

# The Tachinidae of Singapore

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I have been working in Singapore since 2002, but until recently I worked very little on Singapore's Diptera fauna. This had always bothered me, but I did not see a good way to work on the Diptera diversity in a tropical country because I did not see a realistic way to sort specimens to species without the help of many specialists (and there was no funding for them). However, this recently changed because we can now use cheap "NGS barcodes" for species discovery (Wong *et al.* 2014, Meier *et al.* 2016). The barcodes only cost <50 cents per specimen and thousands of specimens can be sequenced without doing much morphological damage to the specimens. After sequencing the specimens, we group them into putative species based on genetic distances (i.e., we do "pre-sorting" based on molecular data) and we can gain interesting insights into the distribution and abundance of the putative species within the country. Of course, these putative "molecular species" should ideally be confirmed with morphological data. We therefore image one specimen per molecular cluster and place all of the images on a website called *Animals and Plants of Singapore* (<http://nathist.science.nus.edu.sg>). I hope that this website develops into a portal that eventually has an image for all multicellular species in the country. Currently, we have ca. 4500 species online but we are regularly adding more. Of course, nobody knows how many species there are in Singapore. I am starting to suspect that it is somewhere between 50,000 and 100,000. So, plenty of work to do.

Of the 4500 species on the website, about 1000 are Diptera (<http://nathist.science.nus.edu.sg/#A-Arth-Hexa-Dipt>) and ca. 40 are Tachinidae (<http://nathist.science.nus.edu.sg/#A-Arth-Hexa-Dipt-Tachinidae>) (Fig. 1), but this number will go up very rapidly once we start sequencing more calyprate flies. For each species there is a thumbnail on the family page. When clicked, a larger image appears in a Zoomify™ format that allows for magnifying particular body parts.

I extend an open invitation to tachinologists for help with the identification of these Singaporean tachinids to subfamily, genus, or species level. The material is, of course, also available for loan, and all dipterists are welcome to visit Singapore when passing through the country. The old Raffles Museum of Biodiversity Research moved into a new building with better facilities (<http://lkcnhm.nus.edu.sg/>) and we regularly host visitors.

## References

- Meier, R., Wong, W., Srivathsan, A. & Foo, M. (2016) \$1 DNA barcodes for reconstructing complex phenomes and finding rare species in specimen rich samples. *Cladistics*, 32, 100–110.
- Wong, W.H., Tay, Y.C., Puniamoorthy, J., Balke, M., Cranston, P.S. & Meier, R. (2014) 'Direct PCR' optimization yields a rapid, cost effective, nondestructive and efficient method for obtaining DNA barcodes without DNA extraction. *Molecular Ecology Resources*, 14, 1271–1280.

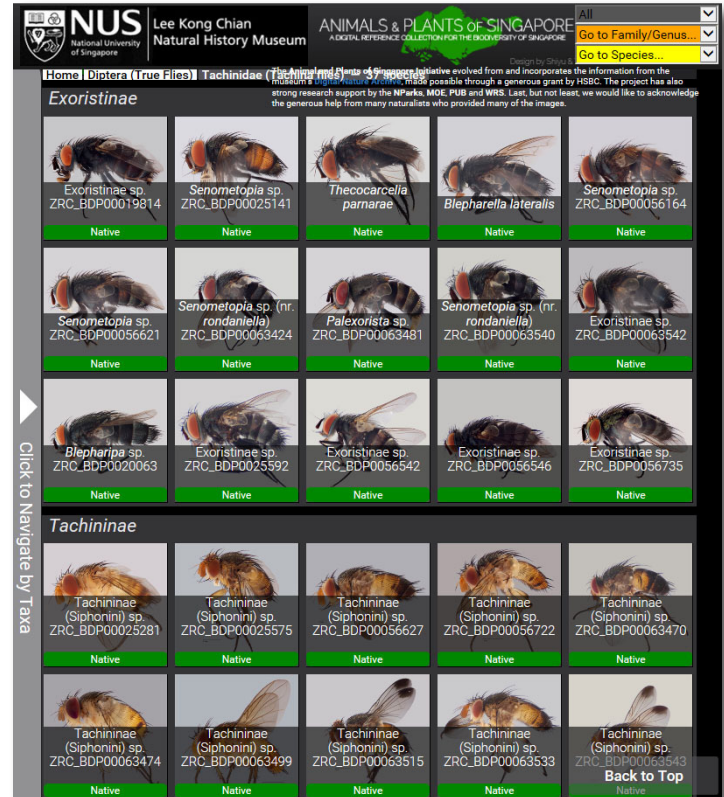


Figure 1. Webpage on Tachinidae on the *Animals and Plants of Singapore* website.