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SÉMINAIRE

Ecology and genomics of fruit tree-pest interactions in the context of domestication

Amandine Cornille

CRCN CNRS, UMR Génétique Quantitative Evolution - Le Moulon (CNRS, INRAE, Univ. Paris Saclay, AgroParisTech), Institut Diversité Ecologie et Evolution du Vivant, Gif-sur-Yvette

Species interactions are crucial for driving species adaptation and diversification. Interacting species evolve in complex abiotic and biotic environments. However, the question of adaptation in species interactions and its genomic bases has yet to be considered in an ecological context. My group (ECLECTIC for "ECoLogical gEnomiCs of muTi-species interaCtions") studies abiotic, biotic, and genomic drivers of species interactions, in particular of pest-fruit tree interactions, to understand how and why pests spread and adapt, and how their hosts fight back, in the context of climate change. We specifically study both sides of an interaction: the apple tree and its major aphid pest (and its endosymbiotic bacteria). To understand the impact of global changes on wild and crop fruit trees, we conducted several experimental orchards of wild and cultivated apples in Europe. Some of these are citizen science projects involving associations, scientists, and citizens around emblematic fruit trees to raise awareness of the impact of global changes on trees and the importance of conserving ex-situ wild and crop fruit tree genetic diversity. Some of these orchards were also manually infested with aphids of various origins to unravel the impact of climate and apple host on aphid attack success. These field experiments, along with the sequenced genomes and transcriptomes of the apple and the aphid we recently obtained, will provide crucial insights into the ecological and genomic drivers of the adaptation of fruit trees and their associated pests. Overall, our research will contribute to a better understanding of 1) how woody perennial species emerge, diversify, and adapt to natural ecosystems and agrosystems, 2) how pests adapt to new hosts or global changes, and 3) how species interactions evolve in response to global changes. Answering these issues is essential for food security and to improve our understanding of the fundamental processes that generate and maintain biodiversity in natural systems, particularly in the context of rapid global changes.

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