Do medical students prefer e-learning to reading printed textbooks?

In the last decade rapid advances have occurred in computer technology. Medical educators understand the need to produce graduates who are tech savvy and able to handle computers, constantly update their knowledge and search for information through the electronic media and effectively relate to a growing number of patients armed with up-to-date information now readily available to them at the click of a mouse. Moreover, computers have entered the medical field as well and medical students these days understand the importance of information technology[1]. Keeping these factors in view, since 2006 Manipal University has been providing medical students with laptops and free access to internet at the time of their admission.

We wanted to study whether the first-year medical students, when provided with all e-learning facilities, prefer it to reading textbooks. This was a questionnaire study involving first-year medical students of the 2010–2011 batch at the end of their first year of course. These students were provided with laptops with 24 h internet facility in the college as well as in the hostel. They also had the facility of intranet system, where e-learning modules of all branches of medicine are readily available to them. Questionnaires were distributed to 140 students randomly, who were all residing in the hostel, which included both boys and girls. The purpose of the study was explained to them and their consent was taken. Students were asked the following questions.

- Did you have previous knowledge of computers?
- Do you use internet or textbooks for gathering additional information about subjects?
- Do you access and use e-modules of learning available on intranet?
- Do you download diagrams, charts or tables to help in your learning?
- Do you visit the library less often now that you have access to internet and intranet in your hostel room?
- Are you reading less from textbooks now that you have internet access?
- Do you think you have benefited in your first year subjects because of computer and internet?

Among the 140 participants, 126 (90%) completed and returned the questionnaire. When asked to rate their previous knowledge of computers, 124 (98.4%) participants rated themselves above average and 2 (1.6%) as poor.

Almost 47% of participants used internet for gathering information and 44% downloaded and used diagrams from internet and intranet sources. A study among dental students in Iran showed that 47.9% accessed clinical photographs[2], 58% visited the library less and 48% admitted to reading less from textbooks. A similar decrease of task-related use of textbooks was reported by Rajab and Bagain[3]. Studies in Jordan[4] and in South India[5] show that where students had access to information technology at home only, they used it more for non-academic activities like e-mailing and playing games.

The present study shows that students have not altogether stopped reading basic textbooks, though the internet seems to be the preferred means of increasing their knowledge. It also shows that when provided with all facilities, first-year medical students are competent and confident enough in using information technology.

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Disjunct distributional record of an endemic liverwort *Chiloscyphus campanulatus* Steph. from Assam in Indo-Burma biodiversity hotspot

The northeastern region of India, being a part of the Indo-Burma biodiversity hotspot[1], serves as a cradle for diverse flora and fauna of the country. Due to its tropical humid climate, varied topography and geographical isolation, it has been one of the richest biodiversity centres of India with virgin, sole forests. The physiographic and climatic conditions have also contributed towards rich bryofloral diversity and its endemism. The area falls under the Eastern Himalayan bryogeographical region[2]. During an exploration through the hilly terrains and sprawling hillocks of the region, one interesting population of the genus *Chiloscyphus* Corda (Geocalycaceae) was collected by us from southern Assam at an altitude of ca 40 m. Critical morpho-taxonomic study and perusal of the literature[3,4] revealed it as *Chiloscyphus campanulatus* Steph.

C. campanulatus is a species endemic to India and hitherto known from the Western Himalaya[3–6]. Hence, the present study reports a disjunct distribution of the taxon from southern Assam in the Indo-Burma biodiversity hotspot as well as range extension of the species up to the Eastern Himalayan bryogeographical region (Figure 1). There is no report on the occurrence of this species in any place between these two regions. Thus,

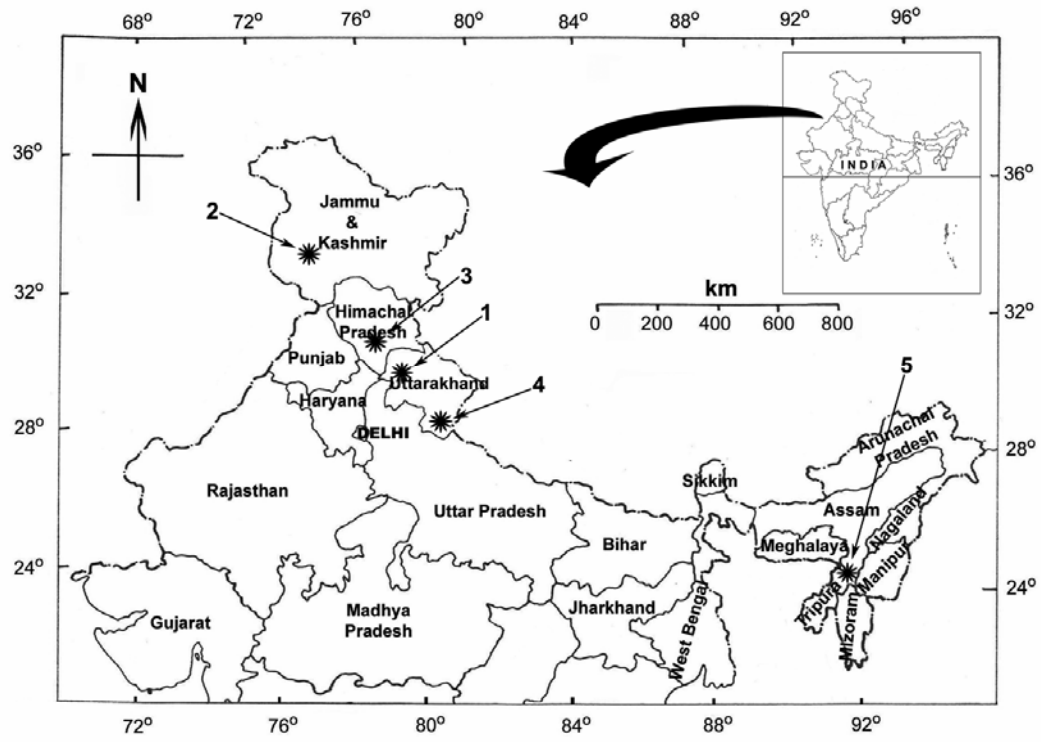

Figure 1. Map showing disjunct distribution of *Chiloscyphus campanulatus* Steph. 1, Type locality; 2–4, Subsequent earlier reports; 5, Present report. (Map source: National Atlas and Thematic Mapping Organization, Department of Science and Technology, Government of India; map outline drawn from India – Physiography, Plate 2.)

the taxon is discontinuously distributed in two widely separated patches, about 1500 km away from each other. The present report also signifies the altitudinal range of the species from ca 40 m in southern Assam to ca 2700 m in Jammu and Kashmir.

Detailed description of the species is given here along with field and microscopic photographs. The plants fully resemble the Western Himalayan plants.

Chiloscyphus campanulatus Steph., Sp. Hepat. 3: 208. 1906; Abha Srivast. & S.C. Srivast., Indian Geocalycaceae: 44. 2002 (Figure 2).

Plants small in size, in prostrate patches, light brownish or olive green, laterally compressed, 5–20 mm long, 1.5–2.0 mm wide; branches scarce, lateral intercalary. Stem oval–suborbicular in outline in cross-section, 9–11 cells across diameter; cells undifferentiated, thin-walled. Leaves closely imbricate, alternate to subopposite, slightly obliquely spreading, flat, oblong–ovate or subquadrate, 0.5–1.0 mm long, 0.5–0.8 (–1.0) mm broad, dorsally free, margin entire, apex narrower than the base, obtuse, truncate–rotundate or retuse; cells thin or thick-walled with distinct triangular trigones; apical marginal cells oblong–polygonal or quadrangular, 14–30 × 14–40 μm; mid-basal cells isodiametric or ovate–oblong, 20–44 × 20–50 μm. Oil bodies 2–3(–4) per cell, greyish to brownish, globose or subglobose, sometimes oval, granular in texture. Underleaves small, distant, free, 0.2–0.4 mm long, 0.1–0.25 mm broad, bilobed up to 1/3–1/2 of its length; lobes subparallel to slightly divergent with broad sinus, 5–10 cells long, 4–8 cells uniseriate at apex, 2–3 cells wide at base; lamina 5–7 cells long, 8–10 cells broad at base, usually with 1–2 teeth on both lateral margins; tooth 2–3 cells long, with a hyaline cell at the apex. Rhizoids in bunch at underleaf bases.

Monoecious. Male inflorescence not seen. Gynoecia terminal on short lateral branches; bracts lobed at apex, same as leaves in size or slightly longer; bracteoles bilobed up to 1/3–1/2 of its length; perianth campanulate, 2.0–3.0 mm long, 1.5–2.0 mm wide, three-plicate, mouth broad, 1/3–1/2 trifid. Sporophyte one in each perianth; seta long, white, thread-like; capsule dark brown, ovoid; cells of outer layer of capsule wall with nodular thickenings on radial walls; cells of inner layer with nodular thickenings on both sides of radial walls extending on the inner tangential wall forming transverse bands. Spores yellowish to golden brown, globose, ca 10 μm in diameter, finely papillose. Elaters bispiralled.

Habitat and ecology: Terrestrial, growing on sandy soil, sometimes growing on loose soil over rocks or in crevices of rocks in moist, shady or swampy places; abundant.

Specimens examined: Assam, Barak Valley, Cachar District, Dargakona Forest, ca 40 m, 7.5.2010, S. Das Bhattacharyya & D. Bhattacharyya 20001, 20004, 20005; Assam University Campus, on the way to Irongmara village, ca 42 m, 12.02.2011, S. Das Bhattacharyya & D. Bhattacharyya 20012, 20013 (Assam University Herbarium).

Distribution in India: Western Himalaya – Jammu and Kashmir, Himachal Pradesh, Uttarakhand[3–6]; Eastern Himalaya – Assam (the present study).

The genus *Chiloscyphus* is represented by five species in the Indian subcontinent[7]. Of these, two species, *C. kashyapii* Abha Srivast. & S.C. Srivast. and *C. polyanthus* (L.) Corda are common to the Eastern and Western Himalayas. Another

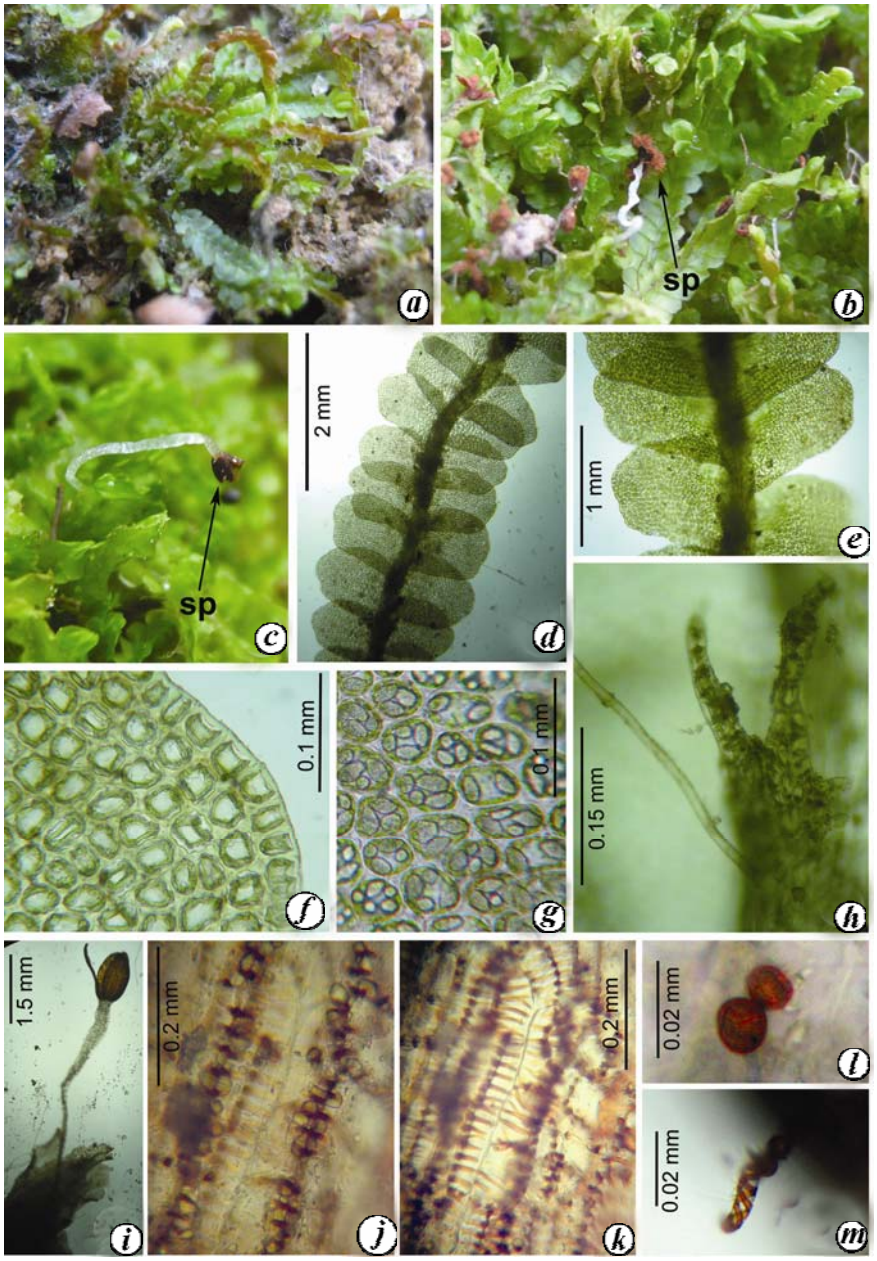

Figure 2. ***a–m***, *Chiloscyphus campanulatus* Steph. ***a***, Vegetative plants in dorsal view; ***b***, ***c***, Fertile plants with sporophytes (SP) in dorsal view; ***d***, Portion of single plant in dorsal view; ***e***, The same enlarged showing arrangement of leaves; ***f***, Apical cells of leaf; ***g***, Mid-basal cells of leaf showing oil bodies; ***h***, Single underleaf; ***i***, Portion of perianth bearing sporophyte; ***j***, Outer layer of capsule wall; ***k***, Inner layer of capsule wall; ***l***, Spores and ***m***, Portion of single elater. (***a–c***, Field photographs; ***d–m***, Photomicrographs; ***d–h***, Taken from S. Das Bhattacharyya & D. Bhattacharyya 20001; ***i–m***, Taken from S. Das Bhattacharyya & D. Bhattacharyya 20012).

two species, *C. gollani* Steph. and *C. himalayensis* Steph. occur in both the Western Himalaya and in the northeastern hill ranges of India[3–6,8]. *C. campanulatus* is a species allied to *C. gollani* and *C. himalayensis*. But it differs from the former which has much larger, 20–40 mm long, 3.6–3.8 mm wide, dorso-ventral plants; leaves with apices broader than base and rectangular apical cells of leaf. It differs from the latter which has larger, 15–40 mm long, 2.3–3.1 mm wide, dorso-ventral plants with slightly to closely imbricate leaves and thin-walled leaf cells with weakly developed or obsolete trigones. *C. campanulatus* can easily be identified by its laterally compressed, small, 5–20 mm long, 1.5–2.0 mm wide plants; closely imbricate leaves with apex narrower than base; polygonal–oblong or quadrangular apical cells of leaf; thin or thick-walled leaf cells with distinct, triangular trigones and campanulate perianth.

C. campanulatus was abundant in southern Assam during the present study. However, it has been noticed that some of its natural habitats along the roadside are getting destroyed due to road construction and grazing. Thus *in situ* conservation is required for better sustenance of this endemic species.

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ACKNOWLEDGEMENT. We thank the Head, Department of Life Science and Bioinformatics, Assam University, Silchar for providing the necessary facilities.

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