

EARLY ABSCISSION IN HACKBERRY LEAVES BEARING *PACHYPSYLLA* GALLS (HOMOPTERA: PSYLLIDAE)

ELAINE SCUDIERI STROMGREN AND CARMINE A. LANCIANI
Department of Zoology, University of Florida, Gainesville, FL 32611

Early leaf abscission has been reported in several species of plants attacked by insects, e.g., leaf miners (Faeth et al. 1981), gall aphids (Williams & Whitham 1986), and psyllids that do not form galls (Clarke 1962, 1963). In northern Florida, the leaves of hackberry (*Celtis leavigata* Willd.) are commonly exploited by the glabrous nipple gall *Pachypsylla* sp. (possibly *Pachypsylla celtidiscurbita* Riley, Yang & Mitter 1994). Observations of very early leaf fall from hackberry trees on the University of Florida campus in Gainesville, Florida, in late August revealed that most fallen leaves bore galls of this psyllid.

Accordingly, we sampled leaf fall from hackberry trees throughout the autumn of 1995 to determine whether galled leaves represented a greater proportion in early than in late leaf falls. We chose 3 widely separated sites on the University of Florida campus. Site 1 was a large, solitary hackberry tree near Keys Residential Complex, site 2 was a small patch of hackberry trees of various sizes on the northwest edge of campus, and site 3 was a large, solitary hackberry tree near the Psychology Building. At each site on 8-IX-95, we delineated a sample area (1.5 m by 1.0 m) where we cleared all leaves. On 29-IX-95, 6-XI-95, 21-XI-95, 29-XI-95, and 6-XII-95, we collected all leaves in each sample area. We later inspected the leaves for galls and calculated the percent of leaves bearing galls. We analyzed the changes in percent galled leaves over time at each site with an ANCOVA model after arcsine transforming percent data.

Our analysis of the data presented in Table 1 revealed that as autumn progressed, leaves bearing galls represented a significantly decreasing percent of fallen leaves ($P = 0.0009$). The percent of fallen, galled leaves averaged over all 3 sites showed the expected trend: 50.55% (29-IX-95), 44.90% (6-XI-95), 40.97% (21-XI-95), 31.27% (29-XI-95), and 30.60% (6-XII-95).

Early abscission of exploited leaves may be an induced plant defense because it can kill exploiters by preventing them from completing development (Williams & Whitham 1986; Prezler & Price 1993). However, leaf abscission may more often be viewed as a plant response to leaf damage, especially if the attacker emerges before leaf abscission or completes development even in abscised leaves (Stiling & Simberloff 1989). Whether adults of *P.* sp. emerge before leaf abscission or nymphs complete development in abscised leaves is not known. But, adults of the closely related *Pachypsylla celtidismamma* (Fletcher) do emerge from galls in *Celtis occidentalis* L. before leaf fall (Lill 1998). Thus, early leaf abscission in trees attacked by gall-making psyllids could be simply a response to leaf damage.

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SUMMARY

We sampled leaf fall from hackberry trees at 3 sites on the University of Florida campus in Gainesville, Florida, during the autumn of 1995 to determine whether leaves bearing galls represented a greater proportion of total leaves in early than in late leaf falls. The proportion of fallen, galled leaves decreased significantly from 29-IX-95 to 6-XII-95. Early leaf abscission in trees attacked by gall-making psyllids could be simply a response to leaf damage.

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TABLE 1. PERCENT LEAVES BEARING *PACHYPSYLLA* SP. GALLS (SAMPLE SIZES IN PARENTHESES) FOR EACH DATE AND SITE.

	Site 1	Site 2	Site 3
29-IX-95	53.82% (275)	42.29% (253)	56.50% (200)
6-XI-95	48.67% (226)	46.18% (262)	39.45% (218)
21-XI-95	45.15% (268)	35.02% (317)	43.97% (257)
29-XI-95	38.10% (189)	31.37% (204)	26.25% (259)
6-XII-95	37.89% (293)	23.70% (173)	28.17% (387)

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