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► To cite this version:

Justine Rivers-Moore, Annie Ouin, Aude Vialatte, Emilie Andrieu. Contribution of wooded habitats to wild bee richness and pollen resources in agricultural landscapes. World Congress on Agroforestry (WCA), May 2019, Montpellier, France. 1 p., 2019. hal-02791658

HAL Id: hal-02791658

<https://hal.inrae.fr/hal-02791658v1>

Submitted on 5 Jun 2020

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Contribution of wooded habitats to wild bee richness and pollen resources in agricultural landscapes

Justine RIVERS-MOORE^{1,2}, Emilie ANDRIEU^{1,2}, Aude VIALATTE^{1,2}, Annie OUIN^{1,2}

1 DYNAFOR, Université de Toulouse, INRA, Castanet-Tolosan, France

2 LTSER Zone Atelier « PYRÉNÉES GARONNE », 31320 Auzerville-Tolosane, France

Context

- Wild bees (Hymenoptera), pollinators of entomophilous crops, are threatened by landscape simplification and loss of floral resources.
- Grasslands provide resources to pollinators (nectar, pollen, nest sites).
- There is a lack of knowledge about floral resource supplies provided by wooded semi-natural habitats (SNH) present in agricultural landscapes.

Study site

LTSER « Vallées et Côteaux de Gascogne ». 50 km South of Toulouse, France.

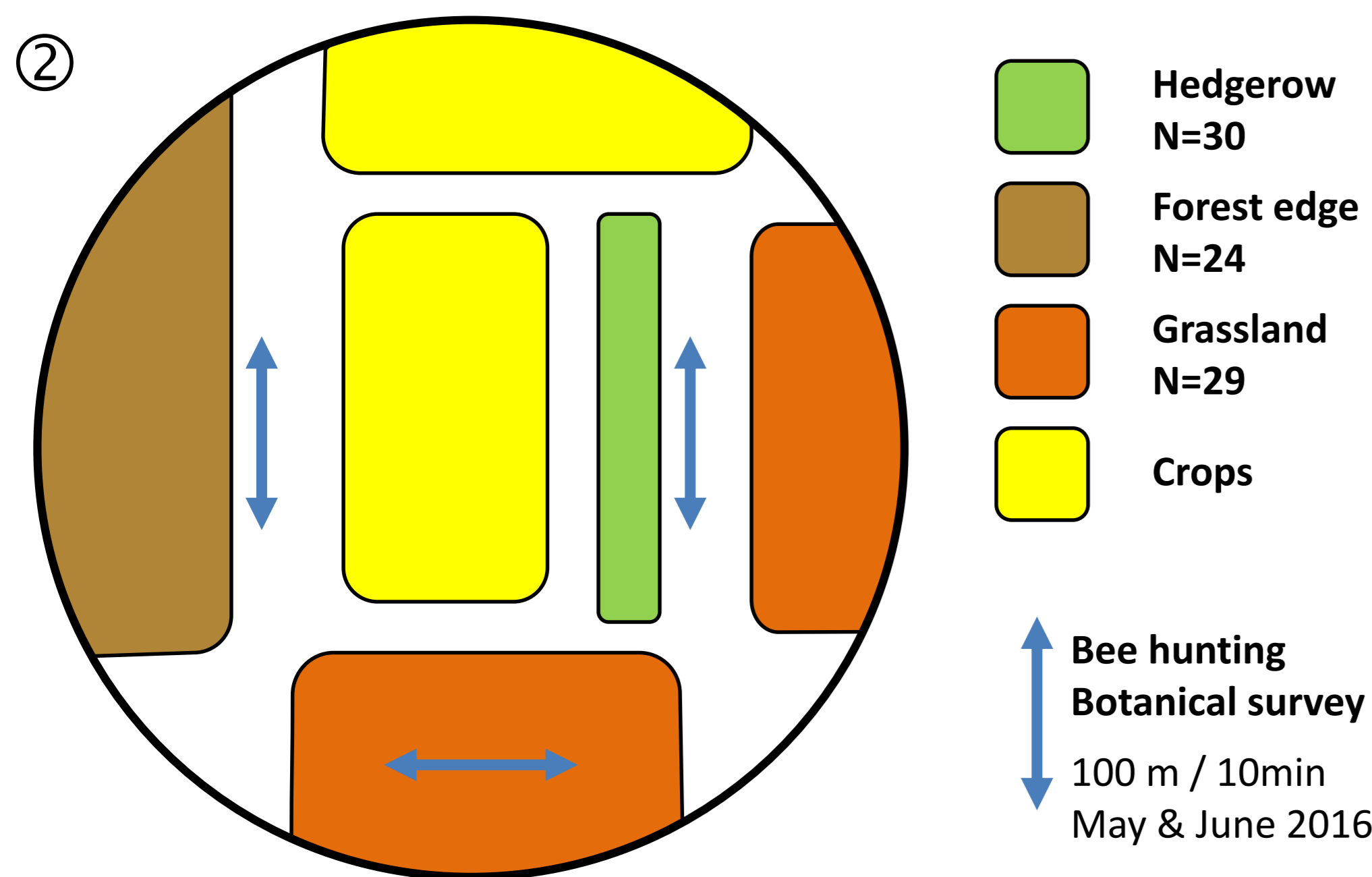


Small forests, permanent grasslands and crop fields.

Aim of this study: To evaluate pollen supply of SNH in wooded habitats (forest edges and hedgerows) and herbaceous habitats (grasslands) for wild bees.

Experimental design and analyses

① 30 landscapes (selected on a gradient of % woods and % grasslands).



④ Jacobs's selection index of each species i :

$$D_i = \frac{CR_i - PA_i}{CR_i + PA_i - 2(CR_i \times PA_i)}$$

CR = Consumption Rate of each pollen species in the survey
PA = Pollen Availability of each pollen species in the pool of landscapes

Jacobs's selection index allows comparing for a particular species its consumption frequency to its availability in the study site.

Discussion & perspectives

Botanical surveys have been done in May for grasslands and in June for wooded habitats. Flowering of species changes across season may influence Jacobs's selection index.

Some pollen species found on bees didn't appear in the botanical surveys. These species are mainly crop-specific (6 species).

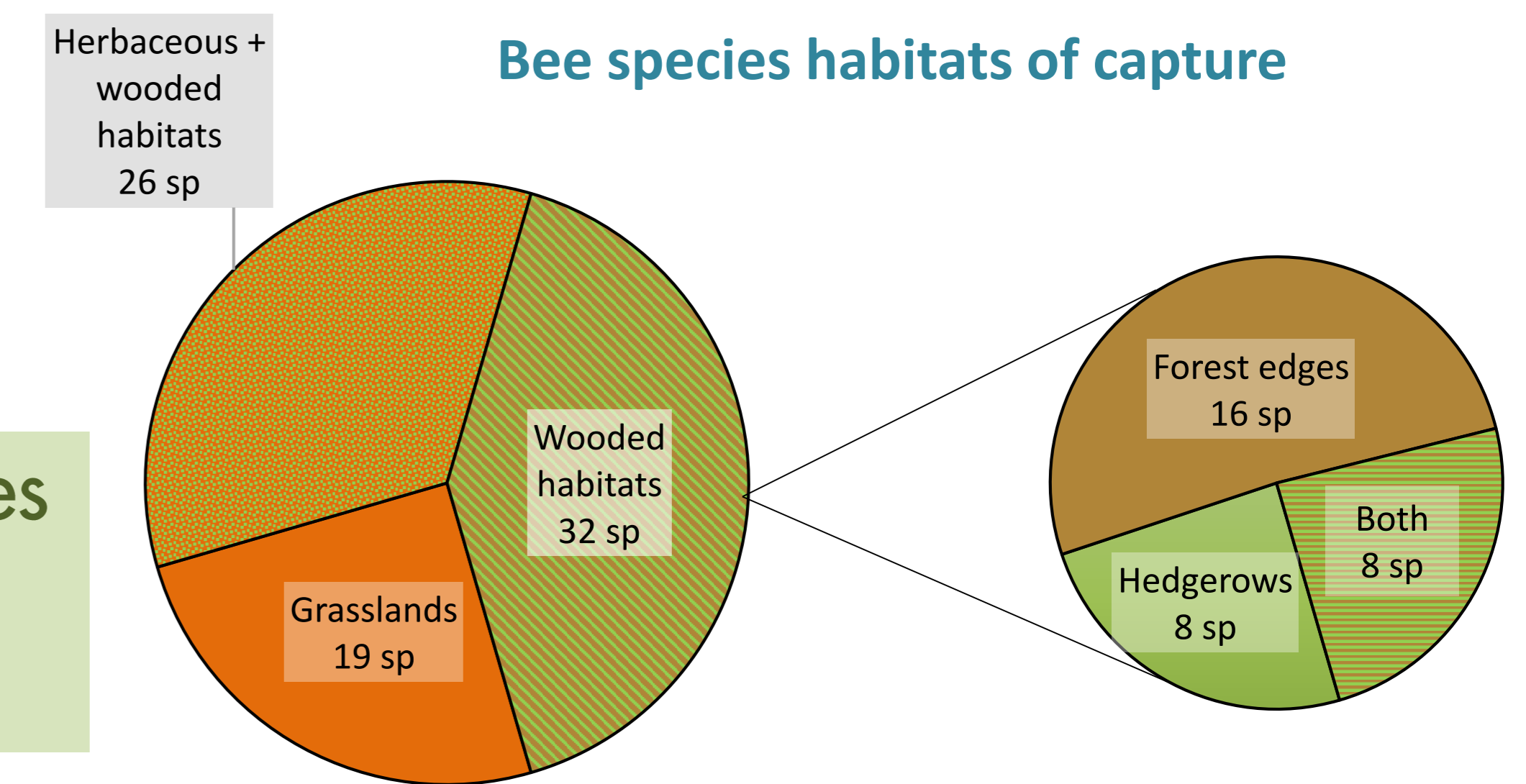
Perspectives :

- To evaluate pollen supply at landscape scale (LP index).
- To use botanical species abundance (instead of presence/absence).

Results

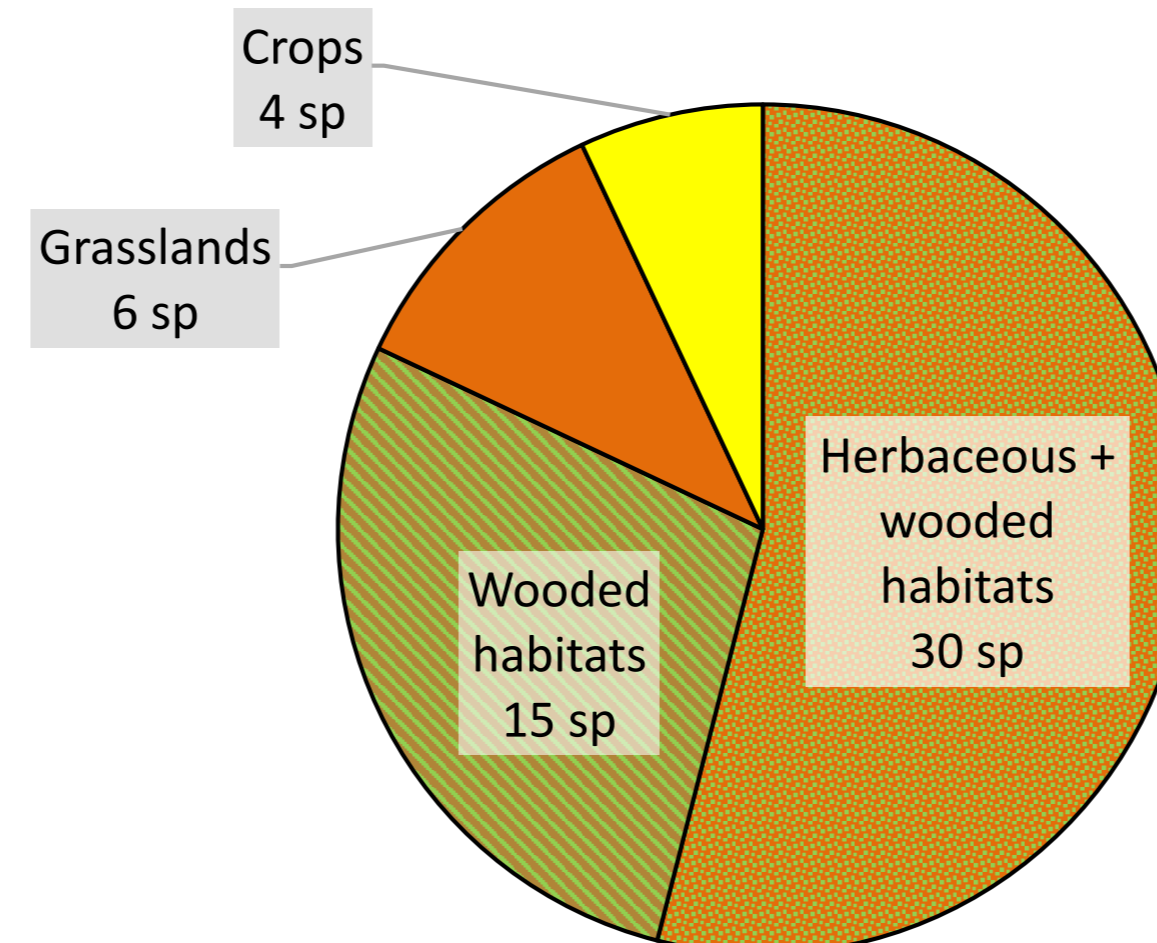
529 wild bees of 77 species

42% of the wild bee species caught are found only in wooded habitats



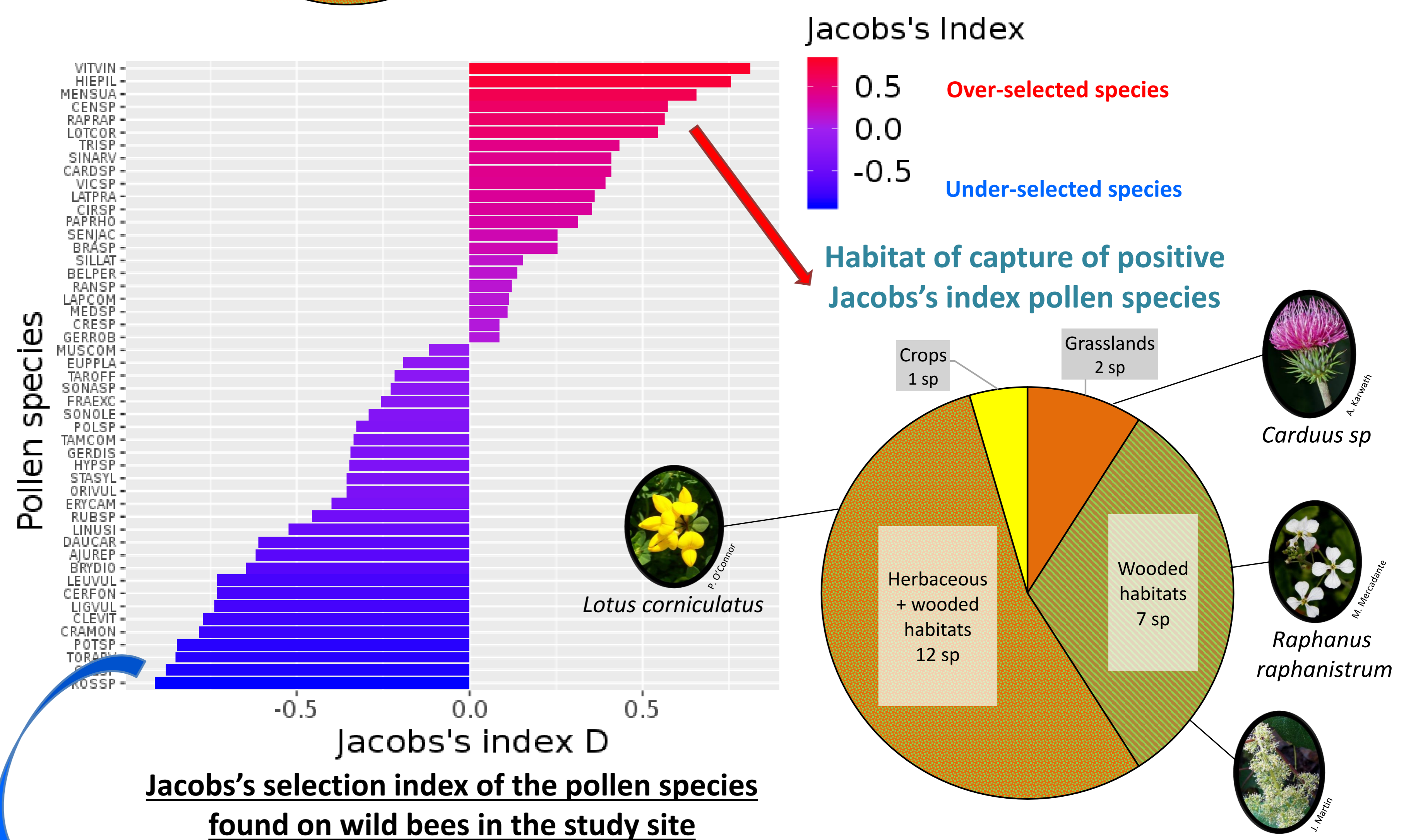
462 pollen samples of 55 plant species – on 28 bee species

Pollen species origin in the botanical survey

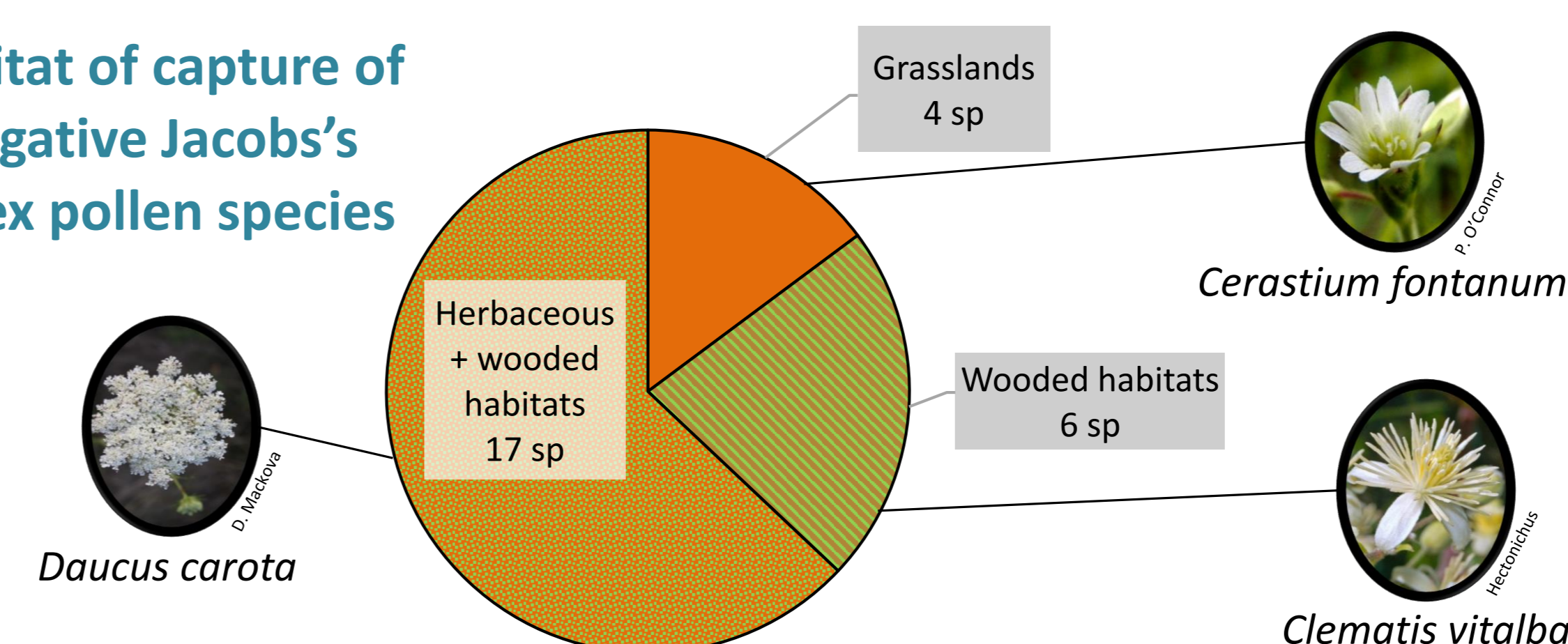


Wooded habitats offer pollen resources to wild bees

28% of pollen species found on bees are found only in wooded habitats (woodland edges and hedgerows) in the botanical surveys.



Habitat of capture of negative Jacobs's index pollen species



32% of over-selected plant species are wood-specific