Surveying the Lepidopteran Community in a Restored Prairie

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Introduction

• The Tecumseh Prairie is a 4-year old restored prairie habitat cultivated in honor of former OSU student Samuel Smith[1].
• Little is known about the prairie succession of invertebrates[2].
• Restored prairies can take over a decade to establish[3], giving a unique opportunity to evaluate baseline levels of insect diversity at the site.
• Here we focus on Lepidopteran diversity, as many species can be used as a proxy to monitor the health and quality of an environment [7, 11].

Materials & Methods

Multiple methods were used to collect as many Lepidopterans as possible:
• Light trap: bright light cast on a white sheet after dark to attract moths
• Aerial traps: pursuit and capture flying insects using a net
• Light/scent trap: attract moths to a sheet after dark to attract moths
• Malaise trap: intercept and preserve

Results

Species found in greatest abundance

Figure 3. The 3 species found in greatest abundance, Colias philodice (A; Lepidoptera: Pieridae), Agriphila vulgivagellus (B; Crambidae), and Caenurgina crassiuscula (C; Noctuidae). As of September 2021, we have not yet collected any prairie specialists species[5, 8, 9].

Invasive Species and Life History

Figure 4. Pieris rapae, the European Cabbage White (A), was the 4th most abundant species. This species was introduced to Quebec in 1860, and spread to Ohio in just 15 years. Today it is the most abundant species in the state[10]. Ailanthus altissima (B) was introduced as an ornamental in 1784 and is now considered an invasive plant. Atteva aurea (C), a tropical moth species, began utilizing the plant in the 1800s, and will form nests in the branches (indicated by arrow). Today the moth can be found across North America in the same range as its new host plant[21].

Trends of diversity

Figure 5. Lepidopteran diversity in September 2021, displayed as the total number of individuals (grey) as well as the number of species (red) in each family. The families with the greatest number of species collected are Noctuidae, Tortricidae, Crambidae, and Nymphalidae. The total lepidopteran species richness is 54. The Simpson’s Index of Diversity is 0.054, indicating a relatively low level of diversity at this site.

Future Work

• Continue to sample throughout peak Ohio Lepidopteran diversity season[4].
• Perform a basic assessment of plant diversity and evaluate common diversity metrics for all lepidopterans surveyed in the spring/summer of 2022.
• Incorporate COI barcodes, e.g. for eye color variant (see below), and to verify phenotypically similar species Colias eurytheme and C. philodice.

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Citations