

Teaching and research – online

Online teaching is a hot topic of discussion in print and visual media today. Strong, well-reasoned arguments for and against are being put forth. Arguments in favour highlight the necessity to engage kids in meaningful, constructive ways to avoid the colossal waste of their precious time otherwise. Growing up in covid situation means no outdoor activities, spending the whole day in limited, defined space mostly with elders. Online teaching provides them with their own space and time in front of a monitor, a virtual feeling of being in a different habitat. Will it be possible to make up for the lost time of the academic calendar in this way? Perhaps not exactly, but at least a good and positive attempt surely.

However, those who are arguing against have their justifications too. Virtual classrooms are in no way equivalent to physical classrooms; as it is impossible for a teacher to monitor students in real time when say thirty computers or smartphones are activated to listen to the

teacher. For students accessibility to a computer, or smartphones is not a given thing. I know of many families in Bengaluru city, with modest income and with just one smartphone to share among parents and kids! This social inequity is compounded by another factor. A recent study in Kerala points out the inadequacy in the number of mobile towers, which is necessary to reach far-flung locations. It is necessary that this digital divide be bridged early and efficiently to ensure the success of online teaching programmes. Otherwise, I am afraid, we will be creating large inequalities among students.

My intention in writing this letter, however, is somewhat different. Being a member of the teaching and research faculty of a well-known institute of the country, I am amused to see research activities being carried out in totality online. Sure, the prevalent desperate situation with a deadly virus on the prowl demands social distancing. I understand

the wisdom in ‘associated research activities’ being conducted online. I have also participated in meetings, group discussions, and selection committees through online platforms such as Zoom, Microsoft team, etc. But in the field of experimental science how is it possible to carry forward the research programme without interacting with the research students/postdocs personally at least once a week? Students try to be active in labs but they need to be monitored as well. Will theoretical science be any different? ‘Frontline workers’ – temporary non-teaching staff are trying to manage the departments as best as they can, but what about experiments?

I have no clue, but if there is a way, I would like to learn it!

DIPANKAR CHATTERJI

*Molecular Biophysics Unit,
Indian Institute of Science,
Bengaluru 560 012, India
e-mail: dipankar@iisc.ac.in*

Is the genus *Biswamoyopterus* that cryptic?

In 1981, when Saha¹ (Zoological Survey of India; ZSI) did a faunistic survey in Namdapha National Park (NP), Tirap district (now Changlang district), Arunachal Pradesh, India, he came across a gliding squirrel specimen which was more like a species that could be placed under the genus *Aeromys* or *Aeretes*. But the unique combination of ear tufts, unpigmented incisors and round tail convinced him to describe an altogether new genus for the gliding squirrels, viz. genus *Biswamoyopterus* and he finally named the specimen as Namdapha gliding squirrel (*Biswamoyopterus biswasi*). Since its discovery, the species has never been sighted till date. Most of the observations reported over time are erroneous and there is mis-identification due to its overlapping distributional range with that of the red giant gliding squirrel (*Petaurista petaurista*) in and around Namdapha NP^{2,3}. *B. biswasi* is placed under the ‘critically endangered’ category by

IUCN, as it is believed to be restricted to about 100 km² area^{3,4}. However, the species still lacks sufficient distribution and biological data for complete evaluation.

In 2013, after nearly three and half decades since *B. biswasi* was described, discovery of a new gliding squirrel from Laos⁴, eventually led to the addition of another species under the same genus. This discovery has given hope to squirrel researchers in India to increase efforts to initiate dormant studies on the Namdapha gliding squirrel. In 2019, another species of gliding squirrel was discovered in the West Yunnan Province of China, adding the third species under the genus *Biswamoyopterus* and named as the Mount Gaoligong flying squirrel (*B. gaoligongensis*)⁵. These new additions under the genus *Biswamoyopterus* indicate that *B. biswasi* is not a monotypic genus as considered before and it has other relatives. Given the range of *B. biswasi* and *B. gaoligongensis* species

and biogeography of South China and Southeast Asia, it will not be surprising if more species of the genus are discovered soon. This is more so, as there is a geographical gap of 1250 km between the type localities of the two described *Biswamoyopterus* species in India and Laos, and 310 km (approx.) between India and China⁴. Further, these new discoveries indicate that the genus *Biswamoyopterus* might not be as cryptic as it has been considered. However, all these are chance discoveries, and have been described from a single specimen. None of the two recent findings of *Biswamoyopterus* species was observed in its wild habitats. The reasons for such assumptions could be the lack of studies targeting nocturnal arboreal mammals in general and gliding squirrels in particular in South and Southeast Asia, which are the hotspots of gliding squirrel diversity⁶. Even though the western world, mostly USA has many publications on the two

species of gliding squirrels which inhabit the forests of the country, a study in 2017 at a genetic level led to the discovery of new gliding squirrel named Humboldt's flying squirrel (*Glaucomys oregonensis*)⁷. This is an evidence to show the dearth of research on this lesser-known glider. Also, it is important to note that till date, there is no DNA barcoding done on *B. biswasi*.

Despite remarkable diversity of squirrels in South and Southeast Asia, research on this group of mammals has been lagging. While funding is a principal reason, other reasons could be difficulty of spotting and tracking these species which dwell in high canopy of the tropical forests. Also, being nocturnal and cryptic in habit, especially the gliding squirrels, these mammals might attract less attention. Also, studying these relatively small, less charismatic species may not be as interesting and appealing as other larger charismatic species⁸.

The exact range and distribution of a species and the number of sympatric species are the baseline to assess conservation status locally or globally. However, this information is lacking in many species and regions. This is particularly

true for North East (NE) India, Nepal, Bangladesh, Bhutan and Sri Lanka⁸. Given the topography, forest type and accessibility of potential habitats in NE India, it is a difficult task to rediscover *B. biswasi*. Nonetheless, more researches on this nocturnal species in the Namdapha NP is the only way to know more about it, which is key to its conservation. We hope that increasing interest in research on species with such multiple challenges will help rediscover the species and open avenues for more challenging research on canopy ecology in future.

At present, it may be difficult to decipher if the genus *Biswamoyopterus* is rare when it comes to occurrence. Nevertheless, the increasing interest in researching these nocturnal gliders in South and Southeast Asia may help us find the answer. As of now, it remains among the lesser-studied genera of gliding squirrels.

1. Saha, S. S., *Bull. Zool. Surv. India*, 1981, 4(3), 331–336.

2. Molur, S., The IUCN Red List of Threatened Species 2016: e.T2816A115063959, 2016; <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T2816A22271554.en> (downloaded on 4 April 2020).

3. Krishna, C. M. and Kumar, A., *J. Threat. Taxa*, 2014, 6(8), 6138–6141.
4. Sanamxay, D., Douangboubpha, B., Bummungsri, S., Xayavong, S., Xayaphet, V., Satasook, C. and Bates, P. J., *Zootaxa*, 2013, 3686(4), 471–481.
5. Li, Q. *et al.*, *ZooKeys*, 2019, 864, 147.
6. Lee, P. F. and Liao, C. Y., *J. Taiwan Mus.*, 1998, 51, 1–20.
7. Arbogast, B. S., Schumacher, K. I., Kerhoulas, N. J., Bidlack, A. L., Cook, J. A. and Kenagy, G. J., *J. Mammal.*, 2017, 98(4), 1027–1041.
8. Datta, A. and Nandini, R., In *Mammals of South Asia: Volume 2* (eds Johnsingh, A. J. T. and Manjrekar, N.), Universities Press, Hyderabad, 2015, pp. 534–535.

MURALI KRISHNA^{1,*}
HIRANMOY CHETIA¹
FIROZ AHMED²

¹*Amity Institute of Forestry and Wildlife, Amity University, Noida 201 313, India*

²*Conservation Biologist, Aaranyak, Guwahati 781 028, India*

*e-mail: muralikrishna.c@hotmail.com