Contribution to the mosquito fauna of the Greek island of Samos

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Abstract

Mosquito collections were carried out on the Greek island of Samos in early June 2001. Nine mosquito species were recorded: Anopheles claviger Meigen, An. marteri marteri Senevet & Prunelle, An. marteri sogdianus Keishishian, Culex hortensis Ficalbi, Cx. mimeticus Noé, Cx. pipiens Linnaeus, Culiseta longiareolata (Macquart), Cx. subochrea (Edwards) and Coquillettidia buxtoni (Edwards). The latter species, although predicted to be in Greece based on its known distribution, is herein formally reported for the first time. All data presented herein comprise new distribution records due to lack of previous mosquito faunal surveys on Samos.

Key words: Mosquitoes, Samos, Greece.

Introduction

The Greek Island of Samos lies in the eastern Aegean Sea, less than 2 km from the coast of Asia Minor (Turkey) (Figure 1). It is the eighth largest of the Greek Aegean Islands at 475 km², with 159 km of coastline. The island is verdant, and comprises a mountainous western part, with flatter coastal plains to the east. Prior to this study, the mosquito fauna of Samos was completely unknown, but reports of mosquitoes posing a biting nuisance led to governmental mosquito control measures in the east and south east of the island. Its close proximity to Turkey and the reported high densities of mosquitoes at certain times of the year led to local concerns that the inhabitants of Samos may be exposed to mosquito-borne diseases, particularly malaria. This short study formed part of a larger objective to document the presence of members of the Maculipennis Complex in Greece (Linton et al., in press). Here we wanted to establish whether An. sacharovi, a historical vector of malaria in Greece and a current effective vector in Turkey (Kasap, 1990; Alten et al., 2000) and other regions of Europe and the Middle East (see Sedaghat et al., 2003), was present on the island.

Materials and Methods

Mosquito collections were conducted on Samos in early June 2001. Link-reared adult mosquitoes, with associated larval and / or pupal exuviae, serve as vouchers for this work and are housed in the mosquito collections of the Natural History Museum, London (BMNH). Adult mosquitoes were identified according to the keys of Darsie & Samanidou-Voyadjoglou (1997) and Samanidou-Voyadjoglou & Harbach (2001).

Results and Discussion

Nine mosquito species, belonging to four genera (Anopheles, Culex, Culiseta and Coquillettidia), were collected (Table 1). Mosquito larvae were collected from three localities in central Samos (Figure 1; Table 1): the village of Pirgos (site 1), the River Imvarsos between Pirgos and Koumadarei (site 2) and in the Mytilinion stream, north of the village of Mitilinii (site 3). Many potential mosquito-breeding habitats yielded no larvae. Most of the riverbeds across the island were already completely dry as a result of low rainfall the preceding winter and, in the swampy areas of Potokaki and Limnonaki in the east and southeast of the island, respectively (Figure 1), there was evidence of recent insecticide applications. Lack of larvae in these areas, and the generally low densities of mosquitoes across the island, indicates that current mosquito control efforts for nuisance mosquitoes on the island are effective.

Culex species collected as larva included Cx. hortensis, Cx. mimeticus and Cx. pipiens. Culex hortensis was the most widespread and abundant
Table 1: Larval habitats and collection details for species of mosquitoes found on the Island of Samos between 3 and 5 June 2003. Sites 1-3 correspond to larval collections, whereas species collected at site 4 were captured in a human landing collection. Site numbers correspond to those on Figure 1.
species in the larval collections, and was present in both clear and polluted waters (Figure 1; Table 1). Culiseta longiareolata (Macquart) was highly abundant in sites 1 & 2, whereas Cs. subochrea (Edwards) was detected in low numbers in sites 2 & 3 (Figure 1; Table 1). The three Anopheles species detected (An. claviger Meigen and the sibling species An. marteri marteri Senevet & Prunelle and An. marteri sogdianus) Keshishian were only found at site 1 (Figure 1; Table 1). No members of the Anopheles maculipennis group were collected.

A single specimen of Coquillettidia buxtoni (Edwards) was collected along with several Cx. pipiens, biting the senior author in the vicinity of a domestic chicken run on the outskirts of the coastal village of Ireo (site 4) (Figure 1; Table 1). In the annotated checklist of Greek mosquitoes presented by Samanidou-Voyadjoglou & Darsie (1997), the inclusion of Coquillettidia buxtoni was based only on purported distributions, thus herein we formally confirm the presence of this species in Greece for the first time. In the same paper, the occurrence of Culiseta subochrea was noted only from the literature from the 1930s and no recent voucher specimens were available. Personal experience in Samos and on the Greek mainland has shown however that this species is fairly common, and is often found breeding in sympatry with Cs. longiareolata (G. Koliopoulos & Y. Linton, pers. obs.). Voucher specimens for all species collected in this study are housed in the Culicid collections of the Natural History Museum, London.

Of the nine mosquito species collected, few are of medical importance. Although An. claviger has been shown to be involved in malaria transmission, it is thought to be only an occasional vector in Turkey (Postigliaone et al., 1972; Postigliaone et al., 1973) Despite the presence of An. claviger in Samos, their low density and the absence of other efficient vectors including An. sacharovi and An. superpictus makes it highly unlikely that malaria could be a potential health risk to the island’s population, despite its close proximity to Turkey where malaria remains endemic (Alten et al., 2000). Anopheles claviger is also known to vector viruses of the Bunyamwera group in Norway and thus could potentially also act as a vector of this or other viruses in southern Europe (Traavik et al., 1985).

The role that mosquitoes play in the transmission of arboviruses transmitted to both humans and animals are becoming increasingly important with West Nile virus (WNV) currently recognized as Europe’s most important mosquito borne virus. Of the confirmed mosquito vectors of WNV, only Cx. pipiens (found positive in Romania (Tsai et al., 1998)) occurs in Samos, although a number of ornithophilic mosquitoes including other common Culex and Culiseta species may also be involved in the transmission of this virus (Lundström, 1999). The Tahyna virus has been isolated from Cx. pipiens in Romania (Arcan et al., 1974). Studies on Sindbis virus, for which antibodies have been detected in humans in Greece (Pavlatos & Gordon-Smith, 1964), showed that Cx. pipiens (Francy et al., 1989) and other species of Culiseta (Niklasson et al., 1984) are involved in the transmission of this virus. Species of Culex and Culiseta could therefore potentially act as vectors for these viral diseases in Samos or in other areas of Greece.

Although this survey represents only a snapshot view of the mosquito fauna of Samos, this represents the only mosquito faunal survey of the island. This data contributes knowledge to the geographic distribution of mosquitoes in Europe, and is of particular interest to those actively involved in control of mosquito and mosquito-borne diseases in Greece.

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