

The Research Group  
**Ecology and Biodiversity**

has the honour to invite you to the public defence of the PhD thesis of

**Mathil Ella VANDROMME**

to obtain the degree of Doctor of Sciences

**Title of the PhD thesis:**

Shedding new light on the cacao pollinator puzzle  
Towards a reliable identification of cacao pollinators and their breeding habitats

**Promotor:**

Prof. dr. Bram Vanschoenwinkel  
Prof dr. Eduardo Somarriba (local promotor, CATIE)  
Dr. Hendrik Trekels (co-promotor)

The defense will take place on

**Monday October 21 2019 at 5 p.m.**

in Auditorium D.2.01 at the Campus Humanities,  
Sciences and Engineering of the Vrije Universiteit  
Brussel, Pleinlaan 2 - 1050 Elsene, and will be  
followed by a reception.

**Members of the jury:**

Prof. dr. Ludwig Triest (Chairman, VUB)  
Prof. dr. Nico Koedam (secretary, VUB)  
Prof. dr. Dominique Maes (VUB)  
Dr. Bea Maas (Universität Wien)  
Dr. Wouter Vanhove (Universiteit Gent)

**Curriculum vitae**

Mathil Ella Vandromme (°1992) obtained a Bachelor of Science in Biology at the Vrije Universiteit Brussel in 2013 and graduated with Greatest Distinction from the Erasmus Mundus Master Course Tropical Biodiversity and Ecosystems studying at Vrije Universiteit Brussel, Université Libre de Bruxelles, Università Degli Studi di Firenze and Universidad Científica del Perú in 2015, for which she received the TROPIMUNDO Best Student Award. Subsequently, she obtained a VLIR-UOS VLADOC scholarship for her doctoral study at the Community Ecology Laboratory of the VUB. During her PhD, Mathil supervised 2 BSc and 5 MSc theses and performed fieldwork in Nicaragua (in collaboration with Centro Agronómico Tropical de Investigación y Enseñanza Nicaragua) and Peru (in collaboration with Universität Würzburg and Bioversity International Peru).

**Abstract of the PhD research**

The production of cacao regularly suffers from a lack of efficient pollination. Yet, despite decennia of research and the consensus that Diptera of the families Ceratopogonidae and Cecidomyiidae are cacao pollinators, the identity and the origin of the morphologically cryptic pollinators continues to be the subject of discussion and controversy.

In this PhD we set out to investigate potential links between tank bromeliads and cacao pollinators. We analysed community structuring processes in tank bromeliads and found that several insects specifically target bromeliads using, amongst others, the presence of leaves as a visual cue. In addition, we showed that chemical cues of a predator affected oviposition in bromeliad dwelling insects, even in neighbouring habitats where the predator was not present.

We found indications that presumed cacao pollinators can indeed develop in bromeliads. However, any effects of the presence of bromeliads in plantations were not strong enough to result in detectable changes in overall insect biodiversity patterns. Using DNA barcoding we were able to unambiguously identify cryptic cacao flower visitors and validate whether dipterans emerging from potential source habitats are indeed the same as those found on the flowers. In doing so, we could not demonstrate that bromeliads are indeed important for cocoa pollination, but we did link pollinators to other breeding habitats within cocoa plantations. Finally, in the last chapter we explain how detailed observations of the behaviour of visiting insects on the flowers are necessary to properly distinguish mere flower visitors from effective pollinators.