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## The Periodical Cicada, Brood III, in Iowa

D. ELMO HARDY

The last study of the distribution of brood III in Iowa was apparently that made by Professor Bessey in 1878\*. This report was based upon information obtained from questionnaire postcards, from an inquiry published in the State Agricultural College Quarterly and from interviews with college students. From these sources he received reports of the brood being present in twenty-eight counties the spring of 1878. Many of his correspondents stated that the cicadas were not as abundant in 1878 as they were in 1861 and Professor Bessey wondered if this brood might be dying out. There can be no doubt but that the brood must be decreasing in numbers of individuals and the distribution is becoming more limited into local areas. So much of Iowa has been brought under cultivation in the past sixty-eight years that innumerable cicada habitats must have been obliterated. No population studies or specific distribution records are available, so there is actually no way of making an accurate comparison of the present distribution and abundance with that of the past.

Brood III appeared again the spring of 1946, and a survey of the southern two-thirds of the state was conducted to determine the present distribution and to obtain information on the amount of damage done by the appearance of large numbers of cicadas. Throughout their range in Iowa it was found that their distribution was dependent entirely upon the presence of suitable habitats; every oak grove or woods in many counties was found to be heavily populated.

The first reports of the appearance of this brood came from the city of Des Moines about the 25th of May. A survey indicated that the infestation was rather localized in a relatively new residential district that encroaches into a wooded section of west Des Moines. The sudden appearance of tremendous numbers of cicadas caused considerable alarm among the people of that area and the Department of Agriculture, State Entomologist's Office, Newspaper offices and radio stations were flooded with requests for information concerning these "strange creatures" that were swarming out of the ground and taking over the trees and shrubs. The majority of the people contacted had never before witnessed a cicada brood emergence and knew nothing about the insect. The experience of seeing the seemingly endless hoards of insects coming out of their lawn and yards and crowding each other for space on their ornamental plants was quite disconcerting to the average home owner. This concern was accentuated as the numerous fables concerning their "poisonous sting" and other fabulous attributes circulated throughout the infested region.

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\*1880, Amer. Ento., 3: 27-30.

Brood III occupies all of southeastern Iowa and extends through central Illinois and northern Missouri. It was found in forty-two Iowa counties during this survey. The northeast boundary extends roughly along the course of the Cedar river north of Benton county. Its west boundary extends to about the west edge of Taylor County and north into Webster. The western limit of this brood may possibly extend farther than this study indicates. At the time the western portion was surveyed the weather was cool and rainy, the cicadas were not singing and were difficult to locate. Osburn\* indicated that *Magisicada cassinii* Fisher was very rare in this brood and that it consisted almost entirely of *M. septendecim* Linn. This was not found to be true for the 1946 brood. Approximately fifty percent of the individuals were *cassinii* and in some areas as high as 86% of all the samples taken were this species. Following are the field notes made for each county where periodical cicadas were observed during the 1946 survey. Brood XIX of the thirteen-year race also emerged this year and it is very probably that the two races were mixed together in the southern edge of the state.

Adair County: *Magisicada septendecim* were abundant in most wooded areas, some *M. cassinii* were present.

Adams County: *M. cassinii* were predominantly abundant in most woods.

Appanoose: *M. septendecim* were predominantly abundant in all wooded areas.

Benton: *M. cassinii* predominant, present in moderate numbers in a local area in southwest corner of county.

Boone: Mixed population of *M. septendecim* and *cassinii*, abundant all along the course of the Des Moines River.

Cedar: *M. septendecim* predominant, in moderate numbers, along the Cedar River.

Clark: *M. cassinii* predominant, abundant in most wooded areas.

Dallas: *M. septendecim* predominant, abundant along Raccoon River.

Davis: *M. septendecim* predominant, abundant in all woods.

Decatur: *M. septendecim* predominant, very abundant in all woods.

Des Moines: Mixed population, abundant in most woods.

Greene: *M. septendecim* predominant, abundant along Raccoon River in Southeast part of county.

Guthrie: *M. septendecim* predominant, abundant along river courses.

Hamilton: *M. septendecim* predominant, abundant in woods in southern part of county.

Henry: Both species in equal abundance in all wooded areas.

Iowa: Mixed population, rather small numbers just north of Marengo and along English River in southern part of the county.

Jasper: *M. septendecim* predominant, abundant only in local areas.

\*1902, The Ohio Nat., III: 323-326.

Jefferson: Both species in about equal numbers, abundant in all woods.

Johnson: *M. septendecim*, in small numbers near center of county.

Keokuk: *M. septendecim*, moderately abundant in woods of south-west portion of county.

Lee: *M. cassinii* predominant in the eastern two-thirds of the county, *septendecim* most numerous in the west portion. Cicadas were abundant in all woods.

Louisa: *M. septendecim* predominant, moderately scarce and localized.

Lucas: *M. cassinii* predominant, abundant in most wooded areas.

Madison: *M. cassinii* predominant, very abundant in all woods.

Mahaska: *M. septendecim* predominant, abundant in most woods.

Marion: *M. septendecim* predominant, abundant in most woods.

Marshall: *M. septendecim* predominant, moderately abundant in woods west of Marshalltown.

Monroe: *M. septendecim* predominant, abundant in all wooded areas.

Muscatine: *M. septendecim* predominant in moderate numbers in most wooded areas.

Polk: *M. septendecim* abundant in southwest portion of county.

Poweshiek: *M. septendecim* predominant, abundant in most woods.

Ringgold: *M. cassinii* predominant, abundant in all woods.

Story: Mixed populations abundant in most wooded areas.

Tama: *M. cassinii* very abundant in Sac and Fox Indian Reservations.

Taylor: *M. cassinii* predominant, abundant in all woods.

Union: *M. cassinii* predominant, abundant in all woods.

Van Buren: *M. septendecim* predominant, abundant in all woods.

Wapello: *M. septendecim* predominant, abundant in all woods.

Warren: *M. cassinii* predominant, abundant in most wooded areas.

Washington: *M. septendecim* predominant, abundant in all woods.

Wayne: *M. septendecim* predominant, abundant in most woods.

Webster: *M. septendecim* predominant, rather abundant along the course of the Des Moines River.

The following maps compare the present distribution (fig. 1) with that reported by Bessey, with the additions of some records from the Department of Agriculture reports, as listed by Marlatt\* (fig. 2).

Rather extensive damage was caused in west Des Moines by the cicada oviposition but throughout the rest of the state the brood was not of great economic importance. Since most emergences were confined to wooded areas a good share of the eggs were laid in large trees and although injury to twigs and small branches was very evident the larger trees were not severely affected. In the infested section of Des Moines considerable damage was done to ornamental shrubs, fruit trees and small shade trees. Numerous observations were made where the plants were so completely covered with the egg punctures that they were unable to survive. A young

\*1907, U. S. D. A. Bull. 71.

apple orchard which had been planted in a recently cleared wooded area was severely damaged. Comparatively minor damage was observed on fruit trees and ornamental shrubs in some nurseries throughout the southeast part of the state and occasionally small trees that had been badly damaged were seen in the cities.

FIG. 1  
PERIODICAL CICADA DISTRIBUTION 1946

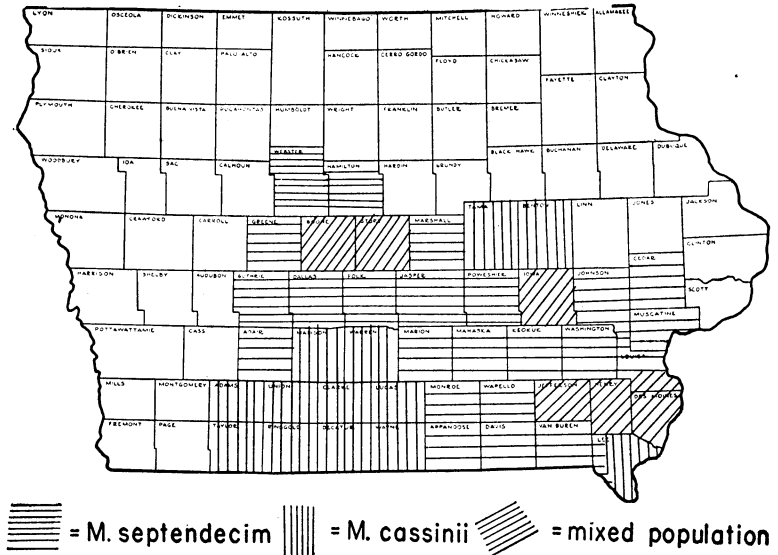
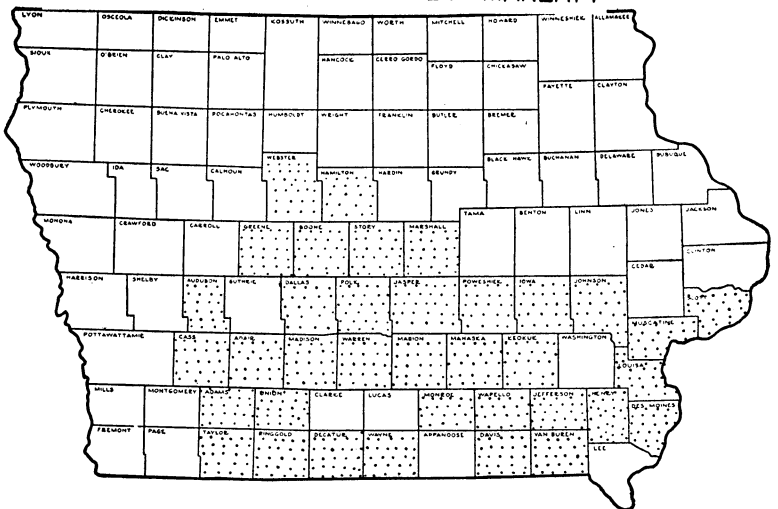


FIG. 2  
DISTRIBUTION RECORDED BY MARLATT



The cicadas apparently do not exhibit a strong preference in the selection of a host in which to deposit their eggs although there is evidence which shows that they do tend to deposit more eggs in apple, crataegus, oaks and hickory when these trees are intermixed with others. The writer began compiling a list of the hosts in which cicada eggs were found but soon decided that for the most part eggs could be found in all trees, shrubs and woody plants which grew in the area where the oviposition occurred. Eggs were even found in the stems of wild currents, gooseberries, grape and some herbaceous plants.

Laboratory experiments and small scale field tests were conducted to determine the effect of some of the new insecticides upon the adult cicadas and to learn whether or not chemical control could be effected. It was found that the insects were rather readily killed by DDT, Gammexane and Piperonyl Cyclohexenone plus pyrethrens, but it was not found to be practical to use insecticides in the field. Even though directly contacted with the poison the cicadas would often have time to oviposit their eggs before they died. It was necessary to reapply the insecticide each morning throughout the emergence period to obtain any noticeable effect upon the cicada population, and even then the results were far from satisfactory. Dinitro-*o*-cresol dust applied over the surface of the ground in the evening when the cicadas were emerging seemed to give the best kill but this material could not be recommended because of its toxic effect upon plants.

The most practical means found of preventing cicada damage was to place a protective covering of cloth or paper over the shrubs and small trees, this method was hardly feasible, however, except where just a small number of plants were involved.

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