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Standardizing Spider Guilds and Seasonal Guild Diversity

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STANDARDIZING SPIDER GUILDS AND SEASONAL GUILD DIVERSITY

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Abstract

Spider guilds are often confusing and non-consistent across scientific literature. With a rework of the classification system of guilds, a new standardized classification system can become widely used in future works. Reworking the guild classification system into a checklist-based system based on hunting techniques and hunting locations will be a more consistent method in determining spider guilds. This way, different genera within a family can be placed under a more accurate guild. Not only will the reworking of guilds be helpful, but also using this new system in a yearlong examination of spider guild diversity in an off-season Christmas tree farm. Various methods including, pitfall traps and visual observations will be used to collect spider specimens within individual trees. Data collected from this project will contribute to the knowledge gaps associated with the seasonality of spiders. Also, this would be able to act as a model for how abundant and diverse certain guilds are throughout the year. With this newly acquired knowledge, people and farmers would be able to use spiders as pest control more throughout the year in their crop fields.

Background Information

- There are roughly 1.2 million extant arthropod species (Stork, 2018).
- Spiders make up 48,306 described species (World Spider Catalog 2019) including the 3,800 species located in North America (Bradley, 2012).
- Under the right conditions, spiders can eat 400-800 million tons of prey annually (Nyffeler and Benz, 1987).
- Plants often grow taller when using spiders as pest control (Fig. 1) (Hoefler et al. 2006).
- Spider guilds are divided based on their hunting technique and/or habitat use.
- One study divided spiders into 8 different guilds (Corcuera et al. 2015).
- Another study divided the same families into 5 guilds (Fig. 2) (Hatley and Macmahon, 1980).
- **Research Aims:** Create a new, standardized guild classification system to reduce the confusing current guild systems.
- **Proposed Question:** Using a new, standardized guild classification system, how does the time of year affect the seasonal guild diversity?

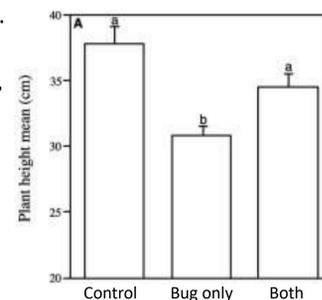


Figure 1. Effects of spiders on plant height (Hoefler et al. 2006).

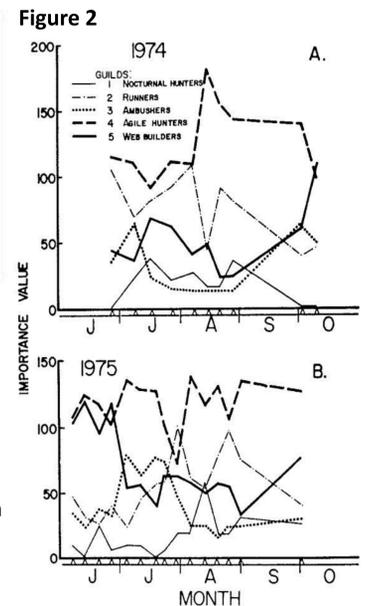


Figure 2. Seasonal importance of five different spider guilds ranging from June to October. Importance was calculated with frequency + density + dominance (Hatley and Macmahon, 1980).

Methodology

Develop novel, standardized guild system

Use new system in seasonal study

Statistical analysis



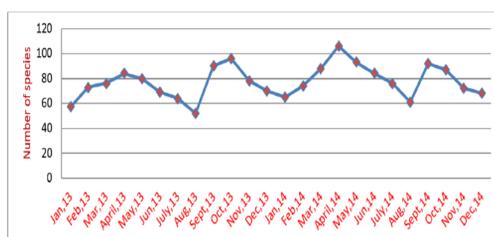
Study Site: Off Season Christmas Tree Farm

Various Sampling Methods

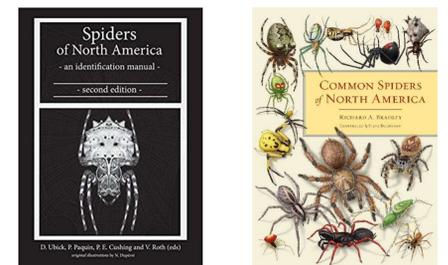


Table 1. New standardized guild categories. New categories taking into consideration both hunting technique and habitat use.

Hunting Technique	Active Hunter	Ambushers/Stalkers	Nocturnal	Web Builders
Habitat Use	Ground	Vegetation	Web Building along Ground	Aerial Web Builders



Examine Seasonal Variance and guild combination variance among seasons



Spider Identification Keys and Guides

Expected Results

- It is expected that **certain guild combinations will not be present**, while some guild combinations be abundant.
- Certain **seasonal trends** will be apparent for guilds.
- Example: A guild where the hunting technique of active hunter and ambusher while utilizing the ground and vegetation would maybe be abundant and diverse March through August (Fig. 3).
- It is expected that certain category combinations will not be present, but **some guild combinations be abundant** (fig. 4).

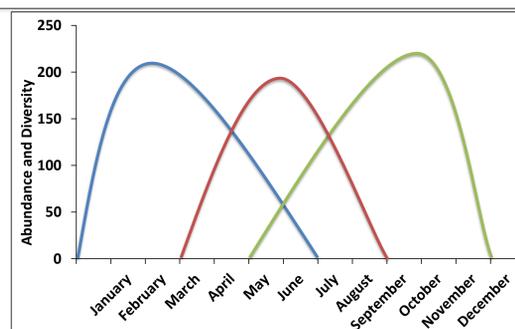


Figure 3. Example seasonal guild diversity of 3 different guilds where each color is a different guild.

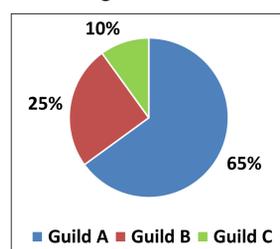


Figure 4. Overall abundance of 3 example guilds. This is accounting for all the seasons.

Conclusions

- Farmers can use these results to understand what type of spider guilds are present in their crop fields.
- Can be used to understand how each guild in their fields are using which crop types (i.e. corn vs. rice).
- Understand the abundance of certain spider guilds during the different seasons.
- Ideally, more naturally pest control (i.e. spiders) can be utilized over pesticides in the future.

Sources

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