Comparative evaluation of research in IISc, IITs, NUS and NTU using CWTS Leiden Ranking 2017 data

Earlier in these pages we have shown that the research performance of the Indian Institutes of Technology (IITs) in engineering using Web of Science (WoS) and Scopus bibliometric databases has not kept pace with that of the more developed countries in the world. Two premier Singapore institutions, namely the National University of Singapore (NUS) and Nanyang Technological University (NTU) outperform all the seven premier IITs taken together. Later, a three-dimensional framework in terms of size, excellence and diversity of the research base of the premier institutes in India and Singapore confirmed that a cluster comprising Indian Institute of Science (IISc) and the seven IITs at Kharagpur, Kanpur, Delhi, Chennai, Mumbai, Roorkee and Guwahati (which we collectively call IISc + 7 IITs) was handsomely outperformed by Singapore, again represented by NUS and NTU.

The Centre for Science and Technology Studies (CWTS) Leiden Ranking 2017 which has just been released offers key bibliometric data which allow comparative evaluation of the scientific performance of over 900 major universities worldwide. Now there are 20 institutions from India (of which the IISc + 7 IITs cluster finds place individually in the top 13 ranks). This will mean that 2.2% of the top higher education institutions (HEIs) in the world are based in India; less than the country’s share of the nominal world GDP (approximately 3.2%). NUS and NTU are the only institutions from Singapore that make the cut. We use these data to review how the Indian cluster compares with the Singaporean HEIs.

We follow the same methodology that was reported earlier in these pages. CWTS Leiden Ranking 2017 (http://www.leidenranking.com) is based exclusively on the WoS database (Clarivate Analytics, Philadelphia, USA) and covers 902 universities from 54 different countries. All universities worldwide with more than 1000 fractionally counted, WoS-indexed core publications in the period 2012–15 are included in the ranking.

In a typical assessment window (say, 2012–15), an institution will have published a total number of papers or articles, $P$ (fractionally counted), and received a total number of citations, $C$. $P$ can be taken as the indicator or proxy measure for the size of the unit and $C$ is the total impact of its published research respectively. Over the years, CWTS has found that the proportion of top 10%
The genus Impatiens L. (Balsaminaceae) consists of about 210 species in India1 with 106 species (and 13 varieties) in the Western Ghats2. Impatiens with over 95% of the species endemic in the Western Ghats, forms one of the primary centres of diversity in India. Recently, several new species from the Western Ghats, viz. Impatiens minae1, I. johnsi-ana2, I. thewekaufiana3, I. courtallensis4, I. sassyadrica2, I. neo-modesta2, I. sasidharanii and a variety hirsuta6, I. glabra4, I. kavtyana, I. taimshukunhi, I. nilgirica var. nawaiyana5, I. stoloni-era5, and I. mankulamensis and I. pandurangani45 have been discovered.

During the floristic explorations by the authors in Talewadi, Bhimad Wildlife Sanctuary, Belagavi district, Karnataka, during September 2014, an interesting species of Impatiens belonging to the Section: ‘Annuae’ was collected, which is found to be new to science, and the same is described here.

**Taxonomy.** Impatiens bhimgadensis Bhaskar & Sringseswara sp. nov.

*Impatiens bhimgadensis* is distinct from its closely allied *I. rupicola* Hook. f. and *I. ramossi sina* Dalzell in having 3–4 mm long, straight and tapering spur in the lip. Type: India, Karnataka, Belagavi district, Talewadi, Bhimad Wild-life Sanctuary, alt. 800 m 20.09.2014, V. Bhaskar & A.N. Sringseswara 934 (holo, UASB!) (Figure 1).

Erect glabrous flaccid herbs, up to c. 50 cm high, often rooted at lower nodes; stems highly branched from the middle, terete, often with a vertical groove, glabrous, translucent, vertically spotted with red hydropetan cells, lower internodes 4–6 cm long. Leaves opposite–decussate, extipulate, sessile or with c. 2 mm long petiole, lamina ovate, lanceolate, c. 3 × 1.4–1.5 cm, round or slightly cordate at base, obtuse or acute at apex, serrate, each serrature denticulate, upper leaves broaden at base, auricled, sparsely hairy on veins above, hairs upwardly erect, glabrous below, eglandular. Flower axillary, solitary, 1–1.25 cm across, pinkish or bluish, with a pair of purple streak on the inner sides of wing petals continuing with perpendiccular honey guides of the same colour, pedicels erect, 3–3.5 cm long in flower and deflexed and c. 4 cm in fruit, erect in flower, deflexed in fruit, minutely pubescent with two lines of hairs. Lateral sepals two, linear, acute, almost as long as standard, smaller than wings, c. 5 × 0.75 mm, glabrous, pale pink. Lip funnel-shaped, mouth c. 5 mm long, distal end acute or acuminate, proximal part three-nerved, a small yellow ‘eye’ present inside, purplish honey guides visible outside and inside, generally light pink, usually glabrous, rarely with a few scattered hairs, base narrowed down to a short spur, 3–3.4 mm, straight, tapering, tip acute, white or pale green. Standard orbicular, c. 5 × 4 mm, slightly recurved, dorsally keeled, with a prominently enlarged pointed crest at base, crest c. 1.25 × 2 mm, sub-acute, anterior tip mucronate or apiculate, mucro and crest placed at same height, pink, usually glabrous or rarely hirtellous on the keel above. Wing petals two-lobed, distal lobe large, c. 1 cm long from base, broader lobe rhomboidal, c. 8.75 × 6.25 mm, pale pink or bluish, stipe c. 2 mm long, basal lobe small, fin-like, c. 3.75 mm long, distal part broad with two acute opposite ends.