

OBSERVATIONS ON PERIODICAL CICADAS (BROOD XIII) IN INDIANA IN 1990

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ABSTRACT: Periodical cicadas of brood XIII (*Magicicada septendecim*, *M. cassini*, and *M. septendecula*) emerged in northwestern Indiana and northern Illinois in June 1990. Cicadas were recorded in Lake, Porter, and LaPorte Counties in Indiana. The distribution of brood XIII in Indiana has been relatively stable with no apparent change in the brood's distribution since 1888. Historical records of cicadas in the three counties suggest that brood XIII may have been ancestral to brood XIV which is ancestral to brood X. The combination of a one year deceleration of the cicada's life cycle followed by a four year acceleration event can account for all the 17-year cicada broods in Indiana.

Brood XIII, one of the 17-year cicada broods, emerged as expected in late May and early June in northwestern Indiana. The emergence was lighter than the 1987 emergence of brood X. All three species were reported to have emerged with *Magicicada septendecim* (Linnaeus) being the predominant species with *M. cassini* (Fisher) and *M. septendecula* Alexander and Moore in generally lower numbers.

The emergence was confined in the following localities: in Lake County, Crown Point, Hobart, Highland, and Ainsworth; in Porter County, Valparaiso, Chesterton, and the National Lake Shore; and in LaPorte County, LaPorte and the western part of the county. Figure 1 shows the distribution of Brood XIII in Indiana in 1990.

Egg nests were collected from hawthorn trees in Valparaiso, and the eggs were counted to determine the hatch rate. The counts showed that 589 eggs out of a sample of 693 hatched for a hatch rate of 85%. This is higher than the 72.2% hatch rate recorded for brood X in 1987 and lower for the hatch rate of 92.6% counted for brood XXIII, a 13-year cicada brood from southern Indiana. The differences in the observed hatch rates may be related to the species of trees sampled, the 1987 drought, and the different hatch rates observed for the three species of cicadas (White, *et al.*, 1982; Lloyd and White, 1983). Studies are currently underway to examine the role of tree species, weather, brood, and cicada species on hatch rate.

Brood XIII is the most stable of the 17-year broods found in Indiana. It has been recorded in the same three northern counties since 1888 (Webster, 1898). Outside of Indiana, brood XIII occurs in northern Illinois, southern Wisconsin, and eastern Iowa. Young (1958) suggested that brood XIII might be the most primitive cicada brood because it is the only cicada brood that inhabits the unglaciated zone of northwestern Illinois and



Figure 1. 1990 distribution of the periodical cicada brood XIII in Indiana.

southern Wisconsin. That scenario is supported by the historical record of cicadas in Indiana. An analysis of historical and collection data from Indiana shows that over 98% of all emergences in Indiana since 1817 are either expected broods, four year accelerations, or one year decelerations from expected broods (Kritsky, 1988). Assuming that brood XIII is the most primitive, then a one year deceleration of brood XIII would give rise to brood XIV, which could have produced brood X by four year accelerations. Electrophoretic data (Simon, 1979) suggesting that brood XIV may be the most primitive brood would require several four year accelerations and one year decelerations to account for all of the cicada broods in Indiana. One year accelerations, also suggested as another mechanism to account for the cicada brood evolution (Dybas and Lloyd, 1966), have not been recorded in Indiana.

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