



Parasites and genetic diversity in an invasive bumble bee

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Introduction

The rapid range expansion of *Bombus hypnorum* (Fig. 1) across the UK over the last decade¹ may be a result of parasites² and genetic diversity. In this study we investigate the impact of *Sphaerularia bombi*, a nematode parasite, that castrates *Bombus* queens, and *Apicystis bombi*, a neogregarine parasite, that causes early mortality³, and genetic diversity of an invasive bumble bee, *B. hypnorum*, in the UK.



Fig. 1 *Bombus hypnorum*



Fig. 2 Catherine collecting bumblebees at Wisley

Methods

We collected queens of non-native *B. hypnorum* and five native *Bombus* species from sites in South East England (Fig. 2), checked them for parasites and monitored colony development in the laboratory (Fig. 3).



Fig. 3 *B. lucorum* (native species) colony in the laboratory

Results

Figure 4 Higher parasite prevalence in the non-native than in native queens

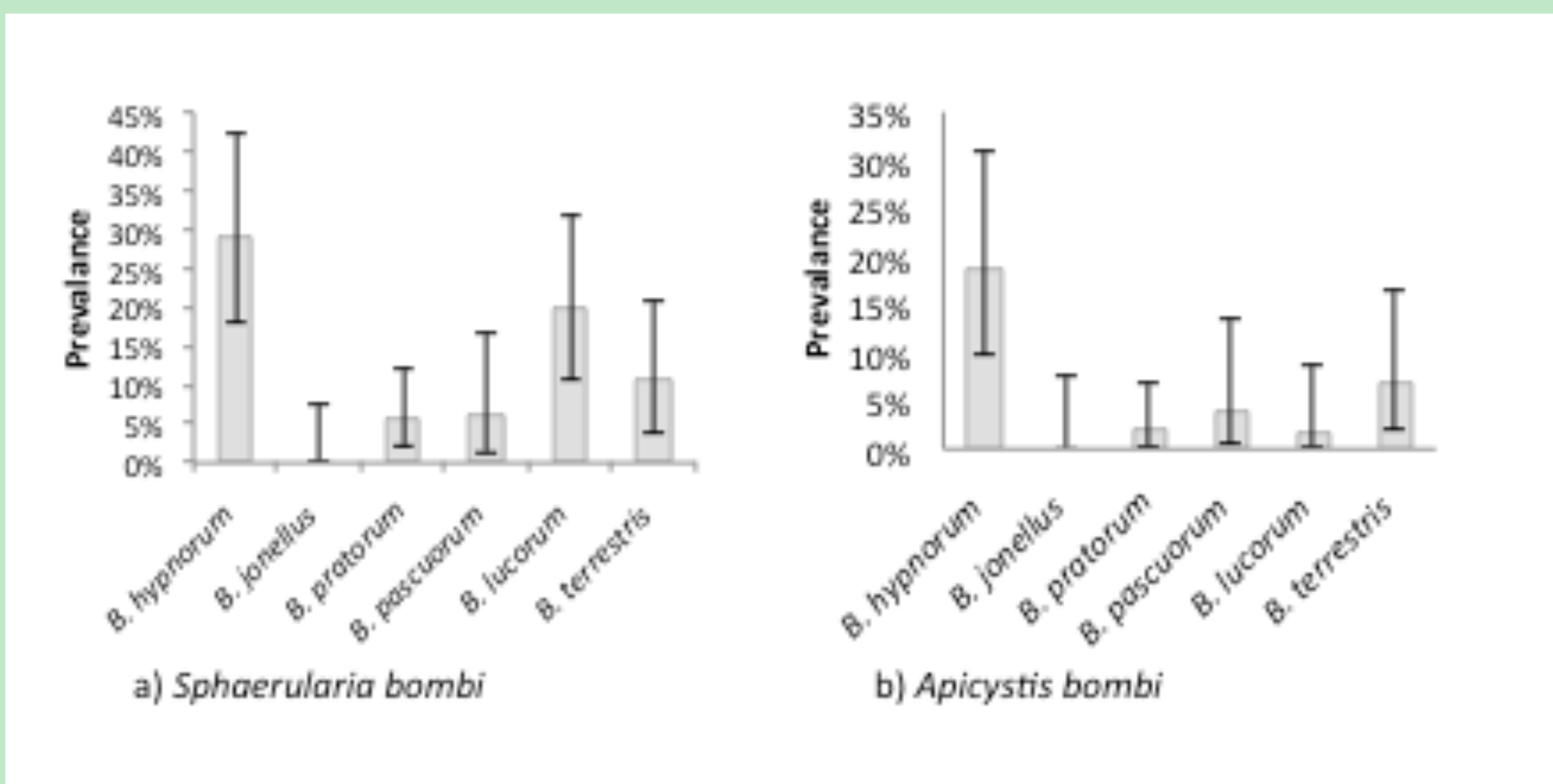


Figure 6 Parasites eliminate more non-native queens from the potential colony founding population than native queens.

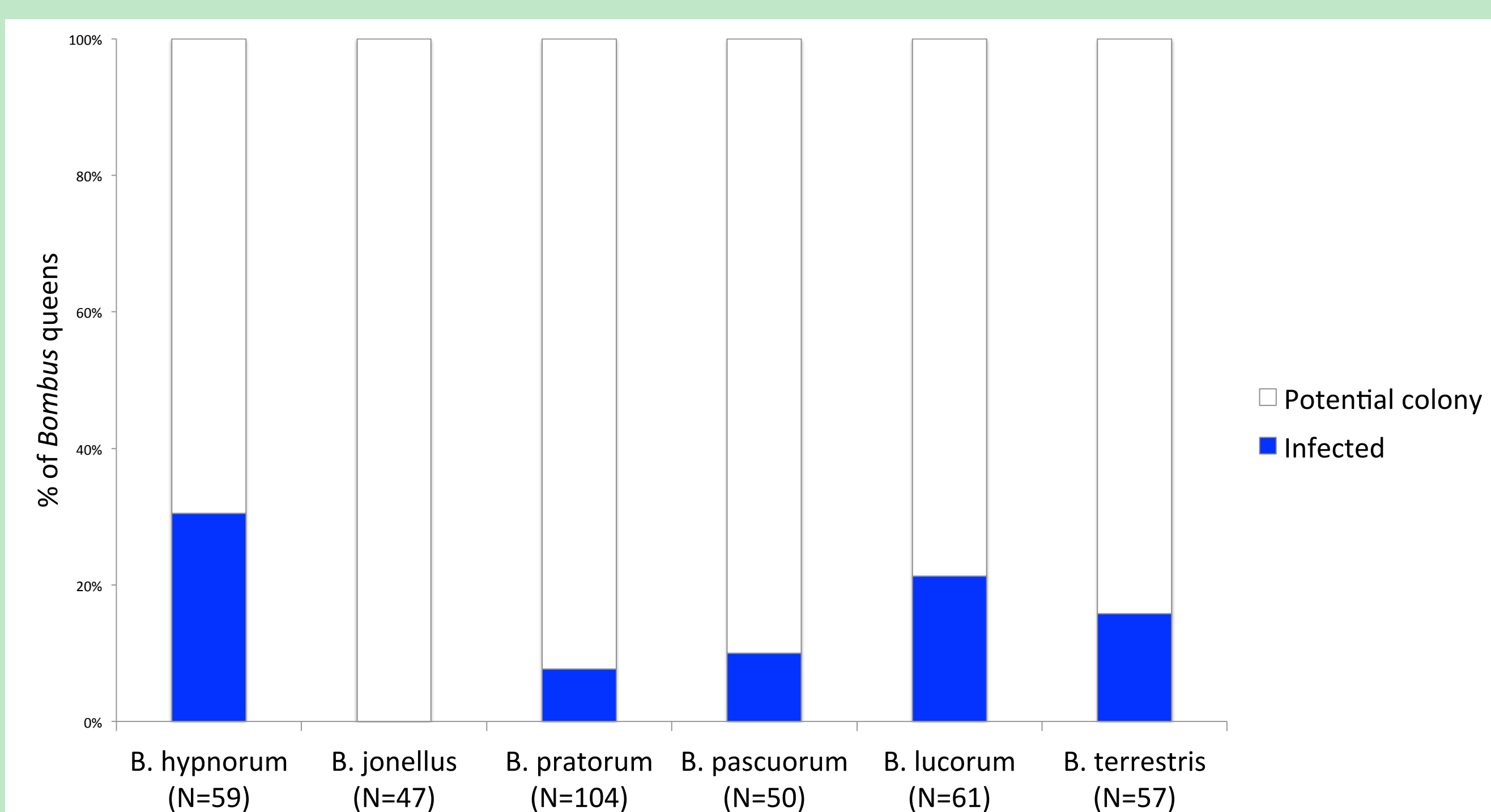


Figure 5 The impact of parasites can be assessed naively (naïve) by assessing the number of queens infected by both parasites, however co-infection (community) and resistance to castration in *B. hypnorum* (probable) predict a lower impact.

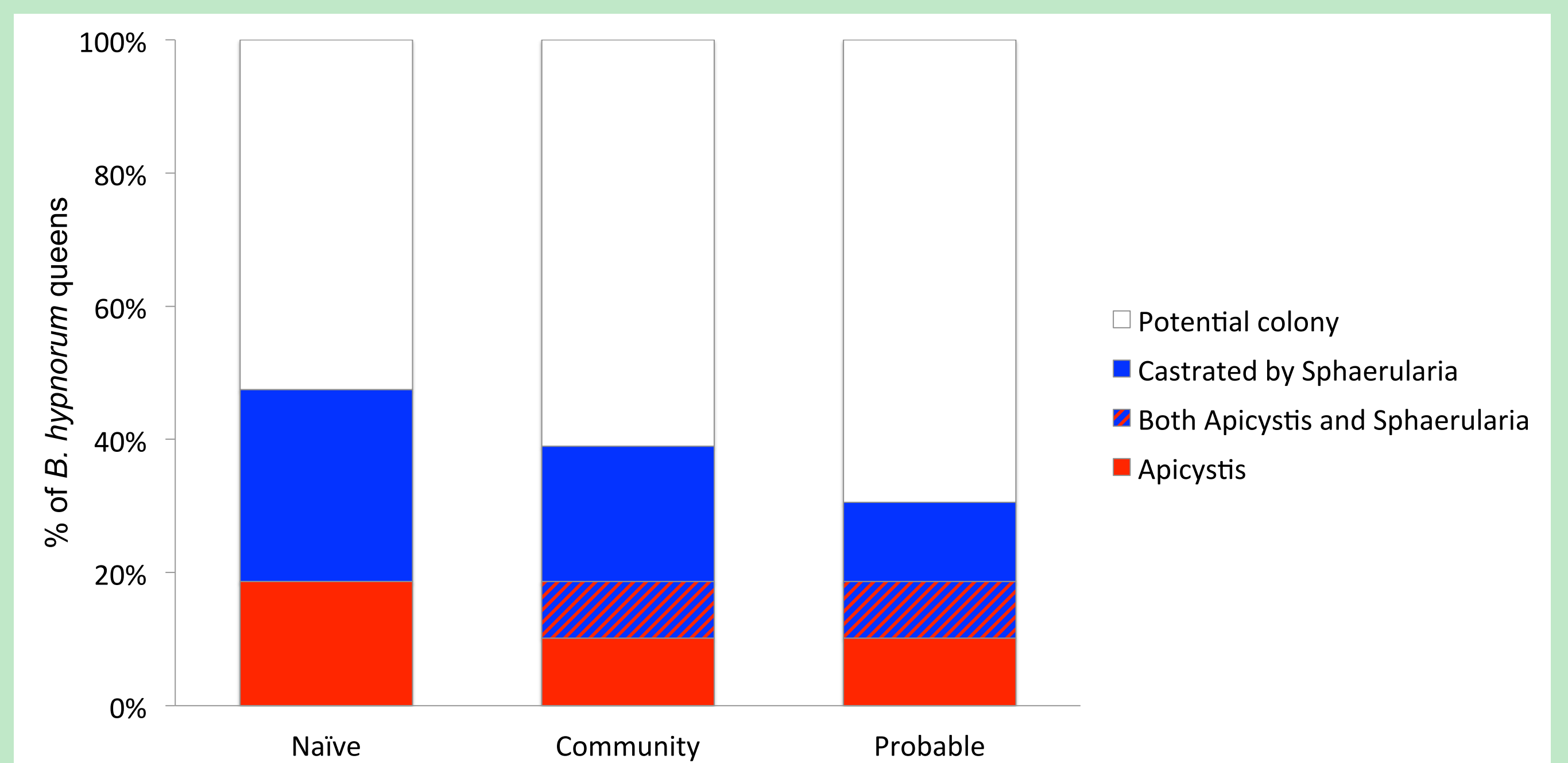
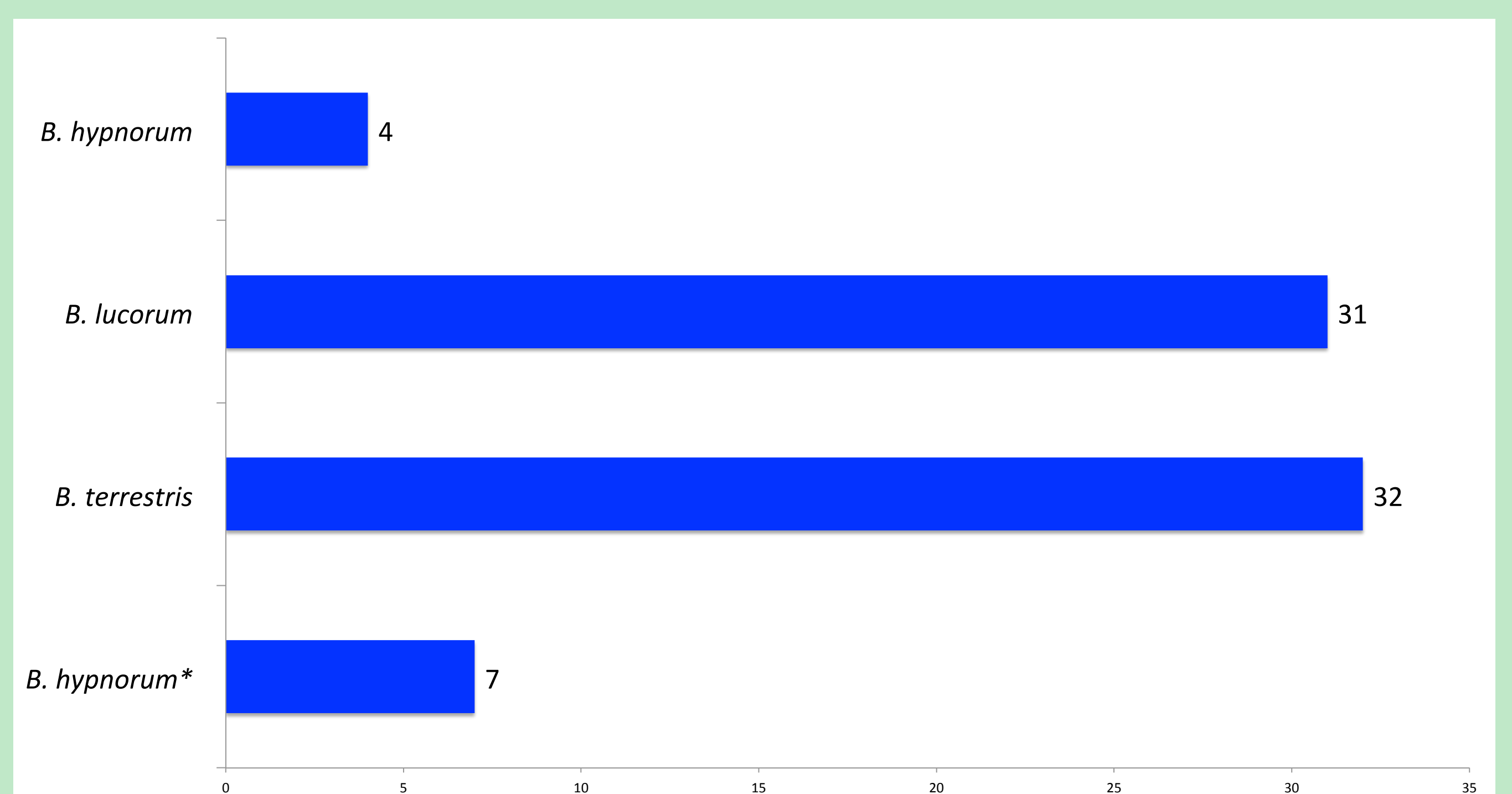


Figure 7 The genetic diversity (minimum number of sex alleles) of non-native *B. hypnorum* was lower than in the native *Bombus* species and in *B. hypnorum** in their native range (Scandinavia).



Conclusion

High parasite prevalence (Fig. 4) and low genetic diversity (Fig. 7) have not restricted the rapid range expansion of *B. hypnorum* across the UK⁴. Due to the high prevalence and the lower impact of *S. bombi* on *B. hypnorum* (Fig. 5), *B. hypnorum* may absorb parasite pressure from native bumblebees⁴. Although *B. hypnorum* may compete with our native species for resources, such as food and nesting sites, as a pollinator of crops and wildflowers, it may be a beneficial addition to the fauna.

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