Temporal turnover of plant-pollinator interaction networks

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Abstract

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Abbreviations

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2 Materials and Methods

2.1 Study area and climate information

The Cerrado spans across most of Central Brazil while extending marginally into Bolivia and Paraguay. It comprises of vegetation ranging from open grasslands to scrublands with a sparse distribution of trees, and smaller regions of gallery and close canopy forests. These patches exist side-by-side, resulting in a highly heterogeneous ecosystem (**?**).

Plant-pollinator interactions were surveyed in the Reserva Ecológica do IBGE (hereafter 'IBGE') and in the Protected Area of the Jardim Botânico de Brasília (Brasília's Botanical Garden Protected Area; hereafter 'BBG'). The two study sites are located on the Brazilian plateau (1,100m a.s.l.), within the federally protected conservation site "APA-Gama-Cabeça-de-Viado,", located approximately 30km south of Brasília (15°56'S, 47°53'W). This region is characterized by a well-defined wet summer season that lasts from November until March followered by a dry winter period that extends from May until September.

Data from the IBGE's weather station was used to obtain monthly median temperature and precipitation sum for the past 30 years (1980-2010). Monthly precipitation sum from June 1995 to June 1997 ranged from ? to ? while median temperatures varied between ? to ?. From October 2008 until September 2009, monthly precipitation sum ranged from ? to ? with median temperatures of ? to ?.

2.2 Sampling methods and species identification

Bees are the predominant pollinators in the Cerrado (∼70%) followed by moths (∼12%), hummingbirds (∼3%), bats, (∼2%) and beetles (∼2%)

2.3 Data Analyses

2.3.1 Turnover Analyses

2.3.2 Climate Analyses

2.3.3 Correlation Analyses

3 Results

3.1 Community composition

93 species of plants and 111 species of bees were recorded over the 12-month study period at IBGE. In total, 968 bee-flower interactions, which comprised of 434 unique interactions, were observed. The bee community composition in IBGE was similar to those previously observed in other Cerrado areas (**??**) with Apidae being the richest group (77 spp.) followed by Halictidae (19 spp.), Megachilidae (13 spp.), Andrenidae (1 sp.), and Colletidae (1sp.). Plant species recorded at this site consisted of mainly herbs and shrubs, and belonged to 24 families, the most species rich group being Fabaceae (18 spp.).

Between June 1995 and June 1997, ? unique interactions and ? visitation events between ? plant and ? bee species were recorded in the *cerrado sensu strictu* area of BBG. Although the BBG area contained a more species rich pollinator community, bee families were present in comparable proportions as those observed in IBGE: Apidae (115 spp.), Halictidae (38 spp.), Megachilidae (27 spp.), Colletidae (3 spp.), and Andrenidae (1 sp.). Plants recorded in BBG represented 41 families, consisting of mostly shrubs, some trees, and a few herbs. Similar to IBGE, Fabaceae was the most species rich group in this area (31 spp.), followered by Asteraceae (20 spp.) and Malpighiaceae (17 spp.).

3.2 High turnover

3.3 Climatic factors influence turnover

4 Discussion

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