

## **Consequences of climate and landscape changes on populations of bumblebees (Hymenoptera: Apidae: *Bombus*) in Belgium**

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It is widely acknowledged that climate and landscape changes are currently the most pervasive drivers of ecosystem change worldwide and will also play an important role in the future. Therefore, a thorough understanding of the mechanisms involved in the responses of populations and communities to these environmental changes is a pre-requisite to predict and mitigate the long-term effects of these changes on biodiversity. Bumblebees are among the most essential pollinators for their services to both natural ecosystems and agricultural production. However they currently experience a strong decline fostered by habitat fragmentation and loss (e.g. diminution of open landscapes) and agricultural intensification. Indeed, changes in the structure of rural landscapes increase the fragmentation and isolation of populations leading to loss of genetic diversity. Moreover, agricultural intensification and standardization of production processes eliminate bumblebee food sources such as leguminous. More recently, several studies have implicated changes in climate in the bumblebee decline. Furthermore, climate and landscape changes are assumed to underlie a multitude of environmental pressures that may have a greater joint impact on biodiversity than when operating in isolation.

The aim of this project is therefore to qualify and quantify the relationship between landscape changes, climate change and changes in populations of bumblebees.

We use a comparative approach based on past and present landscape composition and structure, historical climate records and bumblebees data in Belgium. This will provide key elements for understanding the processes responsible for the decline of populations of bumblebees, which will in the longer term allow designing conservation strategies to halt biodiversity loss of these essential pollinators.