

ANOPHELINE MOSQUITOES (DIPTERA, CULICIDAE) RECORDED IN POTISJE OF THE PANNONIAN PLAIN*

Ž. R. Adamović

Institute for Medical Research, Beograd

SUMMARY

Four anopheline species were recorded in Potisje, the river Tisa lowlands in the Pannonian Plain. *Anopheles claviger* seems to be an extremely rare species in Potisje; *A. maculipennis* is a rare species in the area; *A. messeae* is to be found in the whole area, and it is the predominant mosquito in the majority of sites; *A. atroparvus* is a moderately common to common species in the whole area, being the predominant anopheline mosquito in north Potisje. The frequent occurrence and the predominance of *A. atroparvus* in north Potisje is due to relatively high concentration of dissolved salts in stagnant and slowly current water of the area. — In addition, the following six culicine species were recorded together with the anopheline mosquitoes in the stables and cow-houses of the examined sites: *Culiseta annulata*, *Mansonia richiardii*, *Aedes vexans*, *Aedes caspius*, *Aedes dorsalis*, and *Culex pipiens*.

INTRODUCTION

While researching the anopheline mosquitoes of the country surrounding Beograd, Chloupek (1945) recorded the species *Anopheles messeae* and *Anopheles atroparvus* in Baranda, a village situated at south-east end of the river Tisa lowlands. Vukasović (1950) published the results of his examinations in the same area and, among other things, pointed out that the relative abundance of the species *A. atroparvus* ranged from 28,4% to 28,7% in the village Baranda. No other data upon the anopheline mosquitoes of the Serbian part of the Tisa lowlands are available.

An examination of the mosquitoes was carried out by the author in the whole area of, so called Potisje, the river Tisa lowlands from the Yugoslavia-Hungary boundary to the river mouth. The investigation is a part,

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of a larger project to search for viruses in mosquitoes inhabiting Serbia. — The scope of the present paper is limited to a survey of the distribution and the relative abundance of anopheline mosquitoes in Potisje.

AREA SURVEYED

Potisje is situated between latitudes 45°00' and 46°15' north, and longitudes 20°00' and 20°30' east of Greenwich. The gradient of stream of the Tisa is very slight; and, therefore the river follows a meandering course as it progresses across the Pannonian Plain. Before drainage and flood protection barriers were introduced, the area was regularly flooded, and numerous extensive marshes were to be seen. Even now, many semicircular or oxbow marshes and separate old branch streams are found in the alluvial plain of the river Tisa (Fig. 1, left). In addition, a complex system of artificial channels is a characteristic feature of the area. The saline soil occupies a large part of Potisje and, stagnant and slowly current water has often a relatively high concentration of dissolved salts (G. Petrović, 1956). — The area has a continental climate, characterized by hot, dry summers, severe winters, and relatively small precipitation. The hottest month is July, and the coldest is January. The mean annual rainfall is about 570 mm, with a maximum in May, a secondary maximum in October, and a minimum in February.

METHOD OF SAMPLING

Mosquitoes were collected in the stables with horses and cow-houses of the twelve villages in Potisje, from June till October during 1974 and 1975. A female resting on the ceiling or a wall of an animal shelter is captured directly in a separate glass test tube, 15 mm wide and 160 mm long, provided with a strip of moist filter paper, and plugged with a loose wisp of cotton. It is a convenient method to capture mosquito females which are to be kept alive until oviposition occurs.

RESULTS

More than twelve thousands anopheline females were collected in the twelve villages of Potisje during the two years 1974 and 1975. The following four anopheline species were recorded: *Anopheles claviger* (Meigen 1804), *Anopheles maculipennis* Meigen 1818, *Anopheles messeae* Falleroni 1926, and *Anopheles atroparvus* Van Thiel 1927.

A. claviger seems to be an extremely rare species in the area. Two females (Perlez, 7. VI — 1975) oviposited in captivity, and two others (Melenci, 11. VI — 1975) were identified among the females which died without oviposition.

All other females (12,578 specimens) are of the *maculipennis* complex. The three species of the complex were identified by the shape, colour, surface-pattern and float structure of eggs. The percentage of females which oviposited ranged from 5,64% (a sample taken in Martonoš, 1974) to 65,90% (Čenta, 1974). A total of 3896 females (30,97%) deposited the batches of eggs ready for identification. The number of females collected and the number and percentage of females depositing eggs in captivity varied from village to village, as follows: Martonoš 1074 (376 or 35,01%), Čoka 1284 (412 or 32,08%),

Bečej 935 (213 or 22,78%), Biserno Ostrvo 920 (178 or 19,34%), Melenci 865 (267 or 30,86%), Žabalj 947 (155 or 16,36%), Ečka 1247 (483 or 38,73%), Perlez 882 (136 or 15,41%), Sakule 1290 (433 or 33,56%), Čenta 928 (377 or 40,62%), Baranda 990 (448 or 45,25%), and Opovo 1216 (418 or 34,37%).

The distribution and relative abundance of the species *A. maculipennis*, *A. messeae* and *A. atroparvus* in the twelve examined sites are summarized in a figure (Fig. 1, right). No significant differences were recorded between

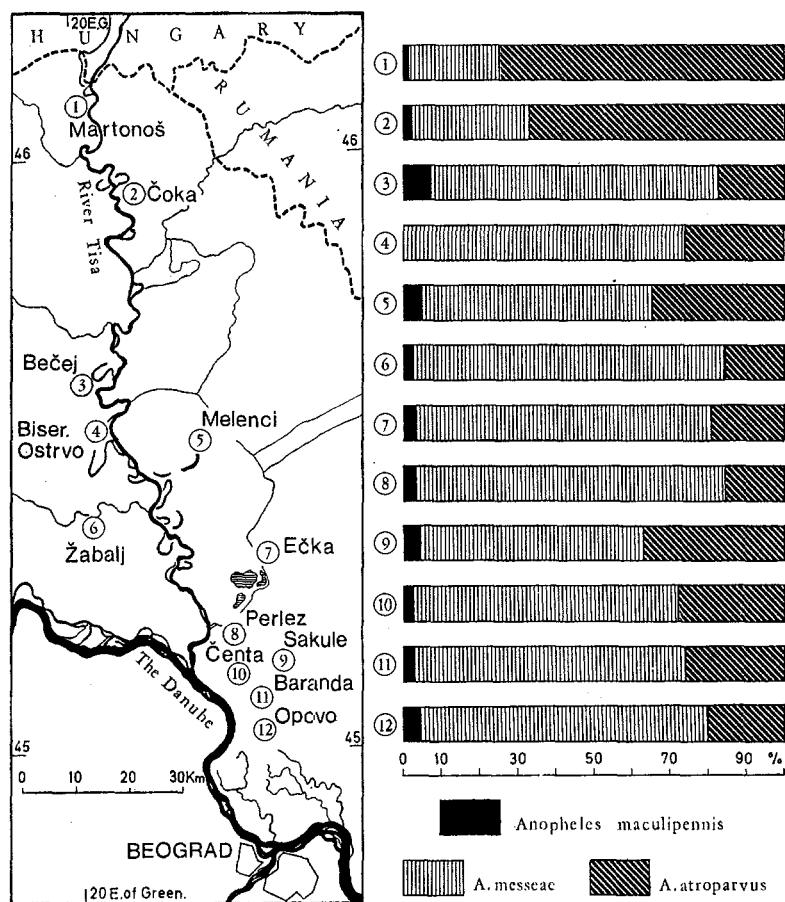


Fig. 1. A map showing the area of Potisje, the river Tisa lowlands in the Pannonian Plain (left); and, the relative abundance of the three species of the *maculipennis* complex, presented as the mean percentage composition of the species in the examined sites: 1 — Martonoš, 2 — Čoka, 3 — Bečej, 4 — Biserno Ostrvo, 5 — Melenci, 6 — Žabalj, 7 — Ečka, 8 — Perlez, 9 — Sakule, 10 — Čenta, 11 — Baranda, 12 — Opovo (right).

1974 and 1975 in the relative numbers of the three species of the *maculipennis* complex.

A. maculipennis is obviously a rare species in Potisje. The relative abundance of the species ranged from 1,67% to 9,42% with an average of 3,34 per cent. The species was not recorded in the village Biserno Ostrvo. It probably exists in the site, but it is so rare that no one specimen has been found in the examined samples.

A. messeae was recorded in all the examined villages; and, it was by far the most abundant anopheline mosquito in the majority of sites. The relative abundance of the species ranged from 22,22% to 85,00% with an average of 62,65 per cent. The batches of eggs of *A. messeae* var. *atroparvoides* Kunst et Novak 1956 were seldom found.

A. atroparvus was also found in the whole area with a relative abundance ranging from 12,00% to 77,78%; on average 34,01 per cent. It was the predominant anopheline mosquito in the villages Martonoš and Čoka in north Potisje.

The eggs of the melanistic aberrations, always few in number, were sporadically found among the typical eggs of the batches of the three species of the *maculipennis* complex.

In addition, six culicine species were recorded together with the anopheline mosquitoes in the stables and cow-houses in the examined sites, namely: *Culiseta annulata* (Schrank 1776) a moderately common species in the whole area; *Mansonia richiardii* (Ficalbi 1889) a rare species, but sporadically common like in Čoka and Perlez; *Aedes vexans* (Meigen 1830) an abundant culicine mosquito of the whole area; *Aedes caspius* (Pallas 1771) a moderately rare species in the stables and cow-houses of the whole area; *Aedes dorsalis* Meigen 1830 a moderately rare species in the mentioned shelters of Martonoš, Čoka and Melenci; *Culex pipiens* Linnaeus 1758 a rare to moderately rare species in the stables and cow-houses of the whole area, however, it is a very numerous mosquito in the cellars and some wells in the examined villages.

DISCUSSION

The anopheline *A. claviger* was previously estimated as an extremely rare species in the village Kupinovo situated in the alluvial plain of the river Sava (Adamović, 1975).

The distribution and relative abundance of the three species of the *maculipennis* complex recorded in south Potisje are in close agreement with the results of the previous examination of these mosquitoes in Serbia. However, the predominance of *A. atroparvus* in north Potisje requires an explanation.

The anopheline mosquitoes *A. maculipennis* and *A. atroparvus* have been estimated as rare species, while *A. messeae* has been described as the most abundant and predominant anopheline mosquito in the country surrounding Beograd (Chloupek, 1945; Kostić, 1946; Vukasović, 1950; Vukasović et al. 1953).

A. messeae is a common and very numerous anopheline mosquito in the river Sava and the Danube lowlands; *A. maculipennis* is a relatively common species of hilly areas of Serbia; *A. atroparvus* is a rare species in the Danube lowlands but, exceptionaly, it is a common species in Godominsko Polje near

Smederevo in the Danube lowlands. The latter is due to the relatively high salinity of marshy and canal water in Godominsko Polje (Guelmino et al 1951).

As it was pointed out previously, saline soil occupies a large part of Potisje. The saline soil and saline stagnant and slowly current water are particularly often found in north Potisje. The frequent occurrence of *A. atroparvus* in almost the whole area, and the predominance of the species in north Potisje, are due to relatively high concentration of dissolved salts in stagnant and slowly current water of the area. The latter could be also a possible reason for the occurrence of the culicine mosquito *Aedes dorsalis* in Potisje.

The mosquitoes *Anopheles atroparvus*, *Aedes dorsalis* and *Aedes detritus* have been also found in some saline districts of the Hungarian part of the Pannonian Plain (Mihályi & Sztankay-Gulyás M., 1963). — The present records of the three species of the *maculipennis* complex in Potisje are also in close agreement with the distribution and relative abundance of the three species described in the Rumanian part of the Pannonian Plain (Lupasco & M. Duport, 1968).

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