THE SOUTHWESTERN NATURALIST 43(4):430–436 DECEMBER 1998

THE EFFECT OF SPIDER-MEDIATED FLOWER ALTERATION ON SEED PRODUCTION IN GOLDEN-EYE PHLOX

JAMES R. OTT, JIM A. NELSON, AND TRACI CAILLOUET

Department of Biology, Southwest Texas State University, San Marcos, TX 78666-4616

ABSTRACT—The crab spider, *Misumenops celer* (Thomisidae) (Hentz), is a sit-and-wait predator that forages for insects on the flowers of golden-eye phlox, *Phlox roemeriana* (Scheele) (Polemoniaceae). Spiders often alter flower morphology of this species by tying together two of the flower's five petals to form a "bower" that they then occupy. Access to the flower's corolla tube is partially to completely obstructed by bower construction in 70% of spider-altered flowers. We investigated the effect of bower construction on seed production by comparing the number of matured seeds in unaltered and spider-altered flowers in a natural population of *P. roemeriana* during the spring of 1996 in Hays Co., Texas. Spider-altered flowers produced significantly fewer seeds per fruit ($\bar{X}$ = 3.4, n = 135) than did unaltered flowers ($\bar{X}$ = 5.5, n = 108). This 38% reduction was attributable to a significantly higher incidence of spider-altered flowers failing to produce any seed, 37% versus 9% for unaltered flowers. Because *P. roemeriana* is an annual species and at our study site typically produced only a single flower, the observed reduction in seed production due to bower construction resulted in a significant decrease in female lifetime reproductive success for those plants whose flowers were modified. Spiders altered up to ca. 5% of flowers in the population at times during the flowering season. At the observed bower frequencies, the effect of *M. celer* on *P. roemeriana* seed production at the population level is minimal.

RESUMEN—La araña de mar, *Misumenops celer* (Thomisidae) (Hentz), es una especie rapaz que "se sienta y espera" para forrajear insectos en las flores del flox de ojo aureo (golden-eye phlox), *Phlox roemeriana* (Schelle) (Polemoniaceae). Las arañas frecuentemente alteran morfologicamente la flor de esta especie, anudando dos de los cinco pétalos de la flor, formando un "arco" el cual después ocupan. El acceso a la corola de la flor está parcial a completamente obstruido debido a la construcción del arco en 70% de las flores alteradas por la araña. Investigamos el efecto de la construcción del arco en la producción de semillas, comparando el número de semillas maduras en flores alteradas y no alteradas por la araña en una población natural de *P. roemeriana* durante la primavera de 1996 en el Condado de Hays, Texas, E. E. U. U. Las flores alteradas produjeron significativamente menos semillas por fruto ($\bar{X}$ = 3.4, n = 135) que las flores no alteradas ($\bar{X}$ = 5.5, n = 108). Esta reducción de 38% fue imputable a una incidencia significativamente más alta de flores alteradas fallando a producir ninguna semilla, 37% contra 9% en las flores no alteradas. Porque *P. roemeriana* es una especie anual y porque en nuestro sitio de estudio típicamente produjo sólo una flor, la reducción observada en la producción de semillas debido a la construcción del arco resultó en un decremento significante en el éxito reproductivo de la vida en las plantas en que las flores fueron modificadas. Las arañas alteraron hasta ca. 5% de las flores en la población a veces durante la temporada de las flores. En las frecuencias observadas del arco, el efecto de *M. celer* en la producción de semillas por *P. roemeriana* al nivel de la población es mínimo.

Variation in pollinator availability, flower herbivory, and subsequent seed predation can each contribute to variation in fitness within populations and to the dynamics of plant populations (Harper, 1977; Crawley, 1983; Denno and McClure, 1983; Crawley, 1989). Spiders of a number of different families commonly use angiosperm flowers as hunting sites and thus interact with insect pollinators, flower herbivores, and seed predators (Gertsch, 1979; Wise, 1993). The net effect of the presence and activities of flower-dwelling spiders on plant fitness likely depends on whether the spider is present during anthesis, duration of its stay, its relative efficiency as a predator of insect visitors, and spider density. For example, the presence of the green lynx spider, *Peucetia viridans*, decreased seed set per inflorescence