

The pupae of Spanish Culicinae: *Aedes geminus* Peus (Diptera: Culicidae)

R. Melero-Alcibar

Servicio de Parasitología, Centro Nacional de Microbiología, Instituto de Salud Carlos III.
Carretera Majadahonda-Pozuelo s/n. 28220 Majadahonda, Madrid. Spain
Email: rmalcibar@isciii.es

Abstract

The pupa of *Aedes geminus* Peus is redescribed and illustrated. A table lists the range and mode of the branches of each pupal seta.

Introduction

Aedes geminus was described by Peus (1970), based on differences of the male hypopygium. The specific shape of the gonostylus allows differentiation among species in genus *Aedes* (*sensu* Reinert *et al.*, 2004).

The members of genus *Aedes* (*Ae. cinereus*, *Ae. geminus* and *Ae. rossicus*) are morphologically similar, so some records of *Ae. cinereus* may correspond to *Ae. geminus* (Eritja *et al.*, 2000; Shaffner, 1998).

In Europe, the pupa of *Ae. cinereus* was briefly described, illustrated or included in a key by Clavero (1946), Senevet & Anderelli (1958), Sicart (1960) and Cranston *et al.* (1987), and *Ae. geminus* by Peus (1972) and Romi *et al.* (1997).

In the present paper, the pupa of *Ae. geminus* is redescribed and illustrated (figures 1-3). The range and modal number of branches of each pupal seta are given (table 1). Chaetotaxy and morphological descriptions follow Harbach & Knight (1980).

***Aedes geminus* Peus, 1970**

Cephalothorax (figure 1): **Setae** 1-5, 7-9-CT long; 6-CT short; 1-, 2-, 3-CT. double; 4-, 5-CT usually with 2 branches; 6-CT single; 7-CT with 2-3 branches; 8-CT usually triple; 9-CT usually single. *Metanotum* (figure 3): **Setae** 10-12-CT long; 10-CT usually double; 11-CT single; 12-CT usually bifurcate

Trumpet (figure 2): Strongly pigmented. Index- 3.5 - 4.6; mode: 3.8.

Abdomen (figure 3): **Seta** 0-II-VIII minute and single; **seta** 1-I with 10-14 branches on basal one-third, 1-II-III moderately long, 1-II single, 1-III with 1-4 branches, 1-IV-VII long, 1-IV-VI usually double, 1-VII usually single. **Seta** 2-I-VII short and single. **Seta** 3-II,III,V,VI, moderately long, 3-I,IV,VII short, 3-I,II,III,VI usually single, 3-IV usually with 3 branches, 3-V usually bifurcate, 3-VII usually with 3 branches. **Seta** 4-I,II, short, 4-III-VI moderately long, 4-VIII long, 4-I pedunculate and usually with 3 or 4 branches, 4-II usually with 4 branches, 4-III usually with 3 branches, 4-IV usually single, 4-V with 2-4 branches, 4-VI with 2-4 branches, 4-VII usually single, 4-VIII usually with 2 branches. **Seta** 5-I short, pedunculate, usually with 4 branches, 5-II,III moderately long, setae 5-IV-VII long, 5-I with 3 or 4 branches. 5-II,III with 2 or 3 branches, 5-IV-VI usually single, 5-VII single. **Seta** 6-I,II extra long and single, 6-III,IV long and usually bifurcate, 6-V-VII moderately long, 6-V,VI usually single, 6-VII with 2-4 branches. **Seta** 7-I,II,VI,VII long, 7-IV, moderately long, 7-III, V short, 7-I,IV usually single, 7-II,III usually bifurcate, 7-V with 2-4 branches, 7-VI,VII single. **Seta** 8-III-VII short; 8-III with 3 branches, 8-IV-VII usually with 2 branches. **Seta** 9-I short, 9-II-VI minute, 9-VII,VIII moderately long, 9-I-VIII single. **Seta** 10-III-VII long, 10-III,IV usually with 2 branches, 10-V,VI usually single, 10-VII single. **Seta** 11-III-VIII short and single. **Seta** 14-III-VIII minute and single.

Paddle (figure 3): Ovoid, posterior one-fourth of margin slightly spiculated; Index- 1.4 -1.6; mode: 1.4. **Seta** 1-Pa moderately long and single.

The above description is based on material from the Monastery of El Paular, Rascafría (Madrid, Spain): 5 males, 27 April 2002: 1 male and 3 females, 15 May 2003. Specimens were captured in a fresh water pool shaded by grass and weeds in a pasture belonging to the Monastery of El Paular, Rascafría, on the mountainous border north of Madrid. *Aedes geminus* is multivoltine and "a classical winter mosquito" (Schaffner *et al.*, 2001).

Table 1: Branching of the setae on pupae of *Aedes geminus* (range with the mode in parentheses).

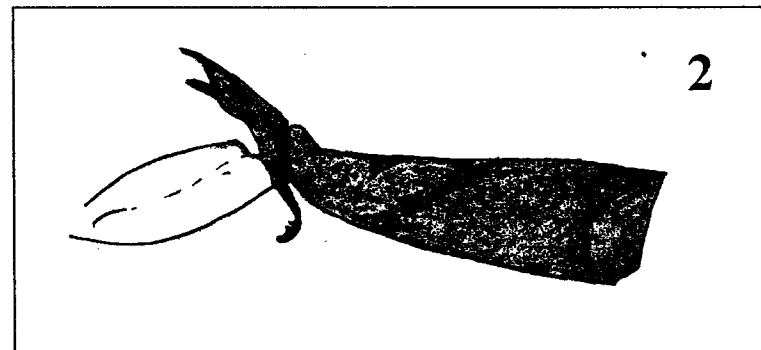
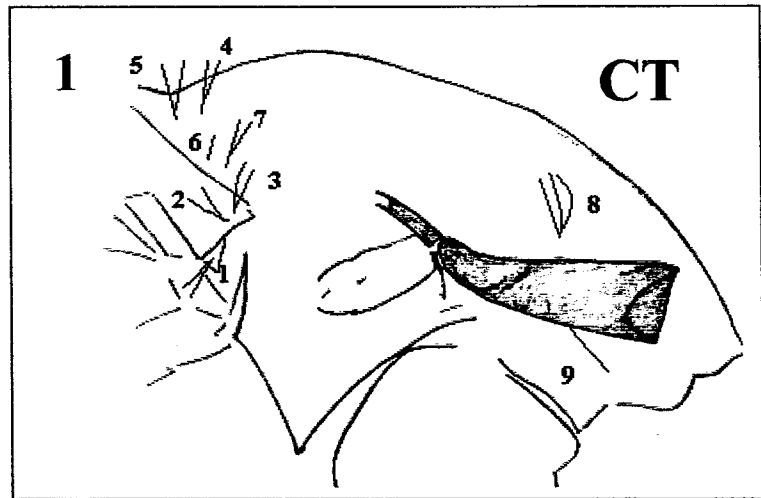
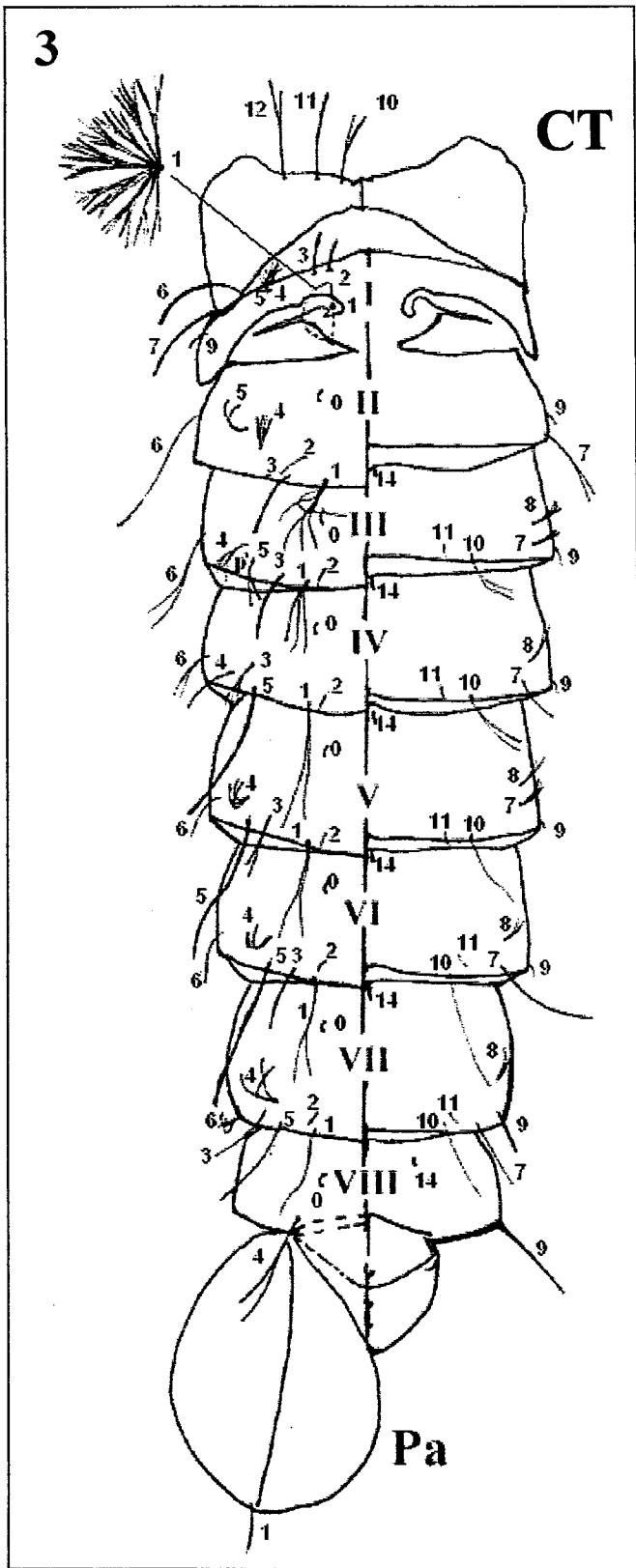
Cephalothorax		Abdominal segments								Paddle
Seta	CT	I	II	III	IV	V	VI	VII	VIII	Pa
0			1	1	1	1	1	1	1	
1	2	10-14 (13)	4-6 (5)	1-4 (3)	1-4 (2)	1,2 (2)	1,2 (2)	1,2 (1)		1
2	2	1	1	1	1	1	1	1		
3	2	1,2 (1)	1,2 (1)	1	2-4 (3)	1,2 (1)	1,2 (1)	2-4 (3)		
4	2,3 (2)	3,4 (3)	2-4 (4)	2,3 (2)	1,2 (1)	2-4 (3)	2-4 (2)	1,2 (1)	1,2 (2)	
5	2-4 (2)	3,4 (4)	2,3 (2)	2,3 (2)	1,2 (1)	1,2 (1)	1,2 (2)	1		
6	1	1	1	2	1,2 (2)	1,2 (1)	1	2-4 (3)		
7	2,3 (2)	1,2 (1)	1-4 (2)	2,3 (2)	1,2 (1)	2-4 (3)	1	1		
8	3-4 (3)			2-4 (3)	2	2	1,2 (2)	2,3 (2)		
9	1,2 (1)	1	1	1	1	1	1	1	1	
10	2-4 (2)			1,2 (2)	1,2 (2)	1,2 (1)	1,2 (1)	1		
11	1			1	1	1	1	1		
12	1,2 (2)									
13										
14				1	1	1	1	1	1	

Acknowledgement

This work was supported in part by the project RICET Co3/04-8.

References

- Clavero, G. (1946) Aedinos de España.. *Revista de Sanidad e Higiene Publica* **20**, 1205-1232.
- Cranston, P.S., Ramsdale, C.D., Snow, K.R. & White, G.B. (1987) *Adults, larvae and pupae of British mosquitoes (Culicidae). A Key*. Freshwater Biological Association. Scientific Publication N° 48. 152 pp.
- Eritja, R., Aranda, C., Padrós, J., Goula, M., Lucientes, J., Escosa, R., Marquès, E., & Cáceres, F. (2000) An annotated checklist and bibliography of the mosquitoes of Spain (Diptera: Culicidae). *European Mosquito Bulletin* **8**, 10-18.
- Harbach, R.E & Knight, K.L. (1980) *Taxonomic Glossary of Mosquito Anatomy*. Plexus Publishing Inc. Marlton, New Jersey. xi + 413 pp.
- Peus, F. (1970) Bemerkenswerte Mücken am Tegeler Flie. *Berliner Naturschutzblätter*, Sonderheft Mai 1970, 18-26.
- Peus, F. (1972) Über das Subgenus *Aedes* sensu stricto in Destschland (Diptera, Culicidae). *Zeitschrift für angewandte Entomologie* **72**, 177-194.
- Reinert, J.F., Harbach, R.E. & Kitching, I.J. (2004) Phylogeny and classification of Aedini (Diptera: Culicidae) based on morphological characters of all life stages. *Zoological Journal of the Linnean Society* **142**, 289-368.
- Romi, R., Pontuale, G. & Sabatinelli, G. (1997) Les zanzare italiane: generalità e identificazione degli stadi preimaginali (Diptera, Culicidae). *Fragmenta Entomologica* **29** Supl. 1-148.
- Sicart, M. (1960) Etude sur les nymphes des Culicines de sous-Bassin. *Annales de Parasitologie humaine et comparée* **35**, 631-647.
- Senevet, G. & Anderelli, L. (1958) Le Genre *Aedes* en Afrique du Nord. II : Les Nymphes. *Archives Institut Pasteur d'Algerie* **36**, 266-286.
- Schaffner, F. (1998) A revised checklist of the French Culicidae. *European Mosquito Bulletin* **2**, 1-9.
- Schaffner, F., Angel, G., Geoffroy, B., Hervy, J.P., Rhaiem, A. & Brunhes, J. (2001) *The Mosquitoes of Europe/ Les moustiques d'Europe. An Identification and Training Programme*. (CD-Rom); Montpellier, France: IRD Éditions & EID Méditerranée.



Figures 1-3. Pupa of *Aedes geminus*

1. Cephalothorax (CT); 2. Trumpet; 3. Metanotum (CT), abdomen and paddle (Pa); I-VIII abdominal segments.