

SHORT COMMUNICATIONS

**THE LARVA OF *ORTHETRUM NITIDINERVE* (SELYS, 1841)
(ANISOPTERA: LIBELLULIDAE)**

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The ultimate instar is described and figured from material collected in the Malaga region, Spain. Some biological notes are included. Also notes are given on techniques for closely examining important features that have become obscured.

INTRODUCTION

Orthetrum nitidinerve is considered to be a Mediterranean species (Askew 1988), being common in North Africa and infrequently recorded in Campania, Italy and the islands of Sicily and Sardinia. In Southern Spain it is recorded from Cordoba, Huelva and Malaga (FERRERAS ROMERO & PUCHOL CABALLERO, 1984); here it is described as being relatively frequent near the coast, becoming less so inland. Adults are recorded flying from early May to the end of July.

BIOLOGY

Three larvae were collected from a stream 1.5 m wide and 30 cm deep, which flows from the hills of Torremolinos into the Marismas del Guadalhorce at Churriana, near Malaga, Spain. Two ultimate and one penultimate instar larvae were found in a section 800 m long, each in a separate spot where overhanging vegetation had caused an accumulation of detritus.

Other larvae found at this site were *Lestes viridis* (Vander L.), *Ischnura graellsii* (Ramb.), *Anax imperator* Leach, *Crocothemis erythraea* (Brullé), *Sympetrum striolatum* (Charp.) and *S. fonscolombei* (Sél.). Adults flying here were *Calopteryx haemorrhoidalis* (Vander L.), *A. imperator*, *Orthetrum chrysostigma* (Burm.) and *O. brunneum* (Fonsc.).

The three *nitidinerve* larvae were brought back alive to U.K. One specimen was lost, another moulted on 2 May 1990, but then died on 15 June 1990, just prior to emergence. The third specimen hatched into a female on 23 May 1990.

Prior to emergence this larva measured 18.6 mm, the final exuvia measuring 23.0 mm (total

lengths excluding labium).

The day before emergence the third specimen had been transferred to a larger aquarium, from which it emerged between 23:30 and 07:00. The imago when discovered, though still very pale overall, already displayed the distinctive amber wing venation peculiar to this species. The non living specimens were set with the labium extended but not flattened (see Fig. 1), whilst the penultimate exuviae was immersed in acetone in order to produce a dry cabinet specimen. Some cleaning of the body surface was necessary in order to reveal important features, this was done using a dampened fine paint brush and a setting pin. When the cuticle and covering detritus are wet many of the underlying markings can be seen surprisingly clearly, but are gradually obscured as it all dries again. Techniques similar to this have been described by CLOPEAU et al. (1987) for separating exuviae of *Gomphus graslini* (Ramb.) from *G. simillimus* (Sél.), which are similarly encrusted with mud or sand.

The head and antennae were covered with mud and algal threads, which made effective cleaning impossible. It was possible with wetting and light brushing to obtain a reasonable reproduction of the underlying structure and markings.

35 mm transparencies were useful in noting coloration and pattern in the living larvae. In this respect there appeared to be few distinctive markings on *O. nitidinerve* apart from the pronotum and femora.

DESCRIPTION

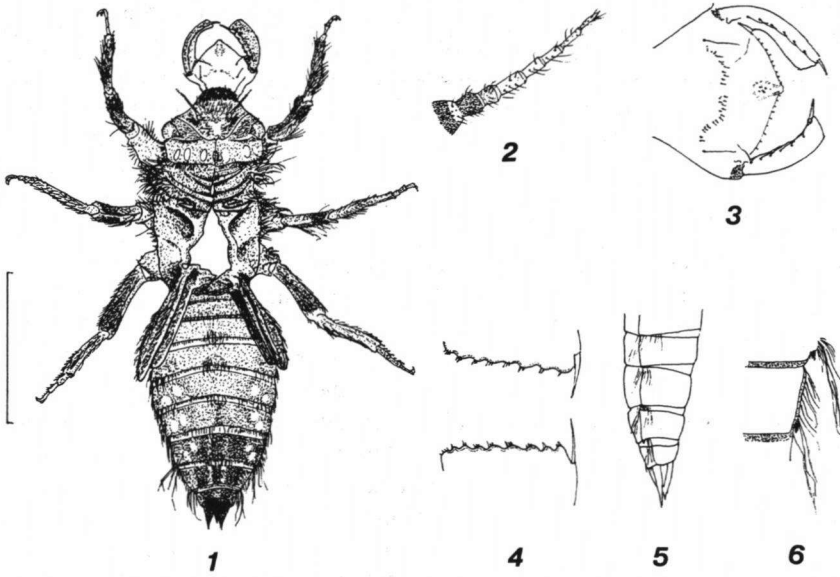
This is based on the final instar larva, plus observations based on any notable features seen in the exuviae, including details from 35 mm transparencies which are noted where appropriate.

HEAD. - It is almost uniformly mid-brown, apart from a crescent shaped marking which joins up the interior angle of each eye, curving gently behind the ocelli. This marking is very pale, particularly in the final instar, when the eyes take on a faint bluish tinge with a cream coloured margin.

At the rear of the head are three pairs of oval shaped spots, plus a central narrowly oval shaped spot - this latter being split into two by the longitudinal head suture. The head becomes darker frontally and there are small dark markings at the side and base of the antennae. The darker area between each eye and the ocelli is covered with small sinuous black lines and there are small fields of fine setae on the lateral edges of the ocelli. The rear of the head and in particular its lateral margins have noticeable tufts of setae, which invariably collect deposits of mud or sand.

Antennae (Fig. 2). - They have 7 segments, the base and scape are dark in colour, the pedicel less so, whilst the succeeding segments of the flagellum become more slender and much paler. These colours are striking in the final instar when the numerous antennal setae can be seen; in the final exuviae their bases can be seen as scattered spots.

Labium (Fig. 3). - In this species it is distinctive with respect to the pattern of premental setae, which appear to be grouped into the following rather indistinctly separated fields: firstly a small group at the centre of the prementum, secondly a diagonal line of setae running in a slight curve outwards to a separate



Figs 1-6. *Orthetrum nitidinerve* (Sel.) exuviae: (1) dorsal view; - (2) antenna; - (3) labium, dorsal view; - (4) distal edge of labial palps, dorsal view; - (5) abdomen, lateral view; - (6) abdominal segments, 8 & 9 ventral view. - [Scale line = 8 mm].

single long seta. In the final instar exuviae the left-hand side fields are comprised of five inner, eleven diagonal and one outer. The right-hand side consists of six, nine and one respectively.

The other European species all have more than one long outer seta (normally 2-4), as illustrated by CONCI & NIELSEN (1956), CARCHINI (1983), GARDNER (1954), DUMONT (1972) and CONESA GARCIA (1990). Therefore the isolation of this single and very long seta makes it an important identification feature.

The distal margin of the labium (Fig. 4) has 10 crenations on either side of the central lobe. Each lobe of the crenation bears a single seta, though some appear to have been damaged. The central lobe itself is roughly pear-shaped and extends basally approximately halfway to an imaginary line drawn between the palpal hinges.

The lateral margins of the labial palps bear 6 or 7 long setae (individuals of many larvae often have an asymmetrical distribution) plus a short and fine moveable hook. The distal margin of the labial palps are scalloped, having 9 lobes (lefthand side) or 8 lobes (righthand side), each lobe separated by a crenation. These notches become deeper laterally, the outer ones bear 1 or 2 stout setae, whilst the central and inner notches bear 3 or 4. [It is difficult to be exact about the number and size of these setae as some appear to have been severely damaged, presumably in the same way as those on the distal margin of the labium.]

When viewed ventrally, the larval labium is cream coloured, developing a

purplish tinge distally. The labial palps are similarly coloured with a pattern of scattered dots, plus a cream coloured crescent shape running from the interior edge of each palp to the respective hinge. The latter is a mark commonly found in the Libellulidae. When the closed palps are viewed frontally, the distal margins have a demarcation, which is dark brown in the final instar and pale brown in the exuviae.

THORAX. - The dorsal surface of the thorax is mid-brown and there are no colour bands visible in the exuviae. The rear ridge of the prothorax has dense clumps of setae on its lateral margins. A cream marking was noticeable on the pronotum of the freshly moulted final instar, similar to that found on *O. brunneum*. It became obscured as the ultimate instar matured.

In the mature ultimate instar larva the forewings reach to segment 6 and the hindwings to segment 7, in the penultimate instar the wing cases reach to segment 4. The wing cases are held parallel in both ultimate and penultimate instars.

The legs are moderately hairy and pale at their bases, though this colouration is only obvious in the ultimate and penultimate instars, not in the exuviae. The larvae have visible bands on either side of the femoral/tibial joint although the joints are not as pale as those of other European *Orthetrum* species such as *O. brunneum* and *O. cancellatum* (L.). The posterior legs, when fully extended, reach backwards as far as segment 9 and their femora and tibiae have a much stouter appearance than those of similar European *Orthetrum* species. The anterior tibiae of the larvae appear dark ventrally in contrast to the other tibiae, which are pale brown in colour.

ABDOMEN. - In ventral view, the basal segments of the exuviae appear light brown, but the distal segments become gradually darker, the anal appendages being almost black. The basal segments are very pale in the ultimate and penultimate instars, whilst segments 8-10 and the appendages are mid-brown. Triangular sclerites can be clearly seen on segments 4-6 on the final instar exuviae. In dorsal view the four basal segments of the final instar exuviae (visible between the wing cases) are pale brown. The succeeding segments become darker and the anal appendages are almost black at their tips. The central area of the dorsum is dark on segments 7-10 and this combined with the tufts of setae distributed centrally on the distal margins of segments 4 & 5, gives the impression of a ridge, though in fact there are no spines nor any raised areas. These dorsal markings were particularly noticeable in the pale, freshly moulted final instar larva.

The epiproct is pale at the base and fringed with setae.

Lateral spines (Figs 5-6). - Contrary to previous observations (NIELSEN, 1955; CONESA GARCIA, 1990), lateral spines can be detected on segments 8 & 9. These spines are very small and have to be observed with some care and a little preparation, using previously described techniques. They are concealed by dense tufts of setae and can best be observed in lateral or ventral view and

only then if the surrounding setae have been cleaned and rearranged. The spine on segment 8 appears to be angled away from the lateral edge of that segment (divergent), whereas that on segment 9 appears slightly incurved (convergent). Magnification of approximately x45 is essential if these spines are to be observed clearly.

SETAE. - This species displays the normal distribution of short setae for the genus, which is comprised of bottom or detritus dwellers. In addition, *O. nitidinerve* has several fields of longer setae. These are situated on the frons, at the rear of the head and thorax, on the sides of the prothorax and on the central dorsal area of the abdomen. These setae are, however, at their longest on the lateral margins of the abdominal segments, particularly on segments 5-9.

The ventral surface has relatively few setae, there are short ones at the bases of the legs, in particular the middle pair and the processes between them. In addition, there are sparse fields of setae on each segment which only reach any length and number at the distal margin of segment 9 (Fig. 6) and the paraprocts. Dorsally there are regular rows of spinous setae on the distal margin of each abdominal segment.

DISCUSSION

The larvae of the closely related European species of the genus *Orthetrum* present several identification problems to the odonatologist and a satisfactory and complete key to them remains to be accomplished. The fact that their features are often obscured by detritus has already been discussed. *O. nitidinerve* appears to be a middle sized member of the genus, smaller than *O. trinacria* (Sél.), *O. albistylum* (Sél.) and *O. cancellatum*, but larger than *O. chryso stigma* and *O. coerule scens*. It appears to be most similar in appearance to *O. brunneum*, from which it can be separated by the latter's more colourful legs and prothorax and by the distribution of the premental setae.

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