



**Figure 1.** The correlation between *SCI* papers published in 2005 and the number of articles downloaded from Elsevier journals in 2005 for 38 CSIR Laboratories.

to one *SCI* publication. In some Labs, this figure approaches 1000. Figure 1 also shows that the correlation between downloads and papers is better for the BioChem Labs (0.95) than for the PhyEngg Labs (0.84). It is also seen from Figure 1 that the BioChem labs publish far more papers and download far more articles than the PhyEngg labs, showing that the research cultures are distinctly different.

This simple spreadsheet analysis was the subject of some discussion within the CSIR. One of the Directors pointed out that downloads and publications are directly proportional to the number of re-

search scholars in each lab. One word of caution is that correlations do not always mean causation.

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GANGAN PRATHAP

*CSIR Centre for Mathematical Modelling and Computer Simulation, Bangalore 560 037, India*  
e-mail: gp@cmmacs.ernet.in

## Training in biology and biotechnology teaching programmes

Of late, India is viewed as a destination for investment in biological sciences/biotechnology and the industry is witnessing investments in the form of foreign direct investments in biotechnology with a parallel growth in National Centers of Excellences. More venture capital companies are also surfacing that really need good, qualified trained manpower with hands-on-experiences in various state-of-the-art technologies. But, the question that still remains is whether we produce enough knowledgeable manpower to fill the gap. The Government policies have allowed liberal setting up of private colleges introducing new courses with fancy topics, new and renewed courses in existing educational institutions, etc. To vie with competition it has become a fashion for these institutes to claim placements offered by campus interviews and this goes to the extent of saying that there were 75–100% placements. But it is appalling to see the plight of those coming out of many institutes without jobs, who end up somewhere in some jobs other than biotechnology. Almost all institutions demand huge sums as tuition fees and other fees in various forms from the students. It is time to ponder whether the students are getting justice for the money they pay. The reality is that the educational system is influenced by various practices, viz. poor quality teaching, faculties who are underpaid, dilution in curriculum,

autonomy and deemed status which help institutions to offer better marks which transcribes into boasting transcripts. It should be the endeavour of such institutions to provide the best practical training to the students rather than spoon-feeding them. Most of the institutions follow the same pattern, viz. admit students, ask them to memorize and write the theory examinations, conduct a few practical classes and send the students for summer training programmes and project work outside the campus. Most of the institutes do not have good laboratories and if available, do not enjoy trained manpower to work in the laboratories. Almost all universities have the system of making the students compulsorily undergo a summer internship/project work during the tenure. Those institutions, running courses on microbiology, biochemistry, biotechnology, either science or engineering and lacking in-house laboratory facilities, prefer to send students out of the campus for exposure, ostensibly to minimize expenditure in their own laboratories. This, in one way, encourages the faculties of such colleges to act as pseudoguides. This is practised by most of the 'science and engineering colleges who send students for project work to other institutes', year after year. It is sad to see students running from institute to institute and industries with letters from their parent institutions to get some slots

for internship/project work. Most of the research institutes/industries running short of workforce, offer places and the students are guided by the scientists and sometimes a thesis/dissertation is written. This leaves a question as to whom the knowledge belongs to. In this exercise, the internal guide has nothing to do with the topic as the student is engaging himself/herself in the ongoing activities of the research institutes/industries where they are getting trained. While it is good that the student gets exposed to various areas of science, this process creates 'pseudoguides', who get certain rights. A comprehensive system needs to be worked out to change this, as India is moving towards intellectual property rights protection and vigorous patenting regime. For this, the concerned universities should (a) insist on the constituent colleges creating sufficient laboratory space allocated for conducting in-house research programmes or (b) scrap the project work from the curriculum or (c) practically insist that the credit be given to the research institutes/industries to which they are sent for such programmes. It is also wise to persuade these institutions to establish good laboratories and appoint qualified manpower to act as guides to conduct such scientific studies. The managements of those institutes should be encouraged to join hands with industries and research institutes for a larger understanding and

greater output in terms of collaborations at faculty–faculty, institute–institute/industry, faculty–institute/industry levels, which is also encouraged by Government-funding agencies, for efficient manpower utilization and to give a fair deal to the partnership, the curriculum as well as in intellectual property developed at various

levels. Mere signing of MOUs between participating institutions to boast that they have collaborations with such and such agencies will not help to solve this problem. A nationwide awareness programme on ‘scientific contributions’ will help to chalk out a path to facilitate scientists, students, colleges and universities

for effective contributions and prevent conflicts that may arise in future.

S. SESHADRI

*Shri AMM Murugappa Chettiar Research Centre, Taramani, Chennai 600 113, India*  
e-mail: tsvisesh@yahoo.co.in

## US patents on plant varieties and beyond?

With the invasion of ‘impact factor’ on the Indian science horizon we had a slogan ‘publish or perish’ in nineties that has gradually acquired a dominant role in decision-making in academic institutions and academies. However, in the commodity-based research institutions there is prominence of its new *avatar* ‘patent or perish’ in the new millennium, although the authorities seek to strive for a composite version ‘patent, publish and prosper’. True, the latter is complementarily pragmatic and deserves to be expeditiously realized into practice, but we in India could always find holes even in the best of the policies to serve our vested interest. With the declining standards in Indian science and increasing interest in patent regime, there has been a desperate urge among some scientists to go for patents in the absence of publications. In this context, the *Nature News*<sup>1</sup> that carried a story about racing for US patents for anything and everything seems quite timely and ‘thought’ for introspection. This is all the more pertinent when it comes to patenting plants and other natural wealth<sup>2</sup>.

Lately, there has been an increasing interest in IPR even in agricultural sciences<sup>3</sup> that have so far been serving the societal concerns. In addition to the other means of IPR protection of plant varieties, USPTO (US Patent and Trademark Office) is the only agency that grants patents on plant varieties. USPTO could be a powerful instrument in the hands of multinational companies developing GE crop varieties. However, a desire has been growing among the so-called ‘high profile’ Indian scientists associated with public-funded institutions to go for US patent on plants – as an easy means to inflate their biodata. This is mainly because

any plant variety/selected clone could be granted US patent when money for patent filing fee is easily available, and one can attach a ‘big’ US tag to his/her CV. There are several instances where the same team of scientists has gone on procuring series of US patents on plant varieties of the *same species* in succession without waiting to realize the economic benefits of the preceding variety. It is easier to obtain a patent in US than any other part of the world<sup>4</sup>.

As a person associated with plant genetics I feel deeply concerned, when we in India attempt to obtain US patent on plant varieties – especially vegetatively propagated ones – for which USPTO is an easy and only instrument as a patent granting authority. I am aware of many instances where a simple selection (better call it as collection?) of a non-conventional crop plant (say a traditional medicinal plant – there may be thousands of such species) for which no standard commercial cultivar could be registered, are granted US patent. With little effort, a clever scientist having public money available for patent fee just describes the characteristic identification features of a vegetatively propagated plant (clone), claims it as a first standard variety (because there is no existing variety ‘check’) and goes ahead for obtaining US patent, and the same is granted.

However, there could be serious apprehensions in venturing for US patents on plants of Indian origin vis-à-vis realizing commercial gains for which patenting is intended.

– Grant of US patent does not ensure that the plant could be introduced in USA for commercial cultivation

just on the wish of the licensee. There are very strict plant introduction and tough quarantine laws, and cultivation regulations in US. Therefore, there is no guarantee to realize commercial benefits even if the plant species patented is worth demanding in US.

- An obligate asexual species of Indian/alien origin having seed forming capacity holds the potential to become invasive in US, thus inviting litigation from US Environment Protection Agency.
- Transfer of plant material of Indian origin to US under US patent license may overlap/clash, with the provisions of CBD for which India is a signatory (but not USA), and with our own plant variety protection measures.
- There may not be many takers in US for cultivation of a non-conventional plant of alien/Indian origin – then why waste huge amount of public money on obtaining US patent and maintenance fee, without any feasibility study on its prospective demand in US?
- For some region-specific species having high international demand including in US, we should prefer to restrict their cultivation within or territorial confines and venture for value addition to facilitate export potential. For example there are many region-specific high value species in Latin America, e.g. Brazilian plant *Pilocarpus jaborandi* (a rich source of pilocarpine, the only effective remedy for glaucoma – having no substitute in modern medicine) that remains virtually under captive cultivation in its native land.

As such, there are reasons to apprehend that under the garb of ‘US patent tag’