chiapas, Fairchild and Hertig (1958a).
cayennensis. Vargas and Diaz Najera.
cayennensis maciasi. Fairchild and Hertig (1948); Vargas and Diaz Najera.
chiapanensis. Vargas and Diaz Najera.
cruciatatus. Vargas and Diaz Najera. We have specimens from the States of Chiapas, Tabasco, Quintana Roo, Morelos, Nuevo León, and Hidalgo, but it seems unnecessary to list the localities in detail.
ctenidophorus. Vargas and Diaz Najera.
deleoni. Vargas and Diaz Najera. Sta. Maria, Chiapas, 17 April 1951, Fairchild and Hartmann colls.
del pozo. Vargas and Diaz Najera.
diabolicus. Vargas and Diaz Najera. Cañon de Lobos, Morelos, 20 Sept. 1955, biting man; Cola de Caballo, Nuevo León, 10 Sept. 1955; near Sta. Ana,

- Hidalgo, 15 Sept. 1955, all Trapido and Galindo colls.
dodgei. Vargas and Diaz Najera. Tuxtla Gutiérrez, Chiapas, 23 March 1951, Fairchild and Hartmann colls. (Fairchild and Hertig 1956).
durani. Vargas and Diaz Najera.
galindoi. Vargas and Diaz Najera. Ocosocautla and Sta. Maria, Chiapas, 8, 12 April 1951, Fairchild and Hartmann colls.
hardisoni. Vargas and Diaz Najera.
intermedius. Vargas and Diaz Najera. This may be a misidentification for one of the several closely allied species, e.g., *ylephiletor* F. & H. The record is based on a single female determined by Biagi, who did not at that time know of the complexity of the group.
longipalpis. Vargas and Diaz Najera list the species as taken by us at Palenque, Chiapas, but our records show only specimens from Tuxtla Gutiérrez, Chis., 23 Mar. 1951. Fairchild and Hertig (1958b).
oppidanus. Vargas and Diaz Najera. Fairchild and Hertig (1957) add Gruta de Garcia, near Monterey, Nuevo León.
ovallesi. Palenque, Chiapas, 30 Mar., 2 Apr. 1951, Fairchild and Hartmann colls., two females, which may belong to an allied species.
panamensis. Vargas and Diaz Najera.
permirus. Fairchild and Hertig (1956), Palenque, Chiapas, 28 Mar. 1951, Fairchild and Hartmann colls.
shannoni. Vargas and Diaz Najera. We have specimens from Ocosocautla and Sta. Maria, Chis., as well as those listed from Palenque.
steatopygus. Fairchild and Hertig (1958a), Palenque, Chiapas, 28, 29, 31 March 1951, Fairchild and Hartmann colls.
stewarti. Vargas and Diaz Najera.
texanus. Vargas and Diaz Najera.
trinidadensis. Vargas and Diaz Najera. Ocosocautla, Chis., 8 April 1951, Fairchild and Hartmann colls.
undulatus. Vargas and Diaz Najera. Ocosocautla, Chis., 8 April 1951. Our records do not show that we took this species at Palenque as reported by Vargas and Diaz Najera.
vexator. Vargas and Diaz Najera.
vindicator. Vargas and Diaz Najera. Cañon de Lobos, near Cuernavaca, Morelos, 20 Sept. 1955 (Fairchild and Hertig 1957).
wirthi. Vargas and Diaz Najera.
ylephiletor. Vargas and Diaz Najera. Teapa, Tabasco, 10, 19 Aug. 1953, Trapido and Galindo colls.

Of the 54 named species recorded above, 31 occur in Panama and 19 extend into South America, 2 of these not having so far been taken in Panama. Five species extend their range into the United States. In general it appears that the tropical rain-forest fauna, as exemplified by the collections from Tela, Honduras, Villa Somoza, Nicaragua, and the Atlantic slope in Costa Rica, is quite similar to the Panamanian forest fauna, with a large element of South American species, or species closely related to South American forms. The Mexican fauna is quite distinctive, the rain-forest species appearing only in the Chiapas and Tabasco collections. We suspect that a number of the Mexican species will be found to extend southward at higher elevations and in dryer habitats along the Pacific coast whenever proper search for them can be made.

Man-biting species, and hence potential disease

vectors, appear to occur throughout the region, but too little information is yet available to be able to correlate their distributions with that of the human leishmaniasis.

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