

ON THE SYNONYMY OF NOTONURUS CRASS WITH COMPSONEURIELLA  
ULMER (HEPTAGENIIDAE)

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Abstract. A comparison of the type material of Componeuriella Ulmer from Java with African species placed in the genus Notonurus Crass has shown that they are closely similar. In particular, they share following characters: fore wing, subcosta and radius 1 follow a sinuous course in the outer 1/3 of the wing; fore leg, tibia longer than tarsus and all femora conspicuously stippled; nymph, acute supra-coxal spurs are present above and behind the mesothoracic coxal processes. On the basis of these and other more general similarities the placing of Notonurus in synonymy with Componeuriella, which had previously been proposed, is held to be confirmed. This has the result that neither of the 2 widespread genera of Heptageniidae in the Afrotropical Region is endemic to the Region and both are presumably endemic to the Region and both are presumably derived from the Oriental fauna. The nymphs of Componeuriella are generally found in rather slow-flowing rivers in lowland Africa, with sand or silty bottoms. In faster rivers they avoid the main current and congregate in vegetation in backwaters. They are capable of surviving in intermittently static conditions in rivers where the flow reverses with the tides.

Taxonomy, morphology, nymphal habitats, distribution, Ethiopian

Some 20 years ago I expressed the opinion that the African genus, Notonurus, described by Crass (1947) from South Africa, was a synonym of Componeuriella, erected by Ulmer (1939) for a species from Java. This conclusion has not been accepted by all workers. One exception was Schönbee (1967), who described the nymph of C. njalensis (Kimmins), thus filling in an important gap in our knowledge. In his major work on the Afrotropical Ephemeroptera Demoulin (1970) maintained Notonurus as a valid genus and figured a nymph as "Notonurus ?". At the same time, he commented that "la synonymie proposée par M.T. Gil-

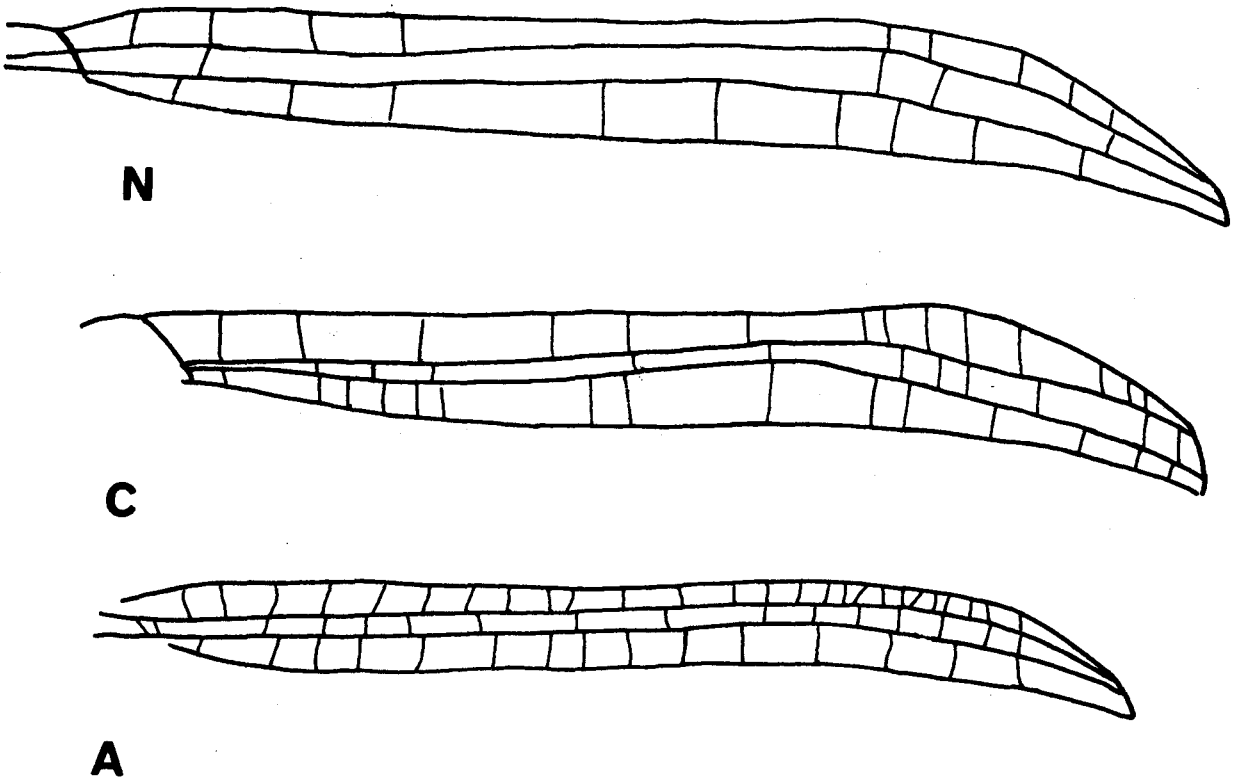


Fig. 1. Anterior part of fore wing in Notonurus tortinervis /N/, Componeuriella thienemanni /C/ and Afronurus oliffi /A/.

lies puisse recevoir une confirmation". It is that confirmation that I hope to provide here. This has been made possible by the kindness of Professor Strumpel of the Hamburg Zoologische Museum in permitting me to examine some of Ulmer's nymphal material of C. thienemanni from Java for comparison with African species.

At the present time, Componeuriella contains the single Oriental species, C. thienemanni Ulmer. Species hitherto included in Notonurus in Africa comprise N. njalensis (Kimmins), N. tortinervis (Navás), N. bequaerti (Navás), and N. sinuosa (Navás). A comparison of the two taxa shows the following features, as set out in the table below.

Wings. In both Notonurus and Componeuriella the subcosta and radius 1 of the fore wing follow a sinuous course in the outer 1/3 of the wing, a most unusual feature in the Heptageniidae (Fig. 1).

Legs. Ratio of the fore tarsus : tibia 1.2-1.3 in Notonurus, 2 : 1 in Componeuriella, 1 : 1 in Afronurus. All femora in Notonurus and Componeuriella are conspicuously stippled.

Penes. Not very differentiated, and seemingly a difficult character to evaluate. Thus Demoulin described the penes of

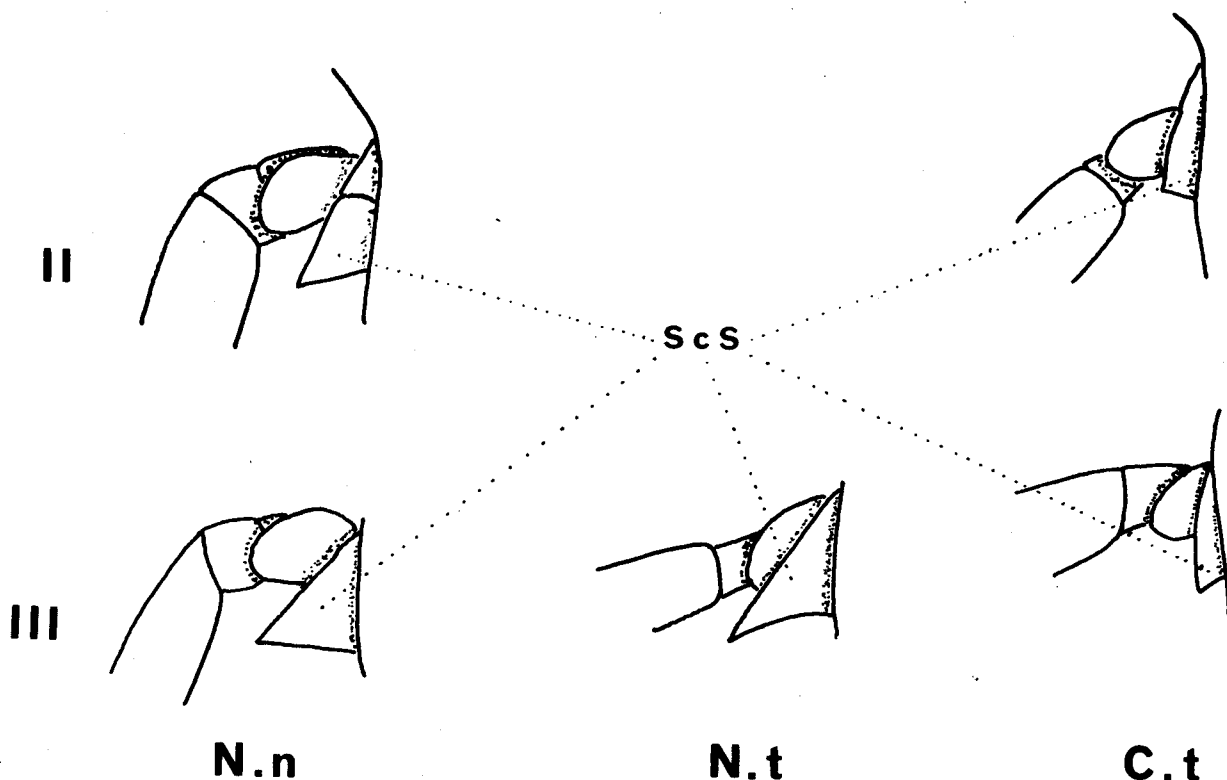


Fig. 2. supra-coxal spurs /ScS/ of meso- and metathorax /II, III/ in Notonurus njalensis /N.n /, Notonurus tortinervis /N.t / and Compsoneriella thienemanni /C.t /.

Compsoneriella as resembling Heptagenia and therefore unlike Notonurus. Heptagenia, however is the very genus Kimmins (1937) regarded his Notonurus njalensis as resembling. The penes of C. thienemanni are, it is true, rather more sessile than in Notonurus, although this difference is absent in the dried specimen of C. thienemanni figured by Ulmer.

Nymphal mouthparts. On the maxillae there are 7 - 12 chitinised combs in Notonurus, 10 - 12 in C. thienemanni. Schoonbee pointed out that there are more than 17 in South African species of Afronurus; however, Corbet (1960) only figured about 12 in A. ugandanus.

Gill lamellae. Obtusely pointed in Notonurus, rounded in C. thienemanni and variable in Afronurus.

Nymphal legs. The femora are conspicuously stippled in Notonurus and figured as such for C. thienemanni by Ulmer although these markings now seem to have faded from his type series of nymphs.

Supra-coxal spurs. The most characteristic feature of the nymph of Notonurus is the presence of sharply pointed supra-coxal, meso- and metathoracic spurs. These are figured by Schoonbee and described in the legend as "spinelike lobes of thoracic

Table 1. Congruent characters in Notonurus and Componeuriella and comparison with Afronurus.

	<u>Notonurus</u>	<u>Componeuriella</u>	<u>Afronurus</u>
<b>ADULT</b>			
Subcosta, radius 1	sinuous	sinuous	evenly curved
Fore tarsus:tibia	1.2-1.3:1	2:1	<1:1
Femora	stippled	stippled	rarely stippled
<b>NYMPH</b>			
Maxillary combs	7-12	10-12	Usually >17 /but 12 in ugandanus
Gill lamellae	obtusely pointed	rounded	variable
Length of gill 1: gills II-VII	equal	equal	variable
Femora	stippled	stippled	rarely stippled
Acute supra-coxal spurs	+	+	-

terga above coxae II and III" (Fig. 2). While not figured by Ulmer, examination of the nymphs of C. thienemanni shows that similar pointed spurs are present, although less prominent than in the African species (Fig. 2). In addition to these acutely pointed spurs, and immediately anterior to them, there are the rounded coxal processes that are present in a number of genera of Heptageniidae, including Afronurus, for example as figured by Demoulin (1970) for A. harrisoni.

Taking all these characters together, I conclude that the differences between Notonurus from Africa and Componeuriella from the Oriental Region are insufficient to justify maintaining them as separate taxa. The previous placing of Notonurus in synonymy therefore seems to be justified.

This conclusion has the result that none of the 3 genera of Afrotropical Heptageniidae - Afronurus and Componeuriella from throughout the region and, possibly, Thalerosphyrus from north-east Africa - can be considered endemic to the Region and must be assumed to be derived from the Oriental fauna. This secondary origin is reflected in the lack of diversity of the Afrotropical Heptageniidae in contrast to the great radiation within the family that has taken place in the Holarctic and Oriental Regions.

## BIOLOGY OF COMPSONEURIELLA IN AFRICA

The most striking feature of the nymphal habitat of Compso-neuriella is its absence from fast-flowing waters and tolerance of slow-moving conditions. In the mountains of north-east Tanzania, for instance, streams and torrents with rocky and stony beds contain Afronurus only. By contrast, Compso-neuriella occurs in lowland streams with silt or sandy beds, and the nymphs are found on submerged logs and branches trailing in the water. Similarly, in South Africa, Schoonbee recorded C. njalensis from floating twigs and reeds in pools and near the banks of streams outside the current. In West Africa, the same species is found in even more surprising situations for a Heptageniid. In the sluggish reaches of the lower basin of the River Gambia, tidal for nearly 500 km from the sea, Compso-neuriella occurs in association with Povilla, Afromera, Choroterpes (Euthraulius), Baetis, Centroptilum and Cloeon in trailing vegetation and on the stem of Phragmites rooted in the silty margins of the river. Being tidal, the flow of the river reverses every 6 hours and the nymphs are therefore exposed to static water conditions and high temperatures for quite long periods. Some 200 km higher up the river, but still in the lowlands, riffles alternate with long slow-moving stretches. Afronurus occurs under stones in the former, Compso-neuriella along the river banks in the latter.

One consequence of this tolerance of poorly oxygenated conditions is the widespread distribution of a handful of species of Compso-neuriella, which have evidently been able to move from one river system to the next, right across lowland Africa. This contrasts with Afronurus which, although very inadequately studied up till now, has apparently undergone extensive speciation in the relative isolation of mountain river systems.

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