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# EFFECTS OF HABITAT STRUCTURE AND PREY AVAILABILITY ON ABUNDANCE OF THE LYNX SPIDER *PEUCETIA VIRIDENS*

JENNY E. JUN AND ANNA R. NOWOGRODZKI

*Abstract:* To test the hypothesis that *P. viridens* abundance varies with habitat structure and insect abundance, we quantified habitat structure as well as numbers of insects and *P. viridens* caught with sweep nets. Spider abundance varied among habitats and increased with flower number. Neither habitat nor insect abundance in sweep net samples affected *P. viridens* abundance. *P. viridens* abundance may be driven more by pollinator abundance (which probably responds to flower number) than by the abundance of insects within the vegetation.

*Key Words: oxyopidae*

## INTRODUCTION

Spider abundance may respond to physical habitat structure and prey abundance (Arango et al. 2000, Foelix 1996). Some spiders select habitats with greater prey abundance, though some do not (Foelix 1996). We hypothesized that abundance of *Peucetia viridans* (Oxyopidae), the green lynx spider, would increase with increasing prey abundance and would respond to differences in physical habitat structure. Because we focused on physical habitat structure and its effect on prey availability, we examined insects within the vegetation, rather than flying insects visiting the patch.

## METHODS

We sampled four 1 $m^2$ plots in each of three habitat types at Palo Verde National Park in Costa Rica: areas dominated by *Justicia comata* (Acanthaceae), a mix of low grass and *J. comata*, and low grass only. *J. comata* was producing abundant flowers at the time of sampling. In each plot, we counted the number of flowers and visually estimated percentages of green and brown vegetative ground cover. To estimate mean plant height, we measured the height of three haphazardly selected plants in each plot. In *J. comata* plots, we counted the number of stems per plot. In mixed and low grass plots where this was not practical, we counted stems in three haphazardly placed quadrats of 222

$cm^2$ area, and then estimated total stem density/$m^2$. We assessed abundance of spiders and insects by sweep netting eight times in a crosshatched pattern covering the entire plot area, and counting all individuals in the samples.

We used JMP 5.0.1 to perform one-way ANOVAs to determine whether habitats differed in structural characteristics, insect abundance, or *P. viridens* abundance. We used linear regression to assess whether *P. viridens* abundance was significantly related to number of flowers, percent vegetation cover, mean plant heights, or insect abundance across habitats.

## RESULTS

*J. comata* plots had greater mean plant height (F = 26.3, df = 2, 9, P = 0.0002, multiple-comparison Tukey test P < 0.05) and total number of flowers (F = 17.8, df = 2, 9, P = 0.0007, multiple-comparison Tukey test P < 0.05) than both mixed and grassy plots. Mixed plots had higher percent green cover than grass plots (F = 5.54, df = 2, 9, P = 0.027, multiple-comparison Tukey test P < 0.05), but the reverse was true for percent brown cover (F = 7.07, df = 2, 9, P = 0.014, multiple-comparison Tukey test P < 0.05). Stem density data were not statistically comparable because of different sampling methods, but stem density appeared much higher in mixed and grassy plots than in *J. comata* plots.

*P. viridens* abundance was significantly higher in *J. comata* plots than in grass plots (F = 4.46, df = 2, 9, P = 0.045, multiple-comparison Tukey test P < 0.05). Across all three habitats, *P. viridens* abundance increased significantly with increasing total number of flowers ($r^2$ = 0.39, df = 10, P = 0.029; Fig. 1). There was a marginally significant trend towards increasing *P. viridens* abundance with increasing mean plant height ($r^2$ = 0.29, df = 10, P = 0.074).

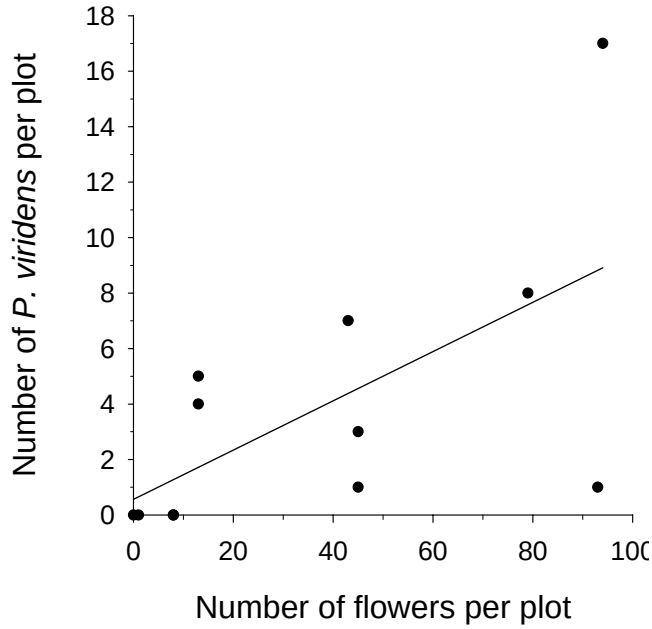


Figure 1. Number of the spider P. viridens per 1 $m^2$ plot, as a function of number of flowers per plot, including data from three habitat types (J. comata only, a mix of J. comata and low grass, and low grass only) at Palo Verde, Costa Rica.

There was no significant difference among insect abundances in the three habitats (F = 1.23, df = 2, 9, P = 0.34). Insect abundance had no significant effect on abundance of *P. viridens* ($r^2$ = 0.06, df = 10, P = 0.45).

## DISCUSSION

The number of *P. viridens* increased with number of flowers across all three habitats, even though the habitats differed structurally. More flowers may attract more pollinators, and lynx spiders may be responding to the abundance of insects vis-

iting flowers, which are unlikely to be caught in sweep nets. There may also be habitat differences important to *P. viridens* that we did not assess. Our design could be improved by using comparable measures of stem density and foliage height diversity. Our findings suggest that research examining the relationship between pollinator abundance and *P. viridens* abundance across varying flower densities would be informative.

## LITERATURE CITED

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