

Characterising Floral Resource Availability for Pollinators at the National Botanic Garden of Wales



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Introduction

Declines in the abundance and variety of plants and pollinators have been observed in recent years. Arguably the main reason is agricultural intensification, resulting in a decrease in available forage for pollinators. We know pollinator foraging is influenced by local vegetation and how it changes throughout the season but a long-term grasp of variability in floral resource over the season is lacking. Previous studies have also left conflicting findings on whether native or non-native plants are better for supporting pollinators, which we analyse here, along with determining whether honeybees have a preference for plants of one native status over another. Illustrating the differences between native and horticultural plants could help us to improve horticultural areas, leading to gardens which are visually attractive to humans and pollinators.

Aims/Objectives

How does floral resource availability change over the season in terms of the number of taxa, the area covered by plants, and diversity?

Are there differences in the number of taxa provided by, and the diversity of, horticultural, native and nativehorticultural plants?

Are honeybees selective in their choice of horticultural, native and native-horticultural plants?

Methods

Floral surveys were carried out at the National Botanic Garden of Wales in Carmarthenshire (2015-2019). Over 750,000 sqm of land were monitored, resulting in a list of plants in flower for each month, along with additional information such as area covered.

The 1994 unique taxa were assigned to one of the following categories: horticultural, native or native-horticultural (one which could not easily be put into either the native or horticultural category).

Finally, the proportion of horticultural, native and native-horticultural genera available in the garden was compared to the proportions found in honey taken from beehives present in the gardens to see whether honeybees are selective in their choice of forage.

Results

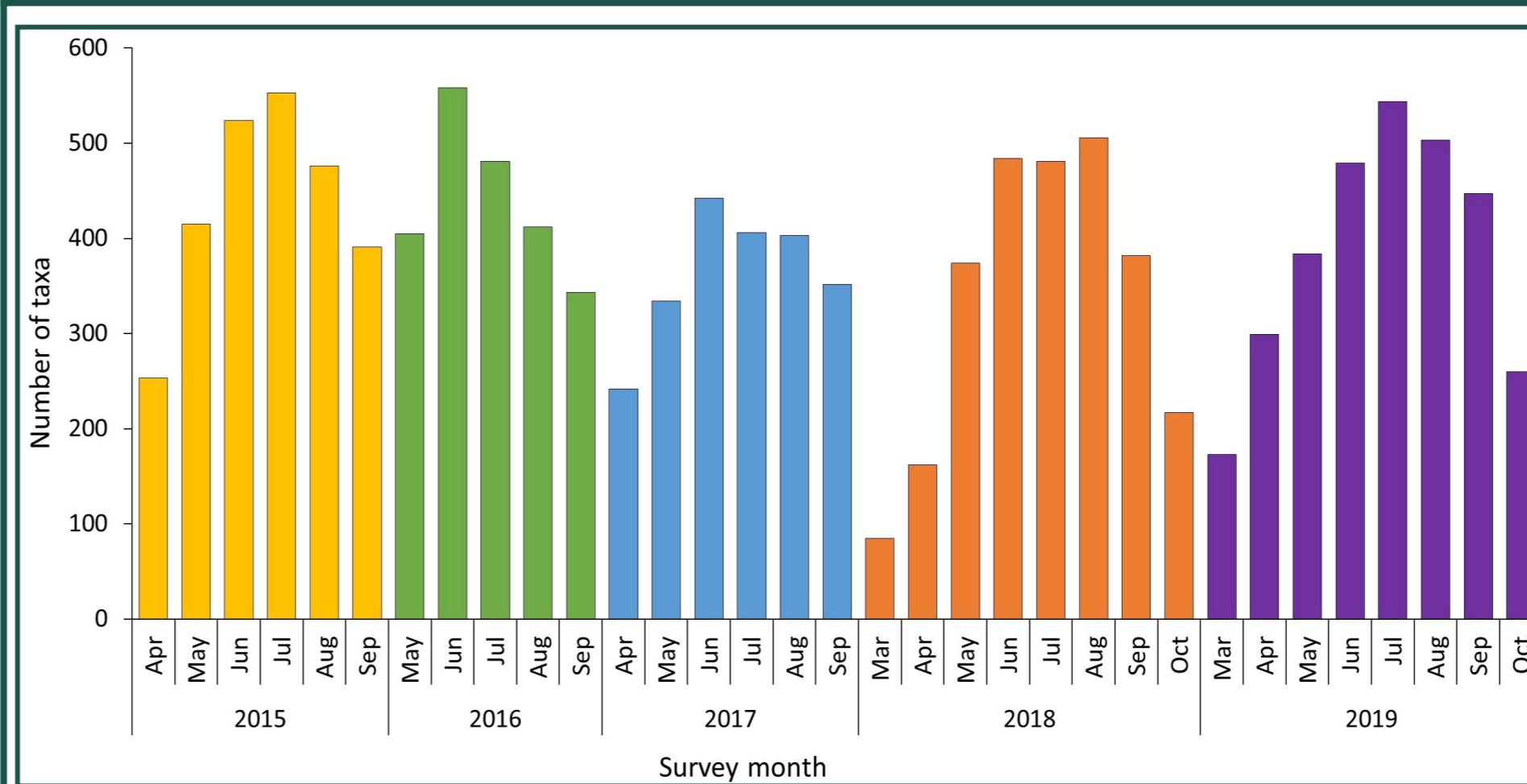


Figure 1. Number of taxa recorded per survey month. The peak always falls between June and August and never increases following August. The month in which the fewest taxa were recorded always occurred in the first or last month that the survey was carried out in that year.

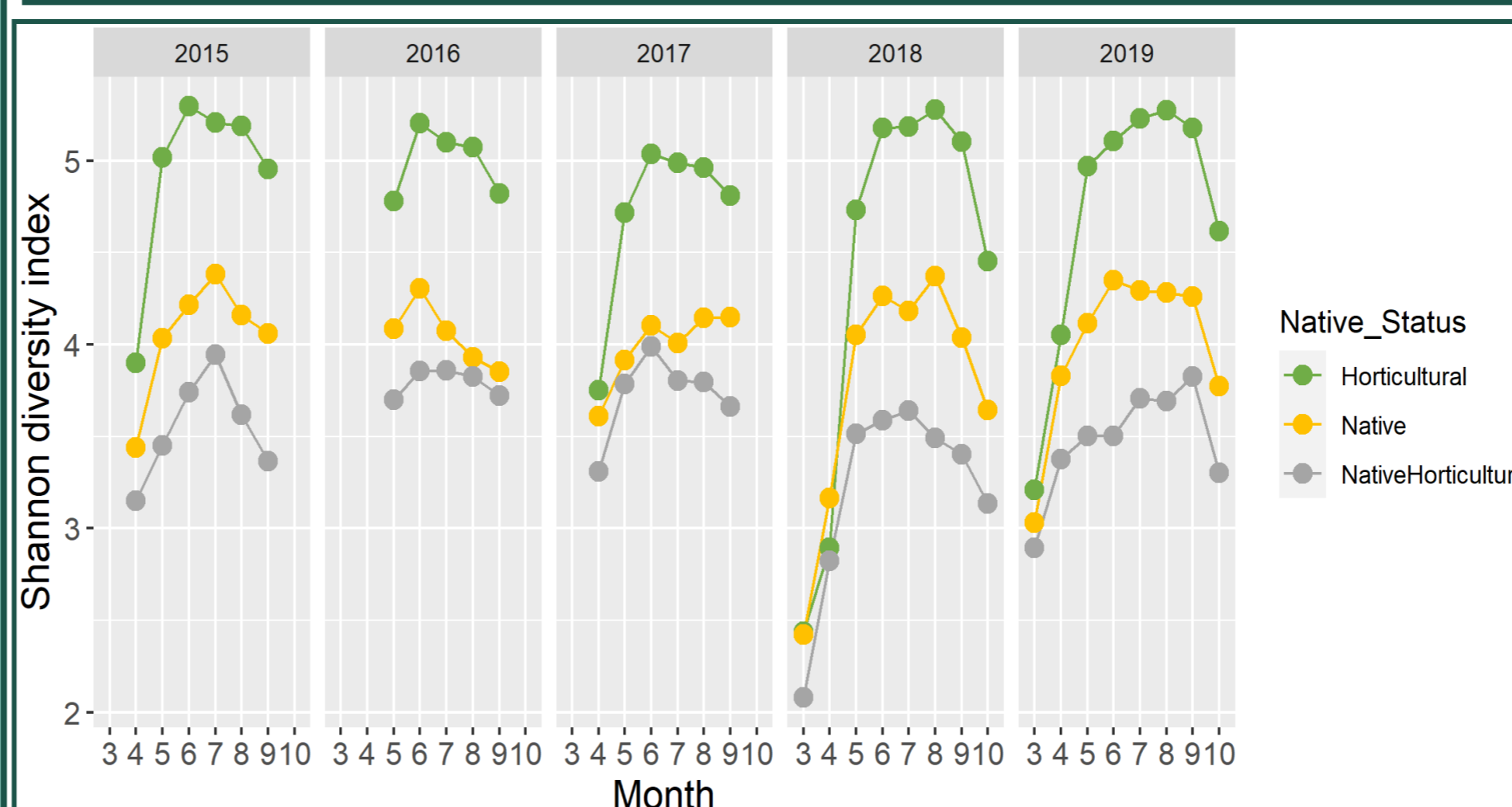


Figure 2. Shannon diversity indices for horticultural, native and nativehorticultural plants each month. Statistically, native status significantly affected the diversity index result ($X^2=49.76$, $p<0.0001$).

	Garden		Honey	
	Number of genera	Percentage %	Number of genera	Percentage %
Horticultural	387	60	57	46
Native	70	11	11	9
Native-horticultural	188	29	57	46

Table 1. Differences between the proportion of horticultural, native and native-horticultural genera found in the garden compared to proportions identified in honey samples. A chi-square test showed these proportions to significantly differ. ($X^2=16.41$, $p<0.001$).

Discussion/Conclusions

The floral surveys revealed that the number of taxa and diversity peak in summer but the area of the gardens covered by flowering plants was highest in April or May. This suggests that there may be more choice for pollinators in summer, but potentially less abundance.

There was higher diversity of horticultural plants than native plants, which has implications for the pollinators that rely on these plants for survival. This is especially true at the end of the season, implying that any lack in native or native-horticultural plants may be supplemented by horticultural plants. This could benefit honeybees in particular, as they have been described as super-generalists. Nevertheless, the honeybees were shown to be disproportionately foraging on native-horticultural genera compared to what is available in the landscape. If honeybees are selecting against horticultural plants, then it would be of more benefit to plant native or nativehorticultural species in order to reverse the decline seen in pollinators.

References

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