

Re-description of the pupa of *Ochlerotatus cantans* (Diptera: Culicidae)

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Abstract

The pupa of *Ochlerotatus cantans* is re-described and is illustrated completely for the first time. A table lists the range, mode, and mean number of branches of each pupal seta. Some notes on the biology of the immature stages are given.

Introduction

Ochlerotatus cantans was described by Meigen (1818) as *Culex cantans*. Senevet & Anderelli (1958) gave a description, accompanied by illustrations of the male, female and larva, together with a description of the pupa based on that of Clavero (1946). Amongst others, Mohrig (1969) in Germany and Gutsevich *et al.* (1974) in Russia gave details of its biology, and Service (1977) and Nielsen (2001) studied ecological and biological aspects of the species in southern England and Denmark. The pupa was listed by Sicart & Ruffie (1960) and by Gutsevich *et al.* (1974), and pupal characters were used by Cranston *et al.* (1987) in a short identification key, but the pupa was not described.

In Europe, *Oc. cantans* has been included in the checklists of Austria, Britain, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Slovenia, Sweden, Switzerland, Ukraine, Yugoslavia (Snow & Ramsdale, 1999), European Russia (Gornostaeva, 2000), Latvia (Spungis, 2000), Spain (Eritja *et al.*, 2000), Slovakia (Orszagh *et al.*, 2001), Luxembourg (Beck *et al.*, 2003) and Romania (Nicolescu *et al.*, 2003). In Spain, the first description of *Oc. cantans* was given by Clavero (1945, 1946), who studied material from the province of Madrid. A complete description of the species, accompanied by illustrations of the larva, adult female and male, including male genitalia, was given by Encinas Grandes (1982) after studying specimens from Salamanca.

The pupa is described and illustrated in the present paper.

Source of specimens studied

Pupae and larvae were collected by the authors from a freshwater pool shaded by grass and weed, and located in a pasture belonging to the Monastery del Paular. This site is near the village of Rascafría on the region's mountainous border north of the city of Madrid and is the same site where Clavero found the species in 1945. Other studies are carried out here and the larval site was sampled at fortnightly intervals between mid-March and mid-May. *Ochlerotatus cantans* is univoltine and passes the winter in the form of diapausing eggs. In this region, overwintered eggs hatch in spring and larvae are present from March to May. The first pupae of *Oc. cantans* were captured on 14 April and yielded eight males and 1 female. Three pupae were collected on 1 May and these produced three adult females (Table 1). Consequently, all the pupal exuviae examined have associated preserved adults.

Table 1. Immature stages of *Oc. cantans** collected from the site at Monastery del Paular.

	16/03/2003	1/04/2003	14/04/2003	1/05/2003
Larvae	55	42	18	6
♂ Pupae			8	
♀ Pupae			1	3

* These larvae and pupae were found together with those of *Aedes geminus*, *Oc. rusticus*, *Oc. quasirusticus* and *Anopheles atroparvus*.

Results

The pupal chaetotaxy of *Ochlerotatus cantans* is summarised in Table 2. The morphological nomenclature follows Harbach & Knight (1980).

Cephalothorax (Fig 1): Setae 1,2,3,4,5,7,9-CT long; 1,2,3-CT double, 4-CT double or triple, 5-CT usually double, 6-CT short; usually with 2 or 3 branches, 7-CT usually with 2 or 3 branches, 8-CT moderately long, usually with 6 or 7 branches, 9-CT with 1 or 2 branches.

Trumpet (Fig 2): Strongly pigmented, index 3.2 - 4.0.

Metanotum (Fig 3): Setae 10-12-CT long, 10-CT with 4 or 5 branches, 11-CT usually with 1 or 2 branches, 12-CT with 2 branches.

Abdomen (Fig 3): Seta 0- II-VIII minute, single; seta 1-II-VII long, 1-I usually with 20 or 21 branches on basal third, 1-II with 5-7 branches, 1-III usually with 4-6 branches, 1-IV usually with 4 branches, 1-V-VI double, 1-VII usually single; seta 2-I-VII short, single; seta 3 I-III, V, VI long, double, 3-IV, VII short, 3-IV usually with 4 branches, 3-VII usually double; seta 4 I-V short, 4-I usually double, 4-II usually with 5 branches, 4-III with 4 or 5 branches, 4-IV usually with 2 or 3 branches, 4-V with 5 or 6 branches, 4-VI moderately long, usually double, 4-VII long, single; seta 5 I-III short, with 4 or 5 branches, 5-IV-VI very long, 5-IV, V double, 5-VI single or double, 5-VII long, single or double; seta 6-I, II very long, single, 6-III-V, VII short, 6-III-V usually with 3 branches, 6 VI long usually single, 6-VII usually with 5 or 6 branches; seta 7-II, VI, VII long, 7-II with 2 or 3 branches, 7-III-V short; 7-III usually with 5 branches, 7-IV usually with 3 or 4 branches, 7-V usually 5 branches, 7-VI, VII single; seta 8-III-VII short, 8-III-VI usually with 3-5 branches, 8-VII usually with 5 or 6 branches; seta 9-I short, single, 9-II-VI minute, 9-II-VI single, 9-VII, VIII moderately long, 9-VII usually double, 9-VIII usually with 4 or 5 branches; seta 10-III-VII long, 10-III, IV usually double, 10-V-VII single; seta 11-III-VIII short, single; seta 14-III-VIII minute, single.

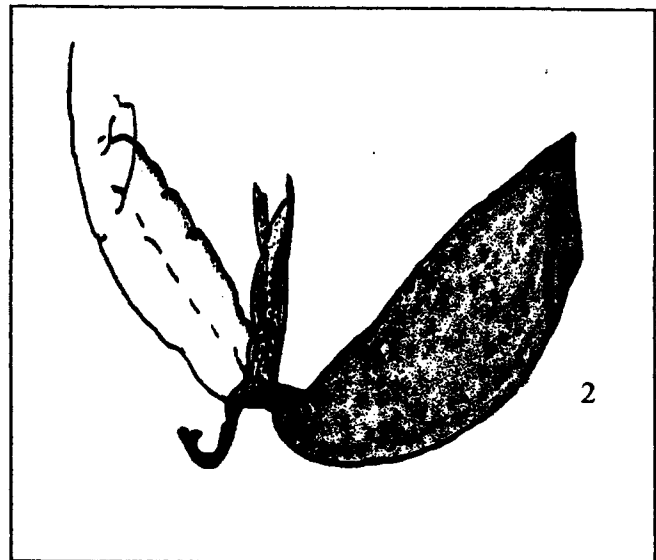
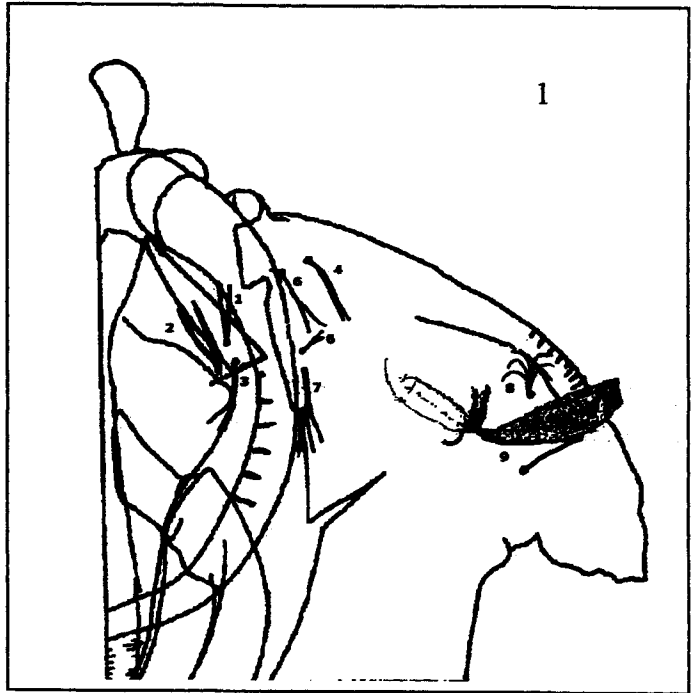
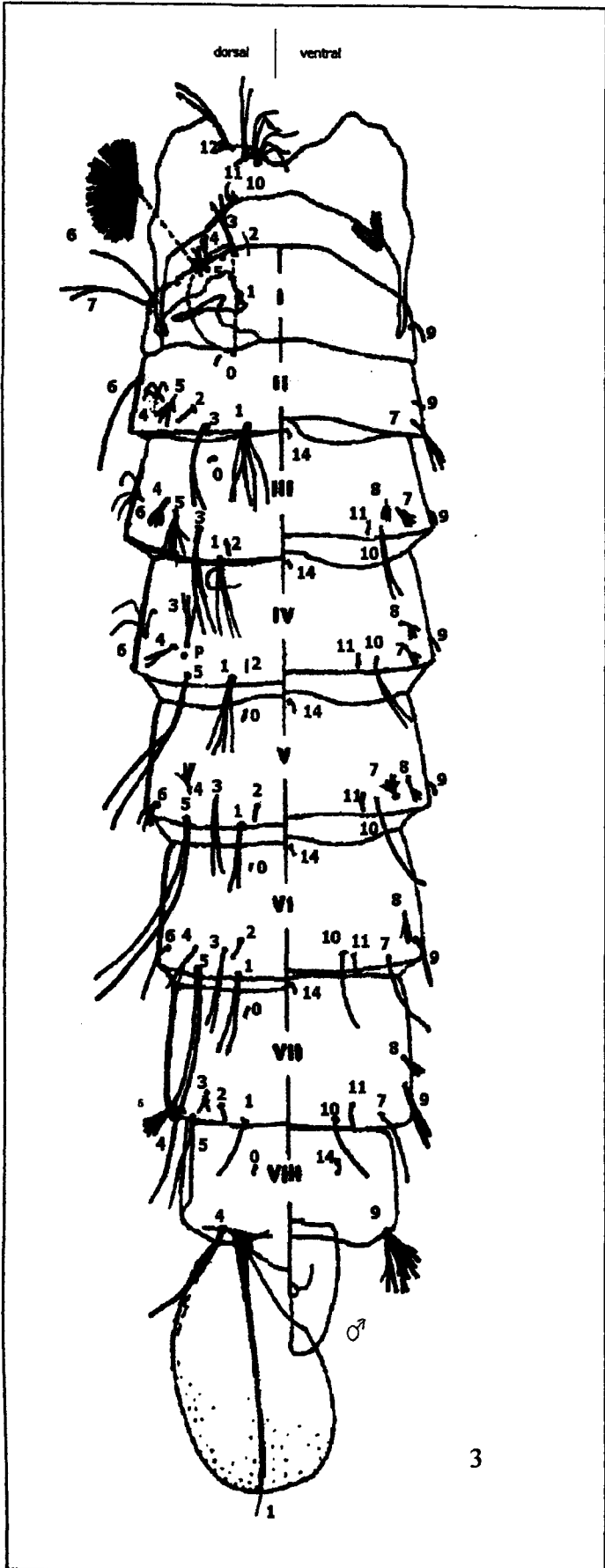
Paddle (Fig 3): With minute spicules along margin. Seta 1-P moderately long, single. Index 1.4 -1.5.

Table 2. Range (mode) of branches for pupal setae of *Ochlerotatus cantans*.

Setae No.	Cephalothorax CT	Abdominal segments								Paddle P
		I	II	III	IV	V	VI	VII	VIII	
0	-	-	1	1	1	1	1	1	1	-
1	1-2(2)	18-22(20)	5-9(6)	5-8(4)	2-5(4)	2,3(2)	1-4(2)	1,2(1)	-	1,2(1)
2	1-3(2)	1	1	1	1	1	1	1	-	-
3	2	1,2(2)	2,3(2)	1,2(2)	3-5(4)	1,2(2)	1-3(1)	2,3(2)	-	-
4	2,3(2)	1-3(2)	4-7(5)	3-5(4)	1-5(2)	4-6(6)	2,3(2)	1	1	-
5	1-3(2)	4-6(5)	3-6(4)	3-7(5)	2	2	1,2(2)	1,2(1)	-	-
6	2-4(2)	1	1	2-4(3)	2-5(3)	2-4(3)	1-4(1)	2-6(6)	-	-
7	2-4(3)	2	2,3(3)	2-7(5)	1-4(3)	2-7(5)	1	1	-	-
8	6-9(6)	-	-	2-5(3)	2-5(3)	2-4(3)	2-7(3)	4-8(6)	-	-
9	1,2(1)	1	1	1	1	1	1	1-3(2)	3-7(4)	-
10	4,5(5)	-	-	1-3(2)	1-3(2)	1	1	1	-	-
11	1,2(2)	-	-	1,2(1)	1	1	1	1	-	-
12	2	-	-	-	-	-	-	-	-	-
14	-	-	-	1	1	1	1	1	1	-

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Figs 1-3. Pupa of *Ochlerotatus cantans*
 1. Cephalothorax 2. Trumpet 3. Metanotum, abdomen and paddle.

I-VIII: abdominal segments; 1-14 setal numbers for specified areas.