

A new record of *Compsoeuriella njalensis*  
(Kimmins) (Ephemeroptera: Heptageniidae) from  
South Africa

by

H. J. SCHOONBEE

Institute for Zoological Research, Potchefstroom University for C.H.E., Potchefstroom

INTRODUCTION

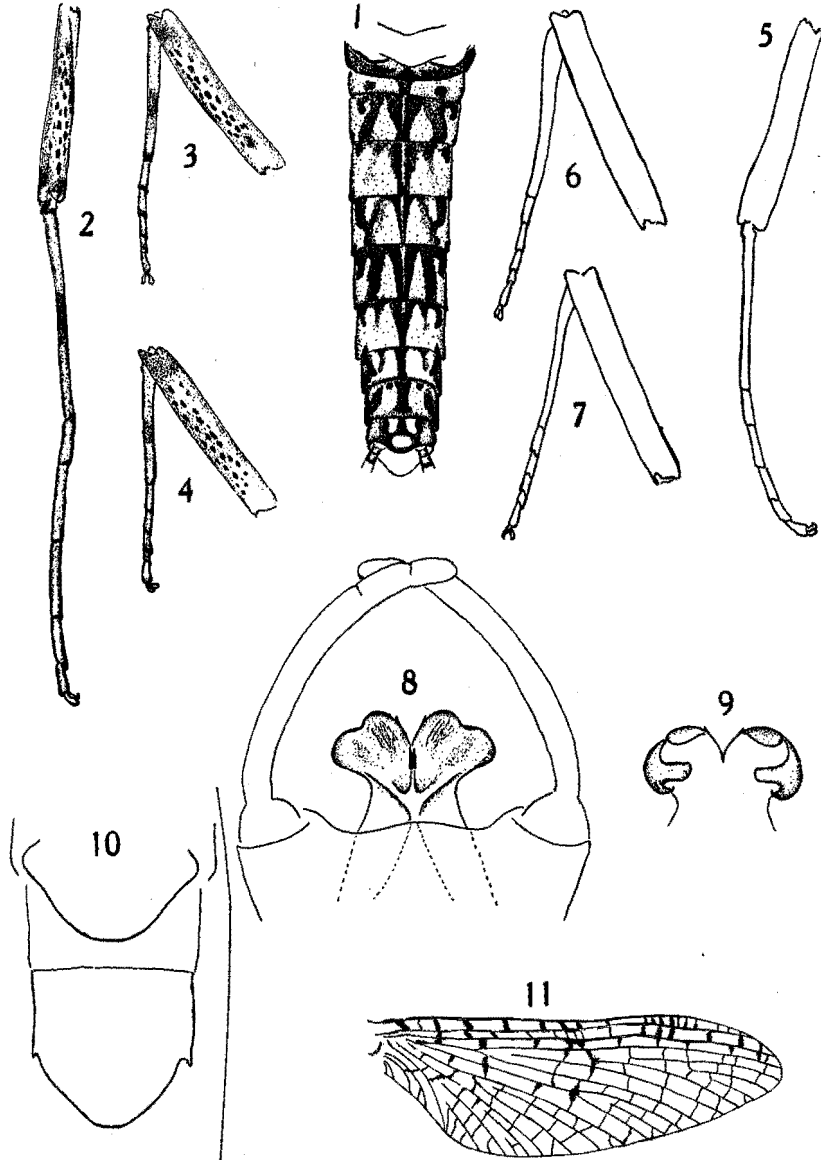
During some ecological investigations of the Vaal river at Skandinawia-drift, 20 miles south-east of Potchefstroom, Transvaal, some mayfly material was collected which included nymphs of *Compsoeuriella* Ulmer. \* Imaginal material reared from the latter closely resembled the description of *C. njalensis* (Kimmins) from Njala, Sierra Leone (Kimmins, 1932). Mr D. E. Kimmins of the British Museum (Nat. Hist.), London was subsequently consulted and he confirmed the fact, that, apart from a few differences in colour pattern, which may well be variable over the considerable distance separating the two localities, it was not possible to separate the Transvaal specimens from the *C. njalensis* type material in his possession.

The following notes on, and drawings of, the Transvaal *njalensis* specimens are supplementary to Kimmins' description of this species. In addition, an account is given of its nymphal form which has not been described by Kimmins.

*Compsoeuriella njalensis* (Kimmins, 1932)

MALE: length 0.94 cm; fore-wing length 0.86 cm, width 0.28 cm; hind wing length 0.24 cm, width 0.14 cm. Leg ratios: fore femur 1.0, tibia 1.02, tarsus 1.30; tarsal segments 1.0, 1.7, 1.6, 0.9, 0.7; middle femur 1.0, tibia 0.7, tarsus 0.6; tarsal segments 1.0, 0.9, 0.8, 0.4, 0.9; hind femur 1.0, tibia 0.7, tarsus 0.5; tarsal segments 1.0, 0.85, 0.7, 0.4, 0.9. *Head*: Turbinate eyes dull yellow, ocelli hyaline (in life), milky (in fluid); fronto-clypeal part of head yellowish, finely mottled with brown; antennae yellow with brownish tinge. *Thorax*: Segments with pale yellow ground colour and purplish-brown markings; pro- and mesothorax with brown streak along mid-dorsal surface; metathorax uniformly brownish. Legs (figs. 2-4) pale yellow with brown markings; femora with characteristic brown mottles; tibiae yellow with a brownish band medially; tarsi yellow, brow-

\* The genus *Notonurus* Crass, 1947 was recently placed into synonymy with *Compsoeuriella* Ulmer, 1939 (Gillies, 1962).



Figs. 1-11. *Compsoeuriella njalensis* (Kimmins). Adults. 1. dorsal view female abdomen; 2-4. legs I-III male; 5-7. legs I-III female; 8. penis and genostyles ventral view; 9. dorsal view of penis to show lobes and position of spines; 10. end of female abdomen, ventral view; 11. forewing male.

nish at joints. Wings: Wing membrane hyaline in life, milky in fluid; cross veins in forewing well marked, brown, some of which are flanked by a dark brown pigmentation of the wing membrane (fig. 11). *Abdomen*: Ground colour yellow with characteristic brown pattern dorsally as in female (fig. 1). *Terminal filaments*: Mainly yellow with brown rings at joints of segments.

*Genitalia* (figs. 8-9): In ventral view, the outer lobes are distinctly wider apically than the inner ones, which gradually curve outwards, each with small spine occurring on its inner margin (fig. 8). In Kimmins' figure (p. 433) this spine appear to be situated ventrally near the inner margin of each penis lobe. Two strongly chitinized medially situated titallators are present. A shallow concavity occurs in middle portion of each pair of penis lobes. Ventral surfaces of inner lobes with fine creases near their inner margins. Dorsally, the bilobed outer penis lobes each terminates anteriorly in a small curved spine.

**FEMALE**: Markings of body, legs and terminal filaments as in male. Wing venation as in male. Excluding a few cross veins in the cubito-anal region, virtually all cross veins show some pigmentation of the adjacent wing membrane. Conditions similar to these were also found in some other specimens, indicating that the pigmentation of the wing membrane is subject to some variation. Length 0.81 cm; forewing length 0.89 cm, width 0.33 cm. Leg ratios: fore femur 1.0, tibia 0.8, tarsus 0.8; tarsal segments 1.0, 1.3, 1.1, 0.6, 0.9; middle femur 1.0, tibia 0.8, tarsus 0.5; tarsal segments 1.0, 0.9, 0.7, 0.5, 0.9; hind femur 1.0, tibia 0.7, tarsus 0.4; tarsal segments 1.0, 0.8, 0.7, 0.4, 1.0.

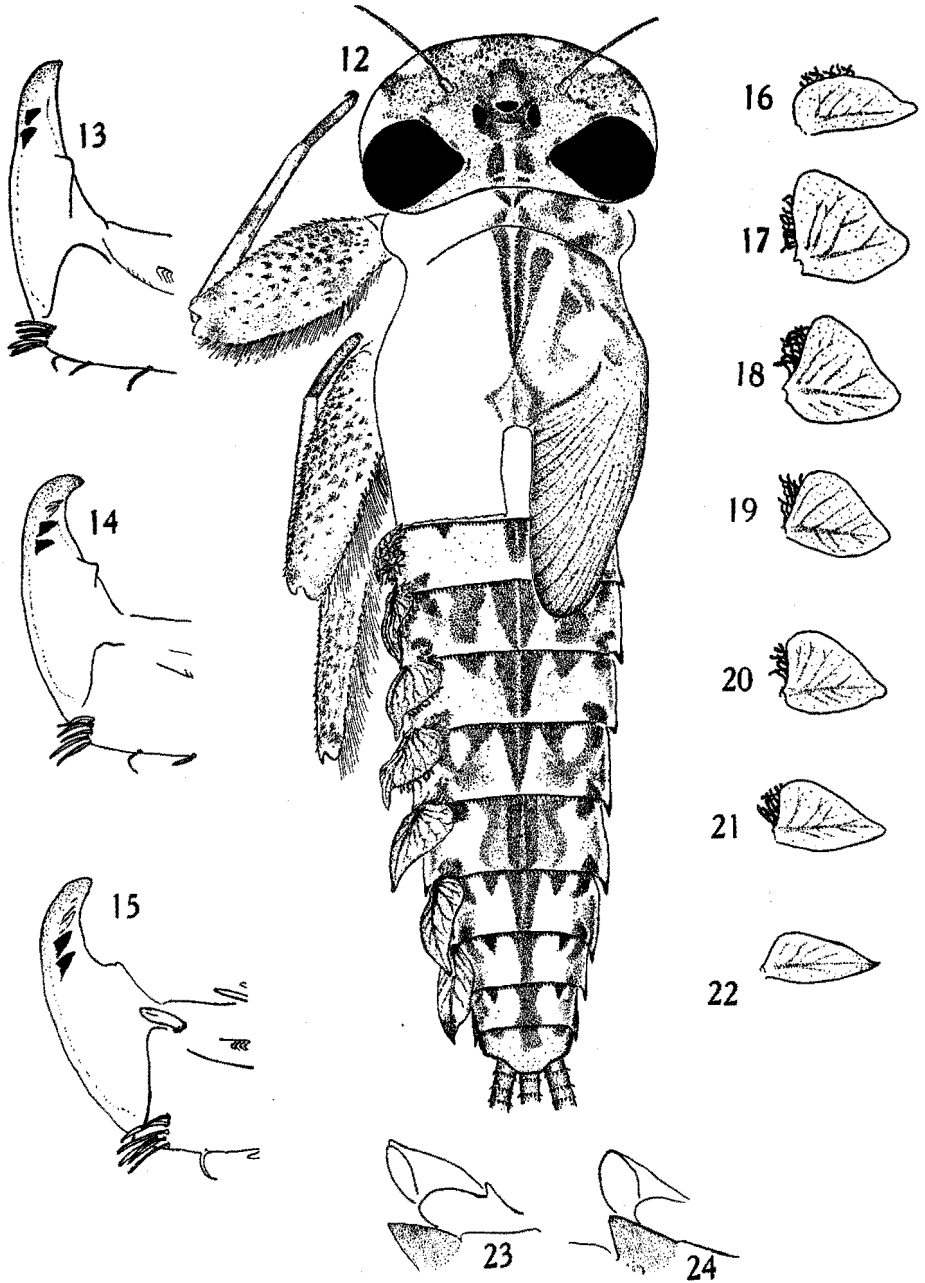
*Genitalia* (fig. 10): Ventral plate curved, rounded at apex.

**SUBIMAGINES**: Markings as in adult specimens. Ground colour of body and wing membrane dull grey. Cross veins well marked. Abdominal pattern and shape of genitalia as in adults.

**NYMPH**: As in *Afronurus* Lestage (Barnard, 1932). It differs clearly from the latter in the stippling of the femora (Gillies, 1962) and the frontoclypeal head shield (fig. 12), and in the presence of distinctly lanceolate lobes above coxae 2 and 3 (figs. 23-24). Spines on femora 1-3 lanceolate; claws 1-3 each with two strongly chitinized spines (figs. 13-15). Abdominal pattern highly diagnostic of the species (fig. 12), resembling that of the adult. Gills (figs. 16-22) as in *Afronurus*, consisting of outer lamellae and inner branchial filaments. Seventh pair of gills without branchial filaments. Abdominal tergites clearly acuminate ventrolaterally, particularly so in segments 5-8. Mouth parts as in *Afronurus* but with chitinized combs on maxilla not exceeding 12 in number, compared with more than 17 in the South African species of *Afronurus* (Schoonbee, in preparation).

#### ECOLOGY

Apart from morphological differences, the South African nymphs of the genera *Compsoeuriella* and *Afronurus* also differ in their habitat preferences. Where



*Afronurus* occurs under stones in the current (Harrison and Elsworth, 1958; Oliff, 1960; Allanson, 1961; Chutter, 1963; Schoonbee, in preparation), the nymphs of *Compsoeuriella* distinctly prefer conditions in the marginal vegetation. In the case of *C. njalensis*, most nymphs were collected from floating twigs and reeds, in pools and near the banks of streams outside the current, particularly on such material which contains a rich growth of algae. Other macro-invertebrate organisms collected with it include:

ANNELIDA: Hirudinea.

CRUSTACEA: *Caridina nilotica*, *Potamon*, *Simocephalus*, *Moina* and *Thermocyclops*.

EPHEMEROPTERA: *Austrocaenis*, *Baetis bellus*, *Centroptilum excisum* and *C. flavum*.

ODONOTA: *Pseudagrion* and *Chlorocypha caligata*.

COLEOPTERA: Helmidae larvae and Hydrophilidae adults.

DIPTERA: Chironomidae (including *Corynoneura*).

MOLLUSCA: *Lymnaea natalensis* and *Ferrissia*.

#### RIVER CHEMISTRY

Chemical data of river water obtained from this locality during the dry season, in August, 1965, are recorded in table 1.

TABLE 1.

pH . . . . .	8.5
Conductivity as mmhos . . . . .	225.0
T.D.S. p.p.m. . . . .	185.96
Calcium hardness as CaCO <sub>3</sub> p.p.m. . . . .	120.0
Magnesium hardness as CaCO <sub>3</sub> p.p.m. . . . .	20.0
Chlorides as Cl.p.p.m. . . . .	30.0
Total Alkalinity p.p.m. . . . .	111.40
Silica as SiO <sub>2</sub> p.p.m. . . . .	0.83
Sulphate as SO <sub>4</sub> p.p.m. . . . .	96.00
Phosphate as PO <sub>4</sub> p.p.m. . . . .	traces
Nitrite N. p.p.m. . . . .	0.032
Nitrate N. p.p.m. . . . .	0.200
OA. (4-hours) . . . . .	1.80

#### EXPLANATION OF FIGURES

Figs. 12-24. *Compsoeuriella njalensis* (Kimmins) Nymph. 12. nymph, dorsal view to show markings and abdominal pattern; 13-15. claws of legs I-III; 16-22. abdominal gills 1-7; 23-24. spinelike lobes of thoracic terga above coxae II and III.

Results show the water to be distinctly alkaline with a pH of 8.5. Although the nitrite and nitrate values indicate some slight organic enrichment, the faunal composition nevertheless indicate upon clean water conditions with the Ephemeroptera and other pollution sensitive organisms being numerically the dominant organisms amongst the macro-invertebrates in the stream throughout the year.

#### ACKNOWLEDGEMENTS

The author wishes to express his sincere thanks to the South African Council for Scientific and Industrial Research, Pretoria for financial assistance, to Prof. P. A. J. Ryke for reading the manuscript and to Mr D. E. Kimmins of the British Museum (Nat. Hist.) for his much appreciated and valuable criticism. Also, the author is much indebted to Mr J. J. Combrinck for the chemical analysis of water samples.

#### REFERENCES

- ALLANSON, B. R., 1961. Investigations into the Ecology of Polluted Inland Waters in the Transvaal. *Hydrobiologia* **18**: 2-76.
- BARNARD, K. H., 1932. South African Mayflies (Ephemeroptera). *Trans. R. Soc. S. Afr.* **20**: 201-259.
- CHUTTER, F. M., 1963. Hydrobiological studies on the Vaal river in the Vereeniging area. Part I. Introduction, Water Chemistry and Biological Studies on the Fauna of Habitats other than Muddy Bottom Sediments. *Hydrobiologia* **21**: 1-65.
- CRASS, R. S., 1947. Mayflies (Ephemeroptera) collected by J. Omer-Cooper in the Eastern Cape Province, South Africa, with a description of a new genus and species (*Notonurus cooperi*). *Proc. R. ent. Soc. Lond. (B)* **16**: 124-8.
- GILLIES, M. T., 1962. A list of Ephemeroptera in the National Museum, Bulawayo, Southern Rhodesia. *Entomologist's mon. Mag.* **98**: 232-3.
- HARRISON, A. D. and ELSWORTH, J. F., 1958. Hydrobiological studies on the Great Berg River, Western Cape Province. Part I. General description, chemical studies and main features of the Flora and Fauna. *Trans. R. Soc. S. Afr.* **35**: 125-226.
- KIMMINS, D. E., 1932. Some new Ephemeroptera. *Ann. Mag. Nat. Hist. (10)* **19**: 430-41.
- OLIFF, W. D., 1960. Hydrobiological studies on the Tugela River System. Part I. The Main River. *Hydrobiologia* **15**: 281-385.