National mapping of science

A recent study, 'National mapping of science: A bibliometric assessment of India's scientific publications based on the science citation index (1990 and 1994)', by two New Delhi-based researchers A. Basu and P. S. Nagpaul from the National Institute of Science, Technology and Development Studies (NISTADS Report No. Rep 248/98) indicates that the Indian Institute of Science (IISc), Bangalore, is the leading centre of scientific research in India. This analysis is based on all papers from India indexed in the science citation index which in turn covers about 4000 journals including 12 from India. This study has been carried out under the National Programme on Scientometrics of the National Information System for Science and Technology, Department of Scientific and Industrial Research, New Delhi.

Specifically, amongst the top 20 institutes with the largest number of research papers in 12 fields of science in 1994, as sorted by cumulative impact, IISc tops the tally in half of these disciplines. These are: (i) Biomedical Research; (ii) Chemistry; (iii) Computers and Communication; (iv) Engineering; (v) Materials science; and (vi) Multidisciplines. Even in the rest, IISc figures prominently as second in the discipline of Physics, third in Biology, fifth in Mathematics and even 15th in Earth and Space science. The top ranking institutes in these four disciplines are Tata Institute of Fundamental Research (TIFR), Mumbai; Aligarh Muslim University, Aligarh; Indian Statistical Institute, Calcutta; and Physical Research Laboratory, Ahmedabad, respectively. In Clinical Medicine, the All India Institute of Medical Sciences (AIIMS), New Delhi, and in Agriculture, the Central Food Technological Research Institute, Mysore, occupy the top positions.

Based upon both output and impact with respect to average of top 50 institutions in 1994, this study also classifies these 50 institutions into four categories, viz. (i) High output – high impact (8 institutions); (ii) Small output – high impact (14); (iii) High output – low impact (8); and (iv) Low output – low impact (20). Here also, IISc tops the first category, the other 7 institutions being TIFR, Mumbai; National Chemical Laboratory, Pune; AIIMS, New Delhi; Indian Institute of Technology (IIT), Mumbai; IIT, Kanpur; Indian Association for the Cultivation of Science, Jadavpur and Hyderabad University, Hyderabad.

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Ichthyophis beddomei Peters, 1879 or *Ichthyophis tricolor* Annandale, 1909–?

A recent note entitled, '*Biswamoyopterus biswasi* (Saha, 1981) or *Ichthyophis tricolor* (Annandale, 1909)?' by Ajith Kumar[1] prompted us to write this article. According to Ajith Kumar (*op. cit*), 'field ecologists' expect the taxonomists to provide common name and scientific name to species in such a way that identification of the species that they encounter in field becomes easily possible based on the name assigned to it.

However, identifying a species correctly is not that easy and often it is not possible to do so depending only on its name even when assigned after special features. A typical case is that of *Ichthyophis tricolor* (Ichthyophiidae: Amphibia). This is not the only species of *Ichthyophis* which is tricoloured. *Ichthyophis beddomei* is also tricoloured. All striped forms of *Ichthyophis* were wrongly classified as *I. glutinosus* and unicolourous forms as *I. monochrous* in India[2]. In fact, these two forms never existed in India, and many references on literature of *I. glutinosus* in India refer wholly or in part to *I. beddomei*[3]. It is therefore possible that earlier authors have mistaken *I. beddomei* or *I. tricolor* for *I. glutinosus*, as pointed out by Dutta[4] and Bhatta[5].

The Ophidian (Reptilia) scenario is also not different. We have in India species such as *Uropeltis macrolepis* and *Trimeresurus macrolepis* besides *Argyrogena fasciolatus* and *Lycodon fasciatus*, all named after features. If one thinks that species can be readily distinguished by their name alone, particularly when assigned after special features, it would be difficult to differentiate *Lycodon fasciatus* from *L. striatus*.

Thus a common name or a scientific one with a feature of the species need not always correctly depict that species, and thereby facilitate a 'field ecologist' to understand the real identity of the species in the field itself. For example, a 'non-taxonomist' may wonder why the bird, common myna has been given the scientific name *Acridotheres tristis*, which literally means 'sad or meloncholy grasshopper hunter', quite contrary to its jubilant disposition. While one might fumble about the meaning of *tristis* as 'sad' or 'melancholy', trying thereby to relate its relevance with the bird, an ornithologist-cum-taxonomist takes the term's usage as dullness of colour and understands the bird as 'dull coloured grasshopper hunter'. Therefore, it is not just the name that matters as the guiding factor but the knowledge about the salient features as well, as drawn out in the description of the species and its distribution, while identifying a species.

The writer of the article under reference while arguing his case has considered only the vertebrates, the alpha-taxonomy of which are nearly complete, conveniently leaving out the vast majority of invertebrates, perhaps not known to him, that the taxonomists still continue to name after special features as well. The writer who finds difficulty in identifying a species in the field based on scientific names, highly appreciates the names given to species by local people. It appears that the writer is unaware that such names for species, except in the case of well-known higher vertebrates, do have only local value or existence and, in many cases, such 'local names' are very confusing as more than one or a few species are known to exist under a local (vernacular) name at many places. As such, not much significance is attached to the local names or common names in the taxonomic identification of the species as exemplified by the common names such as 'The common Indian crow' and 'striped tiger' for butterflies, better known to scientists as *Euploea core* and *Danaus genutia* respectively.

The 'field ecologists' have to realize that taxonomy is not just 'an art of naming the species' but rather it is a task of segregating a new taxon from the known taxa with its proof of efficiency being the aptness of the description in achieving this objective.

The view doubted by the writer that taxonomists are to, sometimes, please their bosses is also highly skewed. In fact, the taxonomist who describes a species enjoys much more liberty in coining the name of a species as he (not his boss) has to shoulder the onus of taxonomic authenticity and identity of the newly described species and, at times, it is respect or dedication to a person, not necessarily to one's boss, that is reflected while naming a species after a person.

To put it briefly, the arguments put forward by the writer have no *locus standi* in the scientific parlance of species naming in accordance with the principles of taxonomy.

1. Ajith Kumar, *Curr. Sci.*, 1998, **75**, 426–427.
2. Taylor, E. H., *J. Bombay Nat. Hist. Soc.*, 1961, **58**, 355–365.
3. Taylor, E. H., *The Caecilians of the World – A Taxonomic Review*, Kansas University Press, Lawrence, 1968.
4. Dutta, S. K., *Amphibians of India and Sri Lanka – Checklist and Bibliography*, Odyssey Publishing House, Bhubaneshwar, 1997.
5. Bhatta, G., *J. Biosci.*, 1998, **23**, 73–85.

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NEWS

First Indian observation of the optical transient of a gamma-ray burst

Gamma-ray bursts (GRBs) are short and intense flashes of cosmic high energy (~ 100 keV–1 MeV) photons. Since its discovery in late sixties, several dedicated satellites have been launched to observe the bursts and numerous theories were put forward to explain their origin. However, only after launching of the Italian–Dutch satellite BeppoSAX in mid 1996, has it been possible to obtain positions of GRBs with an accuracy better than 3–5 arcminutes within hours of occurrence. The follow-up observations of relatively long lasting afterglows in X-ray (few hours), optical (few days) and radio (few weeks) wavelengths have now therefore become routine. Such multi-wavelength observations have contributed significantly to our understanding of GRBs. All these leave little doubt now that some, and most likely all GRBs are cosmological. They release ~ 10^{51}–10^{54} ergs or more in a few seconds and thus are the most (electromagnetically) luminous objects in the Universe.

The first Indian observations of the optical transient of GRB 990123 were made at the Uttar Pradesh State Observatory, Manora Peak, Nainital on 23 January 1999, at UT 21:00 h, approximately 12 h after the trigger of the event. This type of successful observation has been carried out for the first time at an Indian observatory. The observations were carried out in Johnson B, V and Cousins R passbands using a 1024 × 1024 size CCD chip mounted at the f/13 Cassegrain focus of the 104 cm Sampurnanand telescope. The observations were being continued till the first week of February 1999 at the Observatory. The results of the first three nights of observations are given in Table 1.

These observations in combination with the published data have been used to derive light curves of the optical transient in B, V and R passbands which follow the following linear relations:

$$B(t) = (21.02 \pm 0.12) \pm (2.8489 \pm 0.17)\log(t),$$
$$V(t) = (20.44 \pm 0.18) + (2.8314 \pm 0.05)\log(t),$$
$$R(t) = (20.40 \pm 0.22) + (2.6487 \pm 0.13)\log(t),$$

where t is the time in units of days after the trigger of the gamma-ray event. The coefficients and their errors are obtained by fitting least square linear regressions to the observed magnitudes as a function of time. The flux decay of the optical transient is well characterized by a power law, $F(t) \propto t^{-\alpha}$, where F is the flux at time t and α is the decay constant. Allowing for the factor – 2.5 involved in converting the flux to magnitude scale, the values of α are 1.14 ± 0.07, 1.13 ± 0.02 and 1.06 ± 0.05 in the B, V and R passbands respectively. In the K passband, the decay constant has been found to be 1.14 ± 0.08 by Bloom *et al.* (GCN circular 240). Thus, we conclude that the flux decay constants are independent of wavelengths at least in the range of 0.4 to 2.5 micron. Such decay is quite consistent with the fireball models for the optical transient of GRBs.

Table 1. Results of the first three nights of observations of the optical transient of GRB 990123

Time in UT	Filter	Magnitude
January 99		
23.958	B	20.31 ± 0.08
24.000	R	19.61 ± 0.03
24.940	R	20.83 ± 0.05
24.987	B	21.71 ± 0.11
25.028	V	21.08 ± 0.15
25.940	R	21.34 ± 0.10
25.990	V	21.89 ± 0.10

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