NOTATIONS ON SOUTH AMERICAN BAETIDAE
(EPEMEROPTERA)  
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ABSTRACT: Deceptiviosa angolima, comb. n., is the last of the South American species previously placed in either Baetis or Pseudocloeoon to be recombined. All valid South American Baetidae species historically classified as such are non Baetis complex species now residing in 10 different genera. Americabaetis albinervis, A. bruchi, Fallecon inops, and Moribaetis socius are newly considered nomina dubia.

A total of 32 currently valid species of South American mayflies were originally described, or subsequently placed in, the Baetis complex genera Baetis Leach or Pseudocloeoon Klapálek. All of these species may be considered in the family Baetidae, except for what is now known as Hexagenia albivitta (Walker) (family Ephemeridae) and what most assuredly is incorrectly known as Ecdyonurus guttatus (Pictet) (family inquirenda), both of which were originally described as Baetis. Of the 30 valid species of South American Baetidae previously known as Baetis or Pseudocloeoon, all but one have been recombined with non Baetis complex genera (see below). Of the 29 previously recombined species, 17 were originally described as Baetis, and eight were originally described as Pseudocloeoon, leaving two that were subsequently recombined with Baetis, two that were subsequently recombined with Pseudocloeoon, and one that had been subsequently recombined with both Baetis and Pseudocloeoon (Table 1). Only Bernerius incus Waltz and McCafferty had been known historically by an informal name associated with these genera (Baetis sp. B Berner). All other associations involved nominal species.

In addition to the valid species epithets that had been associated with Baetis or Pseudocloeoon (Table 1), Americabaetis peterseni and Fallecon murphyae include replacement epithets for the following original names for South American Baetidae that proved to be primary junior homonyms: Cloeon brunneum Esben-Petersen (subsequently associated with Pseudocloeoon) and Baetis melleus Needham and Murphy, respectively.

In addition to the recombined extractions from Baetis and Pseudocloeoon among South American Baetidae, B. gloriosus Navás is now a junior subjective synonym of Callibaetis fasciatus (Pictet); B. opacus Navás and B. virellus Navás are similarly equivalent to C. zonalis Navás; B. weiserti Navás is equivalent to Andesiops peruvianus (Ullmer); and B. sp. 1 Roback is equivalent to Mayobaetis ellenae (Mayo). With respect to C. zonalis, I had initially considered it the subordinate synonym of C. opacus (Navás) (originally Baetis) based on page priority (McCafferty 1996). However, I realized shortly thereafter...

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that Gillies (1990) may have intended to invoke first revisor’s prerogative in considering *C. zonalis* the senior synonym (even though he had not stated such), and therefore now accept that interpretation. With respect to the present review, I have placed *C. zonalis* as a footnoted species in Table 1, because it is the only South American species to be represented previously as a *Baetis* complex genus by a junior synonymy only.

The bases for all of the previous recombinations of South American Baetidae originally or subsequently regarded as *Baetis* or *Pseudocloeoon* shown in Table 1 are reviewed as follows: For the species previously placed in *Baetis* that have been recombined with *Americabaetis* Kluge, see Lugo-Ortiz and McCafferty (1999a) (see also Lugo-Ortiz and McCafferty 1996b); for those recombined with *Andesiops* Lugo-Ortiz and McCafferty, see Lugo-Ortiz and McCafferty (1999b); for those recombined with *Bernerius* Waltz and McCafferty, see Waltz and McCafferty (1987a); for those recombined with *Callibaetis* Eaton, see Gillies (1990); for those recombined with *Camelobaetidius* Demoulin, see Lugo-Ortiz and McCafferty (1999a); for those recombined with *Cloeodes* Traver, see Waltz and McCafferty (1987b) and Lugo-Ortiz and McCafferty (1999a); for those recombined with *Fallecon* Waltz and McCafferty, see Lugo-Ortiz and McCafferty (1999a); for those recombined with *Mayobaetis* Waltz and McCafferty, see Waltz and McCafferty (1985) and Lugo-Ortiz and McCafferty (1996a); and for those recombined with *Moribaetis* Waltz and McCafferty, see Lugo-Ortiz and McCafferty (1999a). For the species previously placed in *Pseudocloeoon* that have been recombined with *Americabaetis*, see Lugo-Ortiz and McCafferty (1996b, 1999a) and for those recombined with *Cloeodes*, see Waltz and McCafferty (1987b), Waltz (1993), and Lugo-Ortiz and McCafferty (1999a).

Only the Chilean species *Baetis angolinus* Navás, among the South American Baetidae previously associated with a *Baetis* complex genus name, has not been recombined. *Baetis angolinus* clearly does not belong to the genus *Baetis*, or any other genus of the *Baetis* complex, an otherwise widespread baetid lineage that is not represented in South America and is only very poorly represented by boreal-derived species in Central America (e.g., McCafferty 1998, Lugo-Ortiz et al. 1999).

Navás (1933) based *B. angolinus* on a subimago that could generally be deemed nondescript, except for its hindwing shape and venation, and a peculiar reticulate series of crossveins in the distal inter-costal area of the forewings, along with elongate marginal intercalaries in the forewings. For the most part, baetid adults worldwide have not been associated with reticulate forewing venation. Some *Callibaetis* in North and Central America have some inter-costal reticulation, but the inter-costal area itself is relatively narrower than that in *B. angolinus*, and reticulation is not of the same type. In *B. angolinus* there are six crossveins fairly uniformly divided and forming cellules. Also none of the forewings of South American *Callibaetis* illustrated, for example,
by Gillies (1990), demonstrate inter-costal reticulation. More importantly, the small, narrow hindwings of B. angolinus lack crossvenation and are clearly not the type of hindwing found in Callibaetis.

Another possible genus that has hindwings similar to those of B. angolinus and that also has a similar small costal process in the basal third of the hindwing is Moribaetis. Moribaetis is also one of a very few genera of baetids that has some crossvenation in the distal inter-costal area of the forewings (e.g., McCafferty and Lugo-Ortiz 1998). None of the species of Moribaetis presently known as alate stages, however, demonstrate reticulation or inter-costal cells as does B. angolinus.

Lugo-Ortiz and McCafferty (1999b) recently described three related new genera (Andesiops, Deceptiviosa, and Nanomis) indigenous to cool or gradient streams in the Andes and Patagonia (high altitudes or temperate latitudes) of South America. These genera tend to show some remarkable convergence in larval morphology with some unrelated Baetis complex genera such as Acentrella Bengtsson (Holarctic), Demoreptus Lugo-Ortiz and McCafferty (Afrotropics), and Tanzaniella Gillies (Afrotropics). Andesiops, Deceptiviosa, and Nanomis, however, may be related to the non Baetis complex Australian genus Edmundsiops Lugo-Ortiz and McCafferty (Lugo-Ortiz and McCafferty 1999b, 1999c). Andesiops and Deceptiviosa were described from both larvae and adults, the latter of which were shown to possess the peculiar reticulate crossvenation in the distal inter-costal area of the forewings that is similar to that of B. angolinus. Unfortunately, Lugo-Ortiz and McCafferty (1999b) had not been aware of B. angolinus at the time Andesiops and Deceptiviosa were described. It is now clear that B. angolinus most probably belongs to one of these genera. Navás (1933) had additionally indicated that the marginal intercalary veins in the forewings of B. angolinus were long. Lugo-Ortiz and McCafferty (1999b) had also found this particular additional trait in Deceptiviosa, but not Andesiops. I therefore am confident in placing Navás’s species in Deceptiviosa as D. angolina (Navás), comb. n.

The new combination should be regarded as provisional (as essentially most South American baetid recombinations are for various reasons) because of the lack of comparative male adult and larval material of D. angolina. Nonetheless, the forewings match well as do the general coloration and size given by Navás (1933) and Lugo-Ortiz and McCafferty (1999b). Also, the Chilean locality of D. angolina is consistent with the distribution of Deceptiviosa.

Deceptiviosa angolina can be distinguished from D. torrens Lugo-Ortiz and McCafferty, the only other species of Deceptiviosa known in alate stages, by the hindwings. Those of D. angolina are narrower and lack the first longitudinal vein as well as the short third longitudinal vein. The forked vein and its unattached intercalary in the hindwings of D. angolina are similar to the vein 2 system in D. torrens.

Lugo-Ortiz and McCafferty (1999a) indicated that several species of South
American Baetidae are dubious. Gillies (1990) had previously considered Callibaetis abundans (Navás) (originally Baetis) as a nomen dubium. Because D. angolina is based on a single subimagó, one might argue that this species should also be considered a nomen dubium. Navás (1933) stated that his single subimagó was a female; however Alba-Tercedor and Peters (1985) listed the specimen as a male. Gloria Maso, the curator at the Museo de Zoologia del Ayuntamiento (Barcelona, Spain) has confirmed for me that the single specimen is indeed a male, and thus Navás had reported the sex incorrectly. Nonetheless, the wing venation of the combined fore- and hindwings, at least for the present, is enough to distinguish this species among the known South American baetid fauna, and a declaration of nomen dubium is yet uncalled for.

Although their generic assignment can be made with confidence, there indeed remain some South American baetids for which it would be virtually impossible to establish any known morphological criteria for species recognition that may be associated with them. These species are best regarded as nomina dubia based on the study of Lugo-Ortiz and McCafferty (1999a). They include Americabaetis albinervis (Navás), A. bruchi (Navás), Falceon inops (Navás), and Moribaetis socius (Needham and Murphy). As reviewed by Lugo-Ortiz and McCafferty (1999a), in the case of each of the above species, existent descriptions are inconsequential at the species level because they either were incompletely written or were based on subimagos, and either critical body

Table 1. South American species of Baetidae formerly associated with the genera Baetis or Pseudocloeon. *Those subsequently associated with Baetis or Pseudocloeon. **Associated with Baetis only via a junior synonym.

**PREVIOUS BAETIS**

* Americabaetis oldendorffi (Weyenberg)
  Andesiops peruvianus (Umler)
  Bernerius incus Woltz & McCafferty
  Callibaetis abundans (Navás)
  * Callibaetis fasciatus (Pictet)
  ** Callibaetis zonalis Navás
  Camelobaetidius alcyoneus (Traver)
  Camelobaetidius covelace (Traver)
  Camelobaetidius dryops (Needham & Murphy)
  Camelobaetidius tantillus (Needham & Murphy)
  Cloeodes aymara (Traver)
  Cloeodes nocturnus (Navás)
  * Cloeodes stelzneri (Weyenberg)
  Deceptiviosa angolina (Navás), comb. n.
  Falcleon inops (Navás)
  Falcleon murphyae (Hubbard)
  Falcleon yaro (Traver)
  Mayobaetis ellerae (Mayo)
  Moribaetis aneto (Traver)
  Moribaetis comes (Navás)
  Moribaetis socius (Needham & Murphy)

**PREVIOUS PSEUDOCLOEON**

Americabaetis albinervis (Navás)
Americabaetis bridaroli (Navás)
Americabaetis bruchi (Navás)
* Americabaetis jorgensen (Esben-Petersen)
* Americabaetis oldendorffi (Weyenberg)
* Americabaetis peterseni (Hubbard)
Americabaetis weiseri (Navás)
Cloeodes anduzei (Traver)
Cloeodes binocularis (Needham & Murphy)
Cloeodes tubinops (Needham & Murphy)
Cloeodes venezuelensis (Traver)
parts are missing (specimens broken or female only) from existent types or the
type specimens themselves are no longer available.

Other species among those previously considered in *Baetis* or *Pseudocloeon*
that were treated by Lugo-Ortiz and McCafferty (1999a) and whose types have
yet to be found include *A. bridarollii* (Navás), *A. jorgensenii* (Esben-Petersen),
and *A. oldendorffi* (Weyenbergh). More intensive searching may uncover types of
these possible candidates for nomina dubia.

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LITERATURE CITED

Alba-Tercedor, J. and W. L. Peters. 1985. Types and additional specimens of Ephemeroptera
studied by Longinos Navás in the Museo de Zoología del Ayuntamiento, Barcelona, Spain.

Gillies, M.T. 1990. A revision of the Argentine species of *Callibaetis* Eaton (Baetidae; 

Soc. 15: 367-380.

Lugo-Ortiz, C. R. and W. P. McCafferty. 1996b. Taxonomy of the Neotropical genus *America-

35: 257-262.

Environ. 34: 88-104.

species of small minnow mayflies (Ephemeroptera: Baetidae) from Australia. Entomol. News

the genus *Pseudocloeon* (Ephemeroptera: Baetidae), with new species descriptions and

McCafferty, W. P. 1996. Emendations to the *Callibaetis* (Ephemeroptera: Baetidae) of South


McCafferty, W. P. and C. R. Lugo-Ortiz. 1998. The adult of *Moribaetis macaferti* (Ephemeroptera: 


Waltz, R. D. and W. P. McCafferty. 1987a. Generic revision of *Cloeodes* and description of

Waltz, R. D. and W. P. McCafferty. 1987b. Revision of the genus *Cloeodes* Traver (Ephemeroptera: 