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R. E., Parazitologický ústav ČSAV,
Branišovská 31,
370 05 České Budějovice, ČSSR

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ANALOGOUS CASES OF LYME DISEASE

In Northeastern USA, the vector of Lyme disease is the tick *Ixodes dammini* and in Europe *I. ricinus* (Matuschka F. R., Spielman A., 1986: Exp. Appl. Acarol. 2: 337—353).

In Northeastern USA, the great majority of cases occurs within the coastal areas with the highest tick infestation level (Steere A. C. and Malawista S. E., 1979: Ann. Int. Med. 91: 730—733), but a few cases occur outside but adjacent to the area of tick infestation (Magnarelli L. A., Anderson J. F. and Chappell W. A., 1984: Yale J. Biol. Med. 57: 619—626; 1986: Pfizer Central Res. Bull.). This phenomenon is best illustrated on the north shore of Massachusetts (Fig. 1). Here around the Cape Ann area there is a small disjunct *I. dammini* infestation (McEnroe W. D., 1984: Acarology 25: 224—229). It was postulated, that at the northern limit of its range, the successful completion of this ticks life cycle was determined by the late fall to early winter temperature (McEnroe W. D., 1985: Exp. Appl. Acarol. 1: 179—198; in press: Folia parasitol.) which appeared to be limited to a normal average mean November/December of 2.8 °C or above, an isotherm which delimits the range of *I. dammini* in the northeast. This mean is 2.9 °C in the immediate coastal area of Cape Ann declines to 2.3 °C about 15 km inland. Several cases of Lyme disease have been noted here adjacent to but outside of this isolated tick infestation.

This tick is the persistant vector required to maintain the epizootic (Anderson J. F., Magnarelli L. A., Burgdorfer W. and Barbour A. G., 1983: Am. J. Trop. Med. Hyg. 32: 818—824) and is the known disease vector. However biting flies have been implicated in transmission of the disease to humans (Anderson J. F., Magnarelli L. A., 1984: Yale J. Med. Biol. 57: 627—641; Doby J. M., Couatarmanach C., Macallan D. C., Hughes C. A. and Bradlow A., 1987: British Med. J. 294: 1062—1063; Cousanca A., Chevrant-Breton J., Martin A., Legay B. and Geuguen C., 1987: Rev. Appl. Entomol., Ser. B, Abstract 1720, 75: 215; Wilke J., 1987: Boston Globe, Boston). Non-persistent vectors, although unable to maintain an epizootic, could account for Lyme disease present outside of the tick infested area of Cape Ann especially since the extensive marshes present in this area are a prolific source of biting flies. Also such vectors could account for the large proportion of cases of Lyme disease, within a tick infested area,

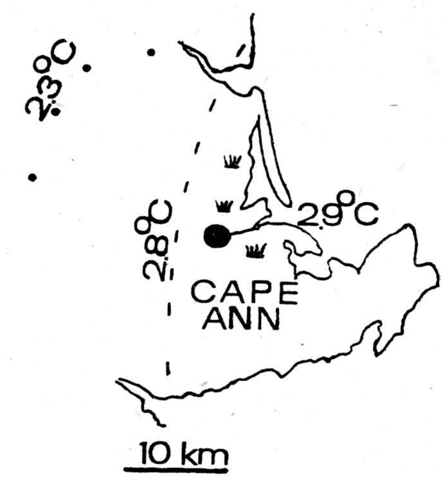

Fig. 1. Cape Ann area of the north shore of Massachusetts. The normal November/December 2.8 °C mean isotherm delimits the *Ixodes dammini* infestation. Large circle, focus of Lyme disease in the tick infested area. Small circles, isolated cases outside tick infestation.

without a history of tick bites (Williams C. L., Curran A. S., Lee A. C. and Sousa V. O., 1986: Am. J. Public Health 77: 62—65).

Secular variation of the November/December means in the marginal limit of the tick range, i.e. East Wareham normal 3.0 °C, 1930—1986 record minimum and maximum —0.5 °C, 7.5 °C, results in extreme variation in the fall adult infestation level (McEnroe W. D., 1977: Acarologia 18: 618—625; 1978: ibid 20: 214—216; 1985: Exp. Appl. Acarology 1: 179—184; unpublished observations). Such a trend of increased infestation occurred from 1984 to 1987 after low levels of infestations since 1969 except for the outbreak in 1975.

During this period there has been a tremendous increase of the human population at risk within the tick infested coastal area. The recent recognition of Lyme disease, with its outlier cases, has given the false impression that this tick can invade interior Massachusetts.

W. D. Mc ENROE,
Suburban Experiment Station
240 Beaver Street
Waltham, MA 02154 USA