

A new synonym and distribution records of *Afroptilum sudafricanum* (Lestage) (Baetidae: Ephemeroptera) from the East African Highlands

by

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ABSTRACT. Adult and nymphal material of *Afroptilum sudafricanum* (Lestage) from South Africa was compared with that of *A. montanum* (Kimmins) from East Africa. No consistent differences between the two could be demonstrated. *A. montanum* is therefore treated as a synonym of *A. sudafricanum*. Notes are given on the distribution of this species in highland areas of East Africa.

INTRODUCTION

In a revision of the African species formerly placed in *Centroptilum* Eaton, Gillies (1990) showed that, with one exception, all of them should be transferred to the new genus *Afroptilum*. *A. sudafricanum* was selected as the type species of *Afroptilum*. Species with a well developed hind wing with a double costal spur were designated the 'sudafricanum' group.

Afroptilum sudafricanum is one of the most widespread South African mayflies. The name was originally given by Lestage (1924) to a species of *Centroptilum* with a double costal spur on the hind wing from Krantzkop, Cape Province. Barnard (1932) described the nymph, its most characteristic feature being the absence of the first gill lamella. Crass (1947) noted that in Natal and the Eastern Cape it was one of the most abundant species. Demoulin (1970) gave its area of distribution as from the Cape to Swaziland.

In his monograph, Demoulin (*loc. cit.*) had observed that *A. sudafricanum* (in *Centroptilum*) formed part of a complex of ill-defined species that included *C. dicentrum* Demoulin and *C. montanum* Kimmins. Their distinctness or otherwise from *A. sudafricanum* was a question he left open at that time. But it was evident that, until the nymphs were described, little progress could be made.

My account of the genus *Afroptilum* included a description of the nymph of *A. montanum* (Kimmins), based on specimens from Kenya. I regarded it as distinct from *A. sudafricanum* on the basis of the chaetotaxy of the legs and the apparent absence of overlap in the geographical range of the two species. At the time of writing I was unaware of the newly published records of *A. sudafricanum* from the Awash River basin in Ethiopia, Harrison & Hynes (1988). Thus the previous assumption of *A. sudafricanum* as a purely South African species was no longer valid. The whole subject called for re-examination.

SYNONYMY OF *AFROPTILUM MONTANUM*

In the earlier study, (Gillies *loc. cit.*), I concluded that, although the nymphs of the two species were very close, notably in the absence of the first gill lamella and in the form of the mouthparts, the type and numbers of spine-like setae on the femora (fig. 1) provided a means for separating *A. montanum* from *A. sudafricanum*. However, I have now examined material from Groot Drakenstein (in the Natural History Museum, London), Umzinkulu, The Rocks and Izotsha R. (Albany Museum) and the Klein Vaal R. (F. M. Chutter) as well as from Tanzania, Kenya and Ethiopia and, as the figures indicate, the distribution of these setae is much the same in all the samples examined, regardless of whether they came from East or South African populations. No other differences in the nymphs have been found.

In the adults, some differences have been recorded in minor details of wing venation, notably in the hind wings. Barnard figured the latter as having 2 longitudinal veins in *A. sudafricanum* while Kimmins showed *A. montanum* as having 3. However, in a detailed study Crass (1947) showed that this character was highly variable, specimens from Natal and the Eastern Cape having either 2 veins, a trace of a 3rd vein or 3 fully developed veins.

Kimmins's (1960) figure of the ♂ forceps of *A. montanum* shows the inner angle of the basal segment produced in 'angular tooth-like callosities'. These details were confirmed by Kopelke (1980) and are also present in a series of males from Kenya I have

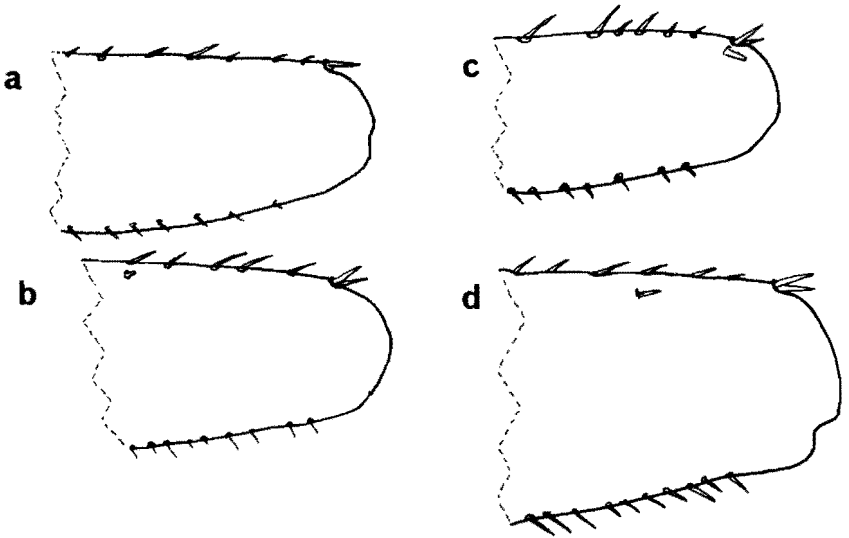


Fig. 1. *A. sudafricanum* nymphs, showing variation in distribution of apical setae of femora. Provenance as follows: (a), (b) South Africa, SE Transvaal, Klein Vaal R., F. M. Chutter. (c) Kenya, Naivasha, R. Malewa, P. C. Barnard. (d) Ethiopia, Debra Berhan, N. of Addis Ababa, D. S. Brown.

examined. They can also be seen in males from Cape Province in the possession of the Natural History Museum, London, provided they are examined from the right angle. No such callosities are shown in Barnard's (1932) figure. In the Museum there is a further series of ♂♂ taken by Barnard on the wing, in all of which the forceps are pressed closely against the Xth sternum. In this position examination of the basal segment is difficult and no angular projections can be made out. It could be argued from this that similar distortions led to the omission of these structures from Barnard's figure. To settle the question examination of the type would be required. However, this is no longer possible since, according to Crass (1947), it has long been lost. In the absence of any other consistent differences between the two species, it is concluded that there are no grounds for continuing to refer to East African populations under the name *A. montanum*.

The history of this synonymy is given below.

Afroptilum sudafricanum Lestage

1924. *Centroptilum sudafricanum* Lestage, *Rev. Zool. Afr.* **12**: 344.
1932. *Centroptilum sudafricanum*, Barnard, *Trans. R. Soc. Sth Africa* **20**: 224.
1947. *Centroptilum sudafricanum*, Crass, *Ann. Natal Mus.* **11**: 76.
1960. *Centroptilum montanum* Kimmins, *Bull. Brit. Mus. (Nat. Hist), Entomol.* **11**: 345. SYN. NOV.
1964. *Centroptilum* sp. no. 1, Demoulin, *Bull. Ann. Soc. Roy. Entomol. Belgique, C*, **21**: 283.
1965. *Centroptilum* sp. no. 1, Demoulin, *Ann. Mus. Afr. Centr. 8^o, Zool.*, **88**: 102.
1980. *Centroptilum montanum*, Kopelke, *Entomol. Abh. Mus. Tierk. Dresden* **43**: 113.
1988. *Centroptilum montanum*, Barnard & Biggs, *Rev. Hydrobiol. trop.* **21**: 130.
1990. (partim) *Afroptilum sudafricanum*, Gillies, *Aquatic Insects* **12**: 98.
1990. (partim) *Afroptilum montanum*, Gillies, *Aquatic Insects* **12**: 109.

Barnard described and figured the abdominal pattern of the nymphs as being distinctive. However, material that I have seen from the Transvaal lacks any well defined pattern. The same is true of East African nymphs. In contrast, the presence of only 6 abdominal gills is highly characteristic, the gill insertions being conspicuously marked with chestnut brown. In this connection, the absence of any similar marking at the margin of the 1st abdominal tergum is a useful confirmatory character of *sudafricanum* in damaged specimens which may have lost some of their gills.

As Demoulin suggested, the nymph he described as *Centroptilum* sp no. 1, (1964), from Ruwenzori and Mount Kenya can now be referred to *A. sudafricanum*. A number of species of *Afroptilum* whose adults have double hind wing spurs have distinctive nymphs, notably *A. decipiens* Gillies and *A. parvum* (Crass). In the case of others the nymphs are not known. While doubts may remain in some cases as to their specific distinctness, without knowledge of the nymphs no final decision can be made.

DISTRIBUTION OF *A. SUDAFRICANUM*

Details of collections of *A. sudafricanum* from north of the Zambezi River are set out in Table I. The most obvious feature of these records is the clustering at high altitudes in East Africa, none of them being from below 1650 m and some of them over 3000 m. The overall distribution of the species is shown in fig. 2. In the southern end of its distribution, in South Africa, *A. sudafricanum* is a widespread and common species, being found from Cape Town to eastern Zimbabwe, Harrison (1965). Oliff (1960) considered it to be typical of mountain streams, while Harrison (loc. cit.) described it as a cold stenotherm. As such, it occurs at moderate altitudes throughout the region, and only in the extreme south are conditions suitable for it at lower levels, Harrison and Elsworth, (1958). The apparent gap in distribution (with the exception of Zimbabwe) between southern subtropical and equatorial populations is almost certainly due to lack of collecting.

In East Africa, in rivers where it occurs, it is sometimes the dominant mayfly in the community. For example, in streams in the Rift Valley of Kenya, Barnard and Biggs found it (as *C. montanum*) to be the single most important species in certain streams. They noted that the catchment was highly modified by farming. In a degraded urban environment such as the Nairobi river in Kenya studied by Pacini, by far the largest part of the catch of mayflies consisted of *A. sudafricanum*.

TABLE I. Records of *A. sudafricanum* and synonyms from East Africa.

<i>Afroptilum sudafricanum</i>		
Ethiopia	Awash R. basin, Harrison & Hynes, 1988	8° 50' N, 38° 25' E
1700-3500 m		
"	27 km S of Asella, Arussi Prov., coll. D. S. Brown.	8° N, 38° 75' E
c. 2400 m		
"	10 km N of Debra Berhan, coll. D. S. Brown	7° 30' N, 39° E
c. 3000 m		
"	Bale Mts., Bale Prov., coll. D. W. Yalden	6° N, 40° E
2400-3300 m		
Tanzania	Mt. Kilimanjaro, coll. M. T. Gillies	3° S, 37° E
c. 2400 m		
<i>Afroptilum montanum</i>		
Uganda	Mt. Elgon, R. Sasa, Kimmins, 1960	0° 15' N, 34° 50' E
3400 m		
Zaire	Kivu Prov., Kopelke, 1980	2° 20' S, 28° 30' E
1800 m		
Kenya	Naivasha district, Barnard & Biggs, 1988	0° 45' S, 36° 20' E
1900 m		
"	Nairobi River, Pacini (1991)	1° 20' S, 36° 50' E
1650 m		
<i>Centroptilum</i> sp. no. 1, Demoulin, 1964		
Uganda	Ruwenzori, Demoulin, 1964	0° 30' N, 30° E
2200 m		
Kenya	Mt. Kenya, Nanyuki, Demoulin, 1964	0° 01' N, 37° 05' E
c. 1800 m		
Tanzania	Mt. Meru, Kordikorda, Demoulin, 1965	3° 15' S, 36° 44' E
2700 m		

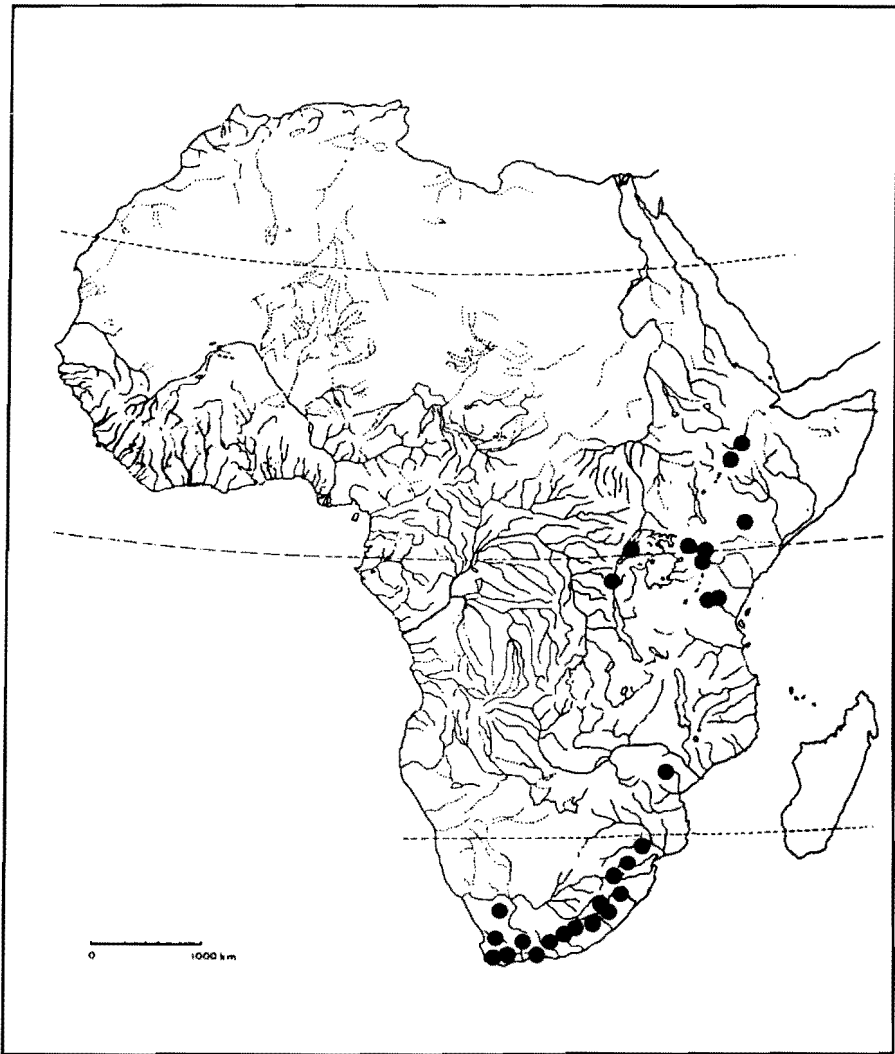


Fig. 2. Recorded distribution of *Afroptilum sudafricanum*.

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