Research on the mosquitoes of Portugal *(Diptera, Culicidae)*

I — Four new culicine records

H. RIBEIRO (1), HELENA C. RAMOS (2), C. ALVES PIRES (3) & R. ANTUNES CAPELA (4)

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1 — INTRODUCTION

The first five mosquito species from Portugal were recorded by M. Sarmento & C. França (1), in 1901: *Anopheles* (*A.*) *claviger* (Meigen, 1804), *Aedes* (*S.*) *aegypti* (L., 1762), *Culiseta* (*C.*) *annulata* (Schrank, 1776), *Culiseta* (*All.*) *longiareolata* (Macquart, 1838) and *Culex* (*C.*) *pipiens* L., 1758. The following year, *Anopheles* (*A.*) *maculipennis* Meigen, 1818 was also recorded by the same Authors (2). In 1906, two new culicine records were added to the portuguese mosquito fauna by R. Jorge & M. Sarmento (3): *Aedes* (*O.*) *pulchritarsis* (Rondani, 1872) and *Culex* (*N.*) *impudicus* Ficalbi, 1890. New additions, however, had to wait for the year 1931, when J. M. Braga (4) published his important monograph on portuguese mosquitoes including 21 species, 13 of which were recorded for the first time: *Anopheles* (*A.*) *plumbeus* Stephens, 1828, *Coquillettidia* (*C.*) *richiardi* (Ficalbi, 1889), *Aedes* (*O.*) *caspius* (Pallas, 1771), *Aedes* (*O.*) *detritus* (Haliday, 1833), *Aedes* (*O.*) *mariae* (Sergent & Sergent, 1903), *Aedes* (*O.*) *rusticus* (Rossi, 1790), *Aedes* (*F.*) *echinus* (Edws., 1920), *Aedes* (*F.*) *geniculatus* (Olivier, 1791), *Aedes* (*Aedim.*) *vexans* (Meigen, 1830), *Culex* (*M.*) *hortensis* Ficalbi, 1889, *Culex* (*N.*) *territans* Walker, 1856, *Culex* (*C.*) *laticinctus* Edws., 1913 and *Culex* (*C.*) *theileri* Theo., 1903. In 1933, F. Landeiro & F. J. C. Cambournac (5) recorded *Anopheles* (*A.*) *atroparvus* Van Thiel, 1927 (as *maculipennis* var.). In 1938, F. J. C. Cambournac (6) described *Aedes* (*O.*) *longitubus from* Águas de Moura and recorded, in 1941, *Orthopodomyia pulchripalpis* (Rondani, 1872) from the same locality (7). Finally, in 1965 the till now known list of 25 portuguese mosquitoes was completed by Mattingly (*fide* Coluzzi *et alii* (8)), with the addiction of *Anopheles* (*A.*) *petragnanii* Del Vechio, 1939.

In spite of the important contributions by these and other Authors, specially by J. M. Braga, the study of the mosquito fauna of Portugal is obviously in need of much more extended research efforts. In the course of the field

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work carried out by the writers during 1975 and 1976 in the Provinces of Algarve, Lower Alentejo and Upper Alentejo, four not previously recorded culicines were found. With these new records, here dealt with, the list of Portuguese mosquitoes now comprises 29 species.

2 — GAZETTEER OF COLLECTING LOCALITIES

The approximate coordinates and altitudes of the collecting localities cited in the text are given in the list below. The localities are also marked on Map 1.

Localities	Latitude (N)	Longitude (W)	Altitude (m)
ALJEZUR	37° 18′	8° 47′	80
AMIEIRA	38° 17′	7° 33′	150
BEIRÃ (Vide river)	39° 24′	7° 26′	400
CANHESTRO RIVER (S of Fer[a] do Alentejo)	38° 02′	8° 07′	100
COUÇO (Sorraia river)	38° 59′	8° 17′	50
DEGEBE RIVER (Vendinha)	38° 27′	7° 41′	200
ERMIDAS-SADO	38° 00′	8° 23′	50
FARO	37° 01′	7° 57′	sea coast
FRONTEIRA	39° 03′	7° 38′	200
GUADIANA RIVER (W of Mourão)	38° 22′	7° 22′	100
LAMAROSA RIVER (Raposa)	39° 03′	8° 33′	100
MARANHÃO	39° 00′	8° 00′	100
MARATECA	38° 34′	8° 40′	50
MONTARGIL	39° 05′	8° 07′	100
MORA	38° 57′	8° 08′	100
NISA	39° 27′	7° 36′	250
ODEMIRA	37° 36′	8° 42′	100
ODIVELAS RIVER	38° 15′	8° 22′	50
PONTE DE SOR	39° 14′	8° 00′	100
REDONDO	38° 39′	7° 31′	220
SANTANA	39° 36′	7° 43′	100
S. CRISTÓVÃO	38° 27′	8° 18′	100
SEDA RIVER	39° 27′	7° 41′	200
SEVER RIVER	39° 29′	7° 25′	200
TOLOSA	39° 25′	7° 40′	250
TORRÃO	38° 17′	8° 13′	50

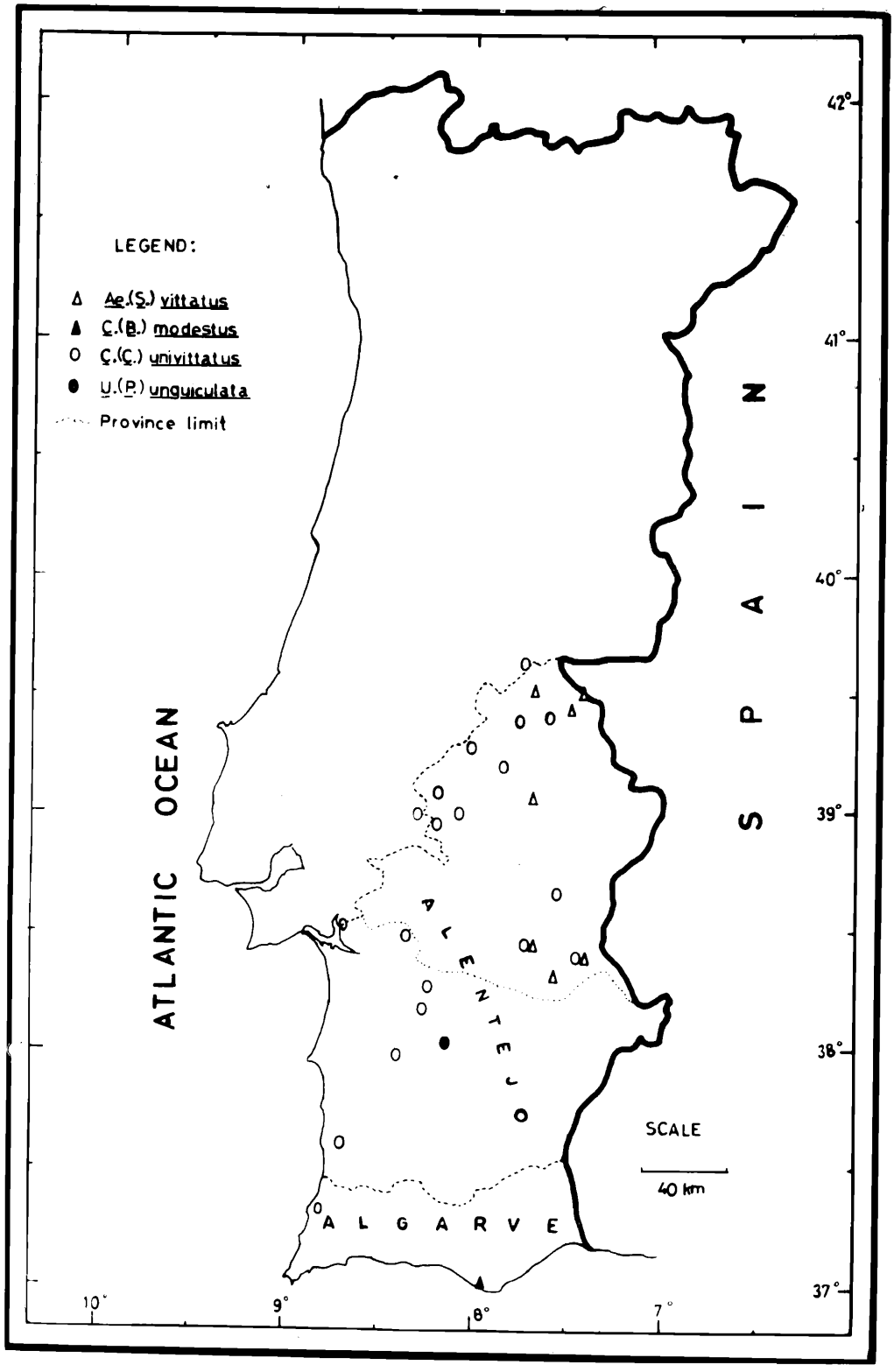
3 — THE NEW CULICINE RECORDS

3.1 — AEDES (STEGOMYIA) VITTATUS (Bigot, 1861)

MATERIAL EXAMINED. *AMIEIRA* (Degebe river), 1 ♀ plus 52 larvae (most in alcohol), 25 and 27.VIII.1976; *BEIRÃ* (Vide river), 5 ♀ 1 ♂, 2.IX.1976; *DEGEBE RIVER* (Vendinha), 32 ♀ 14 ♂ plus 20 larvae (13 in alcohol), 28.VIII.1976; *FRONTEIRA* (Aviz river), 37 larvae (most in alcohol), 1.IX.1976; *GUADIANA RIVER* (W of Mourão), 41 ♀ 9 ♂ 94 larvae (most in alcohol), 28.VIII.1976; *NISA*, 4 ♀ 3 ♂, 3.IX.1976; *SEVER RIVER*, 9 ♀ 12 ♂ 30 larvae (most in alcohol), 2.IX.1976.

DISTRIBUTION. As it was pointed out by Mattingly (9), *Aedes vittatus*, besides being a widely distributed species in Africa South of the Sahara, was known to occur also as two isolated refuge populations, one in the western Mediterranean area, from Spain to continental Italy (Coluzzi (10)), and the other in the South-eastern Asia, from India to Vietnam, Malaya and Hainam Island. The occurence of *Ae. vittatus* in Portugal was, therefore, to be expected, Portuguese records representing the westernmost ones within the western Mediterranean refuge.

As it is shown on Map 1, our seven locality records for *vittatus* lie within the eastern Upper Alentejo, no *vittatus* being found in the western half of this Province, in the Lower Alentejo nor in Algarve. From the geological viewpoint, the area now recorded for *vittatus* corresponds to that of the most ancient rocks within the three surveyed Provinces. These rocks, in which holes



MAP 1 — *Known distribution in Portugal of* Aedes *(S.)* vittatus, Culex *(B.)* m. modestus, Culex *(C.)* univittatus *and* Uranotaenia *(P.)* u. unguiculata

this mosquito bred, were either Hercynian granites (Carboniferous), Lower Silurian schists (schists of Moura) and Cambrian and Pre-Cambrian schists variably affected by regional metamorphism (schist-sandstone complex of the Beiras).

Ae. vittatus is expected to occur also north of Tejo river and, in fact, Prof. F. J. C. Cambournac kindly informed us that he had found *vittatus* larvae at the Serra da Estrela (1).

TAXONOMIC NOTES. Portuguese adult specimens from Alentejo exhibit the same variations as those of Sardinia and Corsica, as shown by Aitkens (11), namely: (a) proboscis black or almost so, (b) reduction of the basal white bands on abdominal tergites, discontinnous with the lateral patches and (c) wings black except for a narrow patch of white scales at the base of the coastal vein. Curiously enough, these variations were also found by the writers in the Angolan population of *vittatus* (12).

Fig. 1 shows details of the male terminalia of *Ae. vittatus* from the margins of the Degebe river, at Vendinha.

36 mounted fourth instar larvae were examined, all of them also from Upper Alentejo. The antennae are either spiculate (53 %) or smooth (47 %), while in Aitkens'material from Sardinia and Corsica they were always smooth and the Angolan larvae had sparsely spiculate antennae. Portuguese larvae have 6-15 comb spines instead of the 8-10 spines found both in the larvae from Corsica and Sardinia as in those from Angola. Finally, it is also to be noted that the number of branches of the siphonal tuft is greater in Portuguese larvae [4-7] than in Aitkens' material [3-4].

BIOECOLOGICAL NOTES. 9 larval biotopes of *Ae. vittatus* were examined, all of them exposed rock-pools at river margins, either on granites [5] or on schists [4]. The breeding water, brownish in two instances, was usually limpid though often with decaying vegetable debris. The pH of the water, measured in all the breeding places, was always low, varying from 5.0 to 6.5 (mean 6.0).

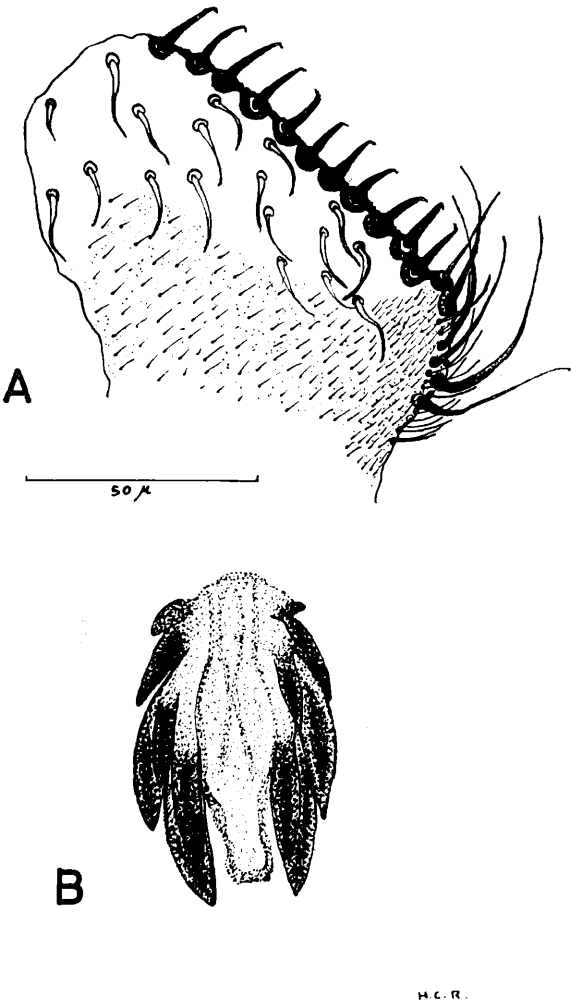


Fig. 1 — Aedes (S.) vitatus *(Bigot), male terminalia, Degebe river (Vendinha).* A — *basal lobe of coxite;* B — *phallosome*

Larvae of four other mosquito species were found as associates of *Ae. vittatus* in its breeding sites: *Culex pipiens* (5 *times*), *Culiseta longiareolata* [3], *Culex theileri* [2] and *Anopheles atroparvus* [1]. In two of the *vittatus* breeding places no associated mosquito larvae were found.

14 unfed females and 1 male were caught as adults, the remainder adult specimens being reared *ex larva*. The adults were caught by day, with a cloudy sky, when resting either on the breeding water surface or on the rock near the breeding place. No *vittatus* females were seen biting man or animals.

Figs. 2, 3 and 4 illustrate the breding area of *Ae. vittatus*.

(1) After the manuscript of the present paper was sent to publication (3rd May 1977) an article by Prof. F. J. C. Cambournac has appeared concerning his record.

Fig. 2 — *Rock-pools in the margins of the Guadiana river, west of Mourão, breeding area of* Aedes *(S.)* vittatus *associated with* Culiseta *(A.) longiareolata*

Fig. 3 — *Peppeting larvae of* Aedes *(S.)* vittatus *and of the associated* Culex *(C.)* pipiens *and* Culiseta *(A.)* longiareolata *from an exposed rock-pool in the granite of the Vide river margins, near Beirã*

3.2 — CULEX (BARRAUDIUS) MODESTUS MODESTUS Ficalbi, 1889

MATERIAL EXAMINED. FARO, 2 ♂ *ex pupa* (pupal pelts lost), 21.VIII.1975.

DISTRIBUTION. *Culex m. modestus,* described from Ravenna (Italy), is a Mediterranean mosquito known to occur from Spain to Iraq, Georgia and Pakistan (Kashmir), with an eastward extension through southern Siberia into China. Recently, a new form of *C. modestus* was described by Kamimura & Wada (13) from Japan, the subspecies *inatomii.* Both forms of *C. modestus* seem to be mainly coastal mosquitoes particularly associated with salt water marshes, though there are also several inland records for the type form.

The present record of *C. modestus* from Faro (Map 1) is in agreement with the pattern of distribution of the nominate subspecies.

TAXONOMIC AND BIOECOLOGICAL NOTES. The morphology of the two males from Faro agree quite well with known descriptions of the nominate subspecies. In particular, male genitalia of Portuguese specimens are practically as figured by Brunhes & Venard (14).

Our *modestus* bred in a very shallow ground pool of limpid, slightly greenish water with emergent grasses and a pH 6.8. The breeding place,

Fig. 4 — *General view of the Degebe river at Amieira, breeding area of* Aedes *(S.)* vittatus *and* Culex *(C.) pipiens*

apparently at the limit of the salt water marshes in the area, was probably influenced by major tides. The chloride content of the brackish breeding water was 3.15 g/l (NaCl).

Anopheles atroparvus and *Culex theileri* were associated species in the same larval biotope.

Fig. 5 shows the breeding area of *C. m. modestus* at Faro.

3.3 — CULEX (CULEX) UNIVITTATUS Theobald, 1901

MATERIAL EXAMINED. *ALJEZUR,* 1 ♀, 27.VIII.1975; *COUÇO* (Sorraia River), 1 larva 9.IX.1976; *DEGEBE RIVER* (Vendinha), 1 ♂ 1 larva, 28.VIII.1976; *ERMIDAS SADO,* 1 ♀ 17.VIII.1976; *GUADIANA RIVER* (W of Mou-

Fig. 5 — *Marshy larval biotope of* Culex *(B.)* m. modestus *and associated* Anopheles *(A.)* atroparvus *and* Culex *(C.) theileri, near Faro airport*

rão), 2 ♂ 2 larvae, 28.VIII.1976; *LAMAROSA RIVER* (Raposa), 10 larvae (3 in alcohol), 10.IX.1976; *MARANHÃO,* 3 larvae, 1.IX.1976; *MARATECA,* 1 larva, 13.IX.1976; *MONTARGIL,* 1 ♂ 5 larvae (1 in alcohol), 9.IX.1976; *MORA,* 1 ♀ 1 ♂ plus 1 larva, 9.IX.1976; *NISA,* 3 ♀ 3 ♂ 3 larvae, 3.IX.1976; *ODEMIRA,* 3 larvae, 18.VIII.1976; *ODIVELAS RIVER,* 9 larvae, 7.IX.1976; *PONTE DE SOR,* 1 larva, 1.IX.1976; *REDONDO,* 6 ♀ 4 ♂ 7 larvae, 28.VIII.1976; *SANTANA, 5 larvae* (1 in alcohol), 3.IX.1976; *S. CRISTÓVÃO,* 1 ♀ 2 larvae, 8.IX.1976; *SEDA RIVER,* 2 ♀ 3 ♂ 8 larvae (3 in alcohol), 1.IX.1976; *TOLOSA,* 1 ♂, 3.IX.1976; *TORRÃO,* 1 larva, 7.IX.1976.

DISTRIBUTION. The known distribution pattern of *C. univittatus,* similar to that of *Aedes vittatus,* is quite interesting from the zoogeographical viewpoint (Mattingly, *op. cit.).* Widely distributed in Africa South of Sahara, *C. univittatus* has two other isolated refuge populations: a western Mediterranean one, known from Spain and the Tell of Algeria (Senevet *et al* (15)), and an eastern Mediterranean population which extends through Middle East to the North-west of India. The occurrence of *C. univittatus* in Portugal was, therefore to be expected.

Map 1 shows the wide distribution of *univittatus* throughout the now surveyed Portuguese territory.

TAXONOMIC NOTES. In the writers' view, the systematics of the different forms of. *C. univittatus sensu lato* cannot yet be satisfactorily stated. The taxonomic status of the allied forms *perexiguus* and *neavei,* both also described by Theobald (16, 17) as distinct full species, has been subjected to much controversy by Edwards (18), Mattingly (9), Mattingly & Knight (19), Stone *et al.* (20) and Jupp (21,22). Quite recently, White (23) reinstated *perexiguus* and *neavei* to full species rank and proposed a key for separating the adults of the three assumed African species of this *univittatus* group based on the scaling of mid femur (♀ ♂) and the lenght of the outer division («spine») of the aedeagal plate.

Unfortunately, this key seems not to be much valuable in ascertaining to which of these two forms of the *univittatus* group Portuguese material belongs. In fact, though the pale scaling of the mid femur both in our females and males is highly variable (from only a few scattered pale scales on basal fourth to a quite distinct stripe almost reaching to the distal end of the segment), the mid femur must be said «without a *complet* anterior stripe» if we mean by complete a stripe «extending its whole length» (Jupp) (21). On the other hand, the aedeagal «spine» of Portuguese males, as it is shown in Fig. 6, is a

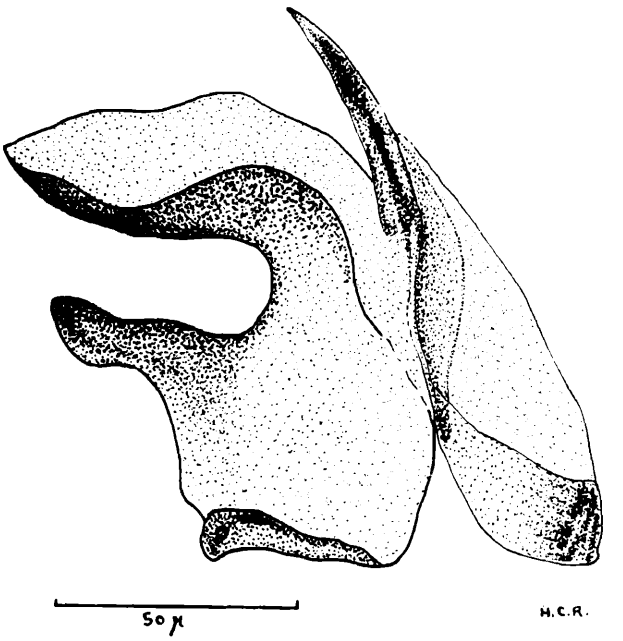


Fig. 6 — Culex *(C.)* univittatus *Theo., outer division of the lateral aedeagal plate, from Degebe river (Vendinha)*

well developed one, excluding the remote possibility that we are dealing with the saharian and eastern Mediterranean *perexiguus.* That is, according to the diagnostic characters used in the key of White, our material would be *C. neavei* Theo., an identification which must be regarded with the greatest reserve not only on distributional grounds but also if we take into account other morphological characters not included in the key of White. In fact, if we consider the redescriptions of *neavei* type material made by Edwards (18) and by Jupp (21), portuguese specimens (16 ♀ and 15 ♂ examined) cannot be *neavei,* as: (a) there is a distinct white stripe on hind tibia in all the females and in most [10] of the males, sometimes reaching to the extremity of the segment (a faint stripe is also present in the remainder 5 males); (b) in the male termi-

nalia, the foliole is narrow, the «foliolar index» (R_1) of Jupp (21) varying from 34 to 47 (mean 42); (c) in both sexes the dorso-anterior dark stripe of hind femur is usually long, «the femoral index» (R) of Jupp (21) being over 75 in 25 out of 30 specimens examined (mean 83; range 51-97).

On the other hand, these taxonomic difficulties are even greater if we adopt the diagnostic criteria proposed by Jupp (22), in which case we had to identify all our males as *C. univittatus* Theo. and most, at least, of the females as *C. neavei* Theo., while there would be no discernible connexion between sexes of both forms.

According to the preceding notes, after excluding *perexiguus* the writers are tentatively treating the Portuguese population as *C. univittatus* Theo., 1901 while regarding form *neavei* as an infrasubspecific variation. It seems that the form of *C. univittatus* occurring in Portugal (and also in Spain and in the Tell of Algeria) is apparently indistinguishable from the type form of Central Africa to which, in any case, it is closer than to the occurring between *perexiguus,* a situation already emphasized by Mattingly (9).

The following are other important characters of the Portuguese adult specimens: a line of pale scales constantly present at base of costa; abdominal terga with complete, usually wide, white basal bands; venter with variable dark markings; postpiracular scales present (and usually numerous) in 16 ♀ and 14 ♂ examined, absent only in one male specimen in poor conditions.

In that concerns larvae, the main morphological characters of Portuguese *univittatus* (48 whole larvae examined) are as follows: head setae *A* with 4-8 (mean 6) branches, *B* 2- or 3-branched and *C* with 2-4 branches, usually trifid; comb of abdominal segment VIII with 36-57 (mean 48) scales; siphonal index 5.5-9.0 (mean 6.9), usually 6.0-8.0; pecten with 6-14 spines, usually 10-12; the mean number of branches in the siphonal tufts is 2.8, though individual tufts may have as many as 5 branches or may be reduced to a single seta; saddle hair with 2-4 branches, usually trifid.

BIOECOLOGICAL NOTES. 25 breeding places of *univittatus* were recorded within the surveyed area. *C. univittatus* is a ground water breeder more often found along the grassy margins of slow-flowing rivers (10 of all the biotopes), in grassy pools in beds of temporary rivers (8 biotopes) or in pools along small watercourses. In all this breeding area *univittatus* is usually associated with aquatic emergent, floating (*Lemna,* nenuphars) and immerse vegetation, namely filamentous green algae. Somewhat surprisingly, rice fields seem not to be much suitable for breeding of *C. univittatus* as they were recorded as such only in two instances, in which cases the larvae were among masses of filamentous algae. Finally, in one instance, *univittatus* bred in a shaded rock-pool (granite) in the margins of the Degebe river. The breeding water was usually limpid and clean, though at times it was contaminated by cattle excreta or contained decaying vegetable debris. The pH of the water, measured in 19 out of the 25 biotopes, was 6.5 in nine of them, 6.0 in other six, 5.5 in three other and 7.0 in only one instance.

Larvae of eight other mosquito species were found as associates in the breeding places of *C. univittatus,* one or more of them being present in 24 out of the 25 larval biotopes recorded. These associated species were, by decreasing order of frequency: *Anopheles atroparvus* (in 14 biotopes), *Culex (C.) pipiens* (12), *C. (C.) theileri* (11), *C. (N.) impudicus* (5), *Aedes (O.) caspius* and *Culiseta (A.) longiareolata* (2, each) and *Aedes (A.) vexans* and *Culiseta (C.) annulata* (once).

Fig. 7 shows a breeding area of *C. univittatus.*

In that concerns adult *univittatus,* only 2 ♀ and 2 ♂ were caught as such, the remainder adult specimens being reared *ex larva.* Three of the specimens (one gravid female and two males) were caught by morning (8-11 h a.m.), at rest on bushes near *univittatus* breeding places, while the other female was biting man in the open near breeding and resting places, at 11 *a.m.*

3.4 — URANOTAENIA (PSEUDOFICALBIA) UNGUICULATA UNGUICULATA Edwards, 1913

MATERIAL EXAMINED. *CANHESTROS RIVER* (6 km S of Ferreira do Alentejo), 1 ♂ *ex pupa,* 24.VIII.1976.

DISTRIBUTION. Described from Tiberias (Palestine), *U. unguiculata* is a Mediterranean species known to occur from Pakistan (Kashmir)

Fig. 7 — *Collecting larvae of* Culex *(C.)* univittatus *and of its associates* Culiseta *(A.)* longiareolata, Culex *(C.)* theileri, C. *(C.)* pipiens *and* C. *(N.)* impudicus *from grassy small ground pools, near Odemira. Rice fields can be seen in the background*

to Spain. The spanish record, the only one previously known in the Peninsula, is from Cabra, a locality SSE of Cordoba, in the periphery of the Guadalquibir Depression.

The Portuguese record (Map 1) also lies on the boundary between the eastern Alentejo and the Sado Depression.

TAXONOMIC AND BIOECOLOGICAL NOTES. Following Peyton (24), *U. unguiculata* belongs to the subgenus *Pseudoficalbia* Theobald, and within this one, to the *maxima* series of Peyton's Section B. Since the description of subspecies *pefflyi* from Saudi Arabia (Al Qatif, near the Persian Gulf), by Stone (27), *U. unguiculata* is known to be a polytypic species.

The morphology of our male agrees with the redescription of the nominate subspecies given by Rioux (25) and Senevet & Andarelli (26). Fig. 8 shows some terminalic details of the Portuguese male.

U. unguiculata bred among the aquatic vegetation in the shaded margins of the rapid flowing, shallow limpid waters of the Canhestros stream. The pH of the breeding water was 7.0.

Larvae of *Culex pipiens* and *C. theileri* were also caught along this breeding area, in association with *U. u. ungiculata.*

Fig. 8 — Uranotaenia *(P.)* u. unguiculata *Edw., male terminalia, Canhestros river (Ferreira do Alentejo).* A — *phallosome;* B — *style*

4 — RELATION TO DISEASE

Aedes vittatus is a well known potencial vector of yellow fever. Being a relatively common mosquito in rural habitats of Upper Alentejo, *vittatus* is expected to extend northwards over most of the interior of Portugal. This occurence in our country of an autochthonous feral yellow fever vector makes it even more dangerous the eventual reintroduction of the domestic cosmopolitan vector *Aedes aegypti,* while it would be probably worth to revise the Y. F. history in Portugal.

Culex modestus is also a medically important mosquito, known to be a potential vector of arboviruses. Accordingg to Mouchet *et al.* (28), *C. modestus* seems to be a major vector of West Nile virus in Camargue, Southern France, while Chippaux *et al.* (29) found that Tahyna virus was carried through winter by overwintering females of *modestus.*

In Portugal, positive animal sera for these two viruses were also recorded by Filipe & Pinto (30) from Alentejo.

During the present survey, we found *C. modestus* only at Faro, in the coast of Algarve, and it seems not to be a much common mosquito even there. Though *modestus* is expected to occur in other coastal areas of Portugal, such as the Tejo and Sado estuaries, it is certainly not involved in the circulation of West Nile or Tahyna viruses in the interior of Alentejo, the only area in which these viruses are known to be active in our country.

Culex univittatus is an important and generalized vector of West Nile and Sindbis viruses. It is known to be a vector of both these arboviruses in Southern Africa (31), in Egypt (32, 33) and in Israel (34).

In the Alentejo, Filipe & Pinto (*op. cit.*) found 16 % of bovine sera and 3 % of ovine sera positive to West Nile virus. Later, Filipe (35) was able to isolate WN virus from a pool of *Anopheles atroparvus,* also from Alentejo. However, as *An. atroparvus* was not known to be a vector of West Nile virus and the pool contained some freshly fed females, the possibility was admitted by Filipe that *atroparvus* was a dead end to this virus and not a vector. In this connection, it is perhaps relevant that *C. univittatus,* a mosquito that feeds on man, domestic animals and birds (36) and is an important potential vector of WN virus, turns to be also a fairly common mosquito in the Alentejo.

Beyond West Nile and Sindbis, other arboviruses were isolated from *C. univittatus* (**s. l.**) in Southern Africa (31), such as Wesselsbron, Usutu, Ingwavuma and Mossuril, making of *C. univittatus* a redoutable potential carrier of AB viruses.

Species of genus *Uranotaenia* L. Arribálzaga are thought to be entirely zoophilic, feeding on birds and amphibians, while *U. u. unguiculata* seems to be a quite rare mosquito in the surveyed Provinces. It is, therefore, of little or none medical importance, at least in Southern Portugal.

5 — SYNOPSIS

It this paper, based on material from Algarve and Alentejo, the writers add four culicine records to the mosquito fauna of Portugal: *Aedes (S.) vittatus* (Bigot), *Culex (B.) modestus modestus* Ficalbi, *Culex (C.) univittatus* Theobald and *Uranotaenia (P.) unguiculata unguiculata* Edwards. With these new records, the list of Portuguese mosquitoes is assumed to include now 29 distinct taxa.

Under each new culicine record, the material examined by the writers and its distribution are given and some taxonomic and bioecological notes are added.

Finally, the medical importance of these four mosquitoes is briefly considered by the writers.

6 — RESUMO

Neste trabalho, baseado em material colhido no Algarve e Alentejo, os autores assinalam quatro mosquitos novos para Portugal: *Aedes (S.) vittatus* (Bigot), *Culex (B.) modestus modestus* Ficalbi, *Culex (C.) univittatus* Theobald e *Uranotaenia (P.) unguiculata unguiculata* Edwards. Com estes quatro culicíneos aqui pela primeira vez assinalados, julga-se que a lista dos mosquitos portugueses passa a incluir 29 taxa distintos.

Para cada um destes culicíneos, indica-se o material examinado pelos autores e a sua distribuição, juntando-se algumas notas taxonómicas e bioecológicas.

Finalmente, a importância médica deste quatro mosquitos é sucintamente considerada pelos autores.

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