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# Two populations of *Temnothorax nylanderi* display differential adaptation in response to heavy metals exposure

Lauren Jacquier<sup>\*1</sup>, Clément Car<sup>2</sup>, Marine Guell<sup>3</sup>, Claire Tirard<sup>4</sup>, and Mathieu Molet<sup>5</sup>

<sup>1</sup>Institut d'Ecologie et des Sciences de l'Environnement (IEES) – Sorbonne Universités, UPMC, CNRS  
– 4 Place Jussieu, 75005 Paris, France, France

<sup>2</sup>Muséum National d'Histoire Naturelle (MNHN) – Musée National d'Histoire Naturelle - MNHN  
(France) – France

<sup>3</sup>Sorbonne Université – Université Pierre et Marie Curie [UPMC] - Paris VI – France

<sup>4</sup>Institut d'Ecologie et des Sciences de l'Environnement (IEES) – UPMC Univ Paris 06, CNRS – 4 Place  
Jussieu, 75005 Paris, France, France

<sup>5</sup>Institut d'Ecologie et des Sciences de l'Environnement (IEES) – UPMC Univ Paris 06, CNRS – 4  
Place Jussieu, 75005 Paris, France, France

## Abstract

Cities are unique opportunities for scientists to study the adaptation of species to environmental changes. Indeed, cities are quite recent, they involve strong modifications of the environment, and each city constitutes an independent replicate. The urban environment has specific features including warm temperatures, fragmented habitat, human presence and light, noise and chemical pollutions. Species that manage to live in such environment often have generalist or opportunistic diets, tolerate human presence and display bold behavior. Species that are not adapted can also maintain urban populations through migration from non-urban source populations. Adaptive traits can result from either genetic evolution or phenotypic plasticity. Most of those traits have been found by comparing different closely related species living either in urban or non-urban environments, however studies comparing population of the same species from different environments are lacking. Our study were aim to determine whether there is adaptation to urban chemical pollution at the level of the population. We used different population of the same ant species, *Temnothorax nylanderi*, that is commonly found both in cities and forest. We reared colonies collected from forest (unpolluted) or urban (polluted) habitats (3 replicates) under either a normal or cadmium-supplemented diet. Cadmium is a heavy metal pollutant found at high concentration in cities. We measured several traits of laboratory-born workers (size, immunocompetence) as well as mortality rate of both workers and larvae and compared them between treatments and habitats. Our results allowed us to discuss whether colonies from urban habitats are more adapted to heavy metal pollution than colonies from forest habitats.

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<sup>\*</sup>Speaker