

***Centroptilum dimorphicum* sp. n., a new species of mayfly  
(Ephemeroptera, Baetidae) from Algeria**

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**Taxonomy, Mediterranean, sexual dimorphism, adult, subimago, nymph, affinities**

**Abstract.** *Centroptilum dimorphicum* sp. n. (nymph, subimago male, adult female), a species exhibiting quite unusual combination of nymphal characters and sexual dimorphism in presence/absence of hindwings, is described from Algeria. Its critical taxonomic characters are compared with those of other species of *Centroptilum* and related genera. Data on its biology are included.

In previous papers dealing with the mayfly fauna of North Africa (e.g. THOMAS & DAKKI, 1979; DAKKI & GIUDICELLI, 1980; SOLDÁN & THOMAS, 1983a, b; THOMAS et al., 1983) little attention was given to the genus *Centroptilum* EATON. Earlier authors (EATON, 1899 and LESTAGE, 1925) mentioned the widespread Eurasian species *Centroptilum luteolum* (MÜLL.) from Annaba (Algeria). EATON (1899) described a new species *C. algiricum* ETN. from Tissadourt (Algeria) based solely on adults. Since then several new species have been described in the nymphal stage (e.g. GRANDI, 1964) in addition to species known from the Mediterranean region only in the adult stage (e.g. EATON, 1883—1888). Thus the taxonomic situation of this genus has become very unclear.

Our extensive North African mayfly material, collected mainly in Algeria and Tunisia, comprises several species of *Centroptilum*, some of them apparently new. *C. luteolum* seems to be distributed evenly in brooks on northern slopes of the Atlas Tellien (found e.g. in Oued Merdja, Oued Mouzaia near Camp des Chenes, Wilaya de Blida), and *C. algiricum* seems to be distributed in the central area of the humid zone in Algeria. Nymphs which might belong to this latter species (typical, chocolate eyes of the pharate subimago different from all remaining European species) were found in a small brook near Isser, Wilaya de Tizi-Ouzou.

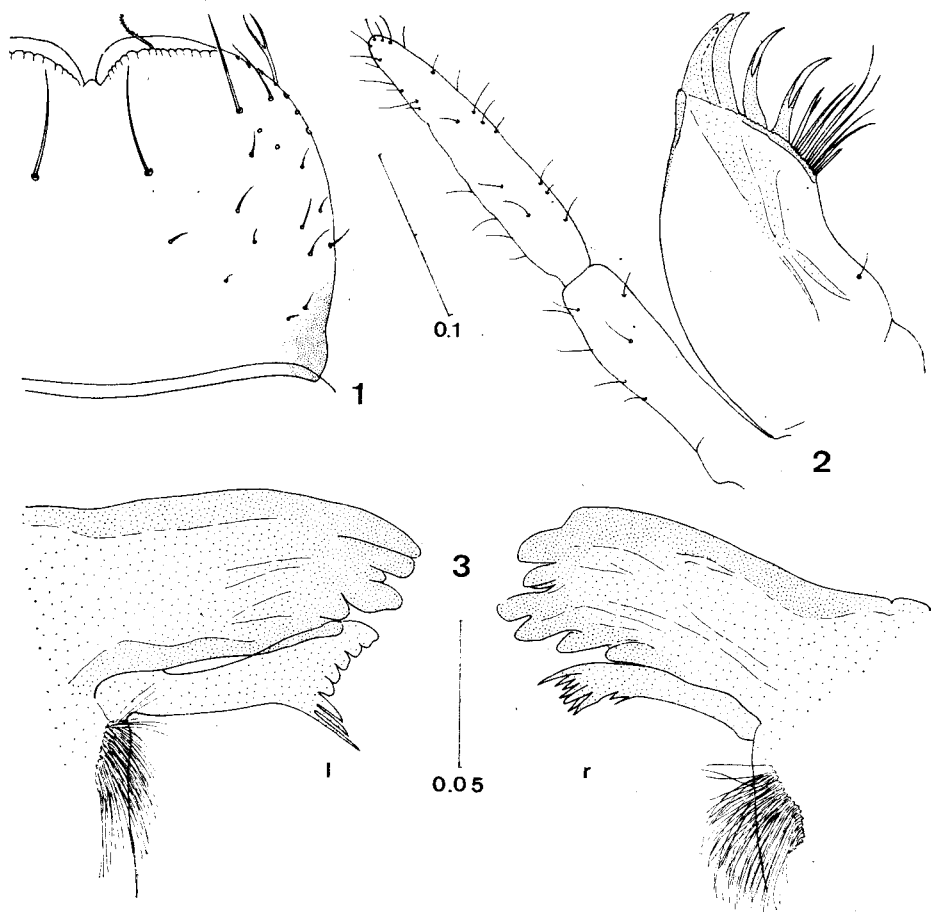
The present paper describes a peculiar new species of *Centroptilum* found at several localities in the humid and subarid zones in Algeria.

*Centroptilum dimorphicum* sp. n.

(Figs. 1—15)

Mature nymph (holotype): Body length 4.8 (4.1—5.5) mm; length of cerci 1.9 (1.7—2.1) mm. Head pale yellowish with slight dark stippling along apicranial suture; eyes black, ocelli brownish black. Antennal pedicel slightly

longer than scape, with blackish diffuse spot in some specimens. Labrum rounded anterolaterally, about 1.4 times as broad as long (ratio width: length 1.37); bristles on anterior margin of labrum finely serrated, anterolateral bristles unserrated, bifurcate, 1 + 2-3 stout bristles on surface (Fig. 1), submarginal hairs relatively wide but short. Maxillae with incisors as in Figs. 3 r, 1; inner incisors with about 5-6 variably shaped rounded teeth; left prostheca with 3 inner pointed teeth much longer than 5-6 outer rounded teeth, right prostheca with smaller, pointed teeth approximately equal in length; humerous hairs arising from base of both prosthecas. Lingua and superlinguae of hypopharynx equal in width (Fig. 4). Galeolacinia of maxilla with three stout apical teeth, two subapical pointed spines and a group of about 7 bristles unequal in length; maxillary palps 2-segmented, apical segment slightly longer than basal one, segment covered with fine hair (Fig. 2). Glossae and paraglossae approximately equal in width, paraglossae bent, with marginal bristle and one inner submarginal row of bristles (Fig. 6).



Figs. 1-3: Nymph of *Centropitulum dimorphicum* sp. n., last instar. Scale in mm. 1 - labrum. 2 - maxilla, dorsal view. 3 - apex and prostheca of right (r) and left (l) mandible.

Labial palps 3-segmented, segments 2 and 3 nearly entirely fused (Fig. 5); segment 2 triangular with conspicuous inner anterolateral lobe, its margins with fine hair. Segment 3 oval, slightly asymmetrical evenly covered with bristles.

Colour patterns of thoracic nota and abdomen very variable. Pronotum usually pale whitish, dark bordered in anterior and posterior margins with diffuse submarginal triangular spots or predominantly dark with three pairs of oval and a pair of V-shaped pale spots (Fig. 9). Meso- and metanotum with dark bordered margins, mesonotum predominantly pale, metanotum sometimes (in males) with a pair of small pale medial spots. Hindwing pads as long as  $1/4-1/3$  of fore wing pads, developed in male nymphs, entirely absent or considerably reduced, empty and rudimentary in female nymphs (Fig. 10). Legs usually pale, in some specimens with stippling forming irregular longitudinal spots on femora and tibiae; tibiae and tarsi approximately equal in length; sparse small stout spines on inner margin of femora, tibial and tarsi, those on tarsi about twice longer. Outer margins of femora with 1-2 small rounded and bordered scales (Fig. 7a). Ventral side of thorax pale, unicolourous. Claws as in Fig. 8.

Abdominal terga with various colour patterns, colouration of a particularly well coloured male nymph apparent from Fig. 11; terga II, IV, VII, VIII and X usually pale, other terga (especially tergum I) with dark brownish or blackish markings. Abdominal segments, especially posterior ones, with posterolateral spines (Fig. 12) and sublateral V-shaped impressions. Posterior margin of terga with a row of heavily sclerotised triangular spines, irregularly alternating with very small ones and short hairs (Fig. 13). Surface of terga without scales and hair, evenly covered with doubled semilunar impressions. Seven pairs of gills; gill 1 narrow, 3-4 times longer than broad, asymmetrical and bent, gills 2-6 oval, slightly asymmetrical with inconspicuous tracheisation and marginal hair, gill 7 symmetrical, smaller than gill 1 (Fig. 15); all gills simple, without rudiments of a second lamella. Paraproct plate (Fig. 14) with marginal row of about 15 teeth, medial teeth larger and smooth surface. Paracercus as long as cerci; cerci pale blackish in apical third, slightly annulated, with bilateral fringe of hair.

Subimago male (dissected from mature male nymph): Turbinate eyes dark yellowish orange, faceted surface distinctly darker than their shaft in freshly fixed specimens. Thorax light brown, with inconspicuous darker smudges. Forewings dark greyish, hindwings present, with rounded posterior margin and distinct costal angulation. Legs whitish yellow, without markings. Abdominal terga with a pair of darker triangular spots, posterior terga paler. Forceps whitish, cerci whitish yellow, not annulated.

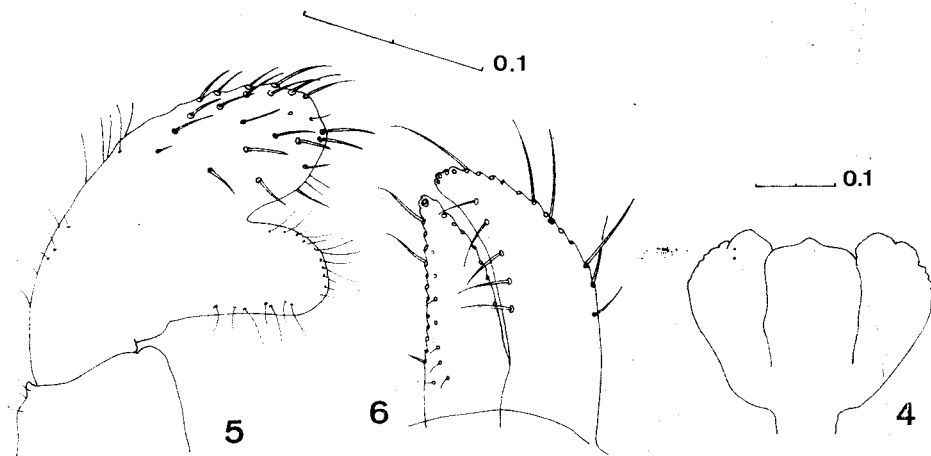
Adult female (reared from mature nymph): Head and thorax light brown with inconspicuous darker smudges. Fore wings slightly brownish, cross and longitudinal veins darker, with single intercalary veins; pterostigma slightly milky. Hindwings completely absent, posterior margin of metanotum as in nymphs. Abdominal terga apparently darker than sterna, cerci lighter, not annulated.

Adult male unknown.

Material examined: mature ♂ nymph (holotype), male subimago (paratype No. 1), female adult (paratype No. 2), 8 nymphs (further paratypes): Algeria, Wilaya de Blida, Oued Chiffa, Gorges de la Chiffa, 8-9. 10. 1981; 2 nymphs (paratypes), Wilaya de Batna, Oued Bouief, Sidi

Kaserou, 16. 10. 1981; 2 nymphs (paratypes) Oued Merzoug, Constantine, 30. 9. 1981 all leg. T. Soldán. Holotype in 75 % alcohol, parts of paratypes on slides; deposited in the Institute of Entomology, Czechoslovak Academy of Sciences, České Budějovice, except for 5 paratypes in the Laboratory of Hydrobiology, Université P. Sabatier, Toulouse.

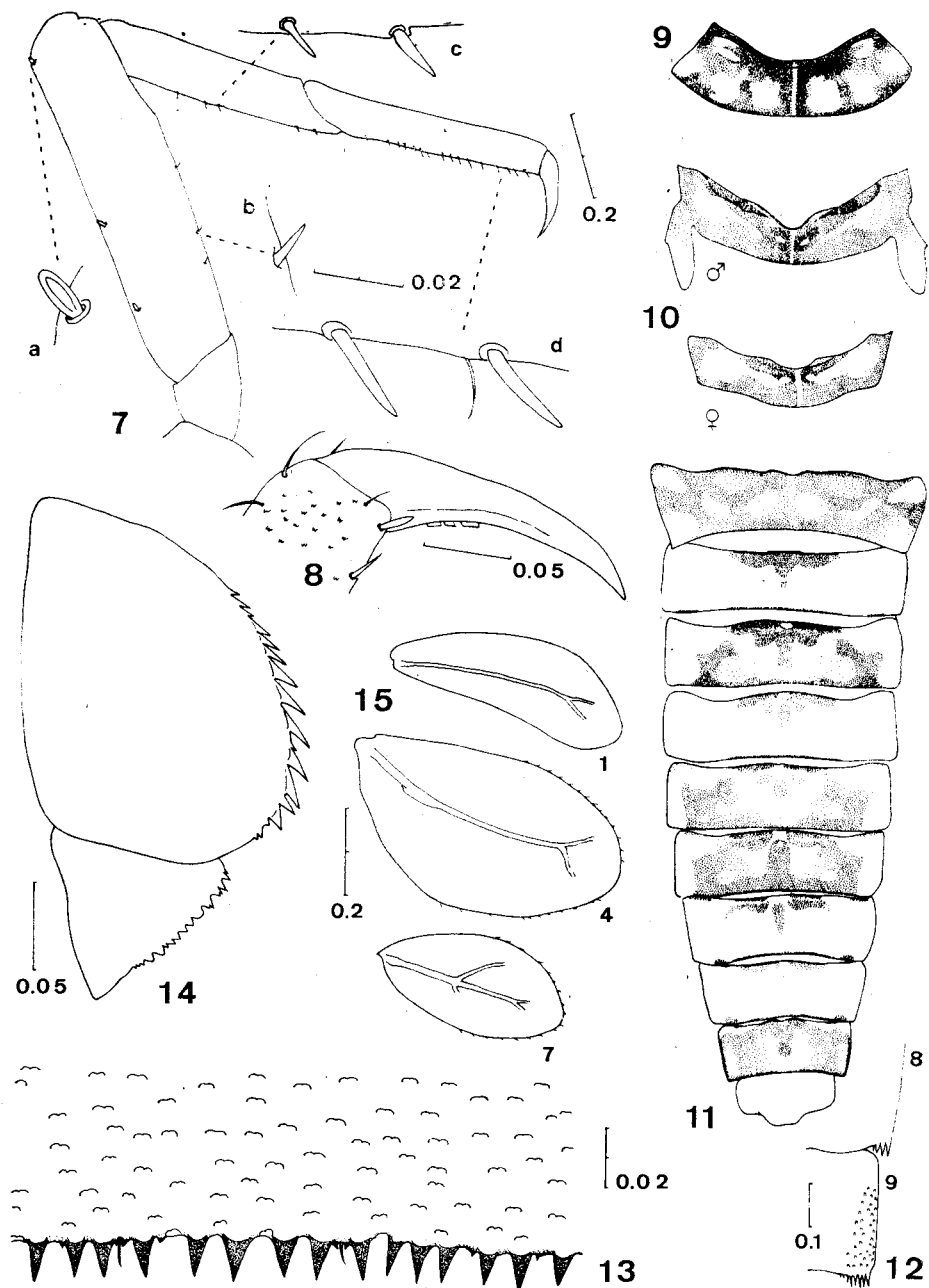
Differential diagnosis and discussion: *Centroptilum dimorphicum* sp.n. occupies a quite isolated position among all known species of *Centropti-*



Figs. 4—6: Nymph of *Centroptilum dimorphicum* sp. n., last instar. 4 — hypopharynx. 5 — labial palpus, ventral view. 6 — glossa and paraglossa, ventral view. Scale in mm.

*lum*. It can be distinguished by the following combination of characters: in nymphs (1) labrum rounded, with 1 + 2—3 bristles, (2) not cleft outer mandibular incisors, numerous hairs arising from base of both prosthecas, (3) maxillary palps 2-segmented, (4) labial palps 3-segmented, segment 2 conspicuously produced anteromedially, (5) strong and relatively short legs with sparse spines and claws almost without teeth, (6) hind wing pads missing in female nymphs, (7) simple, slightly asymmetrical and elongated gills, (8) posterior margin of abdominal terga with triangular spines, surface of terga without scales; in adults (9) dark orange turbinate eyes, faceted surface darker in living and freshly fixed specimens, (10) wing intercalaries simple, (11) no hind wings in females.

Nymphal characters show apparent relationship to the *C. luteolum* species-group (e.g. simple gills, arrangement of mandibular incisors and posterior margin of abdominal terga), while the relationship to the *C. pennulatum* and certain others species-groups within this genus (these groups most likely represent different genera and/or subgenera) are not so pronounced. The shape of the hindwing in the male of *C. dimorphicum* is reminiscent of the *C. pennulatum* group (relatively wide rounded hind wings with well developed costal angulation). The unique arrangement of the second segment of the labial palps is quite unusual within Palaearctic (and Nearctic as well) representatives of *Centroptilum*. However, it is very similar to that of nymphs of the Afrotropical species *C. excisum* BARNARD and *C. flavum* CRASS. Nymphs of *C. flavum* seem to be related to *C. dimorphicum* sp. n. also in general coloura-



Figs. 7–15: Nymph of *Centroptilum dimorphicum* sp.n., last instar. Scale in mm. 7 – dorsal surface of leg and apical portion of femur (a), spines of inner margin of femur (b), of tibia (c) and of tarsus (d). 8 – tarsal claw. 9 and 11 – colour pattern of a particularly well coloured male nymph, pronotum (9) and abdominal terga (11). 10 – metanotum of male (above) and female (below).

tion and lateral spines on abdominal segments (CRASS, 1947), but they differ apparently in the arrangement of mandibles (cleft incisors) and labrum (oblong-shaped, typically *Centroptilum*-like). These affinities represent a case of faunistic similarity between North African and Afrotropical faunas which is otherwise very rare (DAKKI & GUIDICELLI, 1980; SOLDÁN & THOMAS, 1983). The above species of *Centroptilum* are distributed in Natal, Transvaal and Swaziland (BARNARD, 1932; CRASS, 1947; DEMOULIN, 1970). Unfortunately, we have no data concerning the presence or reduction of hindwings in females of these species.

On the other hand, there are some characters in nymphs of *C. dimorphicum* sp.n. which bring some doubt as to generic placement of this species. The arrangement of labrum (shape and especially bristles in the position of 1 + 2—3) shows apparent relationship to the genus *Baetis*. Also generally stout and short legs single these nymphs out from those of true *Centroptilum*. Wing dimorphism, although not so pronounced as in *C. dimorphicum* sp.n. (wings of females shorter by 1/3—1/2 than those of males), can be seen in the genera *Baetis* and *Acentrella* (see e.g. MÜLLER-LIEBENAU, 1970 and others). Total reduction of hindwings has not been so far mentioned within *Centroptilum* and shows certain relationships to the *Cloeon-Procloeon* phyletic lineage. There is no doubt that *C. dimorphicum* forewings possess a single intercalaries like these genera and "true" *Centroptilum*. This case of hind wing reduction developed undoubtedly independently on that of *Pseudocloeon* and *Pseudocloeon*-like genera possessing two intercalaries in forewings.

As has been pointed out above, the taxonomic situation of the genus *Centroptilum* is very unclear, some of the species-groups undoubtedly represent distinct taxa (cf. BOGOESCU, 1947; KAZLAUSKAS, 1964 and others). We have therefore tentatively assigned *Centroptilum dimorphicum* sp.n. to this genus because of its clearly close relationship to the *C. luteolum* species-group, and await the final generic placement when *Centroptilum* is revised on a world-wide basis.

**Distribution and biology:** The above localities indicate distribution in the humid coastal zone of Algeria, with a tendency to inhabit some biotopes of the subarid zone (Oued Bouilef near Batna). However, this tendency does not seem to be so pronounced as in e.g. *Baetis neglectus* which can inhabit also aquatic biotopes in oases in the arid zone. The southern range of the distribution of *Centroptilum dimorphicum* is probably limited by the Atlas saharien. This species is also most likely distributed in Tunisia, judging from its distribution in western Algeria and the faunistic similarity of these areas.

Nymphs inhabit small to moderately sized brooks and streams with rich permanent water, occurring only quite exceptionally in isolated pools. They are able to tolerate moderately eutrophied streams (Oued Chiffa). Typical microhabitats of nymphs are represented by stony bottoms and plant debris at places with relatively strong current but not directly at the streamline. Nymphs occur usually together with those of *Baetis pavidus* GRANDI, *Baetis neglectus* NAVÁS and *Procloeon stagnicola* SOLDÁN & THOMAS. Emergence is

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(below) nymphal thorax. 12 — lateral margins of terga VIII and IX of abdomen. 13 — cuticular ornamentation and posterior margin of abdominal tergum V. 14 — paraproct. 15 — right gills 1, 4 and 7.

probably continual at least during the dry season, overwintering stage remains unknown.

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#### *Centroptilum dimorphicum* sp. n., новый вид поденки (Ephemeroptera, Baetidae) из Алжира

Таксономия, Средиземноморская область, половой диморфизм

**Резюме.** *Centroptilum dimorphicum* sp. n. (личинка субимаго — самец, взрослая самка), виды проявляющие совсем необычные сочетания личиночных черт и полового диморфизма с/без наличия задних крыл описаны из Алжира. Их таксономические черты критически обсуждаются и сравниваются с чертами других видов *Centroptilum* и близких родов. Приведены основные данные по их биологии.

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