

## The accuracy of floristic surveys and digitizing biodiversity

The significance and magnitude of cataloging life on earth can be assessed from the fact that only 1.5–1.8 million species have been given scientific names against 10 million or more species wanting description<sup>1</sup>. Documenting biodiversity therefore is the prime objective at global, national and regional levels. Floristic maps may serve to understand species distribution pattern along the range of complex environmental variables, and as such be of significance to predict their geographical relocation in response to climatic change. The relationship is likely to be stronger within smaller geographical boundaries where environmental variables are relatively uniform compared to larger areas experiencing greater climatic diversity. Information on regional flora, therefore, can be of great utility.

In relation to western Himalaya, two floras, viz. those of the Great Himalayan National Park (GHNP)<sup>2</sup> (31°38'28"–31°51'58"N and 77°20'11"–77°45'52"E) and of Kullu district<sup>3</sup> (31°25'–32°35'N and 76°9'–77°9'E) have recently been published within almost a year's span. The former represents about one-fifth (1171 km<sup>2</sup>) of the area explored under the latter study (5503 km<sup>2</sup>), covering an altitudinal range of 1344–6248 m and 1100–4300 m above msl, respectively. Since 50% of the geographical area of the former falls above 4000 m – an elevation range quite falling out of exploration site in the latter, the flora of GHNP may well be encompassing practically one-tenth of the area of that of Kullu district. Yet flora of GHNP

represents nearly ninety per cent of the total species listed in that of Kullu district. It is interesting to note that in mountain ecosystem, where high ridges create frequent geographical barriers, studies restricted to smaller representative areas, adequately representing the range of environmental and ecosystem variables, could be quite useful for short-duration assessment.

Further on, floristic information, such as dominant families in a region, can lead to several useful correlations, but can be grossly misleading for another reason. For example, in Kullu<sup>3</sup>, 64 grass species are reported in family Poaceae, and compared to a total of (only) 45 grasses reported from Kangra District. Now, would one expect species diversity, such as those of grasses, to decline in Kangra District (5739 km<sup>2</sup> area, comparable to that of Kullu district), which has greater altitudinal variability and annual precipitation at places exceeding 3000 mm (ref. 4)?

In fact, it may not be so. In a prior study, covering only an area of 10 km<sup>2</sup> radius (32°06'30"N and 76°33'36"E; altitude of 1290 m) in Kangra district, 73 grasses have been reported<sup>5</sup>. In yet another study<sup>6</sup>, within 1 km radius of this area, where annual rainfall exceeds 2600 mm, 66 grass species have been encountered. Species diversity, at least in grasses, therefore is understandably higher in Kangra District, contrary to the trend derived<sup>3</sup>. Thus an inadequacy of base information can generate gross error of correlation.

Since documented text constitutes the bulk of information source that is used

to digitize data for developing maps of species distribution, even such small errors could get extrapolated to larger dimensions. The error may persist for a longer time, because a published floristic study for a region would obviate the need as well as incentive to do so again.

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## Environmental fitness and statistics

Once again *Current Science* has acted as the Indian paladin of contemporary world science through its editorial 'Environmental wars' (2002, **82**, 373–374). I do not subscribe to 'Benjamin Disraeli's famous characterization of lies, damn lies and statistics'. I do not agree with the editor either when he says, 'But, in our own surroundings we

hardly need the crutch of statistics to come to conclusion about the effects of development on our environment'. Statistics is like a knife that surgeons use for life-saving surgery. Once in the hands of cynical elements, the same tool becomes a device for atomization of life. By putting statistics to selective use, Bjorn Lomborg has precisely done that.

There is no doubt regarding the statistics about the percentage of 'starving people' coming down from '38 per cent in 1970' to only '33 per cent in 1996' in sub-Saharan Africa. However, the interpretation of such statistics has always been a concern for those believing in long-term perspectives. In spite of the phenomenal growth in the population,

the average per capita food supplies of the world has increased by more than 20% between 1961 and 1994 (ref. 1). A number of factors, including pest control, genetic improvement, increase in irrigation, fertilizer use and the cropland, have contributed to these impressive increases in crop yields. It does not need extraordinary wisdom to realize that all of these factors have only limited sustainability. Once the limit is reached, counteracting environmental degrading factors would dominate the statistical data, making the agricultural production lag behind population growth. People like Lomborg are therefore advised to foresee the likelihood of reversal of the above statistical trends after a few decades from now.

Statistics of convenience is a handy tool for Lomborgians to project their viewpoint. Accessibility to annual renewable freshwater, which perhaps is a better indicator of the environmental soundness, is shrinking everyday. According to one report, per capita availability of freshwater in Africa is likely to go down from 5532 m<sup>3</sup> in 1990 to 2386 m<sup>3</sup> in 2025 (ref. 2). Dwindling world's freshwater pool, 69% of which is used by the agriculture sector alone<sup>3</sup>, and is a major contributor to crop yield, certainly does not suggest that 'the things are getting better'. Let the 'renowned statisticians' like Lomborg address this paradox and settle the issue to the satisfaction of those not falling in line with him.

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## Regret e-mails may appeal to employers

The letter by E. V. Divakara Sastry titled 'Desperately seeking a regret letter' (*Curr. Sci.*, 2002, **82**, 611) truly speaks for the millions of job aspirants and other candidates in India. While this may be an issue of workload, or staffing (= money) for the companies and universities, to the applicant it is the issue of uncertainty versus hope. I think, the suggestion of including a prepaid postcard with the application is a very good one. Let us hope that employers pick up the idea and implement it soon.

I wish to suggest further an option of either enclosing a prepaid postcard or providing an e-mail address. Since many of the cities have a large number of internet cafés, even those candidates who do not own computers can easily

access e-mail. Those who live in areas where access is difficult can enclose a postcard to get a response. This makes the job easier for the employers, as bulk e-mails are a lot easier to be handled with simple software like MS Office, which they are sure to have. One standard letter can be prepared and sent to any number of applicants by entering just 15 to 20 character long e-mail addresses. One does not have to employ a person to stamp hundreds of cards and mail them. It is also more cost-effective. Thus, more employers may start this trend. This could also be a step towards phasing in e-communication in the scientific job market in India, like in many other countries. Online advertisements, online application and online résumé banks will follow in time.

It is true that a regret letter is certainly not one I would be looking forward to when I apply for a job or course admission, but it would certainly tell me that the employer respects me as a fellow human being. Although disappointed at the outcome, I would form a better opinion about that organization over another that did not send a regret letter. So let us hope that employers who have not thought about this do so now.

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## Higher education in science: Roots of mediocrity

'It is not enough to be busy. What are you busy about?' – is the question, Henry David Thoreau.

P. Balaram's lament about the declining standards of Indian science (*Curr. Sci.*,

2002, **82**, 241–242) made interesting reading. It is indeed true that medicine and engineering grab the best brains, leaving basic sciences with second rate students. But there is yet another dimension to mediocrity in Indian science.

There is some truth in the old hackneyed saying, 'The Battle of Waterloo was won on the playfields of Eton'. Early education is critically important in developing the mind. Our failure rests on the style and content of the