



## **A critical review of the world catalogs of Empidoidea (Insecta: Diptera) by Yang et al. (2006, 2007)**

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**Yang D., Zhu Y., Wang M. & Zhang L. (2006) *World Catalog of Dolichopodidae (Insecta: Diptera)*. China Agricultural University Press, Beijing, 704 pp. Hard cover, US\$95.00.**

**Yang D., Zhang K., Yao G. & Zhang J. (2007) *World Catalog of Empididae (Insecta: Diptera)*. China Agricultural University Press, Beijing, 599 pp. Hard cover, US\$78.00.**

Many in the worldwide Diptera taxonomic community were surprised to see the recent publication of the “World Catalog of Dolichopodidae (Insecta: Diptera)” by Yang, Zhu, Wang & Zhang (2006) and the “World Catalog of Empididae (Insecta: Diptera)” by Yang, Zhang, Yao & Zhang (2007). The rapid completion of both catalogs that together report to cover all of the world’s empidoid diversity, the apparent lack of peer review, and the higher classification schemes adopted in these works, appear to have created considerable scepticism and discussion on the extent of their usefulness by empidoid workers. As O’Hara (2008) recently stated “modern technological advances make it possible for just about anyone to compile names from the *Zoological Record*, to scan catalogues, and to gather information from secondary sources to produce an unimpressive world catalogue in record time”. In order to accurately assess the value of these two catalogs, especially for current and future users, we provide a critical review that touches on all aspects of these contributions. It is not our intention to give a page by page critique, but instead to provide a summary of the types of errors and omissions (illustrated with examples) we have encountered and to point out the limitations of these catalogs while also indicating which parts are useful in a general sense.

Both catalogs are attractively bound with a few color habitus figures of representatives of some major empidoid lineages, as well as 12 color photographs of various dolichopodid species in Yang et al. (2006). Line drawings illustrating the head, antennae, thorax, wings, legs, and male and female terminalia accompany both catalogs. The dolichopodid catalog (Yang et al. 2006) also includes habitus line drawings of 21 species representing 9 subfamilies. The dolichopodid catalog (Yang et al. 2006) was the first of the two catalogs to be published, apparently on 26 December 2006. The cut-off date for taxa included in this catalog is not stated, but appears to include names published up until late April 2006. The empidid catalog was published sometime later (Yang et al. 2007). No papers published in 2007 are included in that catalog, so we are assuming that the cut-off date for the empidid catalog is 31 December 2006.

The dolichopodid catalog (Yang et al. 2006) covers the Dolichopodidae *s.str.*, whereas the empidid catalog (Yang et al. 2007) covers the remainder of the Empidoidea including the microphorine and parathalassiine lineages that are now placed in the Dolichopodidae *s.lat.* (Sinclair & Cumming 2006). This division of the Empidoidea (and catalogs) into two families follows a traditional but now outdated classification system in which both groups are viewed as monophyletic families. Nearly all workers now view the former Empididae as composed of several families, and the Microphorinae and Parathalassiinae, previously placed in the Empididae, as basal lineages of the Dolichopodidae *s.lat.* To support the traditional classification of the Empidoidea, Yang et al. (2007) cite three supposed synapomorphies for the monophyly of their Empididae: head small and spherical; thorax distinctly convex dorsally; and eyes with angular inner incision near antennae (Yang et al. 2007: 3). The former two characters are very ambiguous and could refer to a large number of fly lineages. The latter character (i.e., eye notch) should in fact be viewed as a synapomorphy of the entire Empidoidea that

is secondarily lost in Parathalassiinae + Dolichopodidae. There are numerous additional characters supporting the latter relationship that were ignored by Yang et al. (2007), including the number and form of the pseudotracheae (Sinclair & Cumming 2006). Additional character definitions used in their analysis are very simplistic (e.g., proboscis long and narrow with small labellum; anal cell short). In addition, as stated by Sinclair & Cumming (2006: 20) in a previous critique of an earlier analysis of the higher classification of the Empididae *s.lat.* by Yang & Yang (2004), the use of asymmetrical genitalia only (used again as a character in this catalog) to combine the hybotid and microphorine (i.e., Microphorinae and Parathalassiinae) empidoid lineages together shows a complete misunderstanding of the distinct differences in the evolution of this feature in both lineages.

In the empidid catalog Yang et al. (2007) assign all taxa to subfamilies as opposed to leaving problematic taxa as *incertae sedis*. Consequently, a new subfamily Brochellinae had to be created for the Nearctic genus *Brochella* Melander and the Gondwanan genus *Homalocnemis* Philippi was placed in its own subfamily Homalocneminae. The latter subfamily was first erected by Collin (1928), but has not been used subsequently. Sinclair & Cumming (2006) assigned *Homalocnemis* as *incertae sedis* in the Empidoidea, whereas *Brochella* was assigned as *incertae sedis* in the Empididae. Most of the other subfamilies used in the empidid catalog by Yang et al. (2007) are equivalent to those recognized by Sinclair & Cumming (2006); however the concepts of the Ocydromiinae and Oreogetoninae defined by Yang et al. (2007) are certainly not monophyletic.

In the dolichopodid catalog Yang et al. (2006) propose a new subfamily classification scheme and provide a phylogenetic analysis of the subfamilies based on 42 morphological characters. The phylogenetic analysis is flawed for several reasons. No matrix was provided, so tracing the character state distributions is difficult. The lack of a matrix also makes it impossible to subject the data to reanalysis in order to test their phylogenetic hypothesis. As was done in the phylogenetic analysis presented in the empidid catalog (Yang et al. 2007), it also appears that subfamilies were used as terminals in the analysis and scored intuitively instead of using exemplars. This assumes that each subfamily is monophyletic, which is certainly not a reasonable assumption for many subfamilies of Dolichopodidae. The phylogenetic tree presented in the dolichopodid catalog (fig. 1) is indicated in the text to be a strict consensus of three equally parsimonious trees, but this tree has character state changes plotted on it, which is inappropriate for a consensus tree. In addition, the tree shows only 73 of the 89 character state changes reported in the text.

The classification of the Dolichopodidae proposed by Yang et al. (2006) divides the family into 17 subfamilies including the 14 subfamilies recognized in the most recent regional catalog (i.e., Pollet et al. 2004, for America North of Mexico) plus the Australian subfamily Babindellinae and two new subfamilies, the Antyxinae and the Kowmunginae. The Antyxinae includes the genus *Antyx* Meuffels & Grootaert from Australia and New Caledonia and the Kowmunginae includes the Australian genus *Kowmungia* Bickel and *Phacaspis* Meuffels & Grootaert from Australia and South East Asia. Prior to Yang et al. (2006) these genera were treated as *incertae sedis* in the Dolichopodidae (Bickel 1987, 1999; Meuffels & Grootaert 1988). The erection of these new dolichopodid subfamilies by Yang et al. (2006) like the Brochellinae and Homalocneminae used in the empidid catalog, is certainly not justified by their phylogenetic analysis for the reasons discussed above, and merely complicates the nomenclature of the family. In our opinion these genera would have been better placed as *incertae sedis* in the Dolichopodidae until a more rigorous phylogenetic study determines their placement as well as the status of the other subfamilies. In addition, *Katangaia* Parent and *Pseudohercostomus* Stackelberg were recently removed from the Dolichopodinae by Brooks (2005) based on the results of a thorough phylogenetic analysis. In their dolichopodid catalog Yang et al. (2006) reassigned both genera back into the Dolichopodinae on the sole basis of uncharacterized "features of the male genitalia".

## Catalog Entries

Despite criticism of the empidoid higher classification scheme used in both catalogs, a well prepared scholarly work detailing empidoid diversity and nomenclature using this or another higher classification system should be very useful. The present catalogs appear to be a valuable list of empidoid species diversity published before the cut-off dates mentioned above. The authors have also compiled species diversity at the genus level for each zoogeographic region, which is also quite useful. Remarkably only a few valid species appear to have been missed, although a few species entries have been duplicated due to misspellings and generic transfers (see below). Species entries are listed with a number under each genus, including distribution (by country), original combination, brief citation to the original description, and type locality (by country, state or further subdivision depending on the source used). These entries are followed by a list of synonyms, but not incorrect original spellings, subsequent misspellings, unjustified emendations, *nomina nuda*, other errors, or misidentifications, which are also usually listed in catalogs (this type of information is also lacking for names

listed in generic synonymy). Type depositories are also not given, which is very useful information that is generally found in modern catalogs (e.g., Pollet et al. 2004). Unfortunately, apparent production of both catalogs largely from secondary sources without critical and careful checking of each entry, has led to numerous errors and omissions that render both catalogs far less useful than they should be. The secondary sources used by Yang et al. (2006, 2007) to compile both catalogs appear to have included the following recent empidoid monographs and regional catalogs: Bickel (1994), Bickel & Dyte (1989), Brooks (2005), Chandler (1998), Chvála (1989a,b), Chvála & Kovalev (1989), Chvála & Wagner (1989), Dyte (1975), Dyte & Smith (1980), Grichanov (2004), Melander (1965), Negrobov (1991), Pollet et al. (2004), Robinson (1970), Sinclair & Cumming (2006), and Smith (1967, 1975, 1980, 1989). In addition, both the empidid and dolichopodid catalogs contain a number of questionable and unsubstantiated nomenclatural decisions. To assist users of these catalogs, we categorize below the types of errors and omissions we have encountered and provide examples.

**Omissions.** Several taxa were omitted from the dolichopodid catalog by Yang et al. (2006). Some examples follow: *Asyndetus spinosus* Van Duzee (1925: 153) is a valid species also missed in the Neotropical catalog (Robinson 1970); *Condyllostylus helioi* Milward de Azevedo (1976a: 13) and *Condyllostylus lopesi* Milward de Azevedo (1976b: 961), published after the Neotropical catalog were also missed, although both citations were included in the bibliography by Yang et al. (2006). *Balfouria* Parent (1933), a junior synonym of *Falbouria* Dyte (1980) and preoccupied in Mollusca is omitted, although the original combination is given under *Falbouria*. *Cremmus* Wei (2006) is a monotypic genus originally placed in the Peloropeodinae. Yang et al. (2006) apparently considered the genus *incertae sedis* and listed *Cremmus fontanalis* Wei in the “Unplaced species of Dolichopodidae” section. In doing so however, they neglected to provide a proper listing for the generic name in the catalog. *Cremmus* is not listed in the index as a genus name, but does appear in the species listing for *fontanalis*. *Glyphidocerus* Enderlein (1936) is a monotypic genus erected with *Hydrophorus biseutus* Loew as the type, which is now recognized as a synonym of the Palaearctic species *Hydrophorus oceanus* (Macquart). *Glyphidocerus* was omitted from both Yang et al. (2006) and Negrobov (1991), and should be regarded as a synonym of *Hydrophorus* Fallén. *Cachonopus* Vaillant (1953) was erected for two newly described Algerian species (i.e., *Cachonopus aereus* Vaillant and *C. limosorum* Vaillant), although Vaillant did not designate a type species for his genus. Negrobov (1991) referred *C. aereus* to *Chrysotimus* Loew and *C. limosorum* to *Micromorphus* Mik (erroneously listing the original genus of the latter species as *Conchopus*) and *Cachonopus* Vaillant was omitted from the Palaearctic catalog. This omission was repeated by Yang et al. (2006), although *C. aereus* was included in *Micromorphus*. *Perithinus* Haliday (1832) was omitted from Yang et al. (2006). Negrobov (1991) listed this subgenus as an unavailable name and noted that no type species had been designated. However, Westwood (1840) designated *Porphyrops riparius* Meigen, now *Rhaphium riparium* (Meigen) as the type of *Perithinus*. As such, *Perithinus* Haliday should have been listed as a synonym of *Rhaphium*. Other omitted generic names include *Leptopus* Haliday (a synonym of *Xanthochlorus* Loew), *Plectropus* Haliday (a synonym of *Syntormon* Loew), and *Lasiargyra* Mik [unavailable name which has been inappropriately used as a subgenus of *Argyra* Macquart (C.E. Dyte, unpubl. data)].

The following species was omitted from the empidid catalog by Yang et al. (2007): *Atalanta (Philolutra) astigmatiaca* Stackelberg (1937: 133). This currently valid species, which was also overlooked in all other publications covering the Palaearctic Region and was not listed in the *Zoological Record*, should be assigned to the genus *Wiedemannia* Zetterstedt. No illustration of the male terminalia was included in the description by Stackelberg and unfortunately the type specimens can't currently be located (I.V. Shamshev, pers. comm. 2007).

**Duplications.** We have found two cases where a misspelling of a valid species name has resulted in a second entry for that species in the dolichopodid catalog. *Hercostomus ockerothi* (p. 168) is a misspelling of *Hercostomus vockerothi* d'Assis Fonseca (p. 178); *Tachytrechus paricauda* (p. 214) is a misspelling of *Tachytrechus parvicauda* (Van Duzee) (p. 214). Both misspelled species names are included in the species totals for the genera and family by Yang et al. (2006) and are indexed.

In the empidid catalog *Platypalpus brachystylus* (Bezzi) is listed twice on page 398, once in the correct position before *Platypalpus brunettii* Melander, but including an incorrect original combination *Platypalpus brachystylus* Bezzi 1892 instead of *Tachydromia brachystyla* Bezzi 1892, and a second time in the wrong position after *Platypalpus brunettii* Melander, but with the correct original combination. For both entries, Bezzi (1892) is cited incorrectly by Yang et al. (2007) (referring to a journal form of the same publication that appeared later in 1893-1894) and the page numbers given for the species description, which are cited differently for each entry (p. 289 versus p. 263), are both incorrect (actually p. 57 in the original 1892 publication). In addition, the species *Macrostomus argyrotarsis* (Bezzi) (p. 144) is also entered incorrectly a second time under *Porphyrochroa* Melander (p. 146) presumably as a result of confusion caused by redefinition and reassignment of numerous species to these two genera by Rafael & Cumming (2004). These duplicated entries

in the empidid catalog are also included in the species totals for the genera and family by Yang et al. (2007) and are indexed.

**Nomenclature. New generic status:** In the empidid catalog, Yang et al. (2007) elevated *Platyhilara* Frey to full generic status from its original status as a subgenus of *Hilara* Meigen. This new status included the transfer of the *H. maura*-complex and the *H. nitidula-femorella* complex (*sensu* Chávla 1996). This is an astonishing decision, given that *H. maura* (Fabricius) is the type species of *Hilara*. This is a serious error and should not occur in a catalog that claims to be a comprehensive work. We recommend that the genus *Platyhilara* be synonymized under *Hilara*.

**New genera and new combinations:** Three new genera are described in the empidid catalog by Yang et al. (2007). The re-evaluation of generic assignment of the species transferred to the new genera *Achelipoda* Yang, Zhang & Zhang and *Adipsomyia* Yang, Zhang & Zhang had previously been suggested by Sinclair (1995: 729) for the former and Sinclair & Cumming (2006: 76) for the latter. Unfortunately no historical references were cited to assist in the evaluation of these two new genera. The status of the third new genus *Sinotrichopeza* Yang, Zhang & Zhang, which is based on questionable features of the postpedicel, and the relationship of the two included species to the remaining *Trichopeza* Rondani remains unknown (Plant, in press).

The literature appears not to have been checked in either catalog for suggested new combinations. For example, Chvála (1987) suggested in a Palaearctic revision of *Schistostoma* Becker that the Nearctic species *Microphor syncoptantor* (Melander) and *M. armipes* Melander should be transferred to *Schistostoma*. However, these two species were listed in the former genus by Yang et al. (2007). We also discovered three unreported new combinations in the dolichopodid catalog, including *Pelastoneurus flavicoxa* (Aldrich), *Pelastoneurus intermedius* (Van Duzee) and *Pelastoneurus maculatus* (Van Duzee), which were transferred from *Sarcionus* Aldrich by Yang et al. (2006).

**Subgeneric assignments:** The large genera *Empis* Linnaeus and *Rhamphomyia* Meigen have been divided by various workers into a large number of subgenera, mostly for classifying European and Afrotropical species, and these subgenera were used in the empidid catalog. However, Yang et al. (2007) made no attempt to assign New World species to subgenera, including several subgeneric assignments of South American species of *Rhamphomyia* previously made by Smith (1967) (i.e., *Rhamphomyia caeca* Collin, *R. galbanata* Collin, *R. interserta* Collin, and *R. mollis* Collin assigned to *Pararhamphomyia* Frey, and *R. candidula* Collin assigned to *Amydroneura* Collin). Daugeron & Grootaert (2003) transferred several species of *Empis* (*Coptophlebia*) (i.e., *E. argyriiventris* Smith, *E. barotse* Smith, *E. cetywayoi* Smith, *E. dasytarsus* Smith, *E. kafiri* Smith, *E. macropus* Loew, *E. natalensis* Smith, *E. nigrisquama* Smith, *E. oribi* Smith, *E. umzilai* Smith, *E. vetula* Smith, and *E. vumba* Smith) into their *Empis setitarsus* group, which belongs to the subgenus *Empis*, but this subgeneric assignment was also not followed by Yang et al. (2007).

**Synonymies:** In most carefully produced modern catalogs that propose nomenclatural changes affecting the concept of the taxon (e.g., subjective synonyms, resurrection of a taxon from synonymy) an explanation is provided for the change (e.g., see Woodley 2001). Yang et al. (2006, 2007) in general provide no explanation for these types of nomenclatural changes. Some examples are given below.

Three genera were newly synonymized by Yang et al. (2006) in the dolichopodid catalog (i.e., *Guzeriplia* Negrobov with *Chrysotimus* Loew, *Nobilusa* Wei with *Acropsilus* Mik, and *Paluda* Wei with *Scotiomyia* Meuffels & Grootaert); however, no justification or explanation was provided to support these proposed changes. Negrobov et al. (2007) have since resurrected *Guzeriplia* from synonymy. Similarly, two genera, *Lichtwardtia* Enderlein and *Phalacrosoma* Becker, were removed from synonymy with *Dolichopus* Latreille and *Hercostomus* Loew respectively, with no justification. Brooks (2005) previously synonymized *Lichtwardtia* and *Phalacrosoma* based on evidence resulting from a phylogenetic analysis of the Dolichopodinae. Yang et al. (2006) provide no evidence or arguments to counter the findings of Brooks (2005), or to support their generic resurrections.

Five eastern Asian species were newly synonymized in the dolichopodid catalog by Yang et al. (2006). Like the generic synonymies outlined above, no justification or explanation was provided and as such, the reader has no idea how these decisions were made and if type specimens were examined.

**Repetition of previous errors:** The apparent reliance on secondary sources by Yang et al. (2006, 2007) to compile both catalogs without checking primary literature has resulted in the repetition of numerous errors previously published in regional catalogs.

**Example 1.** Yang et al. (2007) list the Mexican species *Platypalpus caligaris* Melander 1928 (*Genera Insectorum* 185, p. 217 *sic*) as a new name for *Platypalpus caligatus trivialis* Wheeler & Melander 1901 (p. 375), not Loew 1874. This information was taken directly (and then altered) from Smith's (1967) Neotropical empidid catalog as indicated by the page number cited from *Genera Insectorum* 185, which was incorrectly reported by Smith as page 217 instead of 349 and subsequently copied by Yang et al. (2007). Apparently as a result of not checking primary literature, the authors also failed to realize that Melander's (1928) new name *P. caligaris* was invalid, because Wheeler & Melander (1901) and

later Melander (1902) did not formally name or even mention a variety under *P. caligatus* Melander 1902, only indicating that one specimen included in the syntypic series was slightly different in appearance. Melander's (1928) attempt to later formally recognize *P. caligaris* resulted in a *nomen nudum*, which although correctly listed by Smith (1967) still requires validation. However, unlike Smith (1967) who did not record in synonymy with *Platypalpus caligaris* a variety name of *P. caligatus*, Yang et al. (2007) also made a further error by listing the incorrect combination *Platypalpus caligatus trivialis* Wheeler & Melander, a name that was never used by Wheeler & Melander (1901) (listed initially only as the misidentification, *Platypalpus trivialis* Loew). Therefore, the nomenclature of *Platypalpus caligaris* Melander presented by Yang et al. (2007) in their empidid catalog has resulted in the creation of a new invalid combination, the repetition of a previous error involving a page number, and a missed opportunity to validate an invalid name.

**Example 2.** *Anasynthormon* Parent is an unavailable name because the genus was proposed after 1930 without designation of a type species from the two included species. Dyte (1975) validated the name by designating *A. secundus* Parent as the type species, but erroneously listed it as *Anasynthormon* Parent instead of *Anasynthormon* Dyte. This was followed by Brooks (2005) and repeated in Yang et al. (2006).

**Example 3.** *Heleodromia zetterstedti* Walker was listed as a junior synonym of *Kowarzia tenella* (Wahlberg) by Chvála & Wagner (1989) in the Palaearctic empidid catalog. This was repeated by Yang et al. (2007) without realizing that Chandler (1998: 87) had already correctly synonymized *H. zetterstedti* with *K. bipunctata* (Haliday).

**Example 4.** Evenhuis & Pont (2004) clearly listed and discussed numerous corrections to the nomenclature of Bigot names, but these changes were not included in either catalog by Yang et al. (2006, 2007). For example, the entire mistaken nomenclatural summary of *Microdromya* Bigot (p. 267) was perpetuated in the empidid catalog, despite the corrections listed by Evenhuis & Pont (2004). Another example is the continued listing of *Wiedmannia* Bigot (not *Wiedemannia* Zetterstedt) in the generic synonymy of *Clinocera* Meigen, but according to Evenhuis & Pont (2004) Bigot did not describe the former as a new genus. In addition, some incorrect spellings made by Bigot and corrected by Evenhuis & Pont (2004) are perpetuated in the dolichopodid catalog (e.g., *Megystostylus* Bigot misspelled as *Megistostylus*, p. 380).

**Misspellings:** Here we provide a small sample of the incorrect spellings of taxonomic names. Some are repeated errors from previous catalogs or lists and some are new errors introduced in both the empidid and dolichopodid catalogs. The generic name *Steleocheta* Becker (synonym of *Iteaphila* Zetterstedt) was misspelled as *Stelochaeta* (Yang et al. 2007: 347) and the specific name for *Wiedemannia (Philolutra) queyrasiana* Vaillant was incorrectly spelled as *W. queyrasiana* (Yang et al. 2007: 78) following incorrect spellings in the last Palaearctic empidid catalog (Chvála & Wagner 1989: 230 and 328, respectively). The genus *Rhychoschizus* Dyte was misspelled by Negrobov (1991) (as *Rhinchoschizus*) and repeated by Yang et al. (2006: 250) in the dolichopodid catalog. In addition, the following misspellings were noted from both catalogs: *Wiedemannia rudebecki* Smith misspelled as *Wiedemannia rudbecki*; *Asyndetus harbeckii* Van Duzee misspelled as *Asyndetus harbecki*; *Pelastoneurus taeniatus* Becker misspelled as *Pelastoneurus teaniatus*; *Nodicornis* Rondani (synonym of *Sybistroma* Meigen) misspelled as *Nordicornis*. We also found that *Sympycnus cirripes* (Haliday) was misspelled as *Sympycnus cirrhipes* by Yang et al. (2006: 490) following Parent (1938) and Negrobov (1991), despite the fact that this misspelling was previously noted and corrected by both Dyte (1993) and Chandler (1998).

**Incorrect authorities and original spellings:** An incorrect authority was discovered in each catalog: *Wiedemannia kenyae* Sinclair not Smith in the empidid catalog, and *Parahercostomus kaulbacki* Hollis not Robinson in the dolichopodid catalog. In both cases the citation was correct, but the author was incorrect. Occasionally Yang et al. (2006, 2007) corrected the gender of adjectival species-group names if the genus-group name was neuter, namely *Schistostoma brandbergensis* Shamshev & Sinclair to *S. brandbergense* (2007: 318), *S. yakimensis* (Melander) to *S. yakimense* (2007: 319), and *Rhaphium beringiensis* Negrobov & Vockeroth to *R. beringiense* (2006: 344). Although this is correct, the original orthographies were not listed in these cases.

**Geography.** The type localities listed in both catalogs are not consistently or always accurately reported. In some cases they include the specific locality and in others only the country, presumably dependent on the secondary source used by Yang et al. (2006, 2007) to obtain the type locality. For example, in the empidid catalog (Yang et al. 2007: 280) the type locality of *Homalocnemis namibiensis* Chvála is given as "Namibia, 10km S. Swakopmund", whereas the type locality of *H. maculipennis* Malloch is given as "New Zealand" rather than "New Zealand, Mt. Grey, N. Canterbury" (likely taken from the Australasian catalog (Smith 1989) where type localities were listed only by country). Incorrect type localities have also been found. For example, the species *Campsicnemus limnobates* Evenhuis (Yang et al. 2006: 461) and *C. uncleremus* Evenhuis (Yang et al. 2006: 468) are recorded as described from "USA (Hawaiian Islands)" but were originally described from French Polynesia.

All localities from syntype series were listed for type localities in the Palaearctic empidid catalog of Chvála & Wagner (1989). Numerous subsequent studies of type specimens have been published in this family, with designation of lectotypes and refinement of type localities. In nearly all cases, Yang et al. (2007) followed the broad type localities encompassed by the syntype series given by Chvála & Wagner (1989) and made no attempt to update these data. For example, Daugeron (2001: 383) designated a lectotype for *Empis (Xanthempis) laetabilis* Collin and refined the type locality to Aviemore (in Britain), and Barták (1985: 30) designated a lectotype for *Rhamphomyia (Lundstroemiella) kerteszi* Oldenberg and refined the type locality to Brassó (in Romania).

In addition, the geographic ranges of species have not always been updated in either Yang et al. (2006) or (2007). For example, *Clinocera appendiculata* (Zetterstedt) is recorded from England in the empidid catalog (p. 54) following Chvála & Wagner (1989), but this species was not listed from Britain by either Collin (1961) or Chandler (1998). Similarly in the dolichopodid catalog, *Argyrochlamys cavicola* (Parent) and *A. impudicus* Lamb are not recorded north of the Afrotropical Region by Yang et al. (2006) even though Brooks (2005) lists both species from the southernmost part of the Palaearctic Region (Oman).

**Spelling and typographical errors.** In the introductory sections of both catalogs, numerous spelling and typographical errors were noted, which could easily have been corrected if the catalogs had been sent out for external review. For example, in the Morphology section of the empidid catalog (p. 2) three subfamily names (i.e., Atelestinae, Oreogetoniinae, and Tachydromiinae) are misspelled and the tribe Parathalassiini is misspelled on page 319. In the Nomenclatural changes section of the dolichopodid catalog there is one genus (*Peodes* Loew) misspelled (as *Poedes*) on page 16, and in the Diversity and Distribution table one subfamily name (i.e., Babindellinae) is misspelled on page 17 and the genus *Pseudargyrochlamys* Grichanov is incorrectly listed on page 18 instead of *Pseudohercostomus*. Another error in both catalogs is the consistent misuse of Australian Region instead of Australasian Region.

**Bibliography.** The bibliographies of both the empidid and dolichopodid catalogs are not strictly a list of cited references and include numerous additional non-taxonomic papers. There are numerous omissions, including all cited papers by Becker, Mik, Oldenberg, and several papers by Ale-Rocha, Bezzi, and Loew in the empidid catalog (Yang et al. 2007), and some papers by Parent in the dolichopodid catalog (Yang et al. 2007). There are also some papers listed in the bibliographies that appear to have nothing to do with Empidoidea (e.g., a paper by Okuyama et al. in the empidid catalog; Darlington in the dolichopodid catalog).

In cases where multiple papers were published by an author in the same year the bibliographic entries are distinguished by letters (e.g., many *Saigusa* papers in the empidid catalog; most Parent papers in the dolichopodid catalog); however, this notation is not actually used in the catalog entries.

**Index.** We found very few problems or errors in the index of either catalog. However, in one example, the index entry for *Oreogeton* Schiner is given as 1860, the year the genus was described rather than the page (p. 349) the genus is found on. Moreover, unlike most other available Diptera catalogs, no formatting was used to distinguish valid names from invalid names. The index also includes two entries for those species that have been transferred to another genus (i.e., one entry for the original combination and a second entry for the current combination).

In summary, the catalogs generally function as practical checklists of species, including summary tables of the number of species in each zoogeographic region. Listing the species by number is a helpful addition, providing quick reference to the diversity of each genus. Unfortunately the ad hoc nomenclatural changes are seldom substantiated and the rather trivial phylogenetic system greatly reduces the quality of presentation. Simply put, the catalogs are useful lists, but they are not very scholarly. The catalogs suffer from “work in isolation” and would have greatly benefited from external reviews by world authorities prior to publication.

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