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Short communication: **First record of *Aedes albopictus* in Gabon, Central Africa**

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Summary The Asian tiger mosquito *Aedes albopictus* is an important arbovirus vector. Originating in East Asia, the species has been introduced to the Americas, the Indo-Pacific and Australasian regions as well as Europe and Africa, mostly during the past 30 years and probably by transportation in used tires. We report *Ae. albopictus* for the first time from Gabon (Libreville). In addition, the yellow fever mosquito *Ae. aegypti* ssp. *formosus* and 16 other culicid species were detected throughout the city, four of which are also new records for Gabon.

keywords *Aedes albopictus*, *Ae. aegypti*, invasive species, BG-Sentinel, Gabon, Africa

The 'Asian tiger mosquito' *Aedes albopictus* (Diptera: Culicidae; = *Stegomyia albopicta* sensu Reinert *et al.* 2004) is an important vector of arthropod-borne viruses such as dengue or chikungunya (CHIK) (Gratz 2004), the latter of which only recently emerged on several islands in the Indian Ocean (Depoortere & Coulombier 2006; Reiter *et al.* 2006). A particular risk is posed by the ongoing worldwide spread of this originally Oriental endemic vector. Beginning its dispersion in modern times in Albania in 1979, *Ae. albopictus* has since invaded North America, South and Central America, the Australasian, Indo-Pacific, Afrotropical regions and Europe (Eritja *et al.* 2005; Aranda *et al.* 2006). From sub-Saharan Africa, relatively few records have been reported; namely from South Africa (1990), Nigeria (1991), Cameroon (2000) and the island of Bioko, Equatorial Guinea (2003) (Aranda *et al.* 2006). However, it has been suggested that this seemingly limited presence might be due to scarce surveying (Eritja *et al.* 2005).

The accepted mode of intercontinental dispersal has been the transport of eggs in used tire shipments (Reiter & Sprenger 1987). The eggs of most *Aedes* species tolerate considerable periods (i.e. months) of desiccation and thus can survive long transports. Furthermore, *Ae. albopictus* is a treehole and container breeder. Hence it prefers small and often man-made oviposition sites, including tires and 'lucky bamboo' containers (Eritja *et al.* 2005).

Despite the previous reports from Central Africa, e.g. Cameroon, *Ae. albopictus* had not yet been detected in neighbouring Gabon. However, the latest published mosquito surveys in the country (other than for *Anopheles*) date back more than 30 years (Mouchet 1971; Service 1976). Of these, only the 1971 survey covered the capital of Gabon, Libreville, where the only *Aedes* species found was *Ae. aegypti* (= *Stegomyia aegypti* sensu Reinert *et al.* 2004) at that time. The coastal city is situated at the Gabon estuary, some 35 km north of the Equator, in a permanently humid tropical climate (mean annual temperature 26 °C). During the short rainy season in November 2006 vector collections were carried out at several locations in Libreville in conjunction with the 2006 EUFOR RD CONGO (European Union Force République démocratique du Congo) mission, using CDC miniature light traps and a BG-Sentinel trap (BioGents GmbH, Regensburg, Germany; Kröckel *et al.* 2006) as well as self-made ovitraps at sites near the international airport in the north (Tahiti) and near the harbour in the south of the city (Owendo). The locations were chosen with respect to proximity to military objects, and traps (CDC and BG traps always combined) were set outdoors in distances of about 1 m to each other and, if possible, where shelter from wind and rain was available. For each collection, the adult traps were operated from around 4:00–6:00 PM (just before sunset) to 9.00–10.00 AM the next morning. The ovitraps were left for 4–6 days. Their laying support consisted of wooden tongue depressors wrapped in elastic bandages, placed in water-filled, black rubber plaster cups.

While the majority of catches at all locations consisted of several *Culex* species, a few adult specimens of the endemic 'yellow fever mosquito' *Ae. aegypti* ssp. *formosus* were also detected throughout the city. Simultaneously, *Ae. aegypti* eggs (as identified from reared larvae) could be obtained from both ovitrap locations mentioned above. However, at Owendo near the harbor (0°19′N; 9°30′E) as

well as at another site more central near the Lowé River (0°22′26″N; 9°30′E) several adults of *Ae. albopictus* (seven females, six males) were caught on two occasions each and also were caught biting us at dusk. Other culicid species we recorded are: *Anopheles gambiae* sensu lato, *Aedes irritans* (first record for Gabon), *Ae. nigricephalus*, *Culex tigripes*, *Cx. rima*, *Cx. nebulosus*, *Cx. cinereus* (first record for Gabon), *Cx. cinerellus* (first record for Gabon), *Cx. quinquefasciatus*, *Cx. antennatus* (first record for Gabon), *Cx. decens* group, *Coquillettidia* sp., *Ficalbia mediolineata*, *Mansonia africana*, *M. uniformis*, *Uranotaenia mashonaensis*.

Although the focal occurrence of *Ae. albopictus* close to the harbour could be attributed to sampling bias, it is more likely to reflect fairly recent invasion via trade shipping, either from infested African countries or of intercontinental origin. However, during the survey no active breeding site was identified, which could be artificial containers or hidden treeholes in nearby forest relics. In terms of potential surveillance it seems notable that all *Ae. aegypti* and *Ae. albopictus* specimens were caught with the BG-Sentinel (which is in fact designed to attract *Aedes aegypti*; Kröckel *et al.* 2006), but without the light traps. Apart from surveillance of used tires the BG-Sentinel therefore seems to be an effective supplementation.

With regard to previous experiences in Cameroon and Nigeria (Simard *et al.* 2005), where *Ae. albopictus* has spread quite rapidly, and in view of its vector potential, it seems prudent to suggest that an in-depth survey and subsequent control efforts be carried out as soon as possible. Yellow fever and CHIK (Gratz 2004) are among the 20 or so human pathogenic arboviruses to which *Ae. albopictus* is known to be susceptible in the laboratory or naturally, respectively. In particular, *Ae. albopictus* has a high vectorial capacity for CHIK at least on La Reunion (Reiter *et al.* 2006). As this virus is endemic to sub-Saharan Africa the need for a quick follow-up response is further corroborated.

As we could demonstrate the co-existence of *Ae. albopictus* and *Ae. aegypti*, consideration should be given to the likely interaction between the two. For example, in North America competitive displacement is well documented (Lounibos 2002), and Gubler (2003) suspected a possible beneficial effect of *Ae. albopictus* displacing *Ae. aegypti* in terms of a lower risk of epidemic transmission of urban arboviral diseases.

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Premier report d' *Aedes albopictus* au Gabon en Afrique centrale

Le moustique tigre asiatique *Aedes albopictus* est un important vecteur d'arbovirus. Provenant de l'Asie de l'Est, l'espèce a été introduite aux Amériques, dans les régions Indopacifiques et de Asie australe ainsi qu'en Europe et en Afrique; la plupart du temps au cours des 30 dernières années et probablement transportée dans des pneus usés. Nous documentons ici pour la première fois *Ae. albopictus* au Gabon (Libreville). En outre, le moustique de la fièvre jaune *Ae. aegypti* ssp. formosus et 16 autres espèces de culicidés ont été détectés dans toute la ville, dont quatre sont également des nouveaux reports pour le Gabon.

mots clés *Aedes albopictus*, *Ae. aegypti*, espèce invasive, BG-Sentinelle, Gabon, Afrique

Primer reporte de *Aedes albopictus* en Gabon, África Central

El Mosquito Tigre Asiático *Aedes albopictus* es un importante vector de arbovirus. Originario del este de Asia, la especie ha sido introducida en las Américas, las regiones del Indo-Pacífico y el Austral Asiático, así como Europa y África, especialmente durante los últimos 30 años y probablemente siendo transportados en neumáticos usados. Por primera vez reportamos la presencia de *Ae.albopictus* en Gabon (Libreville). Adicionalmente se detectaron en la ciudad el mosquito de la fiebre amarilla *Ae. aegypti* ssp. *formosus* y otras 16 especies de Culicidae, cuatro de las cuales son también reportadas por primera vez en esta área.

palabras clave *Aedes albopictus, Ae. aegypti,* especies invasivas, BG-Sentinel, Gabón, África