

count water birds in Ban Ganga in December 2003, villagers of Idrispur (located 20-km from Laskar in Haridwar district) informed me about the presence of both these species in their area. This area is contiguous with the Hastinapur Wildlife Sanctuary of Muzaffar Nagar district in Uttar Pradesh, where a population of hog deer still exists. However, most of these swampy areas along Ban Ganga River have been encroached by farmers to cultivate sugarcane and I doubt the presence of a viable population of both these species in this area. In the past this entire area along river Ganga as well as along Ban Ganga River would have supported a good population of Swamp as well as hog deer. Today, the habitat is gone and the presence of a good population of both these deer species is a thing of past.

Sighting of these two hog deer in Bhimgoda barrage has led us to believe that a very small population of this species still continues to exist very close to Chilla. Adequate protection and enhanced connectivity in the islands located in river Ganga may help in building up this small population of hog deer that still continue to thrive in the Bhimgoda barrage. Chances of this small hog deer population spreading into the Mundal area appear to be remote. However, the way the Mundal grassland is recovering after the relocation of *gujjars*, release of few hog deer caught from the wild (may be from Corbett NP) is worth considering. Hog deer was definitely there in Rajaji NP in the past. It will certainly be a great achievement if we can bring this deer back into the area. The park authorities have already demonstrated their tremendous commitment to save the area by relocating the *gujjars* from the Chilla range. I am sure that with their sincere efforts, one-day hog deer will roam in

the Mundal *chaur*. With the hope of seeing hog deer in the Mundal *chaur* in near future all of us returned back to Dehradun in the evening.

### On the proliferation of species through degeneration of taxonomic thought

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The concept of species is one of the most debated issues in Biological sciences. This primal debate has been intense only among a small group of philosophers from the beginning in Aristotle's days. A small group called 'taxonomists' kept contributing to the world of knowledge that we have today on "species" or more fashionably put today as "biological diversity". Ironically, this group has always remained small even when we have seen rapid strides in our inventory of biological diversity. The title of this narration reveals the intent, we wish to highlight the sudden proliferation of species without a sound backing of the very concept of "species". We will discuss this based on some recent publication related to the amphibian diversity in Sri Lanka-Western Ghats global biodiversity hotspot.

There are several concepts and definitions available to describe a species. In recent days, the core areas of the species debate has focussed on species either as a group or a rank, or species as an Evolutionary Significant Unit (ESU), or the utilitarian value of a species, or species just as the terminal of tree or as a management unit. Mostly these debates are largely restricted to taxonomists and evolutionary biologists. The users of the concept, conservation biologists have rarely participated in these debates. As more sophistication in techniques and analyses became available, the debate has shifted towards

highlighting conservation importance. A recent report of identifying more than 140 new species of amphibians from Sri Lanka made the island nation an amphibian hotspot, thereby attracting large conservation grants. Wide use of Phylogenetic Species Concept (PSC) will have more impact on some taxa and some regions more than others, and comparisons of species lists will be now seriously undermined. Additionally, serious operational difficulties must be overcome before phylogeny can be used as an estimate of biological diversity or evolutionary history since accurate estimation of phylogeny has its own problems and pitfalls. In the light of recent findings, we would like to discuss on taxonomy and conservation of amphibians of South Asia. We do recognize the fact that the scope of this discussion is wide since many taxa of flora and fauna in the region have experienced this "boom in species". As informed biologists or field managers it is important to analyze and understand the implications of such findings. Our research team has recently communicated an analysis to the journal *Current Science* that is in press. Therefore, we draw our arguments from this publication to voice our concerns to a larger audience, beyond taxonomists or herpetologists or conservation biologists.

In the past three years, three major papers have been published in high impact journals like *Science*, *Nature* and *PNAS* addressing the taxonomy and phylogeny and biodiversity conservation issues. This clearly indicates a growing global concern towards resolving systematics and biogeography, highlighting the importance of endemic taxa in conservation. The taxonomy of amphibian fauna of the oriental region is extremely interesting to taxonomists

### X Finance Committee Meeting

X meeting of the Finance Committee was held on March 25, 2004 at Paryavaran Bhawan, New Delhi. Shri N.K. Joshi, Director General of Forests & Special Secretary, MoEF, Govt. of India chaired the meeting. In this meeting, issues regarding execution of departmental civil works, campus development works, annual accounts & understated assets, library account and audit of annual accounts for the year 2002-03 and some other issues were discussed. The committee examined the budget proposals placed before it. The information provided in the agenda notes was noted by the Committee. The Committee approved the budget estimate for ongoing and new research projects for the year 2004-05. The Director, WII was authorized to allocate the funds depending upon the research priorities of the Institute.

and evolutionary biologists due to its affinities with other biogeographic regions. But the taxonomy of oriental amphibians is incomplete when compared to other regions of the world. A typical example is found in 93 frog species of Nepal of which 50 were synonyms (one or two or more scientific names applied to the same taxon), which means over 54% of names assigned to species were redundant. This situation is prevalent more in South Asia where there has been a spur in recent discoveries of species. The reason for such confusion is because of erroneous descriptions without assigning types, few specimens examined, wrong diagnosis or publication without proper peer review. Based on the early works on the systematics of south Asian frogs, southern India had 35 species of the genus *Rana*. However, recent revisions have reallocated species to different genera endemic to southern India and now there is only one species belonging to the genus *Rana*. Ironically, this genus originally contained frogs that were heavily exploited for the 'frog leg trade' and thereby gained protection through the Indian Wildlife Protection Act 1972. The recent revisions have excluded such frogs from the ambit of this law. There is no doubt that such taxonomic twists will directly affect conservation initiatives and therefore the need to promote high quality research in taxonomy and update the end user is priority.

The first report of the discovery of around 200 new species from Sri Lanka was made in 1998, following which taxonomic and phylogenetic studies were initiated. This sensational news shot up the amphibian diversity in Sri Lanka from a mere 54 species to 254 species. Recently a research team reported more than 100 new species from Sri Lanka, while the data came from only 62 samples. It was even more surprising when a careful analysis revealed that the maximum number of new species that can be inferred from this data set could only be 29. There was no explanation offered in the scientific report to substantiate the claim of "discovering more than 100 species" when the data represents only a small fraction of this number. Since the description of several new species was the crux of this paper, we tried to understand how these new species were diagnosed. The authors

stated that they used (i) Morphological (ii) Ecological (iii) Bioacoustic and (iv) Molecular data for recognizing species. Finally, they had used only phylogenetic trees only based on the molecular data (12s and 16s segments of the mitochondrial DNA) to infer new species. There was no of how morphological, ecological, bioacoustic characters were used to identify species. An unequivocal method of combining ecological, bioacoustics and morphological data, which is not available presently, will prove to be a useful tool for the scientific community. The absence of such details in the paper, which the authors claim to have looked into, raises serious doubts on how they assigned the samples to different species. And if indeed these species were assigned, why have they not been described? Interestingly, the initial claim of about 200 undescribed species in 1998 in Sri Lanka has now come down to ca.120 in 2002, this might decrease even further when species descriptions eventually take place. Amphibians exemplify ambiguity in taxonomy, with a high level of conservatism in body plan with extreme within species variations. This leads to one of the two serious problem (i) to record more species than that exist, (ii) to recognize fewer species than that exist. Often, the errors accumulate from the use of different definitions for species and the absence of a standardized methodology. Clearly, morphological data are the primary basis for the recognition of species in the report. The authors used a list of 44 morphological characters. However, an analysis based on these morphological characters was not evident. A field herpetologist peering into these frogs can appreciate the need for such analyses better. We are sure that there will be similar requirements for many other fauna and flora. Unfortunately, there are not many variable morphological characters for the identification of frogs and there is a need for standardization of protocol for selection of characters and their use in taxonomy. A mere listing of morphological characters is not of much use for the field biologist. The claim of the authors that an endemic radiation of more than 100 species of tree frogs in Sri Lanka is not supported by their data. Instead, there are evidences to the contrary. The new species boom syndrome is not only confined to Sri

Lanka, it has extended into Western Ghats of India where around 115 undescribed species have been reported in an inconsequential publication. Such claims do not help either the scientific community or conservation policy makers. In fact, it reduces the credibility of scientific research in conservation in the region.

The analysis that prioritizes hotspots is driven by two criteria (i) endemism (ii) degree of the threats. While Sri Lanka and the Western Ghats may well have a large number of amphibian species (more than earlier described), the claim of Sri Lanka as an "amphibian hotspot" is rather preposterous. The fact that such publications are printed in high impact journals, and reported as important research new is of great concern since they will exert influence upon conservation policy makers and fund allocations. If one asks the question, why is there an emphasis to show high species richness? Clearly, one of the reasons is that funding is directed towards such areas. Recent programs such as the Critical Ecosystem Partnership Fund (CEPF), a joint initiative of major conservation funding agencies, are pumping millions of dollars into biodiversity hotspots such as Sri Lanka and the Western Ghats. The criterion for the identification of these hotspots is the species richness of IUCN 'Endangered' species. "Species proliferators" benefit in two ways: when an existing species is divided into two, it reduces the population and distribution of each one, and inflates the richness of the region (if both populations are found within the region). The benefits of showing or exaggerating species richness are manifested in research grants and major publications. For example, of the primates added to the list of threatened species, changed from 7 to 17 newly described species impacting their conservation status. Similarly, there has been 27% increase in threatened bird species across the globe after revisions in taxonomy.

Conservation today requires a method of measuring diversity that is consistent across taxa and allows accurate measurement of inter-specific variability without being influenced by inconsistent species concepts. The conservation of biodiversity may not be best served



(A) Binomial Nomenclature using PSC

(B) PhyloCode

**Phylogenetic Species Concept (PSC)**

It is the smallest aggregation of populations or lineages diagnosable by a unique combination of characters. Individuals are named following binomial nomenclature based on character similarities. Ranks in the tree are hierarchical. (<http://sevilleta.unm.edu/~lruedas/systmat.html>)

**PhyloCode**

The PhyloCode is a formal set of rules governing phylogenetic nomenclature. It is designed to name the parts of the "tree of life" with explicit reference to phylogeny. Any taxonomic rank above species is just a clade or branching supported by a node and there is no taxonomic hierarchy. It is a monomial nomenclature where there is no Genus, Family or Order and only Specific name is the identity of the population (<http://www.ohiou.edu/phylocode>)

**Example: Name of Human being in the Tree of Life****(A) Binomial nomenclature**

Kingdom : Animalia  
Phylum : Chordata  
SubPhylum : Vertebrata  
Super Class : Amniota  
Class : Mammalia

Sub Class : Eutheria  
Order : Primates  
Family : Anthropidea  
Sub Family : Homonidae  
Genus : *Homo*  
Species : *sapiens*

**(B) PhyloCode**

**Sapiens.** Homo, Hominidae, Anthropoidea, Primates, Mammalia, Mammaliomorpha, Vertebrata, Chordata, Bilateria, Metazoa, Animalia.

when conservation planning is centered around a single taxonomic level, especially one as contentious as the 'species'. Phylogenetic diversity is emerging as an important component in the measurement and assessment of biological diversity. Till such time when there is some consensus on methods used to describe new 'species' or 'evolutionary significant units', we recommend that conservation scientists and policy makers infer diversity from species lists with utmost caution, until full species descriptions following International Code for Zoological/ Botanical Nomenclature (ICZN/ ICBN) norms are made available.

The taxonomist today is one of the most endangered professionals in biology. Presently, biology teaches a student to tackle some of the most difficult conservation problems. But the exasperating efforts of taxonomists diligently examining specimens both live and preserved

and taking down notes and following the taxonomic protocols are discussed casually. The age of degeneration of the taxonomic thought has probably set in, due to unnecessary sophistication, its monotonous nature, and its inability to attract students. Today's naturalists have too many ready to use field guides or keys (often riddled with mistakes), avoiding inquiry into the concept of species.

Against all odds, contemporary work has thrown in many new methods and good ideas, but by and large the old school still holds fort. One such breakthrough is PhyloCode that has recently emerged as the most recent form of nomenclature of biological species. It was conceptualized in Harvard University in August 1998 and over the years it has been formalized and it is all set to take over the current scheme of Linnaean nomenclature. It has a formal set of rules governing phylogenetic nomenclature and it is designed to

name the parts of the tree of life by explicit reference to phylogeny. The PhyloCode will go into operation from July 2004. It is designed so that it may be used concurrently with the existing codes based on rank-based nomenclature (ICBN, ICZN, etc.). It is anticipated that many people whose research concerns phylogeny will find this scheme of nomenclature advantageous.

In order to stall the degeneration of taxonomic thought, we recommend that every biologist should take to taxonomy of any one taxon and pursue the interest in providing greater clarity to that group. A meaningful analysis useful to field biologists and conservationists, would evolve if each one of us attempted to find correspondence between molecular, morphological or other characters. Such an effort can ensure proper characterization for conservation of biodiversity. **For more information contact: [karthik@wii.gov.in](mailto:karthik@wii.gov.in)**