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## COMMENTARY

### ‘INDFAUNA’ CATALOGUING : AN EMPIRICAL ASSESSMENT

C. RADHAKRISHNAN AND K. C. GOPI

*Western Ghats Field Research Station, Zoological Survey of India,  
Calicut-673 002, Kerala, India*

#### INTRODUCTION

Chavan, *et al.* (2004) in their General Article have made a point very categorically that the developing nations, such as India, having richer stock of biodiversity, have not paid a deserving attention to the concept of the electronic cataloguing of their known asset of biodiversity in the well-reasonably advanced era of bioinformatics. They have remarked on the imperatives for the developing nations to keep pace with the developed nations, joining with them, to become an integral part of the web portal system aimed at creating a validated unitary index system cataloguing the world's known organisms. In this context they have made a vibrant appeal calling for encouraging the country to undertake the electronic cataloguing (ECAT) of hitherto known biodiversity resources of India, and as well moved a step ahead initiating a web portal system, under the name 'IndFauna' (<http://www.ncbi.org.in/biota/fauna>), for cataloguing the complete identified and known fauna of the country.

The web portal system cataloguing the Indian Fauna created by them reveals that they have joined the league of biodiversity experts, a select band of leading biodiversity researchers and proponents arguing for developing the Catalogue of Life through an international consortium—a collaboration forged under alliance between Species 2000 ([www.sp.2000.org](http://www.sp.2000.org)) based in UK and Japan, and the Integrated Taxonomic Information System (ITIS) ([www.itis.usda.gov](http://www.itis.usda.gov)) based in USA, and also with other major bodies like All Species Foundation ([www.all-species.org](http://www.all-species.org)) and the Global Biodiversity Information Facility (GBIF) ([www.gbif.org](http://www.gbif.org)). The consortium aims to make a concerted effort to 'reinvent' taxonomy for the online generation, with the ambitious goal of creating a federation of databases that would collectively catalogue the world's biota (Gewin, 2002; Godfray, 2002).

ECAT IndFauna programme takes in its fold, arguably, all the available fauna described from the country so far, making it quite distinct from other efforts of electronic documentation of known Indian fauna, of certain groups or categories, many of the institutions in the country have been undertaking. It is claimed that the database processes initiated by Chavan, *et al.* (2004) have achieved the compilation of “more than 93% of the 90,000 known faunal species in India” assumingly rendered with a notion that the ECAT programme is progressing fast, very much in tune with the concept and content of the Global Biodiversity Information Facility (GBIF).

However, in the absence of a categorical expression about the scientific authenticity of the database entries, the claimed output of more than 93% of the catalogued Indian fauna does not imply that the indexed data comprise exclusively of the scientific names of the valid taxa alone. It appears that the ECAT has obviously or inevitably incorporated the pertinent synonyms of taxa also under valid scientific names. Once synonyms of taxa come in the picture, the indexed/compiled data-output is likely to be a bloated one with profusion of nomenclature, which may render confusion to a needy end user—not necessarily to a taxonomist—on the validity/status of the nomenclature. While making catalogue of species based on the updated review and revisionary taxonomic works over a period of time, there is little scope for synonyms standing for the sake of valid species, or minimal if imperative. In the case of ECAT of IndFauna, it is believed to have overshoot to more than 80% in certain taxonomic groups (Chandra, 2005). Thus, the claim of more than 93% of the known fauna of the country having been already incorporated in the ECAT IndFauna programme does not bear the onus of proof that it contains only the valid names of the hitherto known taxa.

While Chavan and party's endeavor needs to be appreciated, it as well seems to have the potential to generate certain genuine concern about the programme. A miscellany of ambiguities, some of them serious ones, noticed in the ECAT of IndFauna is illustrated here. In many valid scientific names of species recorded in the ECAT version, the binomial system of nomenclature depicting the species—the system that locks up a genus name to a specific name to represent the scientific name of a particular species under its authentic family/order, as per the principles of classification—has gone haywire, thus the actually indented species being depicted as mere abstract names, not valid to science.

Among the indexed species include the scientific names representing the genus/genera of a family/order binomially linked with the specific names unrelated to them, or found associated with some other genus/genera of a different family/order, absolutely unrelated to it. The webpage of the site [<http://www.ncbi.org.in/biota/fauna>—developed by the National Chemical Laboratory (NCL), Pune] listing the recorded species, claimed to be the scientific names, opened and examined as on 27-7-2005, enumerates the insect species belonging to the genus *Curculio* under the family Curculionidae (Coleoptera : Insecta), wrongly categorized as species under the

family Tephritidae (fruit flies) of the order Diptera (Insecta). *Curculio coimbatorensis*, for example, is placed under the family Tephritidae of the order Diptera, thus rendering it an absurd, abstract identity, differentiating itself neither as an insect species of the family either Curculionidae (Coleoptera) or Tephritidae (Diptera). An additional 9 more such 'species' of *Curculio* reflects under the family Tephritidae. Many such fanciful names, unknown to science, have crept into the electronically indexed system. In each case of such an anomalous depiction of a scientific name, there arises the possibility of emerging out a minimum count of two ambiguous species with transposed names of the genus/species.

We all know the common name *Jamun* means a plant, rather a tree, not an animal, in any way. A botanist identifies it with its scientific name *Syzygium cumini* (L.) Skeels (with the synonym *Eugenia jambolana* Lank). In any sensible taxonomic cataloguing system—whether textual or electronic version—one would expect the scientific name *Eugenia jambolana* in the category of plants only. One, especially a taxonomist, may feel very much perturbed to see this plant species insensibly treated as an animal species and included in the taxonomic hierarchy of ECAT IndFauna, rendering it an accepted status under the family Tephritidae (Diptera : Insecta). The particular ECAT web page shows, at the top, the status of the scientific name as accepted/valid, and, at the same time, with impunity makes a volte-face at the page-end, suggesting that no taxonomic scrutiny is done on the name. The content of this web page turns out to be an absolute, absurd paradox when one simply clicks open the Google images, given at the base of the page, to know further about *E. jambolana*, making him/her baffle to see a vivid display of the Jamun plant.

Among the Indian fauna, the group 'butterflies' among 'insects' has got a unique status. It is revealed that the alpha taxonomy of the Indian butterflies is almost absolute, very much like that of avifauna of the country. One well-known genus *Papilio* (Rhopalocera : Lepidoptera : Insecta) has only a diversity of 21 species so far reported or documented from the whole Indian Region (Wynter-Blyth, 1957) and the most recent estimate of the species diversity, of the whole family Papilionidae, comprising 10 genera, including the genus *Papilio*, realized from India is only 107 species (Kunte, 2000). It is beyond comprehension as to how ECAT database, with an avowed scientific prudence, was able to incorporate into itself with as many as 207 species of the genus *Papilio*, rendered with accepted/valid scientific names, in India. There is no point in projecting this error factor in percentages, here.

Yet another revealing example of error is that of a very common dragonfly species, *Orthetrum sabina sabina* (Drury) of the family Libellulidae (Odonata : Insecta), which is listed four times (twice in each of binomial and trinomial name codes) in the category of accepted/valid scientific names of taxa in IndFauna database.

This sort of flaw is not confined to the enumeration of valid taxa of insects or invertebrates alone; it permeates to the treatment of taxa of taxonomically well-documented vertebrate groups too.

Among the freshwater fishes of the genus *Garra* (Cyprinidae : Cypriniformes) known from India, the name *Garra jenkinsonianum* Hora no longer identifies itself with a valid taxon, but only as one among the synonyms, of the species with the currently valid scientific name *Garra mullya* (Sykes). It is rightly presented so in the ECAT web page, under the accepted/valid scientific name of the species *G. mullya* (listed with *G. jenkinsonianum* as a synonym of it). But, just trivializing the scientific merit of this entry, the *G. jenkinsonianum* again reflects as an accepted/valid scientific name, in the category of the scientific names of the valid species of the genus *Garra*.

It is very difficult to understand that this kind of a taxonomic database, with an array of scientific names of taxa in aberrant order (not in conformity with the principles of taxonomy and systematics), is a work-in-progress system that is dynamic. Chavan *et al.* (2005) have remarked that developing ECAT is an ongoing, 'work-in-progress' system that is dynamic in nature. It is true; nobody denies it. But, when an operational system of taxonomic work is said to be dynamic, what one would perceive about it? A straight talk seems to be very expedient in this regard to clear out confusion on certain aspects.

The subject Taxonomy/Systematics itself is a dynamic science, why because the focal base unit of taxonomy, the 'taxon' has come into existence on a hypothetical consideration, not based on an everlasting, sustainable fact. It is the existing knowledge base, extensive or shallow, available on a taxonomic group that a taxonomic expert makes use while observing an array of characters of a specimen(s), sifting them in a discernibly appropriate manner, prior to describing a new taxon. Its flexibility gets revealed when another taxonomist convincingly arrives at yet different conclusions, using till-dated knowledge, rendering it a changed status. The swinging status of a taxon from its genesis to become, later perhaps, a mere synonym or an obsolete, or even, sometimes, a resurrected entity—all processes an inevitable part of the task—is what makes the subject taxonomy a dynamic science. It is this dynamic progress of the status of taxon/taxa, and, in turn, of the taxonomic hierarchy that should get imbibed and translated into a taxonomic cataloguing system, as and when required, that eventually earns the claim an up-to-date, accurate and authentic database. A catalogue of scientific names of taxa depicted with transposed names of genera and species of unrelated taxonomic groups, somewhat symbolizing the binomial system of nomenclature, is not a part of, or an evidence of, a dynamic database work in taxonomy, but only a mere mockery of the same.

Now, with an online appeal, seemingly a turning-point claim has come out in the IndFauna web site, regarding the completion of the compilation of baseline information for over 90,000 known species. This ambitious effort was, according to the database makers, apparently in a self-congratulatory mode, the culmination of an intensive activity taking "20 man years spread over two and half years" Indeed a stupendous achievement, a feat that could not be achieved fully even by the systematists in the developed nations !

But, ironically, a notion of anticlimax to this claim is also closely following, that the 'IndFauna' has collated the basic taxonomic information from over 7,800 sources of scientific literature of the past 100 + years, and extracted also data from several online checklists, to make a "dirty list" of species—to use the cliché of the term the 'IndFauna' database makers applied—to be scientifically sieved again by the taxonomists themselves.

ECAT system greatly benefits end users and policy makers. But such an impression about the programme stems from the end users only when the available data in the system is at least reasonably accurate, irrespective of being whether old or up-to-date. The point is that the database information should never have inherent flaws, in contradiction with the known data of the available knowledge in scientific literature. However, the ECAT of IndFauna is packed with innumerable absurdities of information pertaining to the Indian fauna, perhaps, because of careless imputation of available data into the web system, smarted with unusual haste and quest for attaining the absolute completion of the compilation work. IndFauna system, on one hand, claims a credit or an attribute of scientific precision and authenticity to the system, and quite abruptly, on the other hand, disowns its credibility by not guaranteeing to be reasonably flawless, facilitating confusion of an end user to draw firm scientific information or conclusions from it. As regards the utility and dependability of the ECAT database work to end users, the database makers should have born in mind, with a forethought, one proverb : *'the proof of pudding is in its eating'*

IndFauna database makers wonder why a 'similar exercise' was not initiated before. There is enough euphemism implied in it, as veiled criticism, aimed at the country's premier institutions dealing with biodiversity research. The doubt is partly answered by certain just and bare facts—not mere 'arguments', so perceived by IndFauna makers—such as lack of resources, manpower and standardized procedures. Even then, the delusion on the part of ECAT makers needs to be cleared further. The taxonomists, rather the institutions, such as ZSI or BSI, and perhaps other biodiversity research bodies, know well about the nuances or subtleties of making a unitary, taxonomic cataloguing system—textual (off-line) or electronic (on-line)—linking mega-meta-taxonomic databases of dispersed information, strictly based on the international codes of zoological, botanical nomenclature. These institutions may not simply embark upon a short-term venture of that magnitude with the existing infirmities. Hence these institutions do keep a restraint on initiating such ambitious project, and, instead, run or take the risk of providing the biodiversity information on certain selected taxonomic categories or groups upon which they are at a premium, acquired with quality data of scientific precision and authenticity.

Yet again, taxonomists, very limited in number now-a-days, are preoccupied with their primary roles of describing/inventorying taxa and updating the information through periodic review/revisionary work of groups related to their taxonomic expertise. For them, it is a pre-assigned path since a major chunk of living things, remaining as unknown asset of our biodiversity, needs to be

explored, detected and described. Added to that, when more and more newly described taxa are integrated to the hypothesis-driven, dynamic science of taxonomy, it becomes too heavier a task for the small lot of taxonomists available in the country to handle and manage the unitary, indexing/cataloguing work, encompassing the whole known biodiversity. Besides, consensus among them is an imperative necessity, which plays a critical role imparting consistency and continuity to such a dynamic process of taxonomic work. It requires a collective, collaborated joined action of a larger network of taxonomic experts, reposed with trust and confidence among themselves.

A centralized unitary on-line catalogue of species, encompassing all-known taxa of the country, is not unachievable, but not so soon as sometimes wrongly perceived under some delusion. The documentation processes that are going on, independently, on selected taxonomic categories would certainly be transmuted to become a part of a functional continuum process towards the ultimate goal of a unitary biodiversity information system later, perhaps much sooner, once necessary support links are ensured to taxonomic research in the country. Otherwise, the 'similar exercise', of what ECAT IndFauna makers have done and achieved, could only gain or earn the claim and credit, nothing less than, of being a crass cataloguing work, comprising only supposedly authenticated 'dirty list' of species.

As members of taxonomic fraternity, we have cited certain ills/crucial flaws that beset the instantly accessible ECAT database of IndFauna. Our impressions upon the ECAT database are not just impulsive remarks or a mark of spiteful approach from taxonomists in general. The database makers should see the facts clearly and try to get rid of the errors/perils that have crept into the ECAT IndFauna work. The IndFauna makers take a stand that even the global ECATs like 'ITIS' is not free from the lapse of lacking a thorough scrutiny, which is in no way a justification for the flaws in their database, make up. It must be realized that those database banks seldom reflect the kind of errors and flaws as that found in the ECAT registry of names of IndFauna. More over, such flaws are out of context when the taxonomic hierarchy of species, with the valid/accepted scientific names, followed in ECAT IndFauna system, is claimed to have matched with the standards of ITIS, and as well referred to with International Code of Zoological Nomenclature.

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