

SCIENTIFIC NOTE

Aedes fumidus and *Aedes amesii* in Mangrove Forests of India—Two New Country Records

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ABSTRACT. We report the first records of *Aedes fumidus* and *Ae. amesii* from India based on collections made in mangrove forests of Bhitarkanika in Orissa, Sunderbans, in West Bengal, and Andaman and Nicobar Islands. Collection details include date, location, material examined, larval habitat, and associated species.

KEY WORDS *Aedes fumidus*, *Aedes amesii*, India, first record, mangrove forest

Aedes (Lorrainea) fumidus Edwards and *Ae. (Lorrainea) amesii* (Ludlow) are considered Indo-malayan species, with known distribution in Indonesia, Malaysia, Philippines, Singapore, and Thailand (Mattingly 1959, Lien et al. 1975). We report the first occurrence of these 2 species in India based on collections made during biodiversity studies in Indian mangrove forests. Mosquito collections were made from 1998 to 2001 in mangroves of Bhitarkanika in Orissa, Sunderbans, in West Bengal, and Andaman and Nicobar Islands. *Aedes fumidus* was encountered in all 3 localities and *Ae. amesii* was recorded only from Andaman Islands. Species determinations followed Mattingly (1959).

Bhitarkanika, a wildlife reserve situated in the eastern coast of Orissa, has numerous species of mangrove flora, including *Avicennia alba*, *A. officinalis*, *Sonneratia apetala*, *Rhizophora mucronata*, *Ceriops decandra*, *Xylocarpus granatum*, and *Suaeda maritima*. Average minimum and maximum temperatures are 22° and 30°C. Average annual rainfall is 1,600 mm, and average relative humidity is 85%. Salinity ranges from 0.2 to 2.0‰. Collections were made in Dangmal during October 1998 and March 2000 and Habalikati during March 2000.

The Sunderbans are southeast of Calcutta in the 24 Parganas District of West Bengal. *Heritiera fo-mes*, *Xylocarpus mekongensis*, and *Aegieras canniculatum* are the main mangrove flora. Average minimum and maximum temperatures are 20 and 34°C. Average annual rainfall is 1,920 mm, and average relative humidity is 80%. Salinity ranges from 0.4 to 1.6‰. Collections were made in Sajnakhali and Ramganga during March 2000.

The Andaman and Nicobar Islands lie in the Bay of Bengal at a distance of about 1,200 km from the east coast of mainland India. The islands have a warm, humid climate with average minimum and maximum temperatures of 20 and 33°C. The average relative humidity is 79%, and the average annual rainfall is 3,000 mm. Salinity ranges from 0.04 to 1.3‰. *Rhizophora apiculata*, *R. mucronata*, *Bru-*

guiera gymnorrhiza, *Heritiera littoralis*, *Nypa fruticans*, *Sonneratia caseolaris*, *Avicennia officinalis*, and *A. marina* are the most prominent mangroves. Mosquito collections were made in 16 sites throughout South, Middle, and North Andamans and Car Nicobar during May–June 2001.

Aedes fumidus: We collected 540 specimens including 410 larvae and 130 adults. We examined 280 females, 260 males, 44 associated larval skins, 13 female terminalia, 68 male terminalia.

Bhitarkanika. Dangmal (20°44'N, 86°52'E): October 13, 1998, 34 females, 25 males, 19 larval skins, 7 male terminalia, 1 female terminalia, as larvae from tree holes. March 3, 2000, 16 females, 7 males, 3 larval skins, 3 male terminalia, as larvae from tree holes, and 1 female, in a light trap. Habalikati (20°40'N, 86°59'E): March 4, 2000, 5 females, 2 males, 2 larval skins, 1 male terminalia, as larvae from tree holes.

Sunderbans. Sajnakhali (22°07'N, 88°49'E): March 8, 2000, 1 female resting in a guesthouse. March 9, 2000, 1 female, 1 larval skin, in a beached boat. Ramganga (21°47'N, 88°22'E): March 10, 2000, 19 females, 39 males, 4 larval skins, 5 male terminalia, as larvae from tree holes; 6 females landing on a human; 7 females, 1 male, 1 male terminalia, as adults resting in tree holes, and 2 females in a light trap.

Andaman and Nicobar Islands. Chidiatapu (11°30'N, 92°41'E): May 19, 2001, 10 females, 9 males, 1 larval skin, 2 male terminalia, as larvae in tree holes; 1 female, as larva in a crab hole; 1 female, 1 female terminalia, 1 male, 1 male terminalia, as adults resting in a tree hole. May 20, 2001, 39 females, 39 males, 2 male terminalia, as larvae in tree holes; 1 female, 1 male, 1 male terminalia, larvae in coconut shell; 1 female resting in tree hole; 1 male resting in crab hole; 2 females, 2 female terminalia, 2 males, 2 male terminalia, as adults resting in a root base. Burmanallah (11°32'N, 92°43'E): May 20, 2001, 1 male, 1 male terminalia, as larva in leaf axil; 3 females, 2 males, 1 male terminalia, as larvae in a tree hole; 1 male, 1 male

terminalia, as adult resting in a root base; 2 females, 2 female terminalia, landing on a human. Sipighat (11°36'N, 92°41'E): May 21, 2001, 15 females, 7 males, 2 male terminalia, as larvae in tree holes; 2 females, 1 larval skin, as larvae in a crab hole; 1 female, 1 male, 1 male terminalia, as adult resting in a tree hole; 1 female, 2 males, 1 male terminalia, as adults resting in a crab hole. Alexandra (11°34'N, 92°37'E): May 22, 2001, 3 females, 3 males, 1 male terminalia, as larvae from a tree hole and a swamp pool; 1 female, 3 males, 1 male terminalia, as adults resting in a tree hole; 2 females, 2 female terminalia, landing on a human. Red Skin Island (11°34'N, 92°35'E): May 23, 2001, 3 females, 5 males, 2 male terminalia, as adults resting in a tree hole. Wright Myo (11°47'N, 92°42'E): May 24, 2001, 17 females, 27 males, 6 larval skins, 5 male terminalia, as larvae in tree holes; 5 females, 3 males, 1 male terminalia, as adults resting in a tree hole; 6 females, 2 female terminalia, landing on human. Austin (12°52'N, 92°50'E): May 28, 2001, 3 females, 1 male, as larvae in a tree hole; 2 females, 2 males, 1 male terminalia, as adults resting in a crab hole. Karmatang (12°50'N, 92°56'E): May 29, 2001, 3 females, 4 males, 2 male terminalia, as larvae in a tree hole. Mohanpur (12°57'N, 92°51'E): May 30, 2001, 11 females, 11 males, 1 larval skin, 4 male terminalia, as larvae in tree holes; 5 females, 18 males, 2 male terminalia, as adults resting in a tree base; 2 females, 3 males, 2 male terminalia, landing on a human. Kalighat (13°06'N, 92°56'E): May 31, 2001, 2 females as larvae in a tree hole; 1 female adult in crab hole; 3 females, 3 males, 1 male terminalia, as adults resting in a tree base. Bakultala (12°30'N, 92°51'E): June 3, 2001, 9 females, 10 males, 1 larval skin, 3 male terminalia, as larvae in tree holes; 13 females, 5 males, 2 male terminalia, as adults resting in a tree base; 5 females, 2 female terminalia, collected landing on a human. Rangat Bay (12°29'N, 92°57'E): June 3, 2001, 7 females, 13 males, 2 larval skins, 3 male terminalia, as larvae in a tree hole and a swamp pool. Yeratta (12°26'N, 92°53'E): June 4, 2001, 3 females, 1 male, 2 larval skins, 1 male terminalia, as larvae in leaf axil; 1 female, 4 males, 2 male terminalia, as adults resting in a tree base. Ross Island (11°40'N, 92°43'E) (nonmangrove): June 7, 2001, 1 male, 1 larval skin, 1 male

terminalia, as a larva in a tree hole. Mount Harriet (11°43'N, 92°43'E) (nonmangrove): June 16, 2001, 2 males, 2 male terminalia, as larvae in a tree hole.

Car Nicobar. Kimus (9°07'N, 92°46'E): June 12, 2001, 1 female, as larva in a tree hole; 1 female, 1 female terminalia, landing on human.

Associated mosquito species found with *Aedes fumidus* in tree holes were *Ae. albopictus* (Skuse), *Ae. malayensis* Colless, *Armigeres kesseli* Ramalingam, *Culex brevipalpis* Giles, *Ochlerotatus dissimilis* (Leicester), *Oc. greeni* (Theobald), *Oc. niveus* (Ludlow), *Tripteroides indicus* (Barraud), and *Toxorhynchites splendens* Wiedemann. In swamp pools, it was associated with *Anopheles sundaicus* (Rodenwaldt), *An. umbrosus* (Theobald), *Ae. cancricomus* Edwards, *Cx. mammilifer* (Leicester), *Cx. minutissimus* (Theobald), *Cx. pallidothorax* Theobald, and *Cx. spathifurca* (Edwards). In one instance, it was collected with *Ae. krombeini* Huang in a coconut shell.

Aedes amesii: Six specimens were as adults. Materials examined are as follows: Andaman Islands, Wright Myo: May 24, 2001, 1 female resting in a tree hole. Karmatang: May 27, 2001, 2 females, 2 female terminalia, landing on human. May 29, 2001, 2 females landing on human. Mohanpur: May 30, 2001, 1 female, landing on human.

All material examined has been deposited in the mosquito museum of the Culicid Biodiversity Cell at the Vector Control Research Centre, Pondicherry, India.

We thank P. K. Das, Director, Vector Control Research Centre, Pondicherry, for providing facilities and support. The Chief Conservator of Forests and the Divisional Forest Officers of Orissa, West Bengal, and Andaman and Nicobar Islands are gratefully acknowledged for permission and help provided for mosquito collection in the mangrove forests.

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