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Nomenclature and Nomenklatura. Taxonomy, Taxinomy or Systematics.

Pierre JOLIVET

67 Boulevard Soult, 75012 Paris. e-mail : timarcha@club-internet.fr

Summary.— Zoological and botanical nomenclature, formerly codified by Linnaeus, 250 years ago, are actually threatened by new proposals from various specialists influenced by cladistics and molecular biology. Several people even seriously proposed a barcode which has been tested mostly in ornithology and lepidopterology. Feasibility of such extravaganza seems questionable and it remains difficult to sort out the species, as food items in a supermarket, based only on DNA structure. Certain biologists, as Dan Janzen, were enthusiastic about those new possibilities, but it seems difficult to codify the part of DNA to be selected. To redescribe 1.700.000 Linnean species seems also a challenge and finally no one among those innovators has really seriously threatened the old classical system. The actual codes, as they are written, show discrepancies and often allow some flexibility in their interpretation.

Résumé.— Les fantaisies des règles de la nomenclature zoologique et botanique, pourtant codifiées autrefois par Linné, sont multiples et la flexibilité des codes est beaucoup plus importante qu'on ne le croit généralement. Il y a en plus la diversité des systèmes, car depuis la tour de Babel les humains n'ont jamais pu s'entendre sur quoi que ce soit. Des changements également sont intervenus après l'arrivée du cladisme, de la biologie moléculaire, de l'informatique et ceux-ci ont poussé certains à essayer de tout chambouler et même, dernière innovation on ne peut plus discutable, à préconiser l'usage d'un code barre basé sur le code génétique. On l'a surtout essayé, avec plus ou moins de bonheur, chez les oiseaux. Et pourtant ces multiples propositions pour tenter d'éradiquer le bon Linné n'ont que peu de chances de survivre après avoir passé au crible de l'usage.

Key words.— taxonomy, systematics, taxon, Linnaeus, barcode.

Discussion

Linnaeus showed us, almost 250 years ago, how to classify plants and animals. He created the concept of genus and species. That was a path breaking effort, which has guided the classification of organisms until today. But in the 21nd century many workers think they are more clever and add continuously new ideas about the classification of the living world, without an insight of the problems, involved in this field. No one knows, for instance, how many animals exist, only birds and mammals can be estimated rather accurately. We know that flowering plants reach nearly 250000 species, or slightly more : some favour 300.000 ! We have some rather precise ideas about the number of ferns or the horsetails, but who could give fairly accurate numbers of fungi, bacteria,

and insects ? How many viruses, how many mites, how many worms, or even how many fishes ? Around 1.700.000 living beings have been described. Estimations of the whole living world varies from 5 millions (E. O. Wilson) to 30 millions (Erwin) and even to 80 millions or even more (Stork). Cladistics (Hennig) have not improved that situation, even molecular biology ; in fact these approaches have often created some confusion. Several new ideas have been raised and the latest using a kind of bar code for classifying animals and plants the way we record the food items in supermarkets (MORITZ & CICERO, 2004 ; HEBERT *et al.*, 2004). A system using the genetic profile has been proposed. Even if it works in certain circumstances, we remain sceptical about its acceptance. Use of genetic profiles in criminology is all right. But using it in identifying and defining a species is not correct. While taking to this method the biological definition of a species is ignored. According to the biological definition a species is a gene pool, which is reproductively isolated from similar other pools. First Lucien Cuénot imagined the concept, last century. Ernst Mayr, who developed the biological species concept, has pointed out a weakness of the gene centred thinking (MIRSKY & ANGELO, 2004). It should be clearly realized that a gene is a part of the genotype, and the genotype acts as an integrated system in influencing the development of the phenotype. Too much emphasis on individual genes may be misleading in coming to taxonomic decisions. Several genes may be different in two different populations, but, even then, the reproductive compatibility between the two may be unaffected. In such a situation, on finding conspicuous molecular differences between the two populations, to infer that the two should be taken as distinct species, will not be a correct taxonomic verdict.

In a recent paper HARRIS & FROUFE (2004) have drawn attention to an anomalous situation, being created by the gene centred approach. On finding a considerable difference between DNA profiles of different populations of a species, the species is being split into two or more species. This is being done particularly in developed countries, USA and others, where DNA techniques are readily available, but in Africa and other developing areas, where the techniques are not in easy reach, this taxonomic practice is not in "vogue". This gene centred approach, which is being called the phylogenetic approach to the species concept, ignores the biological concept, which is based on the principle of reproductive compatibility and shared genotype. While this logical principle is being set aside, it is leading to an anomalous "growth" in taxonomy.

HEBERT *et al.* (loc. cit.) proposed that short DNA sequences from a standardized region of the genome provide a DNA barcode for identifying species, mainly for birds. As say MORITZ & CICERO (2004), initial reactions to the DNA bar coding concept have ranged from unbridled enthusiasm, especially from ecologists, like Dan Janzen, to outright condemnation largely from taxonomists. Will this bar code approach help in discovering the nature and origin of the existing biodiversity ? STOECKLE (2003) recently advocated the bar code, the **taxome** project, for conservation biology and understanding of evolution. Will it really help ? The feasibility of the bar code project lies on the choice of the gene. Actually no such unfailling gene has yet been found.

Some subtil people could have seen differences between taxonomy and systematics, but Ernst Mayr none. Some people differentiate alpha and beta taxonomy (KNUTSON, 1990). We really do not follow. The systematians, who created that enormous greek

barbarism, the word *taxon*, are not even in agreement if we must say *taxonomy* or *taxinomy*. Nowadays, people do not learn Greek and Latin, they want to appear erudite and they create all those absurdities because of plain ignorance. What do you think also that joke from an American, to propose *Nicrophorus* instead of *Necrophorus* (HERMAN, 1964)? Not only it is a plain absurdity, but also it is a barbarism. It does not exist in Greek, even in dialects, as pretended with nerve his author. It was just a plain mistake of the printer! Use of barbaric names from Latin or Greek is frequent (KERZHNER, 1982), mostly when the entomologists are ignorant of the subtilities of the extinct languages. Accord between the species and the genus is not always easy, but the botanists know for instance that tree names even having a masculine desinenca are really feminine: *Populus alba*! There are similar cases in entomology. Let us note that the families in zoology are terminated by *-idae*, and the plants by *-aceae*. Another discrepancy between the codes. Also, desinenca in *-odes* and *-oides* are masculine in zoology and feminine in botany (HIRASHIMA, 1985).

It is true that recent plant classifications using molecular biology and parsimony do not modify much the system (NYFFELER, 1999), but LITU system (PLEJEL & ROUSE, 2000) where a so called phylogenetic taxonomy prevails, changes everything. The authors advocate a pragmatic approach by considering species as provisional entities (JOLIVET, 2001). If adopted, discrepancies between the various codes (Entomology, Zoology, Botany, Palaeobotany, Bacteria, etc.) would increase tremendously. There are already discrepancies such as the maintaining in botany the former author name, after the one in brackets, when the genus name changes. It seems a good precaution. R. Ph Dollfus several years ago wanted the first (christian or non christian) name to be also maintained. He refused for instance during one month to publish a paper because he had not the first name of an author. He found it finally: it was Mohamed! Palaeobotany does not use latin for their diagnoses, when botany maintained it. Once, they were more languages accepted in entomology than in zoology. Now the laxism prevails and recently some entomologists described a butterfly in esperanto. Others in catalan.

There are no specific rules for the new Phylogeny Systematics of de QUEIROZ & GAUTHIER (1992). It would require a wholesale reorganization of the Linnean naming system. Clades would be individuals and therefore would be pointed at with proper names rather than diagnosed with synapomorphies. We still doubt about any change, since, for instance, numerical taxonomy, so much popular during the fifties in the USA, died a natural death. Linne, "one of the smartest scientists of any age" has still many years in front of him. His binomial system has foreseen, by simple observation of organic relationships, evolutionist ideas nearly hundred years before Darwin. Yes LTR (lateral gene transfer) may sometimes challenge Linnean logic namely among bacteria, but it is not the reason to turn upside down the whole system.

Now let us stay in the world of classical taxonomy, FAURE (1946), one day, pleaded for brevity and sanity in zoological nomenclature. He complained about names like some used for Crustacea: *Gammaracanthusskytodermogammarus* created by Dybowski in 1926. In the work mentioned above, they are 48 similar monstruosities. It is the longest combination and a Coleoptera Cerambycidae is called: *Brachita interrogationis interrogationis* var. *nigrohumeralisscutellohumeroconjuncta* Plavilsthikov, 1936 (THOMP-

SON, 1986). With *Carabus*, entomologists created their own code with varieties, aberrations (already in use elsewhere) and a speciality : *natio*, and many other stuff like strong and weak species or subspecies. An extra code should be made for carabidologists. On his side, Balazuc, tried in 1958 to review the entomological grammar and its faceties and strangeties. Some people dedicate species or genera to themselves, others sell the generic or species names on the market, like the stars in California, others play a real game and JOLIVET (1995, 1996, 1998) reviewed in detail all the jokes of that fantasy-land.

On political side, Maurice Pic who described in latin more than 25000 species, subspecies, varieties and “aberrations” liked much Maréchal Pétain during the war with the Germans in France and dedicated many species to him. They are many *Petaini*, *Brinoni* and *Lavali* in the list. The last two were shot after the war. He got trouble and lost his job of mayor of his village. The Chinese under Mao rejected names using the Japanese term Manchukuo and pretended that it was offensive (CHOU *et al.*, 1983). They invoked the “moral code”, but it is totally invalid. For instance, *Eodorcadion mandschukoense* (Breuning) is wrongly nullified and becomes : *Eodorcadion jilinrnse* Chiang, nom. nov. The Chinese propose 12 new names which are unacceptable. The same happens with the Turcs who recently, because of the negation of the Armenian genocide, have uniterally decided to debaptise the apricot tree, *Prunus armenicus*, and the goeland, *Larus armeniacus*. All those invalid decisions are childish. Of course there is an *Anophthalmus hitleri* Schreibel and several other similar and unfortunate creations. There are types, but in French we could consider them as “*pauvres types*”. Dedicated names to a country could be also considered as an offense when the country is debaptised. Upper Volta became Burkina Fasso several years ago and do we modify *voltaica* ? When Upper Volta became independent, a local scholar proposed that we replace the *photovoltaic* battery by *photoburkinabe* cell. Do we change also *rhodesiensis*, *cochinchinensis*, *siamensis*, and many more ? Recently some *Agathidium bushi*, *A. cheneyi* and *A. rumsfeldi* were created by Cornell University (Coleoptera : Leiodidae). Will the Iranians be rejecting them ?

We know that a plant in Palaeobotany, can be described with many names, based on the roots, the leaves, the flowers, the fruits, etc. In the case of *Bohumiljania caledonica*, a Chrysomelidae Eumolpinae, the type was lost but the wing is remaining in Brussels Museum. So it was recommended not to create a neotype (JOLIVET *et al.*, 2003). The wing is the type. We can also describe fossil insects from fragments. To use insect sounds in taxonomy seems a bit exaggerated, and it has never been done. The characters of the song however are specific and attracts females as specific light signals attract the males of Lampyrids. Only the sounds used to attract females are likely to be species-specific (REYNOLDS, 1988). They can be used as added characters as for birds and frogs. Recently (REMSSEN, 2005), it was shown that related, sympatric bird species have different voices. Vocal characters can vary clinally and this variation parallels a step-cline in plumage characters.

And they are also “quasispecies” (NOWAK, 1992). Theoretically it designs a “cluster of closely related molecular species produced by errors in self replication of macromolecules”. To Nowak, a quasispecies is a well-defined distribution of mutants that is ge-

nerated by a mutation-selection process. The term is used mostly in virology and it can design virus populations. And what about the “morphospecies” of the canopeists ? They are species detected but not properly named, often new. Biologists in the canopy design entities not identified and counted in their statistics. There are not enough taxonomists and the biologists are obliged to quote undetermined *taxons* or *taxa*, to use that horrible barbarism. The term is in Oxford scientific dictionary and now accepted universally.

Finally, the actual code is very flexible (Anonymous, International Code of Zoological Nomenclature, Fourth edition, 1999). They are many recommendations but also several tolerances. The nomenclatura in charge of the code does not want to hurt anybody and often listen to the traditionalists who want to keep the old habits. Do we say among the Chrysomelidae Lamprosominae or Lamprosomatinae ? PJ had a long quarrel with an Aussie about it. He was promoting the bid ending, PJ was keeping the small, as permitted because former use. He compared that to the quarrel in Swift's Gulliver's travels to Lilliput. Two populations in the story were in war because one wanted to open the eggs by the big end (the big endians) and the rest by the small end (the small endians). He outlined that the quarrel was at that level, but the code should be clear and not laxist. ROHDENDORF (1977) tried once in vain to rationalize the names of higher taxa in Zoology. The maintenance of the capital letter for the species names dedicated to persons, by René Jeannel, despite the unanimous rejection by the code, belongs to the same stubbornness. Courtisans in France and even in Belgium thought themselves compelled to follow. It lasted one generation.

In 1985, a systematic of systematists was published in Antenna (GRIEFF, 1985) and a taxonomy of taxonomists by GASTON & MAY (1992). Elsewhere, the duration of life of taxonomists and entomologists was calculated. It seems that generally they live a long time, necessary to accomplish their long work of descriptions. R. Ph. Dollfus used to say that he needed 300 years more to finish to identify his worms ! He did not get it ! Systematics are an essential part of biology (LANE, 1992), but is it really necessary to create a new taxonomy ? Some people contest the new systems and pretend that morphological data contradict molecular data (BITSCH *et al.*, 2004). Others disagree and defend the new ideas. Some incongruences between the systems, cladistic and taxonomic, have been sometimes detected (GRANT, 2003). We hope here that the Linnean code will persist many more years and centuries, eventually completed and improved by several modern techniques. We cannot rename 1.700.000 species ! Or is it the renaissance of Tower of Babel (MALLET & WILLMOTT, 2003) ?

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