

* **Important Rules for Zoological Nomenclature and
Scientific names of Various Taxa**

Dr . G. B. CHAND

Associate Professor

Aquatic toxicology Laboratory

Department of Zoology

Patna University, Patna

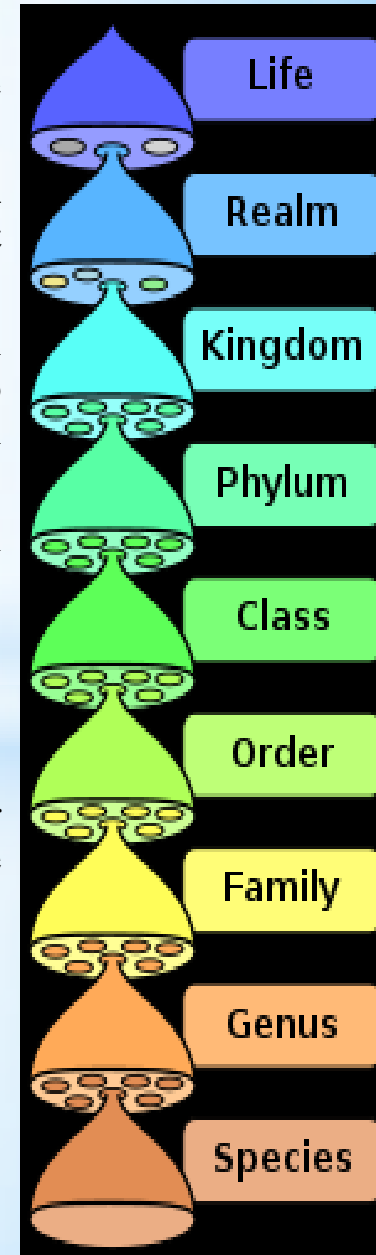
Email : gbchand@rediffmail.com



INTRODUCTION

Zoological nomenclature:

- Zoological nomenclature is independent of other systems of nomenclature, for example botanical nomenclature. This implies that animals can have the same generic names as plants.
- The rules and recommendations have one fundamental aim: **“to provide the maximum universality and continuity in the naming of all animals, except where taxonomic judgment dictates otherwise”**.
- **The International Code of Zoological Nomenclature (ICZN)** is a widely accepted convention in zoology that rules the formal scientific naming of organisms treated as animals. It is also informally known as the ICZN Code, for its publisher, the International Commission on Zoological Nomenclature (which shares the acronym "ICZN"). The rules principally regulate:
 - A. How names are correctly established in the frame of binominal nomenclature?
 - B. Which name must be used in case of name conflicts?
 - C. How scientific literature must cite names?
- The rules in the code determine what names are valid for any taxon in the family group, genus group, and species group. It has additional (but more limited) provisions on names in higher ranks. The code recognizes no case law. Any dispute is decided first by applying the code directly, and not by reference to precedent.





RULES FOR ZOOLOGICAL NOMENCLATURE

Like any code of law, the international code presents the rules starkly and without explanation. Even the experienced taxonomist some times, find difficulties to interpret the rules, and the beginner is often totally bewildered.

- The difficulty of understanding individual provisions is further aggravated by the unavailability of a well articulated presentation of then basic principles, which the individual rules attempt to implement.
- The rules in the Code apply to the rank of superfamily to sub species and also to some extent, above the rank of super family.

The important rules considered for effective zoological nomenclature can be summarized as:

1. Uni-, Bi- and Tri-nominalism:

- The zoological nomenclature is independent of other system of nomenclature and the name of animal is not rejected merely on the ground, that it is identical with the name of a taxon that is not animal(Art.1.4), at the same time it is good to avoid the introduction of those generic names in zoology, which are already in use in botany. It is therefore, advisable to consult the *Index Nominum Genericorum (Plantarum)* and approved list of bacterial names before establishing new genus-group names (Art.1A).
- The scientific names of animals from sub genera and above are uninominal (Art. 4.1, 4.2). These are plural names(for adjective used as noun) for names above genus and singular nouns for genus and sub genus. They begin with an upper case letter.
- The zoological Code (Art.29.2) stipulates standardized endings for the name of superfamily(-*oidea*), family (-*idea*), sub family (-*inae*), tribe (-*ini*) and sub tribe (-*ina*).

* RULES FOR ZOOLOGICAL NOMENCLATURE: BINOMIAL NOMENCLATURE

- The names of species are binomial (Art.5.1) and those of sub species trinomial (Art.5.2) It is included in Uni-, Bi- and Tri-nominalism. e.g.
- Genus-*Bactrocera* Sub genus (*Afrodacus*) species *aberrans* sub species *nigritus* author Hardy,1955. This means that in the system of nomenclature for animals, the name of a species is composed of a combination of a generic name and a specific name; together they make a "binomen" (binomial nomenclature). No other rank can have a name composed of two names. Examples: Species *Giraffa camelopardalis*. The names of the 'Binomen' have actually opposite functions- the specific name expresses distinctness while the generic name relationship. In botanical nomenclature, the equivalent for "binomial nomenclature" is "binary nomenclature" (or sometimes "binomial nomenclature").
- The second word in the parenthesis is the sub genus and the fourth indicate sub species, which forms the trinomen (trinomial nomenclature) Subspecies have a name composed of three names (trinomen): generic name, specific name, sub-specific name: Subspecies e.g. *Giraffa camelopardalis rothschildi*.
- The presence of sub genus does not affect the status of nomenclature. The sub specific names always begins with a lower case letter.
- The knowledge of binomial nomenclature was known to primitive pre Linnaean author. But it was only Linnaeus, who made it a basis of a consistent system of nomenclature
- The precise significance of binomial nomenclature was not entirely clear to Linnaeus nor to most of his successors and even to many of the contemporaries. There is slight difference in three closely allied terms- **Binominal**, **binomial** and **binary**. **Binary** refers to designations consisting of two kinds of names. The Linnaean combination of generic name and differentia was polynominal, yet binary. Code uses only the term binomial nomenclature, even though admitting that the name of a sub species is a trinomen. **Binominal** is an amendment of the formerly used term **binomial**.
- Taxa at a rank above species have a name composed of one name, a "uninominal name" like Genus *Giraffa*, family *Giraffidae*.

* RULES FOR ZOOLOGICAL NOMENCLATURE: BINOMIAL NOMENCLATURE CONTD.,

- The fourth edition now rules that a new names published after 1999, is made available only if, it is clearly indicated as being new (preferably be the term as “sp. nov.,” “fam.nov.,” “nom.nov.”or by the directly equivalent term in the language in which the scientific paper is written).The published new taxa should be brought to the notice of zoological record for their inclusion in it.(Art.8.5;8A).
- The zoological Code does not recognise the names of taxa of infra-specific rank *i.e.* below the sub-species.
- A scientific name proposed expressly as the name of a “variety” or “form” after 1960 is infra-specific and excluded from zoological nomenclature (Art.1.1.1; 1.3.4; 45.6.3), but if, before 1961 these are regarded as sub-specific name (Art.45.6.4).
- The names of sub tribes to super families are family-groups names; genera and sub genera are genus-group names and species and sub specie are species-group names.
- The basic language of scientific same is Latin and names from other languages are Latinised or treated as such. A name proposed for a collective group will be of genus-group name (Art.42.2.1) and a name proposed for ichnotaxon can be of family-group name or genus-group name or species-group name as per its usage (Art.10.3).
- The use of author’s name is optional, but it is desirable to at least mention the same once in each work (Rec.51A). When three or more authors are jointly responsible for a name, the term *et al.* should be mentioned after the name of first author, provided all the names of the authors are once mentioned somewhere in the same work (Rec.51C).
- If the new name is established anonymously the term “ Anon” may be used in the place of name of the author (Rec.51 D). If the name of the taxon is established by the other person than the author of the work or by one in publication of joint authors, author is mentioned as B in A or B in A & B (Rec.51.E). Uniparentally reproducing animals are usually given conventional species names (Art.17). They are quietly listed in catalogues or keyed out in monographs just like other name species. This uniform taxonomic treatment becomes extremely dangerous in view of the fact, that such species (in some groups at least) are sometimes called *Agamo species* or *Micro species*, rather than species (Minelli,1995). Some other workers do not treat them as true species (Dobzhansky,1937; Mayr,1969; Hull, 1980; Ghiselin,1987).



RULES FOR ZOOLOGICAL NOMENCLATURE: BINOMIAL NOMENCLATURE CONTD.,

- Another problem arises with those animals which do not obviously belong to species e.g. hybrids (Art.1.3.3). The biochemical and molecular studies have brought about revolutionary changes in our concept with regard to natural animal hybrids. There are presently many naturally occurring hybrids forms, which at least areas stable and circumscribed as many conventional species. But, these are still denoted by formulae (where a generic name is followed by an accession number or locality name) rather than by Linnaean names from the point of view of nomenclature, but still there is no universality of attitude towards them (Minelli,1995;Echelle,1990a,b).

Advantages of Binomial nomenclature:

- The Linnaeus binomial nomenclature is a compromise between Aristotelian logic and a simple information retrieval system. The binomial nomenclature shows classification of the taxon, which is one of the most important step in the whole hierarchy. It clearly shows that one taxon, the species, is a member of next higher taxon, a genus. When the classification of a group is well advanced and the genera are truly natural units, the binominal can be the basis of prediction and of phylogenetic, evolutionary and zoogeographical speculations, the mono-nomial would destroy this.
- The genera adopted by Linnaeus is extremely wide in scope and truly aid to the memory. Not only a zoologist, but even an educated lay person could memorise the 312 generic names, which Linnaeus used for all animals.
- The scientific names, thus consisted of two components-, a group designating generic name as an aid to the memory and specific name emphasizing distinctness and uniqueness.

Disadvantages of Binomial nomenclature:

- Since Linnaeus times, this system has lost its usefulness. The total number of genera is now exceeding 50000. A generic name no longer tells much to a zoologist except in a few popular group of animals. It has become a tool for the specialist. The degrading of the usefulness of the generic names has been made worse by the extreme generic splitting so prevalent in many areas of systematic zoology.



RULES FOR ZOOLOGICAL NOMENCLATURE: NAME CHANGING AND INSTABILITY IN NOMENCLATURE

Name changing and Instability in nomenclature:

- The worst aspect of the binomial system is its dynamic instability. Every change in the delimitation of a genus or in the assignment of a species to a genus will lead to a change in one or several scientific names. Genera are split, genera are lumped, and species are frequently shifted from one genus to another. Such changes not only annoy the person, who are affected by them, but also reduce the efficiency of the zoological nomenclature as a reference system. Though the zoological Code has the provision to govern such changes, yet this continues to be another important problem.
- The recent Code also rules that no name can be replaced, if it has been used as valid by at least ten authors in 25 publications during the past 50 years and encompassing a span of not less than 10 years, by an earlier synonym or homonym, which has not been used as a valid since 1899. Even grammatically incorrect but established names have been protected by the Commission.
- The Code also gives freedom to taxonomists either to continue to use the original type species for genus-group taxon or taxonomic species actually involved as type in case of misidentifications without referring to the Commission to avoid delay.
- The commission has also safeguarded the names by adopting lists of names in in major taxonomic fields. Names not typed in such adopted list (Art.10.7) will be treated as unavailable names.
- Some times a name is spelled in more than one ways in the same work. Under such cases, the correct spelling is that, which is first selected and used by the first reviser or original author (Art.24.2). It is also necessary to get printed all components of a scientific names in full on first mention and later on it is abbreviated. In cases, abbreviated words creates confusion, it may be used in a little different manner e.g. mosquitos like *Anopheles*, use **An**, and for *Aedes*, use **Ae**. Similarly, for other such names different abbreviation may be erected (Rec.25A).
- Michener (1964) has favoured replacement of bi-nominalism by uni-nominalism or mono-nominalism. He proposed the freezing of the original scientific names of a new species for all times by connecting generic and specific names by a hyphen. This proposal has superficial advantages, in terms of avoiding the problems of homonymy, change of generic and specific combinations and change of specific ending to agree with the gender of the generic name.
- The fourth edition of the Code has simplified the identification of gender in genus-group names and the formation of stems from family-group names. But it created a great confusion in cases, where the species have been transferred from one genus to others, more so belonging to altogether different family.

* RULES OF ZOOLOGICAL NOMENCLATURE: USE OF PARENTHESIS IN TAXONOMIC WORKS

USE OF PARENTHESIS IN TAXONOMIC WORK:

- The author's name is put in parenthesis, when the species is transferred from one genus to the other retaining its original author and date (Art.51.3). It is called new combination, for example, *Hemilea bipars* (Walker,1862) Hardy,1959. This means that Walker described the fruit fly species *bipars* originally in some other genus, but Hardy in 1959, transferred to its correct genus *Hemilea*.
- Thus the “**New combination**” is defined as the first post original combination of any generic name with a previously published species group name. It excludes rank changes of species –group names within any nominal genus, to which they have formally been referred.
- Smith and Perez Higarda (1986) suggested the term *onymorph* (Greek, *Onima*- name; *morphe*- form) for every unique name association for species and sub species.
- Thus any new association of species –groups names with each other or with any nominal genus is regarded as a new combinations.

* RULES OF ZOOLOGICAL NOMENCLATURE: USE OF SQUARE BRACKET AND PUNCTUATION MARKS IN TAXONOMIC WORKS

USE OF SQUARE BRACKET IN TAXONOMIC WORKS:

- The use of citation of author's name or the date in full (or part of it) in square brackets indicates that, the name has been taken from indirect source (or other than the original work). The use of square brackets denote the original anonymity. In citing synonyms, square brackets are also used to include statement of mis-identification.

USE OF PUNCTUATION MARKS IN TAXONOMIC WORKS:

- Comma is always used in between the author's name and the year (Art.22A.2.1) *e.g. Cranopygia bhallai Kapoor,1966*. There should not be any punctuation marks in between the name of the species and the name of the author. In the said example, Kapoor is the original author of the species. When other author in other literature make use of such already published names then, it is necessary to refer such subsequent user as of the name, they should be cited in a way, that should not give the impression that they are authors of junior names (*i.e.* junior homonyms or repetition of already published ones). The zoological Codes provide provisions for denoting such subsequent usage. They should be written after the original citation, but are separated from the latter by a colon or semicolon but never by a comma or full stop.
- No diacritic mark, apostrophe, dieresis, hyphen or ligature of the letter a and e (*ae*) should be used in a zoological name.
- A name (whether old or new) with any of such marks should be corrected by the deletion of the marks concerned and any resulting parts are to be united, excepting one specified use of the hyphen and except that, when in a German word, the umlaut sign is deleted from a vowel, the letter is to be inserted after the vowel *e.g.* the name *Terrae-novaeis* to be corrected to *terraenovae*, *d'urvillei* to *durvillei* and *n'unezi* to *nunezi*; but *mulleri* becomes *muelleri* and is not a homonym of *mulleri* (Art.32.5.2).
- If the first element of a compound species group name is a Latin letter to denote a character of the taxon, it is connected to the remainder of the name *e.g. c-album* (Art.32.5.2.4.3).

* **RULES OF ZOOLOGICAL NOMENCLATURE: USE OF NUMERICALS IN COMPOUND NAMES**

USE OF NUMERICALS IN COMPOUND NAMES :

- The use of numerical is also forbidden by the Code and if, a number of numerical adjective or adverb, forming a part of a compound name is discovered, it is to be written in full as a word and united with the remainder of the name *e.g. decimlineata* not 10-lineata (Art.32.5.2.7).

* RULES OF ZOOLOGICAL NOMENCLATURE: USE OF *IN*, *EX*, *SENSU STRICTO*, *SENSU LATO*, *NON OR NEC*, *PROPARTE* AND *PARTIM* IN TAXONOMIC WORKS

Use of *in*, *ex*, *sensu stricto*, *sensu lato*, *non or nec*, *proparte*, and *partim* in taxonomic works:

- The Latin preposition “*in*” is used to connect the names of two persons, the second of which was the editor (or the main author) of a work in which the first author was actually responsible for validity (making available a name) e.g. *Dacus indicus* Agarwal in Kapoor denotes that Agarwal was responsible for the publication of the name *D. indicus* in a work edited by Kapoor or otherwise written.
- The Latin preposition “*ex*” means ‘from’ or “according to”. It is used to connect the names of two persons, the first author of which, validly published a name, which was actually proposed (but not published) by the second author e.g. *Forcipula indica* Brindle *ex* Burr means that Brindle was responsible for the valid publication of the name *F. indica* originally proposed by Burr, which he himself never validly published. There is no necessity to denote the preposition ‘*in*’ or ‘*ex*’, but their citation helps others to know any extra details required by the readers.
- The Latin word ‘*sensu stricto*’ (s. s, *sens. str.*) denotes the use of the taxon in the strict sense i.e., of a taxon, in the sense of types of its name, or in the sense of its circumscription by its original describer, or in the sense of its nominal subordinate taxon, when two or more subordinate taxa are there in a taxon; or with the exclusion of the similar taxa sometimes united with it.
- When taxa, which includes all its subordinate taxa and/or other taxa, sometimes considered as distinct, the Latin word ‘*sensu lato*’ (s. l. *sens. lat.*), meaning in broad sense, is used. e.g. *Empis s. lat.* (Empidae, Diptera) means, that doubtful sub genera have been assigned to some species of the genus *Empis* in literature, which need to be broken into correct sub genera on world basis.
- The Latin word ‘*non*’ or ‘*nec*’ means not. They are used to denote the actual authority in nomenclature, e.g. *Forcipula indica* Brindle for *Forcipula pugnax* Burr (*nec* Kirby, 1891), means that Brindle described *indica* as new species for *pugnax* Burr (but not of Kirby, which remains a valid species). Such citation also arise due to misidentifications.
- The Latin word ‘*partim*’ or ‘*proparte*’ (p.p.) means that only a part of a taxon as circumscribed by previous author is being referred to by the writer e.g. *F. indica* new species Brindle for *F. pugnax* Burr (*nec* Kirby, 1891)
- “*Proparte*” or ‘*in part*’ means that part of the *pugnax* species of Burr (i.e. some specimens only) belongs to the new species *indica* erected by Brindle.
- The authority of taxon does not change, if the diagnostic characters or circumscription are altered. In case the author for bringing about such alterations in the taxon is to be mentioned; he should be mentioned after the original author in the following manner, with the use of the Latin word *partim*. *Taenia solium* Linnaeus *partim* Goeze, means that, Linnaeus is the original author, while Goeze made alterations in its circumscription.



RULES FOR ZOOLOGICAL NOMENCLATURE: PRIORITY IN TAXONOMIC WORKS

THE LAW OF PRIORITY IN TAXONOMIC WORKS:

- This is the principle that the correct formal scientific name for an animal taxon, the valid name, correct to use, is the oldest available name that applies to it. It is the most important principle—the fundamental guiding precept that preserves zoological nomenclature stability.
- It was first formulated in 1842 by a committee appointed by the British Association to consider the rules of zoological nomenclature. Hugh Edwin Strickland wrote the Committee's report.
- It means the valid names of a taxon is the oldest(taken from the date first published)available names with certain exception(name conserved by the Commission), *nomen oblitum* (forgotten name) and limitations associated with the change of rank
- The authority of name in the family, genus, or species –group names is not changed on its elevation or reduction in rank within the group. A species group name established for an animal but later found to be a hybrid (Art.17.2) is not a valid name even if, it has priority over all other available names, but it may enter into *homonymy*.

Example:

- Nunneley, 1837 established *Limax maculatus* (Gastropoda), Wiktor, 2001 classified it as a junior synonym of *Limax maximus* Linnaeus 1758 from Southern and Western Europe. *Limax maximus* was established first, so if Wiktor's, 2001 classification is accepted, *Limax maximus* takes precedence over *Limax maculatus* and must be used for the species.
- There are approximately 2-3 million cases of this kind for which this principle is applied in zoology.

* RULES FOR ZOOLOGICAL NOMENCLATURE; USE OF SUFFIXES- '*I*', '*ORUM*', '*AE*', '*ARUM*', '*ENSIS*' OR '*IENSIS*' IN TAXONOMIC WORKS

USE OF SUFFIXES- '*I*', '*ORUM*', '*AE*', '*ARUM*', '*ENSIS*' OR '*IENSIS*' IN TAXONOMIC WORKS'(ART. 31.1.2):

- These suffixes are used for species–group names formed from modern personal names. A species–group name, if a noun formed from a modern personal name, should usually end in-
 - (i) '*I*', if the personal name is that of a man *e.g.* *smithi* from Smith, *bhallai* from Bhalla; if the name is based on a Latin or Latinised name of a modern name, the nominative singular ending-'*us*' should be replaced by the genitive singular ending '*i*' *e.g.* *fabrici* from Fabricius; *aurivillii* from Aurivillius; if a name is based on a compound personal name preference should be given to the better known component, *e.g.* *bakaeri* from Bethune Baker.
 - (ii) '*orum*', if men or man (men) and woman (women) together *e.g.* *smithorum* from Smith.
 - (iii) '*ae*', if of a women *e.g.* *guptae* from Gupta.
 - (iv) '*arum*', if of women *e.g.* *smitharum* from Smith.
- Use of suffix "*ensis*" or "*iensis*" in taxonomic works.
- These are important suffixes used for species–group names based on a geographical name *e.g.* *ludhianensis* from Ludhiana; *begalorensis* from Bangalore; and *siciliensis* from Sicily.

* **SCIENTIFIC NAMES OF VARIOUS TAXA: LEGITIMATE AND *NOMEN NUDUM* OR DIFFERENT KINDS OF NAMES WITHOUT NOMENCLATORIAL STATUS**

- A name which is published according to the requirements made in article 8 to 12 of the Code is the “*available name*” or “*legitimate name*” or “*valid name*”.
- A name, which is just mentioned in any text or written on a label of an animal and does not contain description or does not satisfy the condition laid down by article 8-12, it is called a “*nomen nudum*” or “*naked name*” and has no status in nomenclature.
- In addition to these, the Code recognizes directly or by implications several other kinds of names. Pre-Linnaean names, that is, names published prior to January 1, 1758, have no status. Some of the allied names are often used in zoological nomenclature, Since most *nomina dubia* and other such names are potential threat to the validity of the universally accepted names, zoologists frequently apply to the commission to place such names on the official index of rejected names . Names to be excluded from the zoological nomenclature are specified in Art.1. Finally rejected names are published by the commission.
- Most of them may be included in the rejected list.
 1. *Nomen dubium*: It is an available name which can not be assigned to a definite taxon, owing to shortcomings in the original diagnosis or the type of materials and sufficient information.
 2. *Nomen oblitum*: Its Latin meaning is the “forgotten names” applied to a name after January,1, 2000, but unused since 1899.
 3. *Nomen novum* or **replacement name** : A new name; i.e., a name expressly proposed and published to replace an earlier name that can be used for some reason, in case it is junior homonym. Sometimes it is also called substitute name.
 4. *Nomen rejicundum*: Names which are listed as officially “rejected” are to be permanently rejected.



SCIENTIFIC NAMES OF VARIOUS TAXA; NOMEN NUDUM OR DIFFERENT KINDS OF NAMES WITHOUT NOMENCLATORIAL STATUS : CONTD..

5. ***Nomen conservadum***: A name, the use of which has been officially sanctioned in spite of its contravention of one or more provision of a Code. The procedure of giving sanction is called as conservation.
6. ***Nomen triviale***: An expression used by Linnaeus and others for specific names; applied by some authors in the same sense as *vernacular name*.
7. ***Nomen hybridum*** : It includes names of hybrids. Hybrids are normally individuals , not populations. Thus such names have no status in nomenclature.
8. ***Vernacular name***: the name of a taxon in any language other than the language of zoological nomenclature.
9. ***Preoccupied name***: one that is a junior homonym, a name already in use for another taxon with a different type.
10. ***Pre-Linnaean name*** : Names which are published prior to January 1, 1758. They have no status in zoological nomenclature.
11. ***Incertae cedis*** : Names of a taxon with uncertain taxonomic position.
12. ***Species inquirenda***: A doubtfully identified species, needing further investigation.



SCIENTIFIC NAMES OF VARIOUS TAXA: TAUTONYMY

Tautonyms:

- A tautonymy is a name of species or sub species in which the second or even third component of then name repeats the generic name *e.g. Apus apus apus*. The use of such name is also permitted by the Zoological Code (Art.18).

Absolute tautonymy (2 %):

Examples:

- Kobelt, 1871 established the gastropod genus-group name *Candidula* and included 23 species. Among these was *Glischrus candidula* Studer 1820. *Glischrus candidula* is type species fixed by absolute tautonymy (now *Candidula unifasciata*).
- Draparnaud, 1801 established the gastropod genus *Succinea* and included two species, *Succinea amphibia* Draparnaud 1801 and *Succinea oblonga* Draparnaud 1801. Among the synonyms of *S. amphibia*, Draparnaud listed a name *Helix succinea* Müller 1774. Synonyms do count here, so *Helix succinea* is type species by absolute tautonymy (now *Succinea putris*).
- Kobelt, 1904 established the gastropod subgenus *Iberus* (Balearica) and included 10 species. Among these was *Helix balearica* Rossmässler 1838, which Kobelt cited as *Iberus (Balearica) balearicus*. The ending *-us* is irrelevant here, *Helix balearica* is type species by absolute tautonymy (currently *Iberellus balearicus* or *Iberellus hispanicus*).
- *Euxinolauria* Lindholm, 1924 (Gastropoda: Lauriidae) was established as a new replacement name for *Caucasica* Caziot & Margier, 1909 (not *Caucasica* Boettger, 1877 (Gastropoda: Clausiliidae)). *Caucasica* Caziot & Margier, 1909 contained originally four species, among which was *Pupa caucasica* Pfeiffer, 1857. This is the type species for *Caucasica* Caziot & Margier, 1909 fixed by absolute tautonymy, and also for *Euxinolauria* (now *Euxinolauria caucasica*).

The following examples do not represent absolute tautonymy:

- *Scomber scombrus* Linnaeus, 1758 (Actinopterygii), *Babyrousa babyrussa* (Linnaeus, 1758) (Mammalia), *Suricata suricatta* (Schreber, 1776) (Mammalia), *Merlangius merlangus* (Linnaeus, 1758) (Actinopterygii), *Isabellaria isabellina* (Pfeiffer, 1842) (Gastropoda), *Rupestrella rupestris* (Philippi, 1836) (Gastropoda).



SCIENTIFIC NAMES OF VARIOUS TAXA: TAUTONYMY (CONTD..)

Linnaean tautonymy (0.3 %)

Example:

- Linnæus 1758 established *Castor* (Mammalia) and included two species, *Castor fiber* and *Castor moschatus*. Among the synonyms of *Castor fiber* was cited the one-word name *Castor* with references to six pre-Linnean works (Gesner 1598, Rondelet 1554, Jonston 1650, Dodart 1676, Ray 1693 and Aldrovandi 1649). *Castor fiber* Linnæus 1758 is type species fixed by Linnaean tautonymy (now *Castor fiber*).

Subsequent absolute tautonymy (only very few cases)

Examples:

- *Alosa Garsault*, 1764 (Actinopterygii) was established without included species. As first author, Cuvier, 1829 included two species *Clupea alosa* and *Clupea fincta*. Type species is *Clupea alosa* Linnæus 1758 by subsequent absolute tautonymy (now *Alosa alosa*).
- *Rupicapra Garsault*, 1764 (Mammalia) was established without included species. As first author, Blainville, 1816 included three species *Capra rupicapra* Linnæus, 1758, *Capra pudu*, and *Capra americana*. Type species is *Capra rupicapra* by subsequent absolute tautonymy (now *Rupicapra rupicapra*).

Subsequent Linnaean tautonymy:

- only theoretical, there might be no case.



SCIENTIFIC NAMES OF VARIOUS TAXA: SYNONYMY

SYNONYMY:

- Two or more names belonging to the same taxon is known as synonyms.. When there are a number of synonyms in a name, the selection of a proper name applicable to the taxon is done through the law of priority *i.e.* the oldest one is taken as the proper name.
- It is called as *Senior synonym*, while the rest are the *Junior synonyms* (Art.10.6, 11.6) and are placed as the synonyms below the accepted name of the taxon.
- Rate of synonyms differs from group to group. In some groups the observed rate of synonymy can exceed 50% (Gaston and Mound,1993)
- The term synonym is also used in reference to all occurrences of any name or set of names in the literature, or in the given segments for which synonyms do not provide the proper sense. To overcome this issue the term *Chresonymy* was put forwarded by Smith and Smith (1972), for name usage for secondary meaning of synonymy namely a summary of occurrences or usages of any given scientific names or set of names.
- The synonyms is of great significance, as it provides considerable amount of information available in the literature under one or more of these names. The presentation of synonyms is a key to information contained in the taxon.
- The synonymy is of two types-subjective synonymy and objective synonymy

SUBJECTIVE SYNONYMY:

- The **subjective synonyms** , also called as **taxonomic synonyms or heterotypic synonyms**, are those which are based upon different types, and remains synonyms as long as their respective types are considered to belong to the same taxon. Thus, this type of synonymy is not absolute. (Art.61.3.1). It may be indicated by mathematical sign of equality(=).

OBJECTIVE SYNONYMY:

- The **objective synonyms** , also called as **nomenclature synonyms or obligate synonyms or homolytic synonyms**, are those, which are based upon the same type. Such synonymies are always absolute. It may be indicated by the use of mathematical sign of congruence(\equiv) [Art. 61.3.2-4].



SCIENTIFIC NAMES OF VARIOUS TAXA: HOMONYMY

HOMONYMY:

- The names, which are spelt in an identical manner or in a manner so similar as to be considered identical under the provisions of the Code, but based on different types are called homonyms (Art.52-60).The zoological Code rules that if, two or more homonyms are found, only the oldest is used (**senior homonym**)(Art.52.2), while the rest, **junior homonyms** are excluded from use (Art.23.3.5, 23.9.25,39,55 and 60). This may occur when identical names based on different types are used as the same rank *e.g.* sub species in a species, species in a genus and so on. The family group names differing only in suffix, are also considered as homonyms
- The Code also rules that identical species–group names placed in different genera having identical names (homonymous)are not to be considered as homonyms *e.g.* *Noctua variagata* (insecta) and *Noctua variagata* (aves)
- The existence of two or more identical names based on different types is called homonymy.
- The law of homonymy rules that any name that is a junior homonym of an available name must be rejected and replaced. If the rejected homonyms are one or more available synonym(s), the oldest of these must be adopted as valid names, with its own authorship and date (Art.53.3).



SCIENTIFIC NAMES OF VARIOUS TAXA: HOMONYMY

LAW OF HOMONYMY:

- The Code also rules that two or more species –group names of the same origin and meaning and cited in the same nominal genus or collective groups are to be considered homonyms, if the only difference in spelling consists of any of the following (**Art58**):
 1. the use of ‘*ae*’, ‘*oe*’, or ‘*e*’ (e.g. *caeruleus*, *coeruleus*, *ceruleus*).
 2. the use of ‘*ei*’, ‘*I*’, or ‘*y*’ (e.g. *cheiropus*, *chiropus*, *chyropus*).
 3. the use of ‘*c*’ or ‘*k*’ (e.g. *microdon*, *mikrodon*).
 4. The aspiration or non aspiration of a consonant (e.g. *oxyrhynchus*, *oxyrynchus*).
 5. The presence or absence of ‘*c*’ before (e.g., *auctuimnalis*, *autumnalis*).
 6. The use of a ‘single’ or a ‘double consonant’ (e.g. *litoralis*, *littoralis*).
 7. The use of ‘*h*’ or ‘*ph*’ (e.g., *sulfureus*, *sulphureus*).
 8. the use of different ‘connecting vowels’ in compound words (e.g. *nigricintus*, *nigrocintus*).
 9. The transcription of the semi vowel as ‘*y*’, ‘*ei*’, ‘*ej*’, or ‘*ij*’.
 10. The termination of –*i* or –*ii* in a patronymic genitive (e.g., *smithi*, *smithii*).
 11. The suffix –*ensis*’ or –*iensis*’ in a geographical name (e.g., *timorensis*, *timoriensis*).
 12. Three pairs of names are treated as special cases, e.g., *saghalinensis* and *sakhalinensis*, *sibericus* and *sibiricus*, *tianschanicus* and *tianshanicus*, otherwise even one letter difference is sufficient to prevent homonymy e.g., *Raphidia londinensis* and *Raphidia londonensis* (derived from *Londinium* and London, words of the same origin and spelling) are not homonyms, such names so similar in orthography (based on a different type) likely to create confusion, are called **paranym**s.



SCIENTIFIC NAMES OF VARIOUS TAXA: HOMONYMY

KINDS OF HOMONYMY:

- Homonyms are basically of two kinds- Primary homonyms and Secondary homonyms.

PRIMARY HOMONYMS:

- Primary homonyms are those with the same genus and same species in their original combination. The difference between a primary junior homonym and a subsequent use of a name is undefined, but it is commonly accepted that if, the name referred to another species or form, and if, there is in addition no evidence the author knew that the name was previously used, it is considered as a junior homonym.

Examples:

- Drury (1773) established *Cerambyx maculatus* (Coleoptera) for a species from Jamaica. Fueblin (1775) established *Cerambyx maculatus* for a different species from Switzerland, and did not refer to Drury's name. Fueblin's name is a **junior primary homonym**.
- Scopoli (1763) established *Curculio fasciatus* (Coleoptera) for a species from Slovenia. Strøm (1768) established *Curculio fasciatus* for another species from Norway. De Geer (1775) established *Curculio fasciatus* for a 3rd species from Sweden. Müller (1776) established *Curculio fasciatus* for a 4th species from Denmark. Fourcroy (1785) established *Curculio fasciatus* for a 5th species from France. Olivier (1790) established *Curculio fasciatus* for a 6th species from France. Marsham (1802) established *Curculio fasciatus* for a 7th species from Britain. All these names had descriptions, that clarified that different species were meant, and that their authors did not know that the name had been established by a previous author.



SCIENTIFIC NAMES OF VARIOUS TAXA: SECONDARY HOMONYMY

SECONDARY HOMONYMS:

- Secondary homonyms can be produced if taxa with the same specific name but different original genus are later classified in the same genus (Art. 57.3, 59). A secondary synonym, is only a temporary state, it is only effective in this classification. If another classification is applied, the secondary homonymy may not be produced, and the involved name can be used again (Art. 59.1). A name does not become unavailable or unusable if, it was once in the course of history placed in such a genus, where it produced a secondary homonymy with another name. This is one of the rare cases where a zoological species does not have a stable specific name and a unique species-author-year combination, it can have two names at the same time.

Example:

- Nunneley (1837) established *Limax maculatus* (Gastropoda), Wiktor (2001) classified it as a junior synonym of *Limax (Limax) maximus Linnæus*, 1758 from Southern and Western Europe. Kaleniczenko, 1851 established *Krynickillus maculatus* for a different species from Ukraine. Wiktor, 2001 classified both *Limax maximus Linnæus*, 1758 and *Krynickillus maculatus Kaleniczenko*, 1851 in the genus *Limax*. This meant that *L. maculatus Nunneley*, 1837 and *K. maculatus Kaleniczenko*, 1851 were classified in the same genus, so both names were secondary homonyms in the genus *Limax*, and the younger name (from 1851) could not be used for the Ukrainian species. This made it necessary to look for the next younger available name that could be used for the Ukrainian species. This was *Limax ecarinatus Boettger*, 1881, a junior synonym of *K. maculatus Kaleniczenko*, 1851.
- For Wiktor (2001) and those authors who follow Wiktor's system, the name of the Ukrainian species must be *Limax ecarinatus Boettger*, 1881. For the others who classify *Limacus* as a separate genus, the name of the Ukrainian species must be *Limacus maculatus* (Kaleniczenko, 1851).
- So, the Ukrainian species can have two names, depending from its generic classification. *Limax ecarinatus*, & *Limacus maculatus*, the same species. Article 59.3 states that in exceptional cases, junior secondary homonyms replaced before 1961 by substitute names can become invalid, "...unless the substitute name is not in use," an exception of the exception. However, the ICZN Code does not give an example for such a case. It seems that this passage in the ICZN Code is widely ignored. It also does not define what the expression "is not in use" should mean.

Example:

- *Glischrus caelata Studer*, 1820 (Gastropoda) was once classified in the genus *Helix*, and became a junior secondary homonym of *Helix caelata [Vallot]*, 1801. Locard (1880) established a replacement name *Helix glypta*, which has very rarely been used. The species is now known as *Trochulus caelatus* (Studer, 1820), and Art. 59.3 is commonly ignored.



SCIENTIFIC NAMES OF VARIOUS TAXA: DOUBLE HOMONYMY

DOUBLE HOMONYMY :

- Double homonymy (genus and species) is no homonymy: if the genera are homonyms and belong to different animal groups, the same specific names can be used in both groups.

Examples:

- The name *Noctua Linnæus*, 1758 was established for a lepidopteran subgenus. In 1764 he established a *genus Noctua Linné*, 1764 for birds, ignoring that he had already used this name a few years ago in Lepidoptera. *Noctua Linné*, 1764 (Aves) is a junior homonym of *Noctua Linnæus*, 1758 (Lepidoptera).
- Garsault (1764) used *Noctua* for a bird and established a name *Noctua caprimulgus Garsault*, 1764 (Aves). Fabricius (1775) established a name *Noctua caprimulgus Fabricius*, 1775 (Lepidoptera), thus creating a double homonym. Double homonymy is no homonymy, both names are available.
- The same happened with *Noctua variegata Jung*, 1792 (Lepidoptera) and *Noctua variegata Quoy & Gaimard*, 1830 (Aves).
- For disambiguating one genus-group name from its homonym, it is important to cite author and year. Citing the author alone is often not sufficient.

Examples:

- *Echidna Forster*, 1777 (Actinopterygii), not *Echidna Cuvier*, 1797 (Mammalia)
- *Ansa Walker*, 1858 (Lepidoptera), not *Ansa Walker*, 1868 (Hemiptera)
- *Helix balcanica Kobelt*, 1876, not *Helix balcanica Kobelt*, 1903 (both Gastropoda)
- *Conus catenatus Sowerby*, 1850, not *Conus catenatus Sowerby*, 1875 (both Gastropoda)

* SCIENTIFIC NAMES OF VARIOUS TAXA: DOUBLE HOMONYMY

DOUBLE HOMONYMY (CONTD.):

- The name *Ansa* can only be used for a lepidopteran taxon. If that name cannot be used (for example because an older name established prior to 1858 takes precedence), this does not mean that the 1868 name can be used for a hemipteran genus. The only option to use the 1868 name for the hemipteran taxon is to get the 1858 name officially suppressed by the commission. In some cases, the same genus-group or species-group name was published in the same year by the same author. In these cases it is useful to cite the page where the name was established.
- *Amydona Walker*, 1855 (Lepidoptera: Limacodidae) (p. 1110), not *Amydona Walker*, 1855 (Lepidoptera: Lasiocampidae) (p. 1413)
- *Betousa Walker*, 1865 (Lepidoptera: Thyridae) (p. 1111), not *Betousa Walker*, 1865 (Lepidoptera: Noctuidae) (p. 1208).
- *Cicada variegata Fabricius*, 1775 (p. 684), not *Cicada variegata Fabricius*, 1775 (p. 686) (both Auchenorrhyncha).
- *Noctua marginata Fabricius*, 1775 (p. 597), not *Noctua marginata Fabricius*, 1775 (p. 610) (both Lepidoptera: Noctuidae).
- *Clausilia (Albinaria) oertzeni Boettger*, 1889 (p. 42), not *Clausilia (Albinaria) schuchi var. oertzeni Boettger*, 1889 (p. 52) (both Gastropoda: Clausiliidae).
- There are cases where two homonyms were established by the same author in the same year on the same page: *Zonites verticillus var. graeca Kobelt*, 1876 (Gastropoda) (p. 48), not *Zonites albanicus var. graeca Kobelt*, 1876 (p. 48).
- Animal, plant, and fungi nomenclature are entirely independent from each other. The most evident shortcoming of this situation (for their use in biodiversity informatics) is that the same generic name can be used simultaneously for animals and plants. For this kind of homonym the expression "hemihomonym" is sometimes used. Far more than 1000 such names are known.

Examples:

- The generic name *Dryas L.* (1753) represents a genus of magnoliophytan plants (family Rosaceae), and at the same time *Dryas Hübner*, 1807 is also a lepidopteran insect genus (family Nymphalidae).

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Other examples for sometimes well known plant names with zoological equivalents are *Aotus* (Fabaceae and Mammalia), *Arenaria* (Caryophyllaceae and Aves), *Betula* (Betulaceae and Hymenoptera), *Chloris* (Cactaceae and Aves), *Dugesia* (Asteraceae and Plathelminthes), *Erica* (Ericaceae and Araneae), *Hystrix* (Poaceae and Mammalia), *Iris* (Asparagales and Orthoptera), *Liparis* (Orchidaceae and Actinopterygii), *Phalaenopsis* (Asparagales and Aves), *Pinus* (Pinaceae and Mollusca), *Prunella* (Lamiaceae and Aves), *Ricinus* (Fabaceae and Acari), *Taxus* (Taxaceae and Mammalia), *Typha* (Typhaceae and Porifera), *Ulva* (Ulvophyceae and Lepidoptera), *Viola* (Violaceae and Lepidoptera).

For names above the family level, the principle of homonymy does not apply.

Examples:

Pulmonata is usually used for a very prominent group in Gastropoda, but the name is also (rarely) used for a group in Arachnida.

Reticulata is used as an order in Foraminifera, and as an undefined higher group in Ephemeroptera.

Homonyms occur relatively rarely in families (only if generic names are identical or very similar and adding an ending "-idae" produces identical results). Discovering such a homonymy usually produces the same problems as if, there were no rules: conflicts between entirely independent and unconnected groups of taxonomists working in different animal groups. Very often the Commission must be asked to take a decision.

Examples:

Bulimina (Foraminifera) and *Buliminus* (Gastropoda) give both Buliminidae, and both families were used since the 1880s. When the homonymy was discovered 110 years later in the 1990s, the younger (gastropod) taxon had to receive a new family name, and the commission needed was asked for a solution (Opinion 2018).

Claria (Rotifera) and *Clarias* (Actinopterygii) give both Clariidae, but only the actinopterygian fish name was used since 1845. Shortly after Clariidae had been proposed in Rotifera in 1990, the homonymy was discovered and the commission had to decide that the Rotiferan family had to be amended to Clariidae.



SCIENTIFIC NAMES OF VARIOUS TAXA; TYPIFICATION AND VARIOUS KINDS OF TYPES

TYPIFICATION, TYPE AND ITS KINDS & THEIR USES IN TAXONOMIC WORK :

TYPIFICATION:

- The designation of a nomenclature type is called “typification”. It is the means by which, the names are allocated to taxa. This method is the only way to determine objectively and unequivocally the correct application of names to various taxa.

TYPE:

- A “type” is a zoological object on which the original published description of a name is based . It is the objective basis to which a zoological name is permanently linked. In other words it is the nucleus of the taxon and foundation of its name.. Once designated, the type cannot be changed, not even by the original author except by the exercise of the plenary power of the Commission (Art.78) through their designation of a neotype (Art.75).A large number of authors have categorised various types of names differently.

A. **Fernald (1940)** listed 108 different types of names , grouped in three categories-

(i) Primary types : It includes- Allotype, Chierotype, holotype, Paratype etc.

(ii). Supplementary types: (-Neotype, Heautotype, Plesiotype etc.); are the described or figured specimens used by any author to supplement or correct knowledge of a previously defined species.

(iii). Icotypes: *e.g.* homeotype, sideotype, metatype and topotype), are typical specimens that have been used in published description or figures, but consists of materials which the authors have worked on or such as have been collected as the original locality.

B. **Blackwelder (1967)** grouped such names of the types into the following seven categories:

1. Primary types (*i.e.* the single nomenclatural type *e.g.* Holotype, Lactotype , Neotype)
2. Secondary types (*i.e.* the specimens from which the primary type must be selected, *e.g.*, Syntypes, Paralectotypes).
3. Tertiary types (*i.e.* other specimens originally set aside as of special taxonomic interest to supplement the primary type, *e.g.*, Paratype, Allotype.
4. Specimen as identified as of special origin, *e.g.*, Topotypes.
5. Specimens identified as to time or person of identification, *e.g.*, Metatype, Homotypes, or Homeotypes etc.
6. Specimens identified as to special treatment or use , *e.g.*, Plesiotypes, Hypotypes etc.
7. Replicas of type specimens, *e.g.*, Plastotypes.



SCIENTIFIC NAMES OF VARIOUS TAXA; TYPIFICATION AND VARIOUS KINDS OF TYPES

BRIEF DESCRIPTIONS OF DIFFERENT TYPES IN NOMENCLATURE:

1. **Allotype:** Muttkowski (1910) firstly coined this term. It is a specimen of the opposite sex to the type. It can be designated either at the time of typification or subsequently.
2. **Apotype:** A specimen, not the type, upon which a subsequent or supplementary description of figure is based; a hypotype ; a plesiotype.
3. **Autotype:** Any specimen identified by the describer as an illustration of his species and compared with the type; heautotype.
4. **Chiotype:** A type specimen upon which a manuscript name is based.
5. **Cotype:** Any one of all specimens present before the describer at the time the description is drawn (not including type and Alotype); a syntype; paratype ; an isotype. Cotype is now superseded and so not used (Rec.73E).
6. **Genoholotype:** The species on which a genus is founded whether unique or one of a series, specially named as generiotype by the author, essentially the same as genotype, it is not used now.
7. **Genolectotype:** The species of a series selected as the type of the genus in which the describer of the genus placed it subsequently to the description; it is also not used now.
8. **Genosyntype:** One of a series of species upon which a genus is founded, no one species is being mentioned as type; it is also not used now.
9. **Genritype:** The type of the name of a genus; a generotype.
10. **Genotype:** The species which is designated as a type species of a genus upon which, it is based. Recommendation 67A of the 1999 code (4th edition) does not allow its use in referring to the type of a genus as the term creates confusion with its counterparts in use in genetics. Only the use of the term the type species or strictly equivalent forming another language is permitted in referring to the type of a genus. “ Type-species of the nominal genus involves the user in the problem of, whether the type is a nominal species, or the name of the species, as well as in the parallel problem, whether the thing typified is a genus, a nominal genus, or the name of a genus.”



SCIENTIFIC NAMES OF VARIOUS TAXA: TYPIFICATION AND VARIOUS KINDS OF TYPES

BRIEF DESCRIPTIONS OF DIFFERENT TYPES IN NOMENCLATURE (CONTD.):

11. **Geotype:** A species from the type locality.
12. **Hapantotype:** One or more preparations of directly relaxed individuals representing different stages in the lifecycle together forming a name-bearing type in an extent species of Protistans, It is a series that must not be restricted by lectotype selection but if, a hapantotype is found to contain individuals of more than one species, components may be eliminated until it contains individuals of one species (Art.73.3).
13. **Haplotype:** A generic type by a single reference.
14. **Heautotype:** Same as that of autotype.
15. **Holotype:** The single specimen selected by the author of a species as its type; or only specimen known at the time of description; a true type (Art.73.1). According to Recommendation 73C, the holotype must be labelled containing the following data:
 - A. Size of the specimen,
 - B. Locality, date and other relevant data
 - C. Sex
 - D. Developmental stage or form
 - E. Name of the host species in case of a parasites
 - F. Name of the collector
 - G. Collection in which it is kept and any collection or register number assigned to it.
 - H. Altitude in meters for terrestrial species.
 - I. Depth in meters for marine species to know the depth in meters below sea level from where it was collected.
 - J. in case of fossil species , its geological age and stratigraphic position, if possible in meters above or below a well-established place.
16. **Homeotype or Homoeotype or Homotype:** A specimen compared by the type by a person other than a describer as determined by him as conspecific with the type.

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SCIENTIFIC NAMES OF VARIOUS TAXA: TYPIFICATION AND VARIOUS KINDS OF TYPES

BRIEF DESCRIPTIONS OF DIFFERENT TYPES IN NOMENCLATURE (CONTD.):

17. **Hypodigm:** All the specimens personally known to a taxonomist at the time of describing a new species (Simpson, 1961). It is not acceptable to the taxonomist.
18. **Hypotype:** Similar as Apotype.
19. **Ichnotaxon:** A taxon based on the fossilised work of an animal including trails, tracks and burrows, by an animal.
20. **Iceotype:** A typical specimen, which serves the purpose of identification but has not been used in literature.
21. **Ideotype:** A specimen named by the author after comparison with the type, but has not been from the type locality.
22. **Isosyntype:** A duplicate type of syntype, not cited in original description of the name.
23. **Isotype:** A duplicate of the type.
24. **Lectotype:** One of a series of Syntypes, which subsequent to the publication of the original description, is selected and designated through publications to serve as the type (Art.74). A lectotype should be designated only by a specialist. If the description of the species is clearly based on one of the syntypes or one of the syntype is properly illustrated, it should be named as lectotype. As far as possible, a lectotype should be chosen from syntypes, present in a public museum, preferably that museum having the largest number of syntypes or containing the collection on which, the original author of the species has worked or the one containing most of the types of that original author.
25. **Logotype:** A type by subsequent designation.
26. **Metatype:** A specimen compared by the author of a species with the type and determined by him as conspecific with it.
27. **Monotype:** A holotype based on a single specimen; when holotype is correctly designated, it is synonymous with it.
28. **Morphotype:** A selected specimen of a second or a later form of a dimorphic or polymorphic species; Its use is permitted only by International Code of Nomenclature of bacteria, but not by Zoological Code.
29. **Neoallotype:** An allotype (opposite sex of the type) described after the publication of the original description.



SCIENTIFIC NAMES OF VARIOUS TAXA: TYPIIFICATION AND VARIOUS KINDS OF TYPES

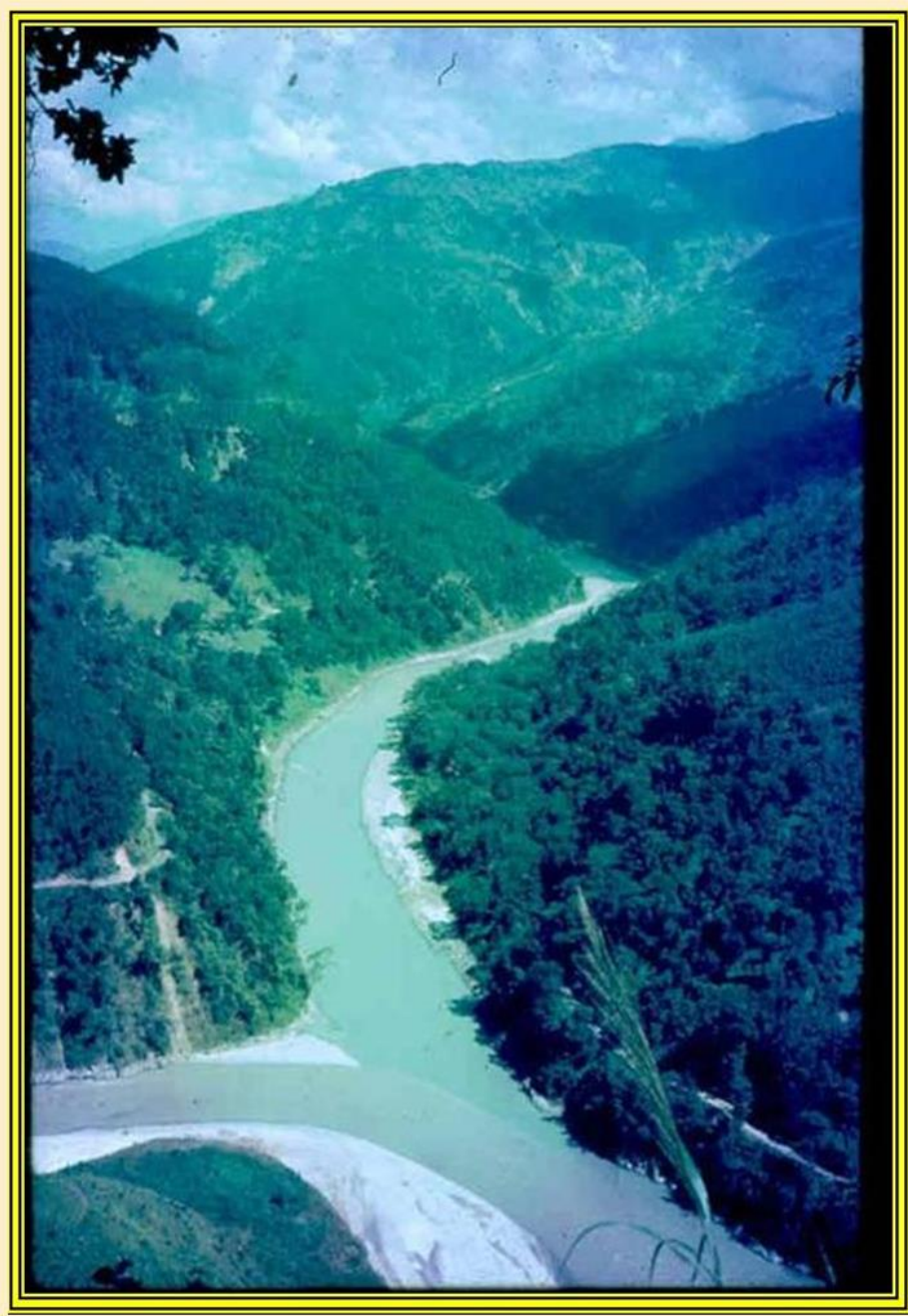
BRIEF DESCRIPTIONS OF DIFFERENT TYPES IN NOMENCLATURE (CONTD.):

- 30. Neotype:** A specimen designated or selected subsequently to serve as the type of a name when all the original type specimens are destroyed or missing or believed to be so (Art.75). Article 75 of the Code regulates the designation of the neotypes, when no holotype, lectotype or syntype exists either through loss or destruction. A neotype should be designated only in the revisionary work or under exceptional circumstances when neotype designation is necessary to solve complex zoological problems like- confused or doubtful identities of closely similar species for one or more for which, no holotype, lectotype or syntype exists. If a neotype is lost presumably another neotype can be selected under the conditions.
- 31. Neoparatype:** A paratype described after the publication of the original; description . This resulted when at the time of description of new species there was no specimen other than holotype.
- 32. Onomatophore:** A specimen on which the original name of the species is based; a “name bearer” as equivalent to holotype (Simpson,1961); it is also not acceptable to the taxonomists.
- 33. Omatype:** Similar to that of topotype.
- 34. Orthotype:** A type species of the genus by original designation. It is also not in use.
- 35. Paratype:** A specimen cited in the original description other than the holotype (Rec.73D).
- 36. Plastotype:** A plaster cast of a type ; used mainly on palaeontology.
- 37. Plesiotype:** A specimen upon which a subsequent or additional description or figure is based ; any specimen identified with described or named species by a person other than the describer.
- 38. Psedotype:** A type species of the genus by erroneous designation.
- 39. Topotype:** A specimen collected in the exact locality from where the original type was obtained It is very valuable, if it is a homoeotype and when the original type has been lost.
- 40. Type:** Same as holotype.
- 41. Typotype:** The type of type *e.g.* if the type of name studied by an author, is a description or illustration of previously published by an earlier author, then the specimen on which, the earlier author’s description or illustration was based, and which as such, the later author did not study, is the typotype of the later author’s name.
- 42. Voucher specimen:** Same as type; opposed as a replacement for type by Darlington(1971); It is actually non taxonomic and cannot replace type, as the former represents only those individuals used or reported in a respective project.



CONCLUSION

- Hence the interpretations of the Code of the International Code of Zoological Nomenclature (ICZN) virtually governs the entire rules and regulations of the nomenclature of various taxa viz. Specific names, sub specific names, various infra-specific names, gender or generic names, genus-group names, super family, family and sub family names, and various names of higher taxa above the family group rank.
- The rules in the code determine what names are valid for any taxon in the family group, genus group, and species group. It has additional (but more limited) provisions on names in higher ranks. The code recognizes no case law. Any dispute is decided first by applying the code directly, and not by reference to precedent.
- The code is also retroactive or retrospective, which means that previous editions of the code, or previous other rules and conventions have no force any more today and the nomenclatural acts published 'back in the old times' must be evaluated only under the present edition of the code.
- In cases of disputes concerning the interpretation, the usual procedure is to consult the French Code, lastly a case can be brought to the commission who has the right to publish a final decision.
- Hence the establishment of the code may be considered as the land mark in the history of taxonomy and is the mother of the generations of rules and regulations for a valid scientific nomenclature of animals..



THANK YOU