

ORCHID CONSERVATION NEWS

The Newsletter of the Orchid Specialist Group of the IUCN Species Survival Commission

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CONSERVATION AND THE DYNAMICS OF CHANGE



A tranquil scene before a storm

Editorial

Change is inevitable, catastrophic weather-related events thankfully sporadic, but storm trajectories and outcomes are as unpredictable for human populations and their infrastructure as for orchids, their habitats, and for associated biodiversity. This year has seen exceptionally destructive hurricanes damaging Caribbean islands and Puerto Rico as well as parts of the south and southeastern US. Two super typhoons struck China. There have been devastating floods, fires, earthquakes and recent volcanic activity. Anthropogenic-driven disturbances may alter biodiversity dynamics and impact conservation of orchids but when change happens, whatever the cause or event, opportunities to analyse the impact and track recovery often emerge.

Vale *et al.* (2013) have examined habitat disturbance including the impact of hurricanes and of overcollection as challenges to the conservation of the endangered endemic *Broughtonia cubensis* in Cuba. Following flooding after the construction of the Balbina dam in Brazil, Storck-Tonon & Peres (2017) used the resulting archipelago of 3546 variously sized and separated islands to learn how an assemblage of euglossine orchid bees responded to habitat loss and varying degrees of island isolation. We may not be able to study locations before natural, mostly stochastic disturbances occur but we can investigate anthropogenic-driven disturbance impact and use these observations to better understand and manage conservation outcomes.

Marilyn H.S. Light, Editor

Orchid bees (Apidae, Euglossini)

Male euglossine bees are specialized, neotropical pollinators of orchids of the Stanhopeinae and Catasetinae subtribes including *Coryanthes*, *Gongora*, and *Stanhopea*. Whereas all species of these orchid genera are dependent upon euglossine bees, and sometimes single species of bee, for pollination and seed production, assessment of these orchids and their vulnerability to pollinator loss is so far lacking. The orchids produce fragrance components that attract and are collected by male bees that can become pollinators during the visits. We do not yet know if any orchid species dependent upon orchid bees for pollination are

negatively impacted by loss of their particular pollinator(s).



Coryanthes macrantha is the most widely distributed of the genus and is pollinated by *Eulaema* spp.

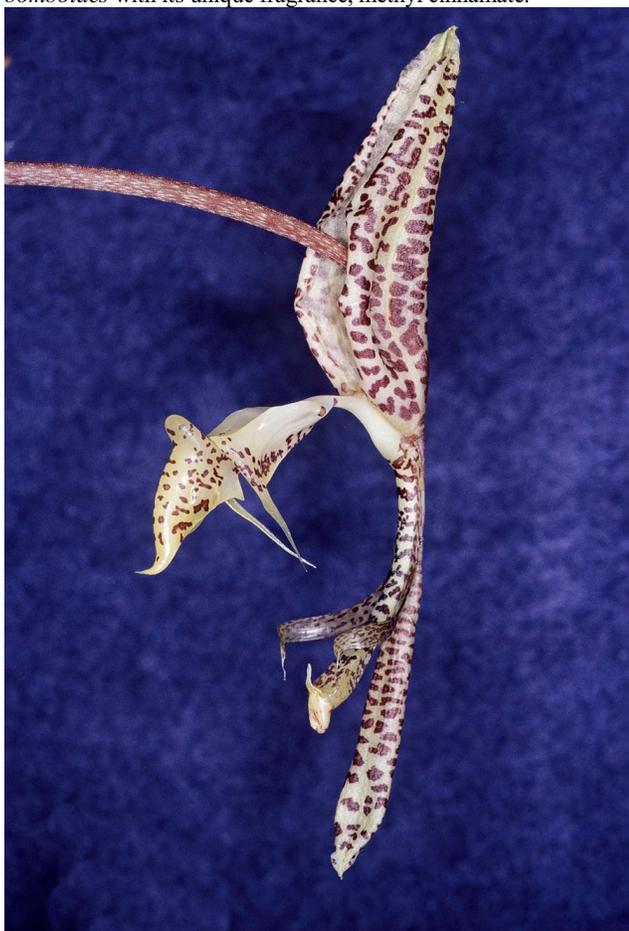
Robert Pemberton has studied a naturalized orchid bee, *Euglossa delimma* (formerly known as *E. viridissima*) and has shared some of his observations and related publications. Thank you.

During the summer of 2003, Robert observed an iridescent blue green female orchid bee gathering pollen from male flowers of *Begonia odorata* growing on his front porch in Fort Lauderdale, Florida, USA. There had been no previous record of any orchid bees in the US before this: a notable discovery. A search of his neighbourhood revealed a surprising abundance of the bee. He observed male bees collecting fragrance compounds from the leaves of basil, allspice and fungal-infected wood. Further study together with Gregg Wheeler led to the conclusion that this naturalized bee and possibly other orchid bees do not need their preferred orchid species as a fragrance source but the orchids must have orchid bees as pollinators (Pemberton and Wheeler, 2006). Additional refs: See *Food for Thought*: Hetherington-Rauth & Ramirez (2016) *Gongora*; Williams & Whitten (1982-83) *Stanhopea*; Ramirez *et al.* (2010) fragrances.

Photo credits: M. MacConaill



Stanhopea embreei has a species-specific attraction to *Eulaema bomboides* with its unique fragrance, methyl cinnamate.



The *Gongora pleiochroma* (pictured above) could belong to one of three different fragrance groups that suggest potentially cryptic taxa for this species.

***Cypripedium arietinum* :**
A notable discovery and a commendable conservation effort

The site, a wooded alvar, is located on the property of a working limestone quarry owned by the Miller Group in eastern Ontario, Canada. A recent environmental assessment revealed the presence of tens of thousands of *Cypripedium arietinum* on the property. Various estimates put the 2017 orchid population in the 80,000 to 150,000 range. Upon learning about the presence of a substantial number of rare orchids on their property, the Miller Group offered to preserve far more of the wooded alvar habitat than was required by law, some 26 ha or about half the site. Protection is assured. As a result, this preserve will remain in its natural state.

The Miller Group received the 2015 Conservation Award of the Ottawa Field-Naturalists' Club. To read more about the award, please go to: <http://www.ofnc.ca/awards/2016/Miller.php>

On the Bookshelf



Atlas of the Human Planet 2017: Global Exposure to Natural Hazards.

Pesaresi, M., Ehrlich, D., Kemper, T., Siragusa, A., Florczyk, A., Freire, S., & Corban, C. (2017).

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atlas2017_online.pdf

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Food for Thought

Byers, D.L., and S.-M.Chang (2017). Studying plant-pollinator interactions facing climate change and changing environments. *Applications in Plant Sciences* 5: 1700052. <https://doi.org/10.3732/apps.1700052>

Downing, J.L., Liu, H., Shao, S., Wang, X., McCormick, M., Deng, R., and J. Gao (2017). Contrasting changes in biotic interactions of orchid populations subject to conservation introduction vs. conventional translocation in tropical China. *Biological Conservation* 212: 29–38.

Engels, M.E., Rocha, L.C.F., and E.M. Pessoa (2017). O gênero *Coryanthes* (Orchidaceae-Stanhopeinae) no estado do Mato Grosso, Brasil. [The genus *Coryanthes* (Orchidaceae-Stanhopeinae) from state of Mato Grosso, Brazil]. *Rodriguésia* 68: 489–501. <http://dx.doi.org/10.1590/2175-7860201768213> (Print version (pdf) available in Portuguese.

Gerlach, G., and R. Schill (1989). Fragrance analyses, an aid to taxonomic relationships of the genus *Coryanthes* (Orchidaceae). *Plant Systematics and Evolution* 168: 159–165.

Good, B.H., McDonald, M.J., Barrick, J.E., Lenski, R.E., and M.M. Desai (2017). The dynamics of molecular evolution over 60,000 generations. *Nature* 551: 45–50.

Han, J.Y., Xiao, H., and J. Gao (2016). Seasonal dynamics of mycorrhizal fungi in *Paphiopedilum spicerianum* (Rchb. F) Pfitzer – A critically endangered orchid from China. *Global Ecology and Conservation*. 6: 327–338.

Hetherington-Rauth, M.C., and S.R. Ramirez (2016). Evolution and diversity of floral scent chemistry in the euglossine bee-pollinated orchid genus *Gongora*. *Annals of Botany* 118: 135–148.

Liu, H., and R. Pemberton (2010). Pollination of an invasive orchid, *Cyrtopodium polyphyllum* (Orchidaceae), by an invasive oil-collecting bee, *Centris nitida*, in southern Florida. *Botany* 88: 290–295.

Pansarin, E.R. and M.C.E. Amaral (2009). Reproductive biology and pollination of southeastern Brazilian *Stanhopea Frost ex Hook.* (Orchidaceae). *Flora* 204: 238–249.

Pemberton, R.W. and G.S. Wheeler (2006). Orchid bees don't need orchids: evidence from the naturalization of an orchid bee in Florida. *Ecology* 87: 1995–2001.

Ramirez, S.R., Eltz, T., Fritsch, F., Pemberton, R., Pringle, E., and N.D.Tsutsui (2010). Intraspecific geographic variation of fragrances acquired by orchid bees in native and introduced populations. *Journal of Chemical Ecology* doi 10.1007/s10886-010-9821-3

Rock-Blake, R., McCormick, M.K., Brooks, H.E.A., Jones, C.S., and D.F. Whigham (2017). Symbiont abundance can affect host plant population dynamics. *American Journal of Botany* 104: 1–11.

Stork-Tonon, D., Morato, E.F., Melo, A.W.F., and M.L. Oliveira (2013). Orchid bees in forest fragments in Southwestern Amazonia. *Biota Neotropica* 13: 133–141.

Stork-Tonon, D. and C.A. Peres (2017). Forest patch isolation drives local extinctions of Amazonian orchid bees in a 26 years old archipelago. *Biological Conservation* 214: 270–277. <https://doi.org/10.1016/j.biocon.2017.07.018>

Telwala Y, Brook BW, Manish K, and M.K.Pandit (2013). Climate-induced elevational range shifts and increase in plant species richness in a Himalayan biodiversity epicentre. *PloS One*. 2013; 8:e57103. doi:10.1371/journal.pone.0057103 PMID:2343732237.

Vale, A., Rojas, D., Álvarez, J.C. and L. Navarro (2013) Distribution, habitat disturbance and pollination of the endangered orchid *Broughtonia cubensis* (Epidendreae: Laeliinae). *Botanical Journal of the Linnean Society* 172: 345–357.

Wiens, J.J. (2016). Climate-related local extinctions are already widespread among plant and animal species. *PLoS Biol* 14(12): e2001104.doi:10.1371/journal.pbio.2001104

Williams, N.H. and W.M.Whitten (1982). Identification of floral fragrance components of *Stanhopea embreei* and attraction of its pollinator to synthetic fragrance compounds. *American Orchid Society Bulletin* 51: 1262–1266.

Williams, N.H. and W.M.Whitten (1983). Orchid floral fragrances and male euglossine bees: Methods and advances in the last sesquidecade. *Biological Bulletin* 164: 335–395.

Changes to contact information?

To maintain effective communication, we need to know of any changes in contact information.

Please inform the OSG Chair, Mike Fay.

(M.Fay@kew.org)

Call for conservation news

Members are invited to provide news of their recent conservation activities for publication in the OSG Conservation News.

Please submit material in Microsoft Word, and illustrations, if any, as separate jpeg files. If applicable, please include suggested captions and photographic credits. Send news to Marilyn Light, Editor, (mslight@distributed.net)