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## Short Communications

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### Lectotype designation and a new synonym of *Cloeodes inzingae* (Crass, 1947) (Ephemeroptera: Baetidae)

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The description of *Pseudocloeon inzingae* Crass, 1947, was based on nymphs and reared adults collected from several rivers in KwaZulu-Natal in 1944 and 1945. The species was redescribed by Waltz & McCafferty (1994) and transferred to *Cloeodes* Traver, a genus previously known only from the Neotropical Region and southeast Asia. *Pseudocloeon saxophilum* Agnew, 1961, from the Western Cape Province of South Africa was also transferred to *Cloeodes* by Waltz & McCafferty (1994), and both species were listed under this genus in the recent checklist of South African Ephemeroptera by McCafferty & de Moor (1995).

We have studied nymphs and adults of *C. inzingae* in the Albany Museum, Grahamstown, which clearly represent at least part of the original material studied by Crass, and may thus be considered syntypes. This is the same material studied by Waltz & McCafferty (1994), but those authors did not realize that it was type material, and also mistook it as property of the South African Museum, Cape Town, housed at the Albany Museum. From this material we are now able to designate a lectotype and paralectotypes as follows: LECTOTYPE, catalogue no. RSC 1A, male nymphal exuviae, slide-mounted in Euparal, Natal, Furth Stream, December 1944. PARALECTOTYPES (all with the same data as lectotype), RSC 1Bi, genitalia and wing of adult male reared from RSC 1A, slide-mounted in Euparal; RSC 1Bii, partial remains of male adult reared from RSC 1A, in 80 % ethanol; RSC 1C, mature female nymph, in 80 % ethanol; RSC 1D, female adult, in 80 % ethanol; RSC 1E, two female adults, in 80 % ethanol; RSC 1F, male adult, in 80 % ethanol. The lectotype and paralectotypes are in the Albany Museum, except for one adult male paralectotype (RSC 1F) which is deposited in the Purdue Entomological Research

Collection, West Lafayette, Indiana.

As the nymphal stages of Baetidae are proving to be of fundamental importance in the recognition of generic diversity (see McCafferty & Waltz 1990), and because South African mayfly species and their types are currently in some disarray (McCafferty & de Moor 1995), lectotype designation of South African species is appropriate when possible. The majority of species now recognized from South Africa were described by Barnard (1932) and Crass (1947), but unfortunately these authors did not designate types, and the depositories of their material are not always apparent or known. Crass' collection, together with all other freshwater aquatic invertebrate collections previously in the Natal Museum, have been transferred and donated to the Albany Museum (B.R. Stuckenberg, R.S. Crass & K.M.F. Scott, pers. comm.; K.J. Duxbury, *in litt.*).

We have also examined three nymphal exuviae and five male and two female adult paratypes of *Cloeodes saxophilus* (Agnew) in the Albany Museum. Our examination indicates that this name is synonymous with *C. inzingae*. The synonymy is based on characters of *C. saxophilus* which match those of *C. inzingae* as detailed by Waltz & McCafferty (1994). Most importantly, contrary to Agnew's (1961) statement that the terminal segment of the male genital forceps is different in proportion, it is actually similar to that of *C. inzingae*. Also, wing venation differences cited by Agnew (1961) represent individual variability, common within baetid species. Colour pattern differences cited by Agnew (1961) were hypothetical, as his specimens were faded, as he admitted. We formally synonymize the names as follows: *Cloeodes inzingae* (Crass) [= *Cloeodes saxophilus* (Agnew) *syn. n.*].

*Cloeodes inzingae* is known from the following localities: SOUTH AFRICA: *KwaZulu-Natal*, 28.iv.1944, Inzinga River, 29.29S 29.43E (Crass 1947); RSC 1A, RSC 1B, RSC 1C, RSC 1D, RSC 1E, RSC 1F, all R.S. Crass, xii.1944, Furth Stream, Dargle, 29.32S 29.56E; ii.1945, Geekie's Stream, Karkloof, 29.19S 30.20E (Crass 1947); x.1953 – vi.1955, Tugela River, mountain torrent, foothill torrent and foothill sandbed zones (Oliff 1960); iii and viii.1961, all from Mooi River, Rosetta Weir, 29.18S 29.58E, above Mooi River Town, 29.13S 30.00E, Weston, 29.12S 30.01E, Seven Mile Drift, 29.11S 30.06E, Muden, 28.58S 30.23E (Oliff 1964); NAT 16E FM. Chutter, 14.vi.1972, Inzinga River Tributary at Carter's Hill, 29.32S 29.44E; NAT 48A, FM. Chutter, 14.vi.1972, Umkomaas River, 29.37S 29.44E; NAT 136B, FM. Chutter, 6.vi.1972, Umtamvuna River, Bangeni Forest Reserve, 30.40S 29.40E; GEN 381A, J.D. Agnew, 20.xi.1959, Droewig River near Ben Nevis, 30.25S 29.16E; *Western Cape Province*: (all from the Great Berg River, A.D. Harrison) GBG 40A, 2.viii.1950, GBG 41A, 2.viii.1950, GBG 81A, 27.ix.1950, GBG 123, 10.xi.1950, GBG 149, 21.xi.1950, all French Hoek (Franschhoek) Forest Reserve, 33.59S 19.04E; GBG 91C, 27.ix.1950, Driefontein Bridge, 33.55S 19.03E; *Eastern Cape Province*, iii.1960, Kruis River, 33.58S 24.04E (Harrison & Agnew 1962); *Mpumalanga*, GEN 28A, J.D. Agnew, 17.ix.1954, Blyde River above Pilgrims Rest, 24.52S 30.46E; GEN 382E, J.D. Agnew, 23.iii.1960, Assegai River, Wakkerstroom, 27.07S 30.08E.

The prefixes RSC, GBG, GEN and NAT refer to catalogues in the Albany Museum. All identifications were confirmed. Where a collector and date are indicated in brackets above, records were taken from cited references and identifications

could not be confirmed.

From accounts in the literature (Crass 1947; Harrison & Elsworth 1958; Harrison 1958; Harrison & Agnew 1962) and records of specimens in the Albany Museum collection, it appears that *C. inzingae* is characteristically found in the mountain torrent and foothill stony-run zones of cool mountain streams throughout South Africa. Their habitat preference is for stony substrates in quiet backwaters and pools. Crass (1947) stated that they inhabit fairly deep slow-flowing water and soon die in captivity. This suggests that they require cool, well-oxygenated water, and may explain why they are able to extend their zonal distribution range further downstream during the cooler periods of winter and spring (see Harrison 1958). If streams start to flow more slowly and deposit more sediment, this species is replaced by others better adapted to greater silt deposits and warmer water conditions. The absence or presence of *C. inzingae* appears to be an indicator of both water and environmental quality and its disappearance from streams apparently indicates a degradation of aquatic and riparian ecosystems.

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## REFERENCES

- AGNEW, J.D. 1961. New Baetidae (Ephem.) from South Africa. *Novos Taxa Entomologica* 25: 2–18.
- BARNARD, K.H. 1932. South African may-flies (Ephemeroptera). *Transactions of the Royal Society of South Africa* 20: 201–256.
- CRASS, R.S. 1947. The may-flies (Ephemeroptera) of Natal and the Eastern Cape. *Annals of the Natal Museum* 11: 37–110.
- HARRISON, A.D. 1958. Hydrobiological studies on the Great Berg River, Western Cape Province. Part 2. Quantitative studies on the tributaries and further information on the fauna, arranged systematically. *Transactions of the Royal Society of South Africa* 35: 227–276.
- HARRISON, A.D. & ELSWORTH, J.F. 1958. Hydrobiological studies on the Great Berg River, Western Cape Province. Part 1. General description, chemical studies and main features of the flora and fauna. *Transactions of the Royal Society of South Africa* 35: 125–226.
- HARRISON, A.D. & AGNEW, J.D. 1962. The distribution of invertebrates endemic to acid streams in the Western and Southern Cape Province. *Annals of the Cape Provincial Museums* 2: 273–291.
- McCAFFERTY, W.P. & DE MOOR, F.C. 1995. South African Ephemeroptera: problems and priorities. In: Corkum, L.D. & Ciborowski, J.J.H. (Eds) *Current Directions in Research on Ephemeroptera*. 463–476. Canadian Scholars' Press, Toronto.

- McCAFFERTY, W.P. & WALTZ, R.D. 1990. Revisionary synopsis of the Baetidae (Ephemeroptera) of North and Middle America. *Transactions of the American Entomological Society* **116**: 769–799.
- OLIFE, W.D. 1960. Hydrobiological studies on the Tugela River System. Part I. The main Tugela River. *Hydrobiologia* **24**: 281–385.
- OLIFE, W.D. 1964. Hydrobiological studies on the Tugela River System. Part IV. The Mooi River. *Hydrobiologia* **24**: 567–583.
- WALTZ, R.D. & McCAFFERTY, W.P. 1994. *Cloeodes* (Ephemeroptera: Baetidae) in Africa. *Aquatic Insects* **16**: 165–169.

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## Species composition and periodicity of phlebotomine sand flies (Diptera: Psychodidae) in the Kruger National Park, South Africa

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An opportunity arose in 1993 to survey phlebotomine sand flies (Diptera: Psychodidae) in the Kruger National Park, South Africa (KNP), in conjunction with a project on *Culicoides* Latreille (Diptera: Ceratopogonidae). A truck-trap built for these studies was also suitable for a phlebotomine survey. Vehicle-mounted nets have been used extensively in studying blood-sucking flies and are efficient at sampling low insect abundance, and are unbiased in not depending on photosensitivity (Roberts & Kumar 1994). By collecting over large distances, the method also reduces the bias of sampling local fly concentrations.

Portable light-traps have also been used for surveys, but are biased in depending on the photosensitivity of the target insects. When supplementing truck-traps, however, they provide additional information and, more importantly, they facilitate sampling in areas inaccessible to vehicles. This is of particular significance in KNP which has a unique habitat in the granitic outcrops, known as 'koppies'.

Granitic outcrops are typically aggregates of large to massive boulders with elevated refuges, numerous cracks, crevices and small caves offering shelter to a wide range of mammals including porcupines (*Hystrix africaeaustralis*), mice (primarily

*Aethomys namaquensis*), bats (mainly species of *Rhinolophus* and *Tadarida*) and Chacma baboons (*Papio ursinus*), while lizards abound in the form of species of *Mabuya*, *Cordylus*, *Gerrhosaurus* and *Plattysaurus*. These animals could provide breeding media for the sand flies through their waste-products. The vegetation on the outcrops is diverse, comprising various grasses, shrubs and a few trees.

A concise description of KNP was given by Braack (1992). Gertenbach (1980, 1983) provided details of rainfall patterns in the Park and described 36 landscape types in the Park, based on climatic data, vegetation and associated vertebrate fauna, and rock and soil types.

Three localities, representing different ecosystems in the Park, were selected for collecting. These were Skukuza (25.00S 31.36E), Pafuri (22.25S 31.13E) and Letaba (23.51S 31.35E). Additional collections of phlebotomines from Skukuza and vicinity were made by R. Meiswinkel, Onderstepoort Veterinary Research Institute, South Africa, from 9–12.ii.93.

Skukuza is located on the Sabie River, and Gertenbach (1983) described the area as being characterized by a dense woody vegetation referred to as an *Acacia nigrescens/Combretum apiculatum* association, but comprising a diverse mixture of woody species.

Routes for the truck-traps were through wooded areas at the edge of the Sabie River. Light-traps were located in the wooded areas, some near the

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