SHORT COMMUNICATION

Mosquito (Diptera: Culicidae) fauna in natural breeding sites of Attica basin, Greece

I. Kioulos1,2*, A. Michaelakis3, N. Kioulos4, A. Samanidou-Voyadjoglou5 and G. Koliopoulos6

Summary: Mosquito larvae from natural breeding sites within Attica basin were collected in 15-days intervals from March 2007 to December 2008. The two – year study revealed eight different mosquito species which belong to three different genera: Anopheles maculipennis complex, Anopheles claviger, Culex pipiens, Culex hortensis, Culex theileri, Culex territans, Culex impudicus and Culiseta longiareolata. Three additional species were caught as adults (Ochlerotatus zammitii, Aedes cretinus and Aedes albopictus). Culex pipiens and Culiseta longiareolata were found in almost all the breeding sites sampled. Potential threats for public health from the above mentioned species are An. maculipennis, Cx. pipiens, and Ae. albopictus.

Additional keywords: Attica, Greece, larvae, mosquito

The first annotated list of Greek mosquito species by Samanidou-Voyadjoglou and Darsie (1993) was based mainly on data from the literature or specimens retrieved from the National School of Public Health Museum (Athens, Greece). The list contains seven genera, 15 subgenera, 53 species and two subspecies. Soon after, three more records (Aedes berlandi, Aedes annulipes and Culex pusillus) were added to the list (Samanidou-Voyadjoglou & Darsie, 1993). Scattered references basically based on newly discovered species and confirmation by others followed. Kaiser et al. (2001) presented 4 new country records from northern Greece (Ochlerotatus sticticus, Oc. pullatus, Oc. punctor and Oc. cataphylla), whereas the presence of invasive species of medical importance (Culex tritaeniorhynchus and Aedes albopictus) was confirmed later (Samanidou & Harbach, 2003; Samanidou-Voyadjoglou et al., 2005).

The urban area of the Greek capital, Athens, extends beyond the administrative municipal city limits into the basin of Attica with a population of 5 million habitats, which is approximately half of the total population of the country (EL. STAT, 2012). The current study aims at some qualitative data regarding the mosquito fauna of Athens and its surroundings after the Olympic Games of 2004, when substantial changes in the infrastructure resulted in changes at the geographical landscape and the associated micro climates of Attica (Tziralis et al., 2005).

Natural breeding sites of mosquito larvae in the basin of Attica were surveyed for the presence of mosquito species, especially those of medical importance, from March 2007 to December 2008. The study area

1 Directorate of Plant Produce Protection, Ministry of Rural Development and Food, 150 Syggrou Avenue, GR-176 71 Kallithea, Attica, Greece
2 Laboratory of Pesticide Science, Agricultural University of Athens, 75 Iera Odos Str., GR-118 55 Athens, Greece
3 Laboratory of Agricultural Entomology, Department of Entomology and Agricultural Zoology, Benaki Phytopathological Institute, Greece, 8 St. Delta Str., GR-145 61 Kifissia, Attica, Greece
4 Directorate of Public Health, Prefecture of Korinthos, GR-201 00 Korinthos, Greece
5 Entomology and Tropical Diseases Laboratory, National School of Public Health, Greece
6 Laboratory of Biological Control of Pesticides, Benaki Phytopathological Institute, 8 St. Delta Str., GR-145 61 Kifissia, Attica, Greece
* Corresponding author: kioulose@yahoo.ca
is defined by natural borders: four major mounts (mount Imittos in the East, mount Parnitha in the North, mount Penteli in the North-east and mount Oros-Aegaleo in the West) and the Saronikos Gulf in the South (Figure 1).

The potential natural larval habitats were mapped and eight representative sampling sites were selected, also taking into account accessibility standards of each site: Pikrodafni, Podoniftis, Kokkinos Mylos, Profitis Ilias, Ivis, Maroussi, Chelidonou, Kato Kifissia (Figure 1). Sampling for mosquito larvae was conducted with a 350 ml dipper once every two weeks. Mosquito larvae were then transferred to Benaki Phytopathological Institute (Laboratory of Insecticides of Public Health Importance, Athens-Greece) and to the National School of Public Health (Laboratory of Entomology and Tropical Diseases, Athens-Greece), and were reared to adults (T= 25±2°C, PH= 14:10 L:D). A few adult specimens were also caught (using mouth aspirator) during larval sampling visits. All specimens were identified to species in the adult stage according to identification keys (Harbach, 1985; Glick, 1992; Darsie & Samanidou-Voyadjoglou, 1997; Samanidou-Voyadjoglou & Harbach, 2001).

Larval surveys revealed 7,896 mosquito specimens classified to eight different species. During the entire study period, larvae of Cx. pipiens and Cs. longiareolata were constantly recorded in all sampling sites. Four more Culex species (Cx.hortensis, Cx. theileri, Cx. territans, and Cx.impudicus) were found sporadically in two different sampling sites (Ivis and Profitis Ilias, Figure 1). Culex territans seems to appear late in the summer and in early autumn (September 2007 and August – October 2008, Table 1), whereas Cx. hortensis, Cx. theileri and Cx. impudicus occur during the summer months (June – August, 2007 and 2008, Table 1). Anopheles

Figure 1. Geographical distribution of collection sites of mosquito species sampled as larvae from natural breeding sites within the Attica basin from March 2007 to December 2008.
Maculipennis complex and An. claviger were present in three (Chelidonou, Ivis, Profitis Ilias, Figure 1) and four (Kokkinos Mylos, Ivis, Profitis Ilias, Kato Kifissia, Figure 1) sampling sites, respectively, and their highest larval population densities were recorded also in the summer period (July - August 2007 and 2008). The presence of An. claviger larvae during the winter months indicates that this species overwinters at the larval stage in the Attica region, a fact that coincides with findings by Becker et al. (2010).

Adult specimens of Ochlerotatus zammitii (Pikrodafni, Figure 1), Aedes cretinus (Chelidonou, Ivis and Profitis Ilias, Figure 1) and Aedes albopictus (Podoniftis, Figure 1) were also caught during the sampling period while females of these three species tried to bite. The two last species (Ae. cretinus and Ae. albopictus) belong to genus Stegomyia and were never sampled as larvae or pupae during the present study. Their larvae develop in tree-holes, phytotelmata and other artificial containers such as tires, barrels, cans etc (Reiter & Sprenger, 1987; Grist, 1993; Simard et al., 2005). Aedes albopictus was firstly reported in northwestern Greece in 2003 (Samanidou-Voyadjoglou et al., 2005). It is a species of great medical importance since it can transmit at least 24 diseases, among which dengue and dengue hemorrhagic fever (Mitchell, 1995; Lundstrom, 1999).

Even though Attica is a densely urbanized and populated city, the current study revealed that medical important mosquito species, such as Cx. pipientis and An. maculipennis may proliferate in the remaining natural breeding sites. These species are active for several months of the year threatening a large amount of the population in many areas of Attica. A mosquito vector surveillance and population monitoring program should be established including the surveillance of invasive species (ECDC, 2012).

### Literature cited


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ΣΥΝΤΟΜΗ ΑΝΑΚΟΙΝΩΣΗ

Καταγραφή της πανίδας των κουνουπιών (Diptera: Culicidae) σε φυσικές εστίες του λεκανοπεδίου της Αττικής

Η. Κιουλός, Α. Μιχαηλάκης, Ν. Κιουλός, Α. Σαμανίδου-Βογιατζόγλου και Γ. Κολιόπουλος

Περίληψη Πραγματοποιήθηκαν δειγματοληψίες ατέλων σταδίων κουνουπιών από φυσικές εστίες στο λεκανοπέδιο της Αττικής από το Μάρτιο του 2007 έως το Δεκέμβριο του 2008 κάθε 15 μέρες. Οι φυσικές εστίες που επιλέχθηκαν βρίσκονται εντός του λεκανοπεδίου Αττικής όπως αυτό ορίζεται από του ορεινού όγκους της Πάρνηθας, του Υμηττού, του Όρους Αιγάλεω, της Πεντέλης και της θαλάσσιας ζώνης του Σαρωνικού κόλπου. Καταγράφηκαν συνολικά 8 είδη κουνουπιών που ανήκουν στα γένη Anopheles, Culex, και Culiseta. Αναλυτικά, τα είδη που αναγνωρίστηκαν ήταν τα ακόλουθα: Anopheles maculipennis, Anopheles claviger, Culex pipiens, Culex hortensis, Culex theileri, Culex territans, Culex impudicus, Culiseta longiareolata. Εκτός των ειδών αυτών, τρία ακόμα είδη συλλέχθηκαν ως ακμαία (Aedes cretinus, Aedes albopictus και Ochlerotatus zammitii), χωρίς όμως να εντοπιστούν τα ατέλη τους στάδια κατά τη διάρκεια αυτής της μελέτης. Από όλα τα παραπάνω είδη, σημαντικό γενικομοσφαιρικό ενδιαφέρον παρουσίαζαν τα είδη Anopheles maculipennis, Aedes albopictus και Culex pipiens γεγονός που καθιστά αναγκαία τη διαρκή παρακολούθηση των πληθυσμών τους καθώς και τον σχεδιασμό και την εφαρμογή κατάλληλων μέτρων καταπολέμησης.