DATA DICTIONARY AND STANDARDS

BioSystematic Database of World Diptera

Data Dictionary and Standards

By F. Christian Thompson

Biosystematic Database of World Diptera is evolving effort to provide people with information about flies (Diptera), especially their names. This database was developed and maintained on a Wang VS minicomputer using the Data Management System (DMS) supplied with the VS operating system. For the printed versions (Norrbom et al. 1998, Thompson & Pont 1994), Ventura Publisher (5.0) was used. The text is done in Word Perfect (5.1 DOS) word-processing. COBOL programs were written to format the data for Ventura. The word-processing documents were converted to standard PC ASCII text files. Then these files were merged and printed with Ventura. The database is now available on the World-Wide-Web at the USDA Diptera site and on the Diptera Data Dissemination Disk. For both these media FileMakerPro format (version 3.0) is used. Both native and run-time application files are available on the CD-ROM.

Nota Bene

What follows are the standards for *Biosystematic Database of World Diptera*. However, at the present time only working data is being provided and this working data is incomplete. For the status of the current coverage, please see the SOURCE.txt file on the Diptera Data Dissemination Disk in /NAMES/BDWD.

Scope

All scientific names proposed for flies, members of the order Diptera, known to occur or have occurred in the World and found in the literature. Each block of data records will have a cut-off date. For fruit flies, this was all literature published before 1 January 1996. Scientific names are here deemed to include, in addition to those recognized by the *International Code of Zoological Nomenclature* (ICZN 1985), unavailable names (*nomina nuda*, incorrect spellings (both original and subsequent) and misapplied names (the results of misidentifications)) where those may cause confusion.

Classification

The *BioSystematic Database of World Diptera* does not include information about infrafamilial classification. The arrangement of genera and species is alphabetic. The *incertae sedis* convention is used for the placement of taxa of unknown relationships. To generate a phylogenetic arrangement, a sequential arrangment is encoded and stored in the field taxcode (q.v.).

Unknown placement (*Incertae sedis*).

If the placement of a species is unknown or of uncertain generic placement, then the *incertae sedis* convention of Wiley is used. Wiley's convention 5 states "Recent monophyletic taxa of uncertain relationships will be placed in the hierarchy *incertae sedis* at the level their relationships are best understood" (Wiley 1981: 212). To implement this convention, special genus and family group records are created to accomodate taxa of unknown or uncertain relationships; special family group records are created to accommodate these genus group records or genera of uncertain or unknown relationships. For the species and genus group records, this means that the valid genus (and possibly valid subgenus field) have the name of higher taxon preceded by a "*G." This special entry will force the appropriate headings to be generated. For names of unknown relationships, there are three basic types.

1) the species is definitely known to belong to a genus, but is not assigned to any of the known subgenera of that genus.

For these the appropriate valid genus group name is entered in the valid genus field and the same name is entered in the VALID SUBGENUS field with a "*G" preceeding that genus group name. For example, the genus *Sphegina* is divided into two subgenera, but a few species have not been assigned to a subgenus. These species would have "*Sphegina*" entered into their valid genus field and "*G*Sphegina*" in their valid subgenus field. Also, a generic record is created for "*G*Sphegina*" to generate the proper subgeneric heading (see below). The resultant print format is:

Genus *Sphegina*
Sphegina Incertae Sedis
orientalis. Taiwan, Philippines (Luzon) [OR].
Sphegina orientalis Kertesz 1914: 73.—Formosa.

2) the species is not known to belong to any genus.

For these, the name of the lowest but definitely known higher group preceded by "*G" is entered as the valid genus name. For example, a species of Syrphidae not known to belong to any genera, but clearly belonging within the tribe Syrphini, would have "*GSyrphini" entered into the valid genus field. Also, genus and family group records are created for "*GSyrphini" [genus group name] and "*FSyrphini" [family group name]. For this example, the print format is:

Syrphini *Incertae Sedis*

Species *Incertae Sedis*
delineatus. Mexico.
Syrphus delineatus Macquart 1846: 267.—Mexico.

3) Genus group names of unknown or uncertain relationships.

These are treated by creating a special family group name record. The genus group record is the same as any other genus group record. The family group record will be an *incertae sedis* name at the lowest known level of resolution. For example, the flower fly genus, *Allograptina*, belongs to the subfamily Syrphinae, but is not definitely known to belong to any tribe within that subfamily. So, there should be a family group record for the name "*FSyrphinae," that is, the family group name preceded by an asterisk and a capital F (indicating family group name). This family name record with proper hierarchical coding generates the following format.

Syrphinae Incertae Sedis

Genus *Allograptina*

Allograptina Enderlein 1938: 226. Type-species, *octomaculata* Enderlein (orig. des.).

octomaculata. Mexico [NT].

Allograptina octomaculata Enderlein, 1938: 226.—Mexico.

Format

Information derived from databases varies according to how the data are presented. Format standards define presentation of data; data standards define the storage format of the data elements. Information in the *BioSystematic Database of World Diptera* is presented in two formats, a printed format and a CD-ROM format. The format for the printed (catalog) version has been determined by tradition and typographic conventions. CD-ROM format is evolving and restricted only by computers and their software environoments. The access to information in the printed version is fixed to a single set of data elements and data, whereas the CD-ROM allows for various forms of access to all data elements and data. This section defines the format used to present the information in the printed version. The following data dictionary defines the data elements and data standards.

The printed version consists of paragraphs, blocks of information set in type and strung together. A family treatment has the following kinds of paragraphs: 1) family header; 5) genus header; 6) genus name; 4) references; 7) species header; and 8) species name. The general format of these paragraphs is given below and is illustrated. These format statements consist of the name-of-the-data-element in the order they appear and with the punctuation or space that separates them. Curved braces ({}) denote information only included when relevant. These formats are derived from various catalogs, attempting to present the maximal information in an effective typographic format and conforming to the standards of the Systematic Entomology Laboratory. The format used for the bibliography section follows the standard set by the *Zoological Record* (BIOSIS 1987) with minor stylistic deviations as noted below.

Family header is centered and set in bold face type.

Category VALID-FAMILY-GROUP-NAME

Genus header is centered and set in bold face type.

Category *VALID-GENUS-NAME*

Genus name paragraph is left justified. The first line begins at the left margin with subsequent ones indented. Available genus group names are set in italics, unavailable names in roman.

Genus-group-name Author, Year [bibliographic-reference-number]: page, *type-species* Author (kind-of-type-designation). {further information, such as author year [bibliographic-reference-number]: page of subsequent designation, current valid name for type-species, and comments}.

References paragraph is left justified with only the first line indented. The first line begins with the identifier "REFS" followed by a string of reference citations, each separated by a semicolon.

REFS—Author Year [Bibliographic reference number]: Page (Contents [BIOTIC REGIONS: Specific geographic areas]) ...

Species header is left justified. The first line begins at the left margin, with subsequent lines indented. The valid species group name is set in bold italics type, followed by the distribution in roman. The biotic regions for the range are given in brackets using two-letter codes.

species. Distribution [BIOTIC REGIONS].

Species name paragraph is left justified. The first line is set in from the left with subsequent ones further indented. Available species group names are set in italics, unavailable names in roman, with the other data in roman. Also, for misidentifications and subsequent combinations an colon is placed after the name and before the author.

Original-genus species-group-name Author Year [bibliographic-reference-number]: page.—Type-locality. Kind-of-type Sex-of-type Depository-of-type. Comments and further information.

Bibliographic citation paragraph begins with the author(s) on a separate line and in bold face type, followed below with the year left justified, the title and source information blocked together, and with the bibliographic reference number right justified. All citations have the date of publication in brackets as "[year.month.day]" following the source information. Annotations if present are blocked separately beneath the main entry.

Author
Year Title & Source. [publication date] Bibliographic Reference Number

Data Dictionary

Information in a database is derived from the values stored in various data elements. Data standards define what values are acceptable (permissible). Community data standards as defined by the *International Code of Zoological Nomenclature* (ICZN 1985) and *Zoological Record* (BIOSIS 1987) are followed here, as well as those adopted by the Entomological Collections Network (Thompson 1990). This data dictionary describes the data elements, what they contain and what specific standards are applied to those values.

These data elements are grouped into tables or files to create the database. The data elements are here listed in alphabetical order, but the tables they logically belong to are indicated in square brackets, along with the unique 8 character name for used for them in the database (the FileMakerPro database format uses longer names as field labels) and the physical data type and size.

Afrotropical?

Does the taxon occur in the the Afrotropical Region? Values are given for all valid names. See under Biotic Region for definition of area. [AF (logical, 1): Family, Genus & Species tables]

Australasian?

Does the taxon occur in the Australasian Region? Values are given for all valid names. See under Biotic Region for definition of area. [AU (logical, 1): Family, Genus & Species tables]

Author

Author of the scientific name. [AUTHOR (Alpha, 24): Family, Genus, Species & Reference tables]

Generally, the separate prefixes for German and Dutch names (such as "van, van der, de (Dutch), von (German)) are dropped; for Spanish names, for men, the last name (maternal) is usually dropped; but for married women the whole name is retained (e.g., for Luis Pena Guzman use Pena, but for Mercedes Lizarralde de Grosso use Lizarralde de Grosso). For Portuguese names, only the last name (e.g., Lima for da Costa Lima). Following the *Zoological Record* standards (as well as the implied standard of the *Code*), diacritical marks are not used in the database. For names in non-roman characters, the author's own transliteration is used if known and consistently used (not the standard of *Zoological Record* (e.g., Korneyev, not Korneev; Richter, not Rikhter).

Where the author data exceed 24 characters, they have been truncated. Often, for multiple authors, only the first (senior) author is entered followed by "et al." However, if the names of multiple authors fall within the 24 character limit, they are all included.

SPECIAL CASES: The "Author in Author" situation is handled in the bibliography. So, the Author field contains only the author(s) of the name.

For example - Wiedemann "published" (validated) a number of species in Meigen's *Systematische Beschreibung* ... For these species, only "Wiedemann" is entered in the AUTHOR field. Then in the bibliography there is an entry for this author & date, i.e., "Wiedemann, C. R. 1820. New species in Meigen 1820 (q.v.)".

Author-of-designation

Author of the subsequent designation of a type-species. Follows the standards used for Author (q.v.). [SUBDESAU (alpha, 24): Genus]

Author-of-valid-name-of-type-species

Author of the valid name of a type species. Follows the standards used for Author (q.v.). This data element is filled in if valid-name-of-type-species is filled in. [CSPAU (alpha, 24): Genus]

Bibliographic-record-number

A unique key to the bibliographic citation which includes the appropriate nomenclatural action. [BIBLIORN (numeric, 8): Family, Genus, Species]

Biotic-Region

The biotic region from which the type was described. The traditional division of the world into biotic regions is used and our definition of those regions conforms to the ones used by the various Diptera catalogs. The boundaries of these have been slightly modified to more closely conform to political boundaries and are here illustrated (maps 1-4). Most countries fall entirely within one biotic region. Some countries, like France and the United States of America with their widespread possessions, have components in many biotic regions. Only three countries, China, Indonesia and Mexico, extend across biotic regional boundaries. For these countries, the boundaries are drawn between political subunits, such as islands following Weber's line (Indonesia), provinces (China, with the Oriental ones being Yunnan, Guangxi, Zhuangzu, Guangdong, Hainan, Fujian & Zhejiang) or states (Mexico, with the Neotropical ones being Nayarit, Jalisco, Colima, Michoacan, Guerrero, Oaxaca, Veracruz, Tabasco, Chiapas, Campeche, Yucatan & Quintana Roo). While this separation of China and Mexico into their respective component regions is not the most accurate, it is the best approximation that conforms to International Data Standards, such as those of the Taxonomic Database Working Group.

In the FileMakerPro format, the separate logical fields for each biotic regions are combined into a single field called Biotic Regions. This arrangement is used as FileMakerPro allows for within field searching.

[BIOREG (alpha, 2): Family, Genus, Species]. Permissible values are:
AF = Afrotropical;
AU = Australasian;
NE = Nearctic;
NT = Neotropical;
OR = Oriental;
PA = Palearctic; and
UK = Unknown.

Category

The category of a valid genus or family group name. Permissable values are: Family, Genus, Subfamily, Subgenus, Subtribe and Tribe. [CATEGORY (alpha, 10): Family, Genus]

Distribution

A brief description of the distribution of a species. [RANGE (alpha, 134): Species]

Distributional information is presented only to the level of country except for large countries where the level of state or province is used. The "&" is used instead of "and." If the species is confined to a few areas, these are listed separately. If more widespread, an overall distribution is given by stating the corners of a rectangle or triangle. Distribution is stated in a northwest to northeast and southwest to southeast direction. Sometimes there may be a combination of these two methods, with an area of general distribution followed by a list. If there are only two or three areas in the distribution instead of three or four, an abbreviated form of the standard style is used. If the areas are in an east to west relationship and the areas are

adjacent, then "area1 to area2, is used, and if the areas are not adjacent (not contiguous), then "area1 & area2" are listed. If the areas are in north to south relationship, then "area1, s to area2" is given in ALL cases. If questionable records are included, these are followed by question mark and are placed following a semicolon after the accepted records.

Family-group-name

The original spelling of the family-group name. [NAME (alpha, 33): Family]

Gender

A code for the gender of a genus-group name. Permissible values are F for feminine, M for masculine and N for neuter. [GENDER (alpha, 1): Genus]

Genus-group-name

The original spelling of the genus-group name. [NAME (alpha, 33): Genus]

Kind-of-designation

The kind of type-species designation, coded in database as follows. Only the first kind of designation under the order of precedence as given in article 69 in the Code is recorded. [TYPEDES (alpha, 2): Genus]. Permissible values are:
AU = Automatic;
FR = First revisor (for incorrect original spellings only)
IN = Indication (typicus, etc.)
MO = Monotypy;
MA = Apparent monotypy;
NA = not applicable;
OD = Original designation;
PD = Present designation;
SM = Subsequent monotypy;
SD = Subsequent designation;
TA = Tautonymy; and
UK = unknown.

A designation by the International Commission on Zoological Nomenclature under its plenary powers is recorded as a subsequent designation, with ICZN used as the "author."

Kind-of-type

A code for the kind of primary type specimen the species-group name is based on. [TYPEKIND (alpha, 2): Species] Permissible values are:
HT = Holotype;
NT = Neotype;
LT = Lectotype;
ST = Syntype;
T = Type (unspecified);
NA = Not applicable; and
? = status undetermined.

While allotype and paratypes are frequently used in the literature, they are NEVER placed in this field as they are not primary types. "T" is used where the original author (such as Francis Walker) didn't specify the kind of type and the original description provides no information on how many specimens the new species was based; "?" is used only where the original description has not been checked.

Nearctic?

Does the taxon occur in the Nearctic Region? Values are given for all valid names. See under Biotic Region for definition of area. [NE (logical, 1): Family, Genus & Species tables]

Neotropical?

Does the taxon occur in the Neotropical Region? Values are given for all valid names. See under Biotic Region for definition of area. [NT (logical, 1): Family, Genus & Species tables]

Notes

Area for various notes, always contains the author and year for preoccupied names. Certain key phrases have been coded to ensure consistency. These codes will not appear in the printed version. Otherwise, nothing will be added to the data in this field. The order of the notes corresponds to that of the list below. [NOTES (alpha, 67): Family, Genus & Species]

The code consists of a number preceeded by "@." These codes will be expanded into the appropriate phrases given below with the variable data as indicated in the brackets "[...]"

@1 = "Preocc. "[Author(s) Year]
@2 = "Proposed as a subgenus."
@3 = "Published in synonymy, validated by "[Author(s) Year: page]"
@4 - "Suppressed by I.C.Z.N. " [Year: page]
@5 - "In interest of stability, the author [next phrase]
@6 - "rejects the prior type designation of "[Author(s) Year: page]
@7 - "rejects this valid prior name."
@8 - (*Nomen nudum*) "Published in synonymy, not subsequently validated by usage."*
@9 - "Suspension of I.C.Z.N. rules required to validate usage."
@10 - "Proposed without included species, first species included by "[Author(s) Year: page]
@11 - "Designation by "gen. n., sp. n." formula."
@12 - "Earlier type-designations invalid under I.C.Z.N. rules."
@13 - "Original type species misidentified."
@14 - "Validated by I.C.Z.N. " [Year: page]
@15 - "Introduced."
@16 - "Unrecognized."
@17 - "Lectotype designated by " [Author(s) Year: page]
@18 - (*Nomen nudum*) "Infrasubspecies (varietal) name proposed after 1960".
@19 - "Proposed as a group."
@20 - (*Nomen nudum*) "Published after 1930 without type designation".
@21 - (*Nomen nudum*) "Published without a diagnosis or indication".
@22 - (*Nomen nudum*) "Name improperly formed (verb)".
@23 - "Status needs to be checked; may not be synonymous".
@24 - "Conserved by I.C.Z.N. " [Year: page]
@25 - "Neotype designated by " [Author(s) Year: page]
@26 - (*Nomen nudum*) "Published after 1930 without a description or bibliographic reference to one".
@27 - (*Nomen nudum*) "Name improperly formed (adverb)".
@28 - (*Nomen nudum*) "Published in non-binominal work".
@29 - (*Nomen nudum*) "Proposed as an infrasubspecific name".

@30 - "Lectotype designation by inference of holotype by "[Author(s) Year: page]
@31 - "Automatic correction under Art. 32(d)."

* The phrase within the parens (*Nomen nudum*) is not included. It is included in the list to remind one that these phrases ONLY apply to *nomina nuda* and that every *nomen nudum* should have a coded phrase.

For example, for a preoccupied name the author and year of the senior synonym is given, such as "Walker 1848" preceeded by "@1." The print formatting program replaces the "@1" code with "Preocc. " to create the following entry.

epistates. Alaska to N.S., s. to Oreg., Colo. & N.J.; Manchuria.
Tabanus socius Osten Sacken 1876a: 467.—N.W.T. Preocc. Walker 1848.
Tabanus epistatus Osten Sacken 1878a: 555.—n. n. *socius* Osten Sacken 1876.

Oriental?

Does the taxon occur in the Oriental Region? Values are given for all valid names. See under Biotic Region for definition of area. [OR (logical, 1): Family, Genus & Species tables]

Original-Genus

Original genus name (i.e., the generic name originally used with the specific name). The spelling found in the original publication is given, whether correct or not. [ORIGEN (alpha, 33): Species]

Original-species-group-name

Contains the original species name for species group names proposed as trinomials. [OSP (alpha, 33): Species]

The specific name with indication of original status with which the trinomial was originally proposed is entered in this field. For example, "*sodalis* var." or "*varipennis* ssp." for a trinomial originally proposed as a variety of *sodalis* or as a subspecies of *varipennis*. (f. = form, var. = variety, ssp. = subspecies). See "Subspecies" section under VALID-SPECIES below for more information.

NB: the contents of this field (Original species) [if not blank] is placed between the contents of the ORIGINAL-genus field and the SPECIES-group-name field.

Page

Page (or plate) on which the scientific name is found. Only one page (or plate) number is given. If a name appears in multiple places, then first page where the maximal information appears is given. For example, if a name appears in both a key and description, the page of the description is given. If a plate is cited, the number is preceded with "pl." Arabic numbers or roman numerals are given as in the original publication. [PP (alpha, 8): Family, Genus, Species]

Page-of-designation

Page (or plate) on which the subsequent type-species designation is found. See under Page above. [SUBDESPP (alpha, 8): Genus]

Palearctic?

Does the taxon occur in the Palearctic Region? Values are given for all valid names. See under Biotic Region for definition of area. [PA (logical, 1): Family, Genus & Species tables]

Record Number

The record number is a unique key assigned to each record in a table and may be used a primary data key. [RECN (numeric 8): Family, Genus & Species tables].

Sex-of-type

The sex or stage of the primary type specimen(s) of a species-group name. [TYPESEX (alpha, 1): Species]. Permissible values are as follows. In the printed version, ♂ ♀ are used.
M = Male,
F = Female,
E = Egg,
P = Pupa or Puparium,
L = Larva,
A = Adult,
B = Both Sexes,
U = Unknown, and
(blank) = Not applicable.

Species-group-name

The original spelling of the species-group name. [SPNAME (alpha, 33): Species]

Species-name-ending

A code for a species-group name to indicate whether the name has an invariant (I) or variable (V) ending. [ENDING (alpha, 1): Species]

Status

A phrase to indicate the status of a name: Permissible values are:
Valid = Valid name (status code < 20)
Invalid = Invalid name (status code < 60)
Obsolete = Obsolete combination (status code = 80)
Misspelling = Mispelt name (status code = 60)
Misidentification = Incorrect use of a name based on a misidentification (status = 70)

Status Code

A code to indicate the nomenclatural status of the name, that is, whether it is available, valid, unavailable, invalid, etc. The status of names is indicated in the printed version by the typographic treatment (bold, italics, roman type faces). [STATUS (numeric, 2): Family, Genus & Species tables]. Permissible codes:
1- = Available, valid:
10 = Available, valid: [no change]
12 = Available, valid: not recognized (nomen dubium)
15 = Available, valid: *new* status
16 = Available, valid: *new* combination
17 = Available, valid: *new* [replacement] name
18 = Available, valid: replacement name
2- = Available, invalid:
20 = Available, invalid: junior synonym
22 = Available, invalid: dubious synonym
26 = Available, invalid: *new* (junior) synonym
27 = Available, invalid: unjustified new name

30 = Available, invalid: junior homonym
34 = Available, invalid: junior homonym, primary
36 = Available, invalid: junior homonym, secondary
44 = Available, invalid: justified emendation
46 = Available, invalid: unjustified emendation
48 = Available, invalid: obsolete combination or rank
5- = Unavailable:
50 = Unavailable: unspecified
51 = Unavailable: suppressed by ICZN
52 = Unavailable: published anonymously after 1950
53 = Unavailable: proposed conditionally after 1960
54 = Unavailable: infrasubspecific name proposed after 1960.
55 = Unavailable: nomen nudum
56 = Unavailable: incorrect original spelling
57 = Unavailable: improper formation
58 = Unavailable: published in synonymy, not subsequently validated
59 = Unavailable: proposed without type designation
60 = Unavailable: established for hybrid
70 = Unavailable: misspelling
80 = Unavailable: misidentification
90 = Unavailable: unregulated by ICZN

Source

The source of the scientific work, which may be a serial or a book. [SOURCE (alpha 67): Reference table].

Taxonomic Code

The taxonomic code is a numeric sequence which allows the names to be sorted in any arrangement, usually used to encode a phylogenetic arrangement. [TAXCODE (numeric 8): Family, Genus & Species tables].

Title

The title of the scientific work. [TITLE (alpha 67): Reference table].

Type locality

The type locality for the species-group name. The format used is "Country. Major (named) political subunit: locality, ..., etc." For single localities, each element is separated with a comma; for multiple localities (series of hierarchial locality units), commas and semicolons are used. The geographic units are always listed from LARGEST to SMALLEST units, with commas to separate logical units and semicolons to separate sets of logical units.

If the type locality is unknown, then the word "Unknown." is used. However, in most cases type-localities are, in fact, unknown. The type locality (or localities) is (are) where the type (holotype, lectotype, neotype or syntypes) was found. Many "catalogers" think the type-locality is what is stated in the "original description" and, therefore, use the phrase "unknown" when no statement of locality is directly associated with the description. Type-locality information may also be found in titles, subsequent publications, specimen labels, or even the species group name itself. Obviously, to declare that the type-locality of *Ptinus upsaliense* Gmelin is unknown is merely revealing one's ignorance of Latin and the rules of nomenclature!

Where obscure and obsolete names of localities (including variant spellings or mispellings) were used in the original publication, the current name is cited in brackets (e.g., Mozambique. Lourenco Marques [Maputo]).

If the name is an emendation, misspelling, new name, etc., its status along with the affected name is entered in this field. Also, the status field is coded (q.v.). Format for such is:

emend.[=emendation of] (species author);
incosp.[=incorrect original spelling of] (species author. author year: page (FR));
misid.[=misidentification] (see below);
missp.[=misspelling of] (species author);
n. n.[=new name for] (species author year of name renamed);

The type-locality field is always positioned after the "YEAR: PAGE.—" data elements in the printed format. Hence, may contain other comments related to the name, especially in those situations where the name never has type-localities. [TYPELOC (alpha, 67): Species]

SPECIAL CASES:

Misidentifications: Misidentifications can be "general" (widespread) or specific. For example, for more than 140 years workers used "*Musca*" *radicum* of Linnaeus for an anthomyid species which breeds in waste (misidentification stems from Bouche (1833), whereas the true *radicum* of Linnaeus is the "cabbage-root maggot" (=*Delia brassicae* Wiedemann). Pont (1981) corrected this misidentification. This information would appear in the printed version as follows.

radicum. ... [the cabbage-root maggot in *Delia*]
Musca radicum Linnaeus 1758: 596.—Sweden. ...
Musca brassicae Wiedemann 1817: 17.—Germany.
audacula. ... [the coprophagous maggot in *Paregle*]
Musca audaculus Harris 1780: 121.—England. ...
radicum, authors, misid.

For these general misidentifications, a separate record is made for the misidentification, with "*radicum*" entered into species field, with "authors" in author field, and "misid." in the type-locality field, with nothing in year, page, original genus fields.

Where the original source of the misidentification is known, the data is entered into all the appropriate fields. For example, Stuckenberg misidentified an undescribed species of *Paragus* as *Paragus bicolor* Meigen. A data record created for that misidentification generates the following printed entry:

bispinosus. Montana to New Brunswick, s. Colorado, Ohio & New Hampshire.
Paragus bispinous Vockeroth 1986: 192.—Ontario. ...
Paragus bicolor: Stuckenberg 1954: 132.—Misid.

Incorrect Original Spellings: For multiple original spellings, a record is made for each spelling. For the incorrect spellings, "incosp.", the valid spelling and author, followed by a period and the "author date: page" of the first revision and ending the entry with "(FR)" is placed in the field. The correct spelling is handled the same way as a typical original name record.

For an example, see under Type-Species below.

Type-species-Author

Author of a type-species. Follows the standards used for Author (q.v.). [TYPESPAU (alpha, 24): Genus]

Type-species

The name of the type species of the genus. If the species was proposed along with the genus, then only the specific name is entered. Otherwise, the full name as spelt in its original combination (genus & species) is entered. If the genus-group name is unavailable, an emendation, a new name, a misidentification, etc., its status is entered in this field along with the name it applies to. Format for such entries are:
emend. [=emendation of] (genus);
incosp. [=incorrect original spelling of] (genus);
misid. [=misidentification of] (genus);
missp. [=misspelling of] (genus); and
n. n. [=new name for] (genus renamed) [with Author of renamed genus in TYPESPAU].

[TYPESP (alpha, 67): Genus]

NB: The kind of designation is either "AU" for new names and emendations or "NA" for all other types (incosp., misid., missp., nomen nudum) of unavailable names. Also, for all genus group names, even unavailable ones, the current valid type species name and author is placed in current valid name & author fields. If the name is an incorrect original spelling, then the first revisor, Year, Bibliographic reference number & page of the revision is placed in the Author, Year and Page of subsequent designation fields.

Justified emendations require three records: one record as if the name was correctly formulated originally (Status Code = 10/20); second record for the original spelling as "incosp. —-" [This record will include the first revisor (here the revisor is the person who emended the name) data (Status Code = 56)]; and third record for the author(s) who made the emendation (Status Code = 44).

For example, the flower fly genus *Chrysidimyia* Hull was originally incorrectly spelled as *Chysidimyia*. Subsequently Hull corrected the spelling to *Chrysidimyia*. Hence, to properly treat these names, three records are entered. One record is created as if *Chrysidimyia* was correctly spelled originally. This first record includes the information about type-species, status, etc. A second record is created for the original, but incorrect spelling (that is, *Chysidimyia*) and that status is indicated in the type-species field (as "incosp. *Chrysidimyia*"). A third record is created for the emendation (*Chrysidimyia*), which includes the data of the source of the emendation and has the type-species field with "emend. *Chysidimyia*" [orig. spelling]. These three records generate the following final printed format:

Genus *Chrysidimyia*

Chrysidimyia Hull 1937c: 116, *chrysidimima* Hull (orig. des.).
Chysidimyia Hull 1937c: 116, incosp. *Chrysidimyia* Hull (Hull 1938: 126).
Chrysidimyia Hull 1938: 126, emend. *Chysidimyia* Hull.

Type-depository

The acronym for the institution or personal collection in which the primary type(s) of the species-group name is (are) deposited. The museum acronyms follow the standard set in Griffiths - Flies of the Nearctic Region (see table in the Collections section of the Status of Knowledge chapter). [TYPEDEP (alpha, 8): Species]

Type-genus

The genus-group name upon which the family-group name is based. If unavailable name or emendation, then its status was entered here along with the name it applies to. Format for such are:
emend. [=emendation of] (family-group name);
incosp. [=incorrect original spelling of] (family-group name);
missp. [=misspelling of] (family-group name); and
nomen nudum [unavailable name].

[TYPEGEN (alpha, 33): Family]

Type-genus Author

The author of the genus-group name that is the type of the family group name. [TGAUTHOR (alpha, 24): Family]

Valid-Family

The valid family to which the scientific name belongs. [VALIDFAM (alpha, 33): Family, Genus & Species]

Valid-Family-Group

The valid family group (subfamily, tribe) to which the scientific name belongs. [VALIDFGP (alpha, 33): Family, Genus & Species]

Valid-genus

The valid genus to which the scientific name belongs. [VALIDGEN (alpha, 33): Genus & Species]

Valid-name-of-type-species

The valid species to which the type-species of a genus-group name belongs. This data element is filled even if identical to value in the type-species data element. [CSP (alpha, 33): Genus]

Valid-species

The valid species to which the scientific name belongs. [VALIDSP (alpha, 33): Species]

Valid-subgenus

The valid subgenus to which the scientific name belongs. [VALIDSBG (alpha, 33): Genus & Species]

Year

Year of the original publication of the scientific name or work. Must be 1758 or after. [YEAR (numeric, 4): Family, Genus, Species & Reference].

Year-of-designation

Year of the subsequent designation of the type-species of a genus group name. Must be 1758 or after. [SUBDESDD (numeric, 4); Genus].

Tables (Files)

The above fields are currently grouped and ordered into 4 tables (files) as follows:

Family Table

The family table includes: Record#, Name, Author, Year, Page, Type Genus, Valid Name, Verify, Status, Family, TaxCode, Biotic Type Region, Biotic Regions, Category, Notes, Biblio Recn, Type Genus Author, Type Genus Year, Type Genus Biblio Recn, and Family Check.

Genus Table

The genus table includes: Record#, Genus, Author, Year, Page, Type Species, Verify, Status, Gender, Family, TaxCode, Biotic Type Region, Biotic Regions, Valid Genus, Valid Subgenus, Category, Type Designation, Type Species Author, SubDesAuthor, SubDesYear, SubDesPage, Current Type Sp, C Type Sp Author, Notes, Biblio Recn and Biblio Des Recn.

Species Table

The species table includes: Record#, Species, Author, Year, Page, Original Genus, Type Locality, Valid Species, Valid Sp Author, Vaild Genus, Status, Verify, Family, TaxCode, Type Kind, Type Sex, Type Depository, Biotic Type Region, Biotic Regions, Range, Notes, Valid Subgenus, Original Species and Biblio Recn.

Reference Table

The reference table includes: Author, Year, Title and Source, Biblio Recn.

List of abbreviations used

A	Adult
ACT	Australian Capital Territory
AF	Afrotropical
Arch.	Archipelago
AU	Australasian
AU	Automatic
B	both sexes
CD-ROM	Compact Disk-Read Only Memory
cent.	central
Coll.	Collection
Dist.	District
E	egg
E, e.	East, eastern
e. g.	*exempli gradia* or for example
emend.	emendation
et al.	et alia
f.	form
F	female
fig.	figure
FR	First Revisor
HT	Holotype
I. C. Z. N.	International Commission on Zoological Nomenclature
I., Is.	Island, islands
IN	Indication
incosp.	incorrect original spelling
L	larva
LT	Lectotype
M	male
m.	meter(s)
MA	Apparent monotypy
mi.	mile(s)
misid.	misidentification
missp.	misspelling
MO	monotypy
Mt., Mts.	Mount or Mountain, Mountains
n. n.	new name
N, n.	North, northern
NA	Not applicable
Nat.	National
N. Comb.	New Combinaton
NE	Nearctic
NE, ne.	Northeast, northeastern
nr.	near
NSW	New South Wales
N. Status	New Status
N. Syn.	New Synonym
NT	Neotropical
NT	Neotype
NW, nw.	Northwest, northwestern
OD	Original designation
OR	Oriental
P	pupa, puparium
p., pp.	page, pages
PA	Palaearctic
PD	Present designation
pl., pls	Plate, plates
Preocc.	Preoccupied
q. v.	quod vide
Qld	Queensland
R.	River
Rep.	Republic
S, s.	South, southern
SA	South Australia
SE, se.	Southeast, southeastern
SM	Subsequent monotypy
ssp.	subspecies
ST	Syntype
T	Type
TA	Tautonymy
Tas.	Tasmania
U	Unknown
UK	Unknown
USA	United States of America
var.	variety
vic.	vicinity
Vic.	Victoria
W., w.	West, western
WA	Western Australia

Acryonyms and Names used for type depositories

AMNH American Museum of Natural History, Department of Entomology, Central Park West at 79th St., New York, NY 10024, USA

AMNZ Auckland Institute and Museum, Private Bag 92018, Auckland, New Zealand

AMS Australian Museum, Department of Entomology, P.O. Box A285, Sydney South, New South Wales 2000, Australia

AMUZ Aligarh Muslini University, Department of Zoology, Aligarh, Uttar Pradesh, India

ANIC Australian National Insect Collection, CSIRO, Canberra, ACT, Australia

ANSP Academy of Natural Sciences, Department of Entomology, 19th and the Parkway, Philadelphia, PA 19103, USA

Baggesen Baggesen Collection

BAUC Beijing Agricultural University, Beijing, China

BBM Bernice P. Bishop Museum, Department of Entomology Collection, P. O. Box 19000A, 1525 Bernice Street, Honolulu, Hawaii 96819, USA

BCIQT Animal & Plant Quarantine Laboratory, Taichung Branch Office, Bureau of Commodity Inspection & Quarantine, Ministry of Economic Affairs, Taichung, Taiwan

BMNH The Natural History Museum, Department of Entomology, Cromwell Road, London SW7 5BD, England, UK

BPIH Pennsylvania Department of Agriculture Arthropod Collection, Bureau of Plant Industry, Pennsylvania Department of Agriculture, 2301 North Cameron St., Harrisburg, PA 17110, USA

BPIM Bureau of Plant Industry, Manila, Philippines

CAS California Academy of Sciences, Department of Entomology, Golden Gate Park, San Francisco, CA 94118, USA (see Arnaud 1979)

CDFA Collection of Arthropods, Analysis and Indentification Unit, California Department of Food and Agriculture, 1220 N. St., Rm 340, Sacramento, CA 95814, USA (types of Blanc and Foote transferred to CAS; see Wasbauer 1970, Arnaud 1979)

CMP Carnegie Museum of Natural History, Section of Insect and Spiders, 900 Forbes Ave., Pittsburgh, PA 15213, USA

CNC Canadian National Collection of Insects, Centre for Land and Biological Resources Research, Biological Research Division Agriculture Canada, Ottawa, Ontario KIA OC6, Canada

CNMS National Museum, Sir Marcus Fernando Mawatha, Colombo 7, Sri Lanka

CPARJ Centro de Pesquisas Agropecuarias Centro-Sul, EMBRAPA, Rio de Janeiro, Brazil (formerly Instituto de Biologia Vegetal) (see Zikan & Wygodzinsky 1948)

CSUFC Colorado State University, Department of Entomology. C.P. Gillette Arthropod Biodiverstiy Museum, Fort Collins, CO 80523, USA (types of Tephritidae transferred to USNM)

CUI Cornell University, Cornell University Insect Collection, Department of Entomology, Ithaca, NY 14850, USA

DAC Plant Protection Department, Ministry of Agriculture, Dokki, Cairo, Egypt

DEI Deutsches Entomologisches Institut, Deutschen Akademie der Landwirtswissenschaften zu Berlin, Schicklerstrasse 5, 13 Eberswalde, D-1300, Germany (formerly Institut fur Pflanzenschutzforschung)

DeJean Dejean, P.F.M.A., personal collection. Widely dispersed (Horn & Kahle 1935: 52) and some Diptera types via Robineau-Desvoidy, Bigot and Verrall-Collin Collections are now at Oxford (**UMO**).

Destroyed Used in Type depository field only if types are clearly known to have been destroyed

Dirlbek Dirlbek, J., Dirlbek, K., and Dirlbekova, O., personal collection. Central Research Institute for Plant Protection, Cesko-Slovenska Spolecnost Entomologicka, Vinicna 7, 128 00 Praha 2, Czech Republic

Doleschal Collection of C. L. Doleschall

ENA Universidade Federal Rural do Rio de Janeiro, Brazil (formerly Escola Nacional de Agronomia)

ENIH National Institute of Health, Department of Entomology, 10-35 Kamiosaki, 2-Chome, Sinagawa-ku, Tokyo 141, Japan

ESEE Entomology Society of Egypt, 14 Ramsey St., Cairo, Egypt (see Steyskal & El-Bialy 1967)

ETHZ Entomologisches Institut, Eidgenossische Technische Hochschule-Zentrum, Universitatsstrasse 2, Zurich CH-8006, Switzerland

EUMJ Ehime University, Entomological Laboratory, Matsuyama, Japan

FMNH Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago, IL 60605, USA

FSCA Florida State Collection of Arthropods, Division of Plant Industry, 1911 34th St., SW, P.O. Box 147100, Gainesville, FL 32614, USA

Germar Germar, E.F., collection. Dispersed, some material in ZMHU, DEI, & MLUH (Horn & Kahle 1935: 89).

HUS Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo, Hokkaido 060, Japan

IEXV Instituto de Ecologia, Apartado Postal 63, Km. 2.5 Antigua Carretera a Coatepec, 91000 Xalapa, Veracruz, Mexico

IGPUG Institut und Museum fur Geologie und Palaeontologie, Georg-August-Universitat, Gottingen, Niedersachsen, Germany (see Evenhuis 1994: 17)

IML Fundacion e Instituto Miguel Lillo, Universidad Nacional de Tucuman, Miguel Lillo 251, Tucu-

man 4000, Argentina (see Hayward & Golbach 1963)

IMZ Museo ed Istituto di Zoologia Sistematica, Universita di Torino, Via Giovanni Giditti 34, Torino I-10123, Italy (collection possibly transferred to Museo Regionale Scienze Naturale, Via Giolitti 36, Torino 10123, Italy)

INHS Illinois Natural History Survey, Insect Collection, 607 E. Peabody Drive, Champaign, IL 61820, USA

INPC National Pusa Collections, Division of Entomology, Indian Agriculture Research Institute, New Delhi, Delhi 110012, India

IOC Fundacao Instituto Oswaldo Cruz, Av. Brasil 4365, C.P. 926, Rio de Janeiro, Rio de Janeiro 20.000, Brazil

IPV Instituto de Patologia Vegetal, INTA, C.C. No. 25, Castelar, Buenos Aires, Argentina

IRSNB Institut Royal des Sciences Naturelles de Belgique, Collections Nationales Belges D'Insectes et D'Arachnides, 29, Rue Vautier, Brussels B1040, Belgium

ISTM Institute Scientifique, Tananarive, Madagascar (Status uncertain. Types of some species described by Munro or Hering said to belong here (or from Paulian) are still in SANC, whereas some others are in MNHNP).

IZAM Instituto de Zoologia Agricola, Facultad de Agronomia, Universidad Central de Venezuela, Apt. 4579, Maracay, Aragua 2010A, Venezuela

IZAS Institute of Zoology, Academia Sinica, Insect Collection, 19 Zhongguancun Lu, Haidian, Beijing 100080, China

IZTG Institute of Zoology, Tblisi, Georgia

IZUSN Instituto di Zoologia, Universita degli Studia di Napoli, Portici, Italy

Kieffer Kieffer, J.J., personal collection. Mostly destroyed, including all Kieffer & Jorgenson neotropical types (Gagne 1994: 5)

Kirchbg Kirchberg, E., personal collection

Kozanek Kozanek personal collection

KU Kyushu University, Entomolgical Laboratory, Faculty of Agriculture, Hakozaki, Hi-Gashiku, Fukuoka, Kyushu 812, Japan

KUB Kasetsart University, Bangkok, Thailand

KUTK Systematic Entomology Laboratory, Department of Agricultural Biology, Kyungpook National University, Taegu, Korea

LACM Natural History Museum of Los Angeles County, Los Angeles, CA, USA

LSL Linnean Society, Burlington House, Piccadilly, London WIV OLQ, England, UK

MACN Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Divison Entomologia, Av. Angel Gallardo 470, C.C. 220, SUC. 5, Buenos Aires 1405, Argentina

MHNA Museum d'Histoire Naturelle d'Autun, 14 Rue St.-Antoine, F71400 Autun, France

MCSNG Museo Civico di Storia Naturale, "Giacomo Doria", via Brigita Liguria 9, Genoa I-16121, Italy

MCSNM Museo Civico di Storia Naturale, Corso Venezia 55, Milan 20121, Italy

MCZ Museum of Comparative Zoology, Entomology Department, Harvard University, 26 Oxford Street, Cambridge, MA 02138, USA

Merz Merz, B., personal collection, Entomologisches Institute, ETH -Zentrum, CH-8092, Zurich, Switzerland

MEUA Museo de Entomologia, Universidad Nacional Agraria "La Molina", Apartado 456, Lima, Peru

MEUV Museo de Entomologia, Universidad del Valle, Dpto. de Biologia, A.A. 25360, Cali, Colombia

MGAB Muzeul de Istoria Naturala, "Grigore Antipa", L. Chaussee Kisselef 1, Bucharest, Romania

MHNL Musee d'Histoire Naturelle de Lyon, 28 Blvd. des Belges, 69006 Lyon, France

MHNLi Museum d'Histoire Naturelle, Lille, France (see Macquart 1850)

MLUH Wissenschaftsbereich Zoologie, Sektion Biowissenschaften Martin-Luther-Universitata Halle, WB Zoologie, Domplatz 4, Halle/Salle D-4020, Germany

MMB Moravske Muzeum, Entomology, Preslova ul. 659 37, Brno, Czech Republic

MMS MacLeay Museum, University of Sydney, Australia

MNHNP Museum National d'Histoire Naturelle, National Collection of Insects, 45, rue Buffon, Paris 75005, France

MNHNS Mueso Nacional de Historia Natural, Casilla 787, Santiago, Chile

MNM Magyar Termeszettudomanyi Muzeum Allattara (Hungarian Natural History Museum), Baross u. 13, 1088 Budapest, Hungary

MRAC Musee Royal de l'Afrique Centrale, Section d'Entomologie, Leuvensesleenweg 13, Tervuren B-3040, Belgium

MSUEL Michigan State University, Department of Entomology Collection, East Lansing, MI 48824-1115, USA

MVMA National Museum of Victoria, Department of Entomology, 71 Victoria Crescent, Abbotsford, Victoria 3067, Australia

MZB Museum Zoologicum Bogoriense, P. O. Box 110, Jalan. Juanda 3, Bogor, Java, Indonesia

MZLS Museo Zoologico "La Specola", Via Romana 17, Firenze 50125, Italy

NIAS Laboratory of Insect Systematics, National Institute of Agro-Environmental Sciences, Kannondai, Tsukuba, Ibaraki Pref. 305, Japan

NMB Naturhistorisches Museum, Entomology Department, Augustinergasse 2, Basel CH-4001, Switzerland

NMBA Naturhistorisches Museum der Benedikiner-Abtei Admont, Admont A-8911, Austria

NMBZ National Museum, Invertebrate Collection, P. O. Box 240, Centenary Park, Bulawayo, Zimbabwe (see Hancock, Chahwade & Mhlanga 1995)

NMI National Museum of Ireland, Insect Collection, Kildane Street and Merrion Street, Dublin 2, Co. Dublin, Ireland

NMKE National Museum of Kenya, Section of Entomology, P.O. Box 40658, Nairobi, Kenya

NMNHS Insect Collection, National Museum of Natural History, Bulgarian Academy of Sciences, Boulv. Tzar Osvobodital, Sofia BG-1000, Bulgaria

NMP Natal Museum, Private Bag 9070, Pietermaritzburg, Natal 3201, South Africa

NMPC National Museum (Natural History), Department of Entomology, Kunratice 1, Prague 4, 148 00, Czech Republic

NMW Naturhistorisches Museum Wien, Postfach 417, Burgring 7, Vienna A-1040, Austria

NMWC National Museum of Wales, Cathays Park, Subdepartment of Entomology, Department of Zoology, Cardiff, South Glamorgan CF1 3NP, Wales, UK

NRS Naturhistoriska Riksmuseet, Sektionen fur entomologi, Stockholm S-10405, Sweden

NSWA New South Wales Agricultural Scientific Collection Trust, Biological and Chemical Research Institute, P. M. B., 10, Rydalmere, New South Wales 2116, Australia

NTU National Taiwan University, Department of Plant Pathology & Entomology, Taipei, Taiwan (also see Government Research Institute of Formosa)

NZAC New Zealand Arthropod Collection, Entomology Division, Landcare Research New Zealand Ltd., Private Bag 92170, Auckland, New Zealand

PACL Punjab Agricultural College & Research Institute, Lyallpur, Pakistan

PAN Polish Academy of Science, Museum of the Institute of Zoology, Wilcza 64, Warsaw 00-679, Poland

Payen Payen personal collection (in "Stadt. Mus., Tournai" according to Horn & Kahle (1936: 203), a collection unknown to us).

PIM Paleontologicheskii Institut, Acad. Nauk, Moscow, Russia

PQMAB Plant Quarantine Institute, Ministry of Agriculture, Beijing

PUCP Punjab University, Department of Zoology, Chandigarh, Punjab, India

QMBA Queensland Museum, P.O. Box 3300, Brisbane, Queensland 4101, Australia

Reaumur Reaumur personal collection. Presumed lost.

RNH Nationaal Natuurhistorische Museum, Raamsteeg 2, Leiden 2311 PL, Netherlands

Ryden Ryden, N., personal collection, Halsingborg, Sweden

SAFAI Laboratorio di Entomologia, R. Stazione Sperimentale di Agrumicolturae Frutticoltura, Acireale, Sicily, Italy (status uncertain)

SAMA South Australian Museum, North Terrace, Adelaide, South Australia 5000, Australia

SAMCT South African Museum, Entomology Department, P.O. Box 61, Queen Victoria Street, Cape Town, Cape Province 8000, South Africa

SANC South African National Collection of Insects, Private Bag X134, Pretoria, Transvaal 0001, South Africa (see Holm & Wessels 1974)

SDNHM San Diego Natural History Museum, Entomology Department, Balboa Park, P.O. Box 1390, San Diego, CA 92112, USA

Shinji Shinji, O., personal collection, Morioka Higher Agricultural and Forestry School, Japan. Location of collection unknown (Ito 1984: 149).

SLJG Steiermarkisches Landesmuseum Joanneum, Abteilung fur Zoologie, Raubergasse 10, Graz A-8010, Austria

SMF Forschungsinstitut und Naturmuseum Senckenberg, Entomologische Section 1, Senckenberganlage 25, Frankfurt-am-Main, Hessen D-6000, Germany

SMKM Selangor Museum, Kuala Lumpur, Malaysia (Collection, at least in part, transferred to BMNH (see Hardy 1973: 58)).

SMN Staatliches Museum fur Naturkunde, Rosenstein 1, Stuttgart, Baden-Wurttemburg D-7000, Germany

SMT Department of Entomology Collection, Staatliches Museum fur Tierkunde, Dresden, Forschungsstelle, Augustusstrasse 2, Dresden D-8010, Germany

Spinola Spinola, M.M., personal collection. In Castello di Tassarolo, Novi Ligure, Italy according to Horn & Kahle (1936: 264).

Takeuchi Takeuchi personal collection. Possibly in UOPJ (see Ito 1984:85).

TAUI Insect Collection, Zoological Museum, Tel Aviv University, Tel Aviv 69978, Israel

Tavares Tavares, J.S., personal collection. Mostly lost except for galls now in MNHNP and SMN (see Gagne 1994: 7).

Theowald Theowald, Br., personal collection, Amsterdam

TMP Transvaal Museum, P.O. Box 413, Pretoria, Transvaal 0001, South Africa (Diptera collection transferred to NMP, but types of a few species of Tephritidae described by Bezzi or Munro retained at SANC (M. Mansell, pers. comm.)

Tollin Tollin, C., personal collection. Whereabouts unknown (Horn & Kahle 1936: 280).

TUKN Tribhuvan University, Kirtipur, Nepal

UASK Ukrainian Academy of Sciences, Schmalhausen Institute of Zoology, Lenin Street, 15, 252650, Kiev 30, Ukraine

UASL Nature Museum, Ukrainian Academy of Sciences, Lvov, Ukraine

UCB University of California, Essig Museum of Entomology, Department of Entomological Sciences, Berkeley, CA 94720, USA

UCD University of California, The Bohart Museum of Entomology, Davis, CA 95616, USA

UChS Museo Entomologico, Universidad de Chile, Facultad de Agronomia, Casilla 1004, Santiago, Chile

UCR University of California, Entomological Teaching and Research Collection, Riverside, CA 92521, USA

UKaL University of Kansas, State Biological Survey of Kansas Invertebrate Collection, 2045 Constant Ave., Campus West, Lawrence, KS 66044, USA (see Byers et al. 1962).

UMCE Universidad Metropolitana de Ciencias de la Educacion, Santiago, Chile

UMO Hope Entomological Collections, University Museum, Park Road, Oxford, Oxfordshire OX1 3PW, England, UK

UMSP University of Minnesota, Department of Entomology, 219 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108, USA

UNAM Universidad Nacional Autonoma de Mexico, Coleccion Entomologica, Instituto de Biologia, Apdo. Postal 70133, Mexico, Districto Federal 04510, Mexico

Unknown Depository of types not stated in publication and unknown to us.

UOPJ Entomological Laboratory, University of Osaka Prefecture, Mosu, Umemachi Sakai, Osaka 593, Japan

UPRG Universidad Nacional "Pedro Ruiz Gallo", Departmento de Fitotecnica, Museo de Entomologia, Apartado 3, Lambayeque, Lambayeque, Peru

UQIC Insect Collection, Department of Entomology, University of Queensland, Saint Lucia, Queensland 4067, Australia (Holotypes were transferred to QMBA)

USNM United States National Museum of Natural History, United States National Entomological Collection, Washington, DC 20560, USA

USP Museu de Zoologia, Universidade de Sao Paulo, Biblioteca, 7172, Sao Paulo, Sao Paulo 01.051, Brazil

USU Utah State University, Department of Biology, Entomological Museum, Logan, UT 84332, USA

UZMC University of Copenhagen, Zoological Museums, Department of Entomology, Universitetsparken, Copenhagen DK-2100, Denmark

UZMH Zoological Museum, Finnish Museum of Natural History, University of Helsinki, P. Rautatiek 13, Helsinski, SF-00100, Finland

WSU Washington State University, James Entomological Collection, Department of Entomology Collection, Pullman, WA 99163, USA (see Zack 1984)

Zaka-Rab Zaka-ur-Rab, M., personal collection. Possibly in AMUZ.

ZFMK Zoologisches Forschungsinstitut und Museum "Alexander Koeing", Adenaueralle 160, Bonn D-5300, Germany

ZIL Museum of Zoology, Lund University, Helgonav 3, Lund S-223, Sweden

ZISP Zoological Museum, Academy of Sciences, Russian Academy of Sciences, Universitetskaya, Naberzhnayal B-164, St. Petersburg, Russia

ZMAN Zoologisch Museum, Instituut voor Taxonomische Zoologie, Universiteit van Amsterdam, Plantage Middenlaan 64, Amsterdam 1018 DH, Netherlands

ZMHU Museum fur Naturkunde der Humboldt Universitat zu Berlin, Bereich Zoologisches Museum, Invalidenstrasse 43, Berlin, D-1040, Germany

ZMM Zoological Museum, University of Moscow, Herzen str. 6, Moscow 103009, Russia

ZSBS Zoologische Staatssammlung, Munchhausenstrasse 21, Munchen 60, Bayern D-8000, Germany

ZSI Zoological Survey of India, National Zoological Collection, 34, Chittaranjan Avenue, Calcutta, West Bengal 700 012, India

ZSZMH Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg, Germany

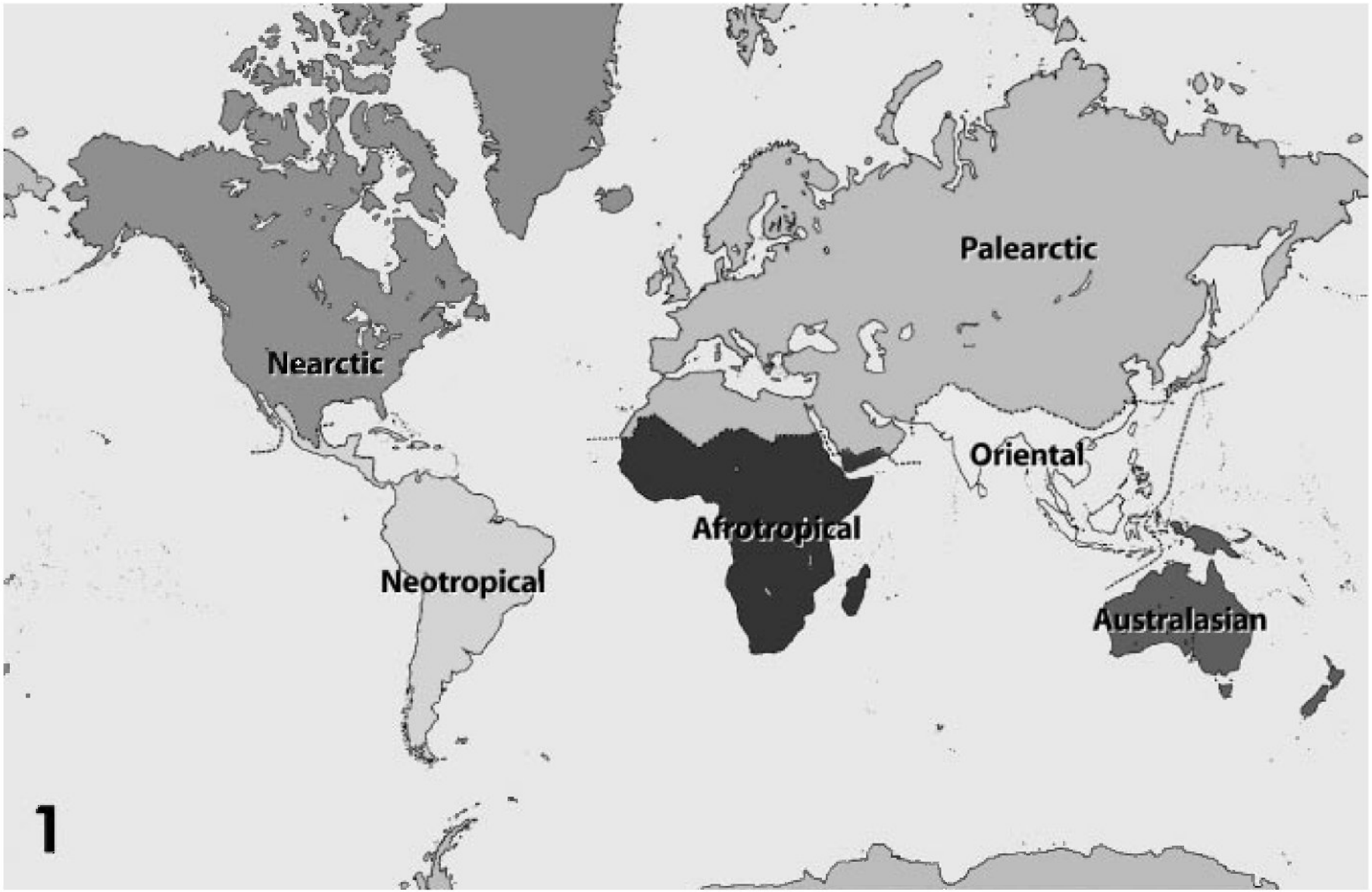
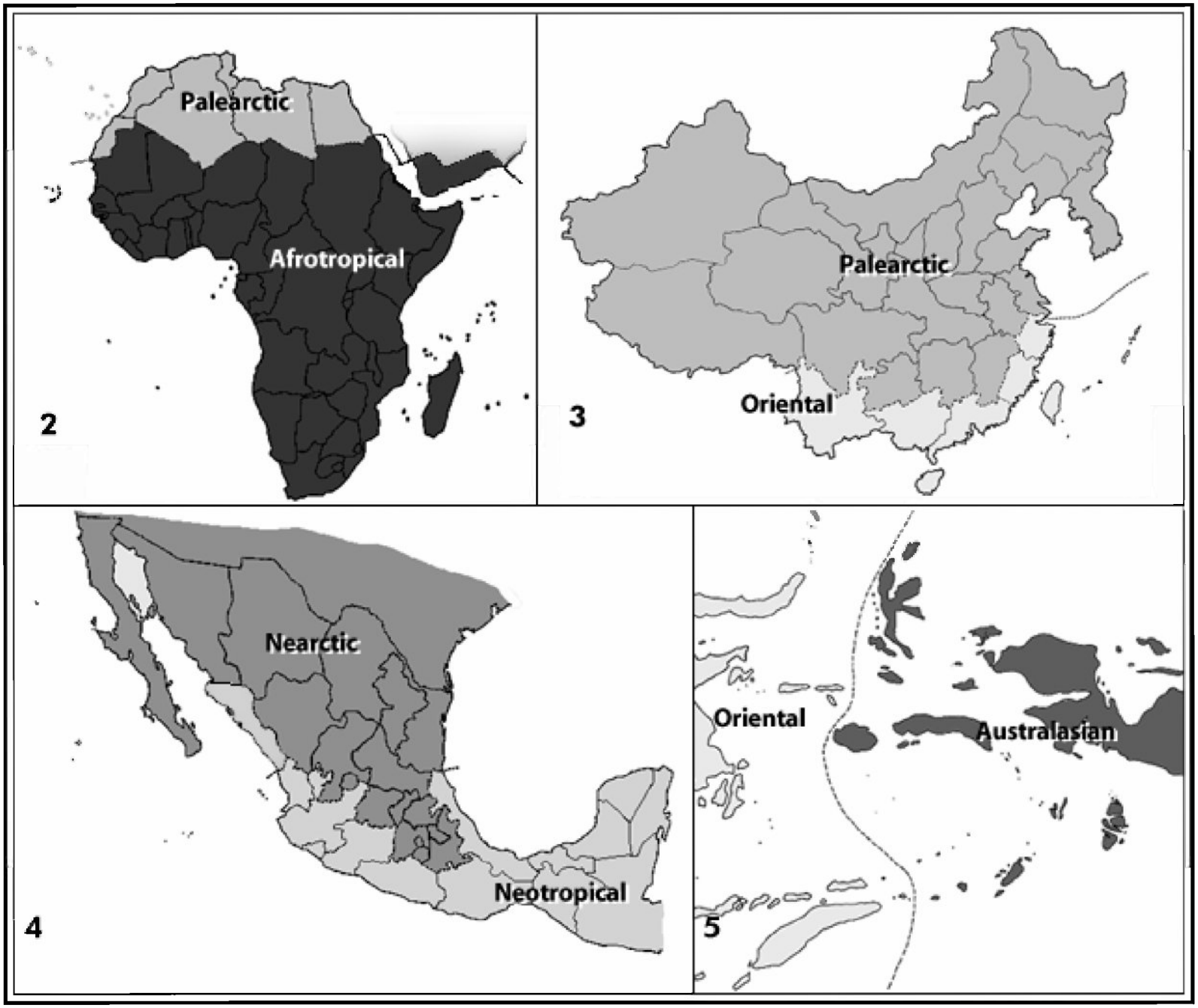


Fig. 1. Biotic Regions of the World



Figs. 2-5. Boundaries between biotic regions.