OPINION

availability of toposheets of the restricted category. This has placed a major impediment to progress without serving the security needs. Even geological maps without physiographic details, pertaining to restricted areas, prepared by the Geological Survey of India need clearance from the Ministry of Defence prior to their publication. In many cases, latitudes and longitudes are deleted and in some cases even exclusion of scale for the map is suggested making a mockery of the geographical information system and reducing the utility of geological maps. This practice of restriction on such valid geological information has placed India in poor light among the comity of nations. Despite extensive cartographic, geodesic, geophysical and aerial coverage of India, there is an awful paucity of essential information made available to needy scientists, research workers and organizations within the country as to imperil the scientific progress of the country. The restriction on toposheets has deprived mountaineers, whose forerunners in the past prepared the most remarkable maps of inhospitable terrains, of the essential map information of the Himalayan regions.

Is restriction relevant

As scientists we have to examine whether this restriction of toposheets by the Ministry of Defence is justified and how relevant it is in the present scenario. Satellite photography has now revolutionized the mapping processes, and some of these satellites have very high resolution. India is planning to launch a satellite capable of providing resolution of 2.5 m in panchromatic band, and an American Company, EOSAT is launching one that would offer 1 m resolution. Thousands of satellites are encircling the earth and these can recognize roads, buildings, installations, water bodies, rail lines, telephone lines, trees, vegetation, nature of crops, berthing of ships, airports, rocks, soil, dams, and canals beside providing a variety of remote sensing data. All this information is accessible through foreign commercial remote sensing agencies. The range and depth of satellite observation with regard to the so-called security aspects is so enormous, that the information contained in the 1:50,000 scale toposheets pales into insignificance. Moreover the 1:250,000 scale toposheets restricted by SOI due to security consideration along the external borders and coastline areas, are available for sale in London. Thus restricting toposheets has not served any purpose, other than negative impact on the working of Indian scientists.

Remote sensing techniques have brought about a sea change in vital data gathering. Almost every country in the world has access to this data which is marketed commercially by private agencies in the developed world. Satellites are capable of gathering data over a wide area and the data so available will be more homogeneous in nature than that collected through several ground stations, and are also spatially continuous. The data collected from satellites are amenable to easier processing and computation. Further, modern instruments like geographic positioning system (GPS) provide accurate location of any area with the heights. Gravity and magnetic data obtained by satellites encircling the earth are easily available. In such a scenario the question arises as to what purpose the restriction on maps and other information has served.

Conclusion

In this age of explosion of technological advancement in gathering vital information pertaining to land and human activities related to the earth, and rapid dissemination of information through the Internet, the restrictions placed on toposheets and maps is ludicrous. We cannot reconcile to the rule of restriction on maps when electronic eyes from across space peer into everything on the surface of the earth. This restriction denies us our fundamental right to information, flouts the democratic principle of access to data collected at the cost of tax-payers' money and restricts our valid professional activity. Hence this has to be opposed.

Indian scientists should make it clear to those concerned that derestriction of toposheets and making available other land-related information to Indian citizens will not in any way compromise the security of the country. It is time that the entire scientific community raises its voice and gets this archaic restriction removed once for all before the advent of the next millennium and thereby earn the gratitude of all citizens.

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COMMENTARY

Journal impact factors for the individual scientist: An unnecessary evil

J. Gowrishankar

In the last several years, the entity 'journal impact factor' has begun to take on a larger than life dimension in the assessment of the quality of journals and also of the research output of nations, their constituent institutes and universities and departments, and even of individual scientists therein. So much so that I know of several scientists who base their decisions to send manuscripts to particular journals because of decimal differences in the impact factors between the different journals.

The impact factor is defined as the mean number of citations received in the current year by papers published in the journal in the preceding two years. I have recently come across two rather unrelated articles that discuss the relevance and value of the impact factor in assessment of research quality, which I wish to share with the readers.

The first is a laudatory review published in Nature of a book authored by J. M. W. Slack, 'Eggs and egg: an almost true story of life in the biology lab'. Unfortunately, I have not had the opportunity to read the book itself, but I quote from the review by Lawrence:

'Nowadays, as Slack points out, assessment of researchers is not by the content of the articles, not even by their titles, but just by the names of journals in which
they are published (sic). Slack picks the
top "fashion journals" in biology as *Cell, 
Nature* and *Science*, which have high
impact factors. Yet the impact factor is
determined not by the bulk of the papers
in the journal, but by a few heavily cited
ones. Thus, most of what the fashion
journals contain is actually the same sort
of thing the specialist journals carry but
rolled up to look a bit special. Slack's
[own] papers published in specialized
journals were just as good as those [he]
published in the fashion journals, both in
his opinion and as measured by the
citations they attracted'. Lawrence also
states that 'in a creative industry like
research, where real discoveries are always
ahead of their time, these measures [such
as the impact factor] are at best crude'.

The second article I wish to cite is a
commentary by Graham Walker, editor-in-chief of the *Journal of Bacteriology*
and I quote some excerpts: 'It is strik-
ingly obvious how biasing one's
editorial decisions to favor only
fast-moving areas of research . . . could
greatly increase a journal's impact factor
. . . [On the other hand,] we publish truly
the best papers in the field but do not
bias our decisions by considering the
perceived popularity of the topic . . . .
The enduring legacy of this editorial
tradition has been the publication of
important papers that continue to
generate citations for many years'. Walker then provides data which show
that: (i) approximately 2200 articles
published in *Journal of Bacteriology*
in 1995 and 1996 garnered 7700 citations
in 1997, for an impact factor of 3.5; (ii)
these 7700 citations represent only 17%
of the citations in 1997 to all papers
published in the journal, with the
remaining 83% (which one may call the
'forgotten citations') citing papers pub-
lished in 1994 and the years preceding;
and (iii) there were, respectively, around
2000 and 2400 citations in 1997 to the
900 papers published in 1988 and the
1000 in 1989, for an 'endurance impact
factor' (my own jargon) of 2.3. So then,
should we say that there are the hares as
well as the tortoises among the different
journals?

In our country, some scientometricists
and science administrators have gone one
step beyond the impact factor to employ
derivatives, such as average impact
factor per paper published (which in my
opinion is nonsensical), to compare the
research outputs of different institutions.
One wonders whether to such a science
establishment (as Lawrence puts it), 'the
real purpose of the endeavours becomes
forgotten and it devotes itself, not to
making the important measurable, but to
making the measurable important'.

488.
1–3.

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**SCIENTIFIC CORRESPONDENCE**

A potential biocontrol agent for pigeonpea cyst nematode
(*Heterodera cajani* Koshy)

Cyst nematodes are soil-borne plant
pathogens capable of causing destructive
plant diseases. These plant pathogens
produce survival structures called cysts
(Figure 1 a), which are actually dead
females. The females upon laying their
eggs gradually undergo morphological
changes and become protective cases for
the eggs. Cysts remain viable for many
years in the soil. Thus, once introduced
in a cultivable area, it is difficult to eradi-
cate them, the best example being that of
potato golden cyst nematode which since
it was spotted in the Nilgiris, Tamil Nadu
in 1961 (ref. 1) still remains a major
constraint to the cultivation of potatoes
1.

Pigeonpea cyst nematode, *Heterodera
cajani* was first reported on pigeonpea
(*Cajanus cajan* (L.) Mill.) from India in
1967 by Koshy and was earlier described
as *H. trifoliata*. Apart from pigeonpea, it
has a vast host range including many
other legumes, viz. greengram, black-
gram, moth bean, cowpea and an oilseed
crop sesamum. The second stage juven-
niles upon emergence from the eggs
infect the host plant root system through
their stylets. The root system initially
shows white females which upon death
become brown cysts containing eggs and
juveniles. The plant gradually loses its
vigour, grows poorly and yields less
depending upon the initial nematode
density. The yield reductions have been
reported to be up to as high as 80%
(ref. 4). The pathogen is fast becoming a
serious threat to pigeonpea.

The cysts are highly resistant to
pesticides and tolerate adverse edaphic
factors. With research efforts to get host
plant resistance remaining scarce, bio-
logical control techniques offer a good
option in the management strategy
against *H. cajani*. Biocontrol agents in
addition to being cheap and effective are
the safest in terms of environmental
considerations and warrant relatively less
technical skill for their application. Walia
*et al.*5 reported an actinomycete
*Pastoria penetrans* infecting second stage juven-
niles of *H. cajani*. *P. penetrans* is an
obligate parasite and is not cultivable on
synthetic growth media. Methods to mass
multiply *P. penetrans* have been fraught
with difficulties. Thus with the above
considerations in mind, a study was
undertaken to isolate native antagonistic
fungi from the field soils since natural
enemies will be effective in combating
this nematode. Earlier reports indicate
that egg parasitic fungi are more effective
against soybean cyst nematode6. Hence,
the study was confined to the isolation of
fungal endoparasites of cysts and eggs.

Field soils from Gulbarga district,
Karnataka, where pigeonpea monocropping
is practised were processed for cysts of
*H. cajani* as per the standard sieving and
decanting procedure of Cobb7. Cysts
were then surface sterilized with 1%
sodium hypochlorite solution and placed
on potato dextrose agar (PDA) medium
in petriplates aseptically. The plates were
incubated for three days at room
temperature and then observed for

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