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The pupae of Spanish *Ochlerotatus* III: *Ochlerotatus punctor* (Kirby) (Diptera: Culicidae)

R. Melero-Alcíbar
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 punctor* (Kirby) is redescribed and illustrated. A table lists the range, mode and number of branches of each pupal seta. Results of a comparative study of the chaetotaxy of *Oc. punctor* pupae from the Nearctic and Palaearctic Regions are given.

Introduction

The pupa of *Ochlerotatus punctor* was originally described by Clavero (1946) from Spanish material, and Darsie (1951, 1957) from Nearctic material, but the descriptions are discordant (Darsie, 1957). This species is currently regarded as an *incertae sedis* taxon, i.e. it is a valid species of uncertain generic placement, but it should continue to be cited with its accustomed generic affiliation until its taxonomic position if resolved (Reinert *et al.*, 2004)

Pupae of Spanish *Ochlerotatus* species are currently being re-examined (Melero-Alcíbar & Salom, 2003; Melero-Alcíbar, 2004; 2005) and in the present paper the pupa of *Oc. punctor* is redescribed and illustrated (figures 1-3). The range and modal number of branches of each pupal seta is given (table 1). Chaetotaxy and morphological descriptions follow the nomenclature of Knight (1971) and Harbach & Knight (1980).

Ochlerotatus punctor (Kirby, 1837)

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

Trumpet (figure 2): Strongly pigmented and with low-cut border. Index- 3.5 - 4.9; mode: 4.1

Abdomen (figure 3): **Seta 0**-II-VIII minute and single. **Seta 1**-I, usually with 23-31 branches on basal one-third, **1**-II,III moderately long, **1**-II with 4-8 branches, **1**-III usually with 1-5 branches, **1**-IV-VII long, **1**-IV-VI usually single, **1**-VII single. **Seta 2**-I-VII short and usually single. **Seta 3**-I-III,V-VII moderately long; **3**-I-III usually with 2 or 3 branches, **3**-IV short and usually with 3 branches, **3**-V,VI usually with 1 or 2 branches, **3**-VII usually with 2 branches. **Seta 4**-I-V, short, **4**-VI moderately long, **4**-VII,VIII long, **4**-I usually with 3 branches, **4**-II usually with 5 branches, 4-III usually with 2-4 branches, **4**-IV usually with 3 branches, **4**-V with 2-6 branches, **4**-VI with 1-3 branches, **4**-VII,VIII single. **Seta 5**-I short and usually with 4-6 branches, **5**-II,III moderately long, **5**-IV-VI extra long, **5**-VII long, **5**-II with 2 or 3 branches, **5**-III usually with 3 branches, **5**-IV with 2 or 3 branches, **5**-V,VI with 1-3 branches, **5**-VII with 1-2 branches. **Seta 6**-I,II extra long and usually single, **6**-III-VII moderately long, **6**-III usually double, **6**-IV-VI usually single, **6**-VII with 2-5 branches. **Seta 7**-I,VI,VII long, **7**-II,V, moderately long, **7**-III,IV short; **7**-I usually bifurcated, **7**-II with 2-5 branches, **7**-III,V with 2-5 branches, **7**-IV usually with 2 or 3 branches, **7**-VI single, **7**-VII usually single. **Seta 8**-III-VII short, **8**-III usually with 5 branches, **8**-IV-VII usually double. **Seta 9**-I short, **9**-II-VI minute, **9**-VII,VIII moderately long, **9**-I-VI single, **9**-VII usually double, **9**-VIII, with 2-5 branches. **Seta 10**-III very long, **10**-IV-VII long, **10**-III with 1 or 2 branches, **10**-IV usually single, **10**-V-VII single. **Seta 11**-III-VIII short, **11**-III,IV,VI,VII single, **11**-V usually single. **Seta 14**-III-VIII minute, single.

Paddle (figure 3): Ovoid. Spiculate margin of paddle interrupted posteriorly on each side of insertion of seta 1-Pa. Index- 1.4 -1.9; mode: 1.7. **Seta 1-Pa** moderately long, single.

The description is based on 24 larvae collected by the author on 17-04-2004 and individually reared in the laboratory. All pupae have associated adults. In addition 6 males in the UCM entomological collection, captured as pupae on 5-03-1999, were studied. All specimens were collected in two seasonally flooded meadows at Canencia, on the region's mountainous border northwest of Madrid. *Ochlerotatus punctor* is a woodland floodwater mosquito and associated with cold water. The first larvae can be observed in late February. This species is univoltine.

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

Cephalothorax		Abdominal segment								Paddle
Seta	**CT**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**Pa**
0			1	1	1	1	1	1	1	
1	1-3 (2)	23-31 (28)	4-8 (5)	1-5 (2)	1,2 (1)	1,2 (1)	1,2 (1)	1,2 (1)		1,2 (1)
2	1,2 (2)	1,2 (1)	1	1	1	1	1	1		
3	1-3 (1)	2,3 (2)	2-4 (3)	2,3 (2)	2-5 (3)	1,2 (1)	1,2 (1)	1,2 (2)		
4	2-4 (3)	3-6 (3)	3-7 (5)	2-6 (4)	1-4 (3)	2-6 (4)	1-3 (2)	1,2 (1)	1-2 (1)	
5	1-5 (2)	4-6 (5)	1-5 (2)	2-6 (3)	2,3 (3)	1-3 (2)	1-3 (2)	1,2 (1)		
6	2-4 (3)	1,2 (1)	1,2 (1)	1-3 (2)	1,2 (1)	1,2 (1)	1-3 (1)	2-5 (3)		
7	1-5 (3)	1-3 (2)	2-5 (4)	2-5 (3)	1-4 (2)	2-5 (3)	1	1,2 (1)		
8	1-3 (2)			2-6 (5)	1-3 (2)	1-4 (2)	2,3 (2)	1-4 (2)		
9	1,2 (2)	1	1	1	1	1	1	2-4 (2)	2-5 (4)	
10	2-7 (5)			1,2 (2)	1,2 (1)	1	1	1		
11	2,3 (2)			1	1	1,2 (1)	1	1		
12	1-4 (2)									
13										
14				1	1	1	1	1	1	

Discussion

Pupal characters of *Oc. punctor* were first given by Clavero (1946) in a short identification key as: trumpet with low-cut border and seta 9-VIII moderately branched (less than 6 branches), seta 5-VII bifurcated, large and seta 1 VI, VII and VIII, large and simple. Later Darsie (1951, 1957) described this pupa more fully using Nearctic material (North America). His Nearctic material shows at least two different characters (Darsie, 1957): seta 1 VI, VII and VIII is mostly double and the pinna of the trumpet generally short, about one-fifth of the total length.

Comparison of pupae from Nearctic areas and Madrid (Spain) showed differences in branching of various setae (Table 2). However, there are differences between pupae described in the present study and those from other European locations: the pinna of the trumpet is generally short, about 1/4 of the total length, not as long as in pupae described by Clavero (1946) and the spiculate margin of the paddle is interrupted on each side of 1-P. Cranston *et al.* (1987) described an uninterrupted spiculate margin in *Oc. punctor* from Britain. It is necessary to evaluate the significance of these differences in order to discuss the taxonomy of Spanish *Oc. punctor*.

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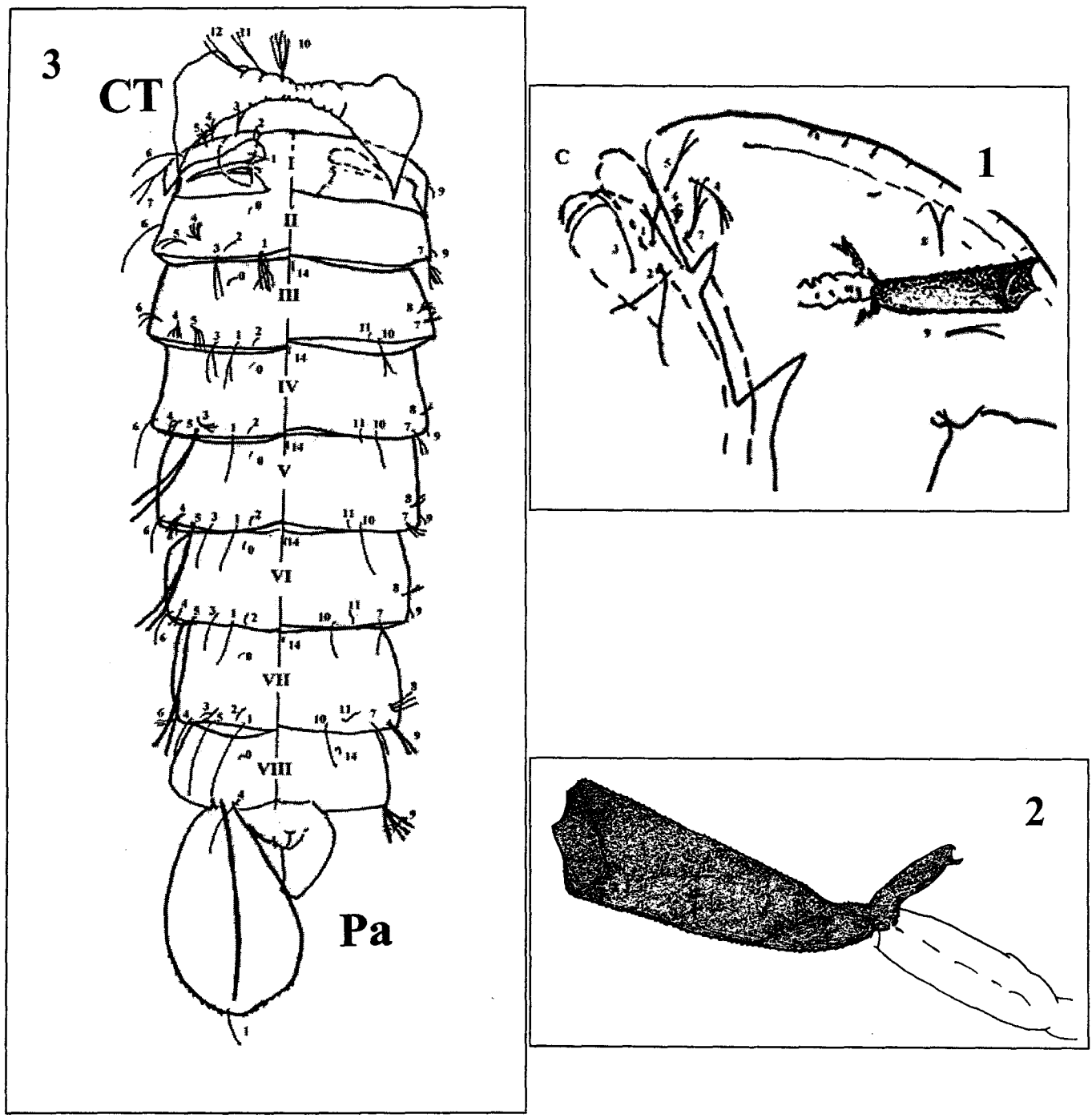
	CLAVERO, 1946		DARSIE, 1951		DARSIE, 1957		PRESENT PAPER	
SETA	RANGE	MODE	RANGE	MODE	RANGE	MODE	RANGE	MODE
5-CT			3-5	4			1-5	2
8-CT			3-8	4			1-3	2
4-I			2-6	4			3-6	3
5-I			4-7	7	5-7		4-6	5
1-II			2-6	4/5			4-8	5
4-II			6-9		5-7		3-7	5
5-II			2-6	3	3-4		1-5	2
1-III			2-8	4			1-5	2
4-III			4-8	5	4-6		2-6	4
5-III			3-9		5-7		2-6	3
7-III					4-6		2-5	3
8-III					3-5		2-6	5
1-IV			2-3	2			1-2	1
3-IV			3-7	5	4-5		2-5	3
6-IV			1-5	3			1-2	1
7-IV					3-4		1-4	2
8-IV					3-5		1-3	2
1-V		1?	2-3	2			1-2	1
3-V			1-6	2			1-2	1
4-V			3-7	3	4-5		2-6	4
7-V					4-6		2-5	3
8-V					3-5		1-4	2
1-VI		1?	1-4	2			1-2	1
3-VI			1-3	1		2	1-2	1
4-VI			2-4	3			1-3	2
5-VI		2?	1-2	1			1-3	2
1-VII		1?	1-2	2			1-2	1
6-VII			2-7	5			2-5	3
9-VIII	Less than 6 branches		1-6	2			2-5	4

Table 2. Recorded differences of range and mode of setae of *Oc. punctor* pupae.



Figures 1-3. Pupa of *Ochlerotatus punctor*.

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