

Taxonomic observations on the larvae of *Eukiefferiella calvescens* Edw. and *E. verralli* Edw. (Diptera: Chironomidae)

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Introduction

During an investigation of benthic insects in a small lotic system in Western Ireland (X'68—IX'69) a large number of *Eukiefferiella* (Orthocla-diinae) larvae were taken. On examination they were found to form two groups which were distinguishable on the occurrence of an occipital rim on the larval head capsule. In a subsequent rearing programme (II'70—I'71) a number of fourth instar larvae were brought to the pupal stage and some emerged as adults. The two larval types were found to have distinct emergence times, although some overlap occurred. There follows a description of the two larval types including comment on pupal and adult dimensions and a statistical account of variation of some larval features in the two species.

Descriptions of various stages of the life cycle of several species of the *Eukiefferiella calvescens-bavarica* group have been published by Edwards (1929), Goetghebuer (1934, 1940—'50), Saether (1969), Thienemann (1936) and Zavrel (1939). Brundin (1956) refers to this group as being composed of a number of unclarified species. Lehmann (In press) has recently revised the taxonomy of the European species of the genus *Eukiefferiella*.

A comparison of the species *Eukiefferiella verralli* and *E. calvescens*

The material for the following description was collected during a 12 month period in which benthic handnet samples were taken irregularly in a small stream system in western Ireland. After removal of detritus fourth instar Chironomid larvae were taken from the sorting dish manually and placed in wide dishes each of which contained 2 mm of water approx. The jars were examined daily and pupation dates noted. Subsequent development did not always occur and, after allowing a further fortnight to elapse, pupae which had not produced adults were considered to have failed. When a full series of larva, pupa and adult had developed the pupae and larvae were mounted in euparal. The adult was left for 3 hours approx. for the

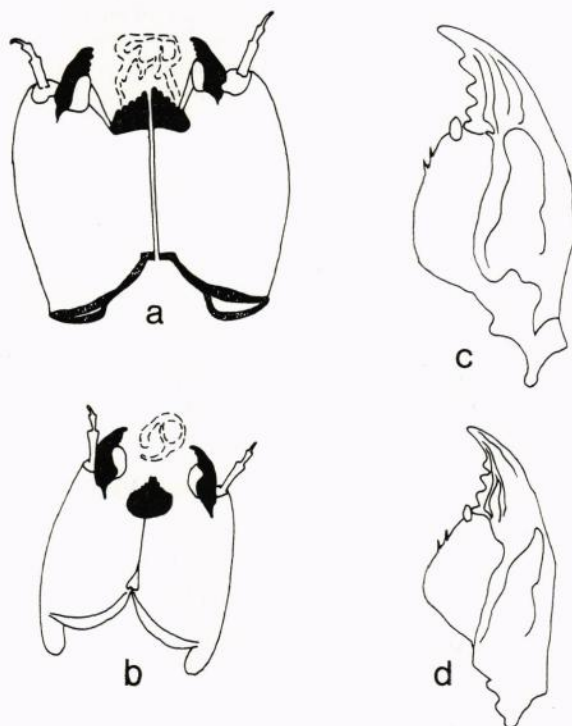


Fig. 1. The final instar larva head capsule and larval mandible of *E. verralli* (a & c) and *calvescens* (b & d). Approximately to scale.

colour to develop and the exoskeleton to harden after which it was immersed in alcohol. Some of the adults were retained intact and some were dissected and mounted to facilitate measurement.

Larvae

E. verralli

Head capsule yellow with a dark occipital pigment ring or at least a dark thickened ridge around the posterior border of the head capsule (Fig. 1). Body blue in colour. Biometric data in Table 1.

E. calvescens

Head capsule yellow without a posterior thickened ridge or pigment band. Body blue-violet in colour. In Fig. 2 percentage length frequency histograms for various skeletal features of the two species are shown. The three characters examined show normal distributions in the two groups and there is some overlap in measurements.

The occurrence of pupae for the two groups (Fig. 3) during a 12 month period is in a complementary cycle. However there is an overlap of linear dimensions and pupal (and presumably adult) co-occurrence takes place.

Table 1. Biometric data for the larvae of *verralli* and *calvescens*. Measurements in mm.

	Length head capsule	Length of basal antennal segment	Mandible length
<i>Eukiefferiella verralli</i> (N=9)			
Mean	0.345	0.067	0.121
Range	0.315—0.375	0.059—0.070	0.119—0.126
Standard deviation	0.013	0.006	0.009
Coef. of variability	3.0	8.9	7.3
<i>E. calvescens</i> (N=17)			
Mean	0.248	0.053	0.102
Range	0.225—0.315	0.049—0.059	0.099—0.109
Standard deviation	0.011	0.009	0.004
Coef. of variability	4.4	17.5	3.8

Pupae

A casual examination of pupae of each larva indicated that a considerable amount of variability exists in the number of spinules involved in shagreenation etc. so the present description is confined to one representative of each group.

The pupae of the two species are distinguished by the possession by *verralli*

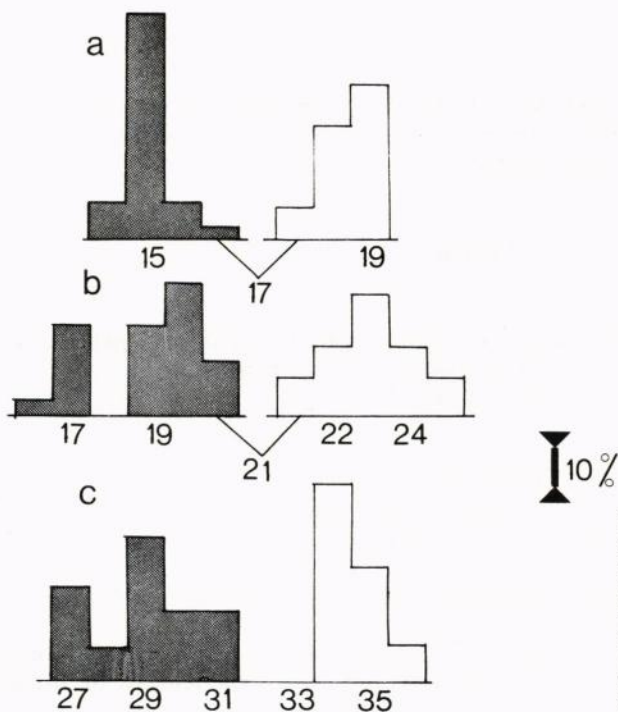


Fig. 2. Length frequency histograms for larvae of *E. verralli* and *calvescens* (stippled). a, length basal antennal segment; b, length head capsule; c, length mandible. The length scale (units) is not common to the three histograms (see Table 1). Overlap is indicated V.

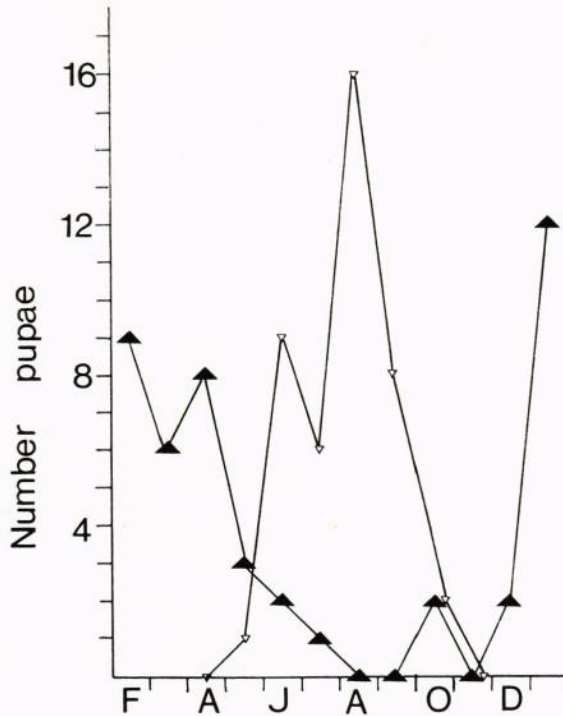


Fig. 3. Numbers of pupae developing from larval collections of *E. verralli* (▲) and *calvescens* (▽) during a 12 month period.

of intersegmental spots which are absent in *calvescens* and by the presence of pale intersegmental stripes in *calvescens*, these missing from pupae of *verralli*. Readings are in mm.

E. verralli (Number measured=1)

Colour, dark green-blue. Length=3.3 (exuvium measured mounted on a slide). Width=0.9. Prothoracic horn: bulb=0.150 long; apical portion=0.407 long. Abdominal shagreenation is absent from segment 1 and is faint

Table 2. Length of the palp segments of *Eukiefferiella verralli* and *calvescens* to show overlap in linear dimensions. The number of measurements are in brackets.

<i>verralli</i> male			
0.028—0.042	\bar{x} =0.036;	0.067—0.095	\bar{x} =0.079;
0.086—0.105	\bar{x} =0.095;	0.126—0.144	\bar{x} =0.137
(4)			
<i>verralli</i> female			
0.046—0.049	\bar{x} =0.047;	0.077—0.088	\bar{x} =0.082;
0.084—0.095	\bar{x} =0.089;	0.118—0.120	\bar{x} =0.119
(2)			
<i>calvescens</i> male			
0.028—0.042	\bar{x} =0.035;	0.070—0.081	\bar{x} =0.074;
0.077—0.095	\bar{x} =0.086;	0.102—0.158	\bar{x} =0.127
(4)			
<i>calvescens</i> female			
0.028—0.032	\bar{x} =0.030;	0.035—0.060	\bar{x} =0.047;
0.070—0.081	\bar{x} =0.075;	0.105—0.140	\bar{x} =0.123
(2)			

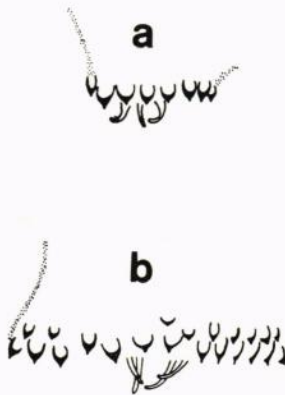


Fig. 4. Shagreenation of the third abdominal tergite of pupa of (a) *E. calvescens* and (b) *E. verralli*.

on segments 2 and 8. On the third abdominal tergite the sculpture consists of approximately 13 spinules on either side with three claws below each row of spines (Fig. 4). There are three lateral spines on the telson and one on each side of the abdominal terminal covers.

E. calvescens (N=1)

Colour green-blue. Length=3.0; width=0.8. Bulb of prothoracic horn=0.128 and apical portion=0.364. Shagreenation as is *verralli* but fewer spinules to a row and fewer hooks also (Fig. 4). Chaetotaxy of telson as described for *verralli*.

Adults

Adults of the two species were obtained in the rearing programme described above. A number were dissected and mounted in euparal and various skeletal features measured (Table 2).

The skeletal features would appear to be in the same proportion in the two species and linear measurements show, as in the larvae and pupae, some overlap.

Conclusions and summary

The larvae of two *Eukiefferiella* species were collected from a small lotic system in western Ireland. The adults have differing emergence times and the larvae, pupae and adults of both groups differ in dimensions. There is however some overlap in both emergence period and dimensions. The larvae are distinguishable by the presence or absence of an occipital rim and live material is distinguishable on colouration.

Note: A number of measured larvae and pupae will be deposited in the National Museum, Dublin.

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