



Increased Population Densities of *Amblyomma americanum* (Acari: Ixodidae) on Long Island, New York

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Increased Population Densities of *Amblyomma americanum* (Acari: Ixodidae) on Long Island, New York

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ABSTRACT: Lone star ticks, *Amblyomma americanum* comprised a significantly greater proportion of total ticks flagged on eastern Long Island and Fire Island, New York, in 1986 and 1990 than in samples reported by other authors from the 1940s (when *A. americanum* was not collected by flagging or from hosts) and the 1970s. Therefore, population densities of *A. ameri-*

canum apparently have increased in recent years on southeastern Long Island, where this species now is distributed widely.

The lone star tick, *Amblyomma americanum* (L.), is an aggressive species that attaches to hu-

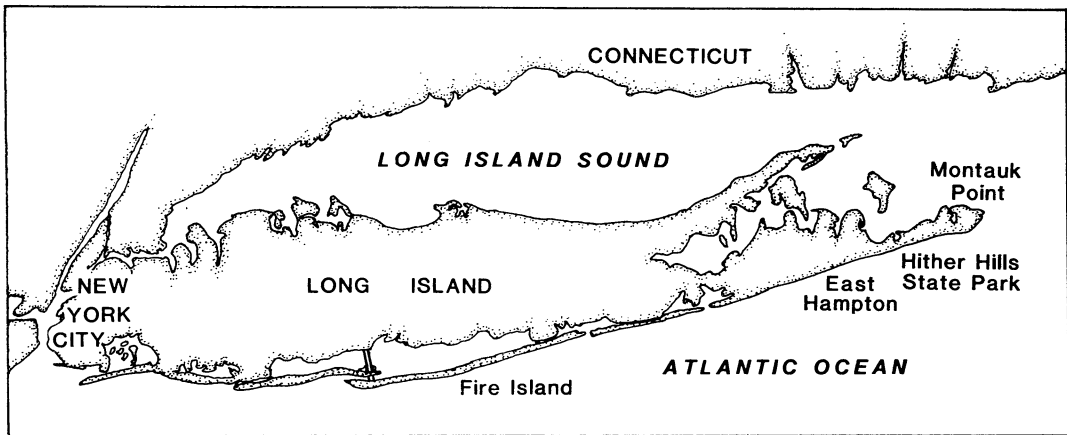


FIGURE 1. Map of Long Island, New York, showing collection sites of *Amblyomma americanum*.

mans in all active stages and that potentially can transmit causative agents of several diseases, including Rocky Mountain spotted fever and Lyme disease (Strickland et al., 1976; Schulze et al., 1984). In a recent review, Hair and Bowman (1986) gave the distribution of *A. americanum* as extending from west-central Texas north to Missouri and east to the Atlantic coast, with the northernmost limit of coastal populations of economic importance (Hair and Bowman, 1986: fig. 18.1) in southern New Jersey. More northerly, but sparse, populations have been reported from New York, Connecticut, Massachusetts, Maine, and even Labrador (Hooker et al., 1912; Clifford et al., 1961; Good, 1973; Anderson and Magnarelli, 1980). In this paper we report populations of *A. americanum* on Fire Island and eastern Long Island, New York, that are far denser and more extensive than previously reported this far north.

Questing *A. americanum* were collected by flagging on eastern Long Island and on Fire Island, a barrier island off the south shore of Long Island (Fig. 1). The eastern Long Island samples were taken with a light blue corduroy flag (roughly 1.1×1.2 m) in Montauk Point State Park at the northeastern end of the South Fork of Long Island on 16 June 1986. Additional samples were taken in Montauk Point State Park and Hither Hills State Park with a 1-m² off-white blend broadcloth flag on 13 June 1990. On Fire Island, nymphs were collected by flagging (using unbleached cotton muslin flags, see Ginsberg and Ewing [1989a, 1989b] on 1–10 July 1986, 24 June–12 July 1987, 28 June–14 July 1988, and 12 June–4 July 1989. Ticks also were collected from living deer (individuals captured in Clover

traps or immobilized, see O'Connell et al. [1988]) and from specimens found dead from natural causes on Fire Island.

Flagging samples in Montauk Point State Park comprised 153 nymphal and adult *A. americanum* in about $\frac{1}{2}$ hr of flagging in 1986, and 191 *A. americanum* in 20 min of flagging in 1990. Lone star ticks also were collected by flagging in Hither Hills State Park (2 *A. americanum* in 20 min of flagging) and at 7 sites on Fire Island. They were collected from deer at 5 additional sites on Fire Island. Densities of free-living ticks declined from east to west (Spearman rank correlation of number of ticks captured per minute in 1986 with distance from the east end of Fire Island, $r_s = -0.820$, $P < 0.05$). The highest recorded densities on Fire Island were an average of 2.2 nymphs per 5-min sample ($n = 10$ samples) at Watch Hill in 1988 and 4.5 nymphs per 5-min sample ($n = 15$) at Talisman (in an area that had been treated with permethrin-treated cotton balls the previous year) in 1989. At Montauk Point, 5.6 nymphs were collected per 2-min sample in 1990.

These results suggest that *A. americanum* is established on eastern Long Island and Fire Island. In contrast, extensive studies of Long Island tick populations in the 1940s did not detect *A. americanum*. Anastos (1947) collected 894 ticks from mammals and 15 while flagging at Montauk Point, Hither Hills, and East Hampton, but none was *A. americanum*. Collins et al. (1949a, 1949b) collected 2,801 ticks from mammals and birds in 1946–1947 and 1,226 ticks from mammals over much of Long Island (including Montauk Point) in 1948, without finding a single *A. americanum*. In 1971, Good (1972,

TABLE I. Ticks collected by flagging in eastern Long Island, New York.

Study sites	Sample year	Number of ticks flagged	Number of <i>Amblyomma americanum</i> collected	Reference
Montauk Point, Hither Hills State Park, Hook Pond (East Hampton)	1946	15	0	Anastos, 1947
Near Montauk Point	1971	853	17	Good, 1973
Montauk Point State Park	1986	200	153	This study
	1990	199	191	This study

1973) collected only 19 *A. americanum* from 3,845 ticks collected from animals and by flagging on a ranch near Montauk Point.

Densities in recent samples cannot be compared statistically with the samples from the 1940s and 1970s because the sampling techniques in the older studies were not reported in sufficient detail. However, the proportion of the ticks collected by flagging that were *A. americanum* (Table I) increased dramatically between the earlier samples and those taken since 1980. A heterogeneity *G*-test (Sokal and Rohlf, 1981) of the number of ticks other than *A. americanum* vs. the number of *A. americanum* collected in the samples cited in Table I, indicates significant overall heterogeneity among years ($G = 1,062.196$, $P < 0.001$), with the samples taken before 1980 comprising an insignificant subset ($G = 0.599$, $P > 0.1$). In 1990 at Montauk Point State Park, 73 *A. americanum* were taken in 10 min of flagging at 1 site, and 80 were collected in 10 min of flagging at scattered sites in the park. These results, along with the collections from Hither Hills State Park and Fire Island, suggest that *A. americanum* now is distributed widely along the Atlantic coast of eastern Long Island. We have no previous data from Fire Island. However, the lack of *A. americanum* in extensive samples from much of Long Island over 3 yr in the 1940s, and the small number collected in intensive samples near Montauk Point in 1971, suggest that this species was previously rare, and that population densities of *A. americanum* have increased markedly in recent years on eastern Long Island.

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