

The pupae of Spanish *Ochlerotatus* II. *Ochlerotatus rusticus* (Rossi) (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 *Ochlerotatus rusticus* (Rossi) is redescribed and illustrated. A table lists the range and modal number of branches of each pupal seta. Characters are provided for separating *Oc. rusticus* and *Oc. quasirusticus*.

Introduction

The pupa of *Ochlerotatus rusticus* was originally described by Rossi (1790) and was briefly described by Senevet & Anderelli (1958). It has a Palearctic distribution and has been recorded several times in Europe (Romi *et al.*, 1997; Schaffner, 1998; Kubica-Biernat, 1999; Jalili *et al.*, 2000; Gornostaeva, 2000; Spungis, 2000). This species is a member of subgenus *Rusticoidus* of genus *Ochlerotatus* as currently defined (Reinert *et al.*, 2004).

Pupae of *Ochlerotatus* were collected during mosquito surveys in Madrid. As a result of these studies, Melero & Salom (2003) redescribed the pupa of *Ochlerotatus cantans* and Melero-Alcibar (2004), the pupa of *Ochlerotatus quasirusticus*. In the present paper, the pupa of *Oc. rusticus* is redescribed and illustrated (figures 1-3). The range and mean number of branches of each pupal seta are given in table 1. Chaetotaxy and morphological descriptions follow Knight (1971) and Harbach & Knight (1980).

***Ochlerotatus rusticus* (Rossi, 1790)**

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

Trumpet (figure 2): Strongly pigmented, index 3.4-4.4 (mode 4.0).

Abdomen (figure 3): **Seta 0-II-VIII** minute and single; **seta 1-I**, usually with 40-45 branches on basal one-third, **1-II,III** moderately long, **1-II** with 3-8 branches, **1-III** usually with 3-7 branches, **1-IV-VII** long, **1-IV** with 1-3 branches, **1-V** usually double, **1-VI** single or double, **1-VII** usually single. **Seta 2-I-VII** short and single. **Seta 3-I-III, V-VII** moderately long; **3-I-III** usually with 2 or 3 branches, **3-IV** short and usually with 4 branches, **3-V** usually double, **3-VI** with 1 or 2 branches, **3-VI** with 2-4 branches. **Seta 4-I-V**, short, **4-VI** moderately long, **4-VII, VIII** long, **4-I** usually with 3 branches, **4-II** usually with 4-6 branches, **4-III** usually with 2-4 branches, **4-IV** usually with 2 branches, **4-V** with 2-6 branches, **4-VI** with 3 branches, **4-VII, VIII** single. **Seta 5-I** short and usually with 4-7 branches, **5-II, III** moderately short, **5-IV-VI** extra long, **5-VII** long, **5-II** with 4-7 branches, **5-III** usually with 5 branches, **5-IV** double, **5-V, VI** usually double, **5-VII** with 1-3 branches. **Seta 6-I-VII** long, **6-I** with 2-4 branches, **6-II-IV** usually double, **6-V** single, **6-VI** with 1 or 2 branches, **6-VII** usually with 3 branches. **Seta 7-I, II, V-VII** long, **7-III, IV** short; **7-I** usually single, **7-II** with 1-3 branches, **7-III** with 2-5 branches, **7-IV** with 2-4 branches, **7-V** usually with 5 branches, **7-VI, VII** single. **Seta 8-III-VII** short, **8-III** usually with 3 or 4 branches, **8-IV** usually double, **8-V, VI** usually with 2 branches, **8-VII** with 3-5 branches. **Seta 9-I** short, **9-II-VI** minute, **9-VII, VIII** moderately long, **9-I-VI** single, **9-VII** usually with 2 or 3 branches, **9-VIII** with 6-9 branches. **Seta 10-III, IV** moderately long, **10-V-VII** long, **10-III, IV** usually double, **10-V, VI** single, **10-VII** with 1 or 2 branches. **Seta 11-III-VIII** short and single. **Seta 14 III-VIII** minute and single.

Paddle (figure 3): Spiculate margin of paddle interrupted posteriorly on each side of insertion of 1-Pa; Index 1.7-1.4 (mode 1.65). **Seta 1-Pa** moderately long and single.

The above description is based on 20 adults captured as larvae (13-03-2004) and individually reared in the laboratory. They were collected in a seasonally flooded meadow at San Mamés, on the region's mountainous border north of Madrid. *Ochlerotatus rusticus* overwinters in the larval stage. Larvae develop from December to May, even below ice. This species is univoltine. As *Ochlerotatus rusticus* and *Oc. quasirusticus* were found together, a key is provided to separate the pupae:

- Seta 9-VIII with 6-9 branches; trumpet index 3.4-4.3; seta 8-C with 4-6 branches*Ochlerotatus rusticus*
- Seta 9-VIII, usually with 4 or 5 branches, which may be subdivided into up to 9 branches; trumpet index-3.3-4.2; seta 8-C single or double*Ochlerotatus quasirusticus*

Table 1. Branching of setae of *Ochlerotatus rusticus* pupae (range with the mode in parentheses).

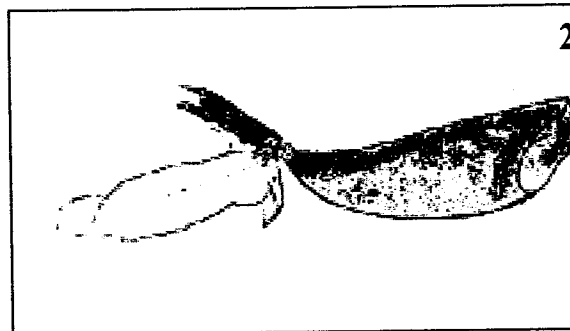
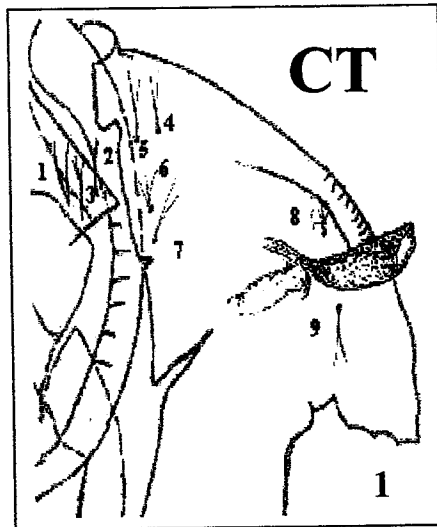
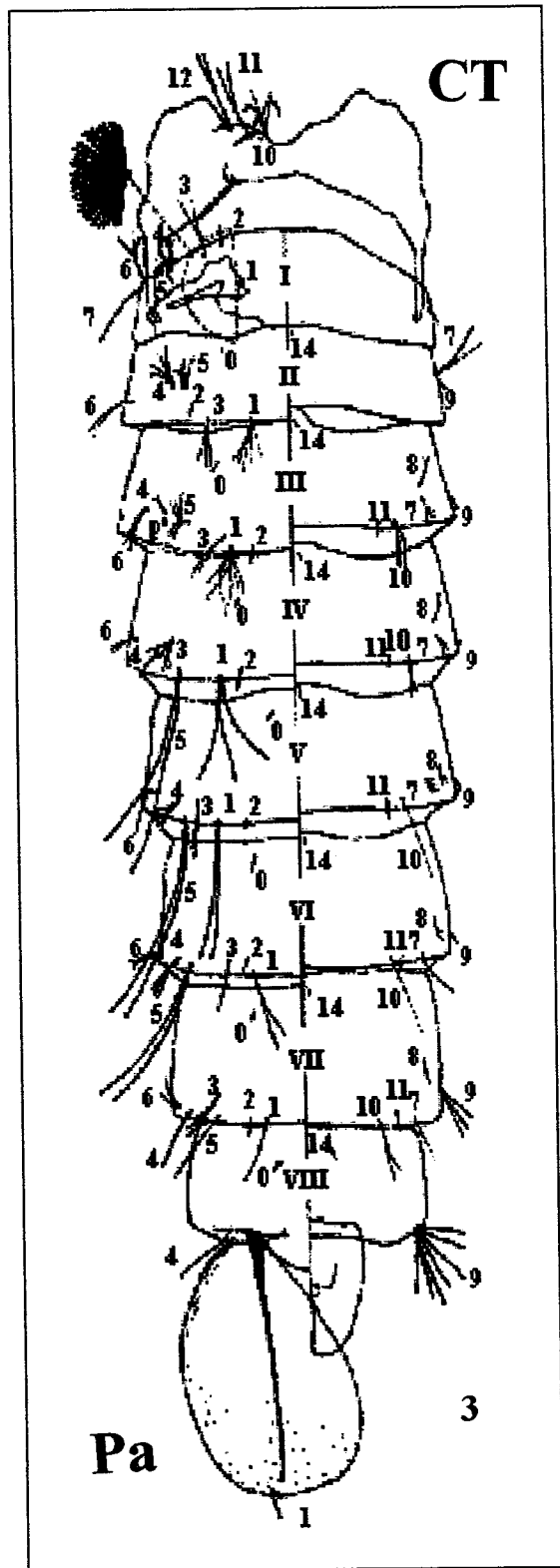
| Cephalothorax | | Abdominal segments | | | | | | | | Paddle |
|---------------|---------|--------------------|---------|---------|---------|---------|---------|---------|---------|--------|
| Seta | CT | I | II | III | IV | V | VI | VII | VIII | Pa |
| 0 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 1 | 1,2 (2) | 40-45 (44) | 3-8 (4) | 3-7 (4) | 1-3 (3) | 1,2 (2) | 1,2 (2) | 1,2 (1) | | 1 |
| 2 | 1,2 (1) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 3 | 1,2 (1) | 2-4 (3) | 2-4 (3) | 2,3 (2) | 3-6 (4) | 1,2 (2) | 1,2 (1) | 2-4 (2) | | |
| 4 | 2,3 (2) | 2-4 (3) | 4-6 (5) | 2-5 (2) | 1-3 (2) | 2-6 (4) | 2-4 (3) | 1,2 (1) | 1 | |
| 5 | 1-3 (2) | 4-7 (6) | 4-7 (6) | 3-6 (5) | 2 | 1,2 (2) | 1,2 (2) | 1-3 (2) | | |
| 6 | 1-4 (3) | 2-4 (3) | 1-3 (2) | 1,2 (2) | 1,2 (2) | 1 | 1,2 (2) | 2-4 (3) | | |
| 7 | 2,3 (2) | 1,2 (1) | 1-3 (2) | 2-5 (4) | 2-4 (2) | 3-6 (5) | 1 | 1 | | |
| 8 | 4-6 (5) | | | 3,4 (4) | 1-3 (2) | 2,3 (2) | 2,3 (2) | 2-5 (4) | | |
| 9 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2-4 (3) | 6-9 (7) | |
| 10 | 5-8 (7) | | | 1-4 (2) | 1-3 (2) | 1 | 1 | 1,2 (1) | | |
| 11 | 1,2 (2) | | | 1 | 1 | 1 | 1 | 1,2 (1) | | |
| 12 | 1-3 (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 Higiene Publica* **20**, 1205-1232.
- Gornostaeva, R.M. (2000) A revised checklist of the mosquitoes (Diptera, Culicidae) of European Russia. *European Mosquito Bulletin* **6**, 15-19.
- Harbach, R.E & Knight, K.L. (1980) *Taxonomists' Glossary of Mosquito Anatomy*. Plexus Publishing Inc. Marlton, New Jersey. xi+413 pp.
- Jalili, N., Orszagh, I., Halgos, J. & Labuda, M. (2000) Mosquitoes (Diptera, Culicidae) of Slovakia. *European Mosquito Bulletin* **6**, 20-26.
- Knight, K.L. (1971) A Mosquito Taxonomist's Glossary VII: The Pupae. *Mosquito Systematics Newsletter* **3**, 42-65.
- Kubica-Biernat, B. (1999) The distribution of mosquitoes (Diptera: Culicidae) in Poland. *European Mosquito Bulletin* **5**, 1-10.
- Melero-Alcibar, R. (2004) The pupae of Spanish *Ochlerotatus* I. *Ochlerotatus quasirusticus* (Diptera: Culicidae). *European Mosquito Bulletin* **17**, 20-22.
- Melero-Alcibar, R. & Salom, F. (2003) Redescription of the pupa of *Ochlerotatus cantans* (Diptera: Culicidae). *European Mosquito Bulletin* **16**, 18-21.
- 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) Le zanzare italiane: generalità e identificazione degli stadi preimaginali (Diptera, Culicidae). *Fragmenta Entomologica* **XXIX** (Supplemento), 1-141.
- Rossi, P. (1790) Fauna Etrusca. Sistens insecta quae in provinciis Florentina et Pisana praesertim collegit. Vol. 2, 348 pp., 10 pls. Liburni.
- Senevet, G. & Anderelli, L. (1958) Le Genre *Aedes* en Afrique du Nord. II: Les Nymphes. *Archives Institut Pasteur d'Algerie* **36**, 266-286.
- Spungis, V. (2000) A checklist of Latvian mosquitoes (Diptera, Culicidae). *European Mosquito Bulletin* **6**, 8-11.
- Shaffner, F. (1998) A revised checklist of the French Culicidae. *European Mosquito Bulletin* **2**, 1-9.



Figures 1-3. Pupa of *Ochlerotatus rusticus*.
 1. Cephalothorax (CT); 2. Trumpet;
 3. Metanotum, abdomen and paddle (Pa);
 I-VIII: abdominal segments.