

Does intensive crop management affect the diversity and abundance of species in fruit crops in Quebec, Canada?



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Introduction

Several studies have shown that more diversified farms have equal or greater profitability than less diversified farms, using fewer chemical inputs (Davis et al., 2012). Additionally, heterogeneous ecosystems are recognized to be more stable and more resilient in varying conditions (Özkan and Berger, 2014). On the other side, agricultural intensification is susceptible to altering the arthropod's community's structure.

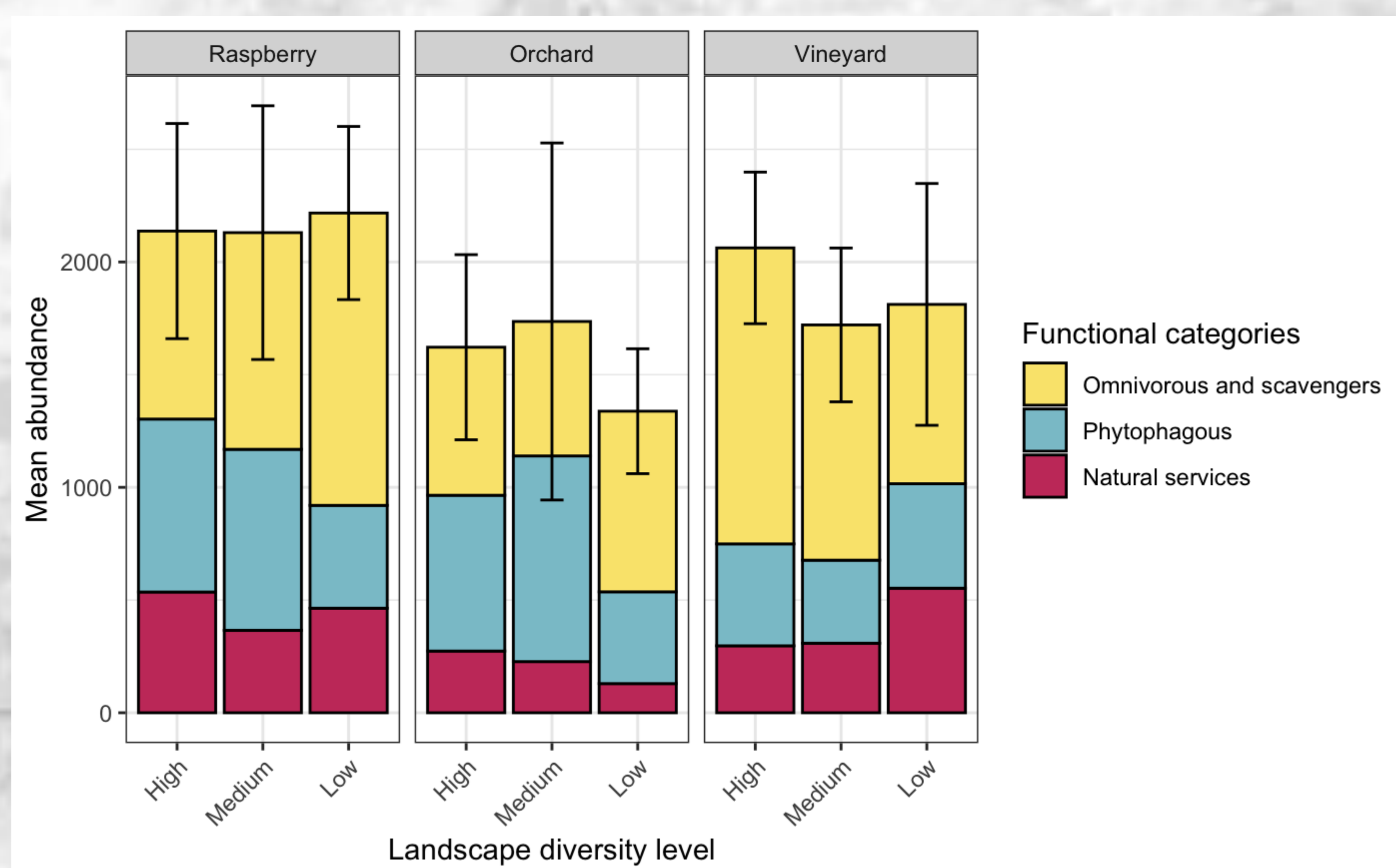
This project aims to determine the impact of intensive crop management on the abundance and diversity of phytophagous and natural enemies for three agricultural systems: vineyards, apple orchards, and raspberry.

Results and discussion

- Intensive crop management affected the three fruit crops differently:
 - Raspberry productions possessed the highest landscape heterogeneity while orchards was significantly lower.
 - Raspberry & apple orchards presented higher pesticide applications in simplified landscape, while in vineyards, medium diversified landscapes presented the highest pesticide applications ($F_{4,41}=2.48$, $p<0.031$).
 - The landscape simplification significantly increased fruit yield ($F_{2,35}=8.28$, $p<0.001$) and was higher in apple orchards than in vineyards ($F_{2,35}=64.06$, $p<0.001$).
- Raspberry productions presented significantly more arthropods than apple orchards or vineyards.
- A tendency where higher captures were obtained in high and medium diversified landscapes was observed for vineyards and orchards, respectively.
- Among the collected entomofauna, 31% were phytophagous, and 18% were natural services.
- Raspberry and apple orchards presented a higher number of phytophagous than vineyards.

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- 3 crops: raspberry, vineyard, apple
- 9 sites /crop
- 3 Landscape diversity types/culture
- 3 Pitfalls and bol traps/site
- Bimonthly sampling in summer 2019-2020
- Register of pesticide use
- Yield production
- Arthropods identification



Overall, the preliminary results of this project show that landscape diversity is not the main driver of entomofauna loss, but it does increase the yield production and reduces the presence of natural services.

References: Davis et al. 2012. PloS One 7; Özkan and Berger 2014. Pol. J. Ecol. 62.

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