



ZOOLOGY 2018

Zoology in the Anthropocene

13-15 DECEMBER 2018 - @ZOO Antwerpen



Assessment of pollination ecosystem service throughout wild bees biodiversity and associated phytometer experiment – a case study at farmstead Froidefontaine in ecological transition (Havelange, Belgium)

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Pollination is a key ecosystem service. It contributes to around 87.5% of wild flowering plant reproduction and up to 70% of insect pollinated crops production (i.e. orchards, vegetables...). This service is provided by the pollinators community, including bees (Hymenoptera: Anthophila) which are the most efficient pollen vectors. Therefore, worldwide decline of pollinators could negatively impact human food supply because of pollination service depletion. Organic farming is one alternative strategy to provide solutions against this issue by offering less pesticides use, restoring plant biodiversity (i.e. hedgerows, intercropping, companion weeds ...) or reducing tillage impact. The goals of this research study are (i) the analysis of wild bees community structure, (ii) the assessment of pollination service throughout selected phytometer, buckwheat (*Fagopyrum esculentum* Moench 1794), and (iii) the potential relation between wild bees diversity and phytometer seed production amongst four micro-environments (crops, permanent meadow, apple orchard and wetland) located at the Froidefontaine farmstead which is a farm undergoing agro-ecological transition. Alpha diversity measures of wild bees' community show no significant differences between studied micro-environments. On the contrary, bee communities are structured in response to the environment (i.e. beta diversity), explained by distinctive plant communities that offer a diversity of floral resources. Seed production of buckwheat was higher in crops environment than in every other micro-environments. This trend can be explained by concentration and dilution effects of pollinators foraging behaviour at landscape scale. Lastly, our linear models were not able to detect link between wild bee community structure and the range of buckwheat seed production amongst different micro-environments. These new insights point out that more scientific investigations are needed for a better understanding of the management of our agroecosystems in ecological transition.