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SESSION 01 – AGRICULTURAL AND FOREST ENTOMOLOGY
Scientific Theme: Invasive species biology, ecology and management

Host's masting drives spatio-temporal patterns of pre-dispersal seed predation by
invasive wasps in a natural forest ecosystem
V. Doublet, Gidoin C., F. Lefèvre & T. Boivin

In the context of trade globalization, forest ecosystems and tree plantations are increasingly subject to invasions by phytophagous insects. Seed insects are particularly prone to bioinvasions and are subsequently likely to affect plant populations through increased direct trophic interactions, which can result in more complex indirect effects on natural regeneration processes or intensively-managed seed orchards' productivity. Identifying both patterns and drivers of resource exploitation by invasive seed predators in their recipient ecosystem is a key step to forecast their impacts under both ecological and economic considerations.

Within the general framework of herbivores' resource concentration/dilution hypotheses, we specifically addressed how spatio-temporal variations in host resource availability may drive spatio-temporal patterns of pre-dispersal seed predation (PDSP) by invasive wasps at the tree population scale. We used an ideal masting tree-wasp system (*Cedrus atlantica*-*Megastigmus*) surveyed in a 10-year longitudinal study under natural conditions in Southern France. Both fructification and PDSP patterns of individual trees were characterized over the period along with other individual tree and environmental characteristics. A mixed model was developed to assess how PDSP responded to spatio-temporal variations in these characteristics. We showed that spatial distribution of PDSP was significantly dependent on the interaction between annual fructification level and neighbouring host density: during mast seeding years wasps preferentially attacked trees that are at low density (resource dilution effect), while trees at high density concentrated wasp attacks during years of seed scarcity (resource concentration effect).

This work highlights that host's masting may not only influence annual PDSP rates but also drive the spatial distribution of invasive seed specialists. We conclude that forecasting and managing spatial patterns of PDSP may require the consideration of both spatial and temporal dimensions of seed production at the tree population scale.