Observations on Periodical Cicadas (Brood XIV) in Indiana in 1974 (Homoptera-Cicadidae)[1]

FRANK N. YOUNG
Zoology Department,
Indiana University, Bloomington, Indiana 47401

Abstract

Emergence of Brood XIV of periodical cicadas *(Magicicada)* in Indiana began about one week later than on the last emergence in 1957. Emergence was again restricted to two apparently separated areas: 1) Brown and Morgan counties, and 2) Crawford, Harrison, Perry, and Washington counties. Again as in 1957, all three 17-year species were not found in both of these areas but only *M. septendecim* and *septendecula* were found in Brown County and only *M. septendecim* and *cassini* in the southern counties. Emergence in Lawrence and Orange counties reported in 1957 could not be reconfirmed. Emergence in Crawford, Morgan, and Perry counties was not reported in 1957. Scattered emergence observed in Monroe County probably represents a 4 year delay of individuals from Brood X which was very abundant in 1970. Brood XIV has been greatly reduced in Indiana since the early 1900's. In 1923 it was reported from many of the southern counties and as far north as Tippecanoe, Carroll, Grant, and Wayne counties.

Periodical cicadas of Brood XIV (*Magicicada septendecim* L., *M. cassini* Fisher, and *M. septendecula* Alexander and Moore) emerged in moderately large numbers in two apparently separated areas in southern Indiana in May and early June 1974. No evidence of reduction in intensity of emergence could be detected in Brown, Harrison, or southeastern Crawford counties, but 1957 records of emergence near Orleans, Orange County (Marshall, CEIR) and Lawrence County (Alexander and Moore, 1962) could not be reconfirmed. Cicada flagging was apparent in part of Washington County in the late summer, but no specimens were observed there in May or June. Flagging was also reported from Crawford, Harrison, and Perry counties (Sproat, CEIR). A single *M. septendecim* was observed in Monroe county by Prof. Val Nolan, and a specimens of *M. septendecim* and two nymphal skins were collected by Mrs. D. G. Frey near Bloomington, Monroe County. These records probably represent a 4 year delay of individuals from Brood X which was very abundant in the same areas in 1970 (Young, 1971).

The first emergence of *M. septendecim* was observed in Brown County on May 21, about one week later than reported in 1957 (Hamilton, CEIR). *M. cassini,* however was reported calling in Harrison County on May 20 (Dr. D. Dunning and John Byers). *M. septendecula* was first observed emerging in Brown County on May 24, but may have begun somewhat earlier.

By May 30, *M. cassini* was calling in nearly every clump of trees from Motts Station, Harrison County, along Ind. Hwy. 135 into Meade County, Kentucky, and back along western edge of Harrison County to near Leavenworth in Crawford County. Many choruses of *M.*

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septendecim were heard at the same time along this route but seemed to occur largely in more extensive stands of timber.

The emergence in Brown County was less apparent than in the southern counties, but *M. septendecim* appeared in considerable numbers in Brown County State Park and along Ind. Hwy. 135 north through Nashville to the vicinity of Bean Blossom and to the east. *M. septendecula* was found calling in large numbers on drier cut-over slopes along Bear Wallow Road just south of Nashville.

The 1957 and 1974 records of Brood XIV indicate that there has been a considerable reduction in the area over which this brood occurs since the early 1900's. Periodical cicadas were reported in massive swarms in Brown and Perry counties in 1923, and in smaller numbers in Clark, Clay, Daviess, Dearborn, Floyd, Fountain, Grant, Harrison, Johnson, Knox, Monroe, Morgan, Orange, Putnam, Ripley, Scott, Sullivan, Tippecanoe, Warrick, Washington, and Wayne counties. Older and doubtful records are for Boone, Carroll, Dubois, Crawford, Greene, Jackson, Lake, Lawrence, Pike, Posey, Steuben, Vanderburg, and Vigo counties. Some of the latter records may actually be for Brood XXIII of 13-year cicadas which emerged along with Brood XIV in 1872.

In 1957 periodical cicadas were recorded only from Brown, Harrison, and Lawrence counties (Alexander and Moore, 1962), Orange County (Marshall, CEIR), and Brown County (Hamilton, CEIR).

An attempt was made to determine whether or not Brood XIV overlapped extensively with Brood X. This attempt was hampered by lack of precisely located stations for Brood X in most of the area of overlap. The situation in Brown County is particularly uncertain. The late Prof. J. J. Davis told me that in 1936 (following an emergence of Brood X) that the canopy of the forest in Brown County State Park was brown over a large area by late summer from the flagging caused by cicada oviposition. In 1970, however, cicadas were not found in Brown County State Park, although they were collected in large numbers in Yellowwood State Forest to the west and near Story along Ind. Hwy. 135 to the south. No emergence of Brood XIV was detected in either of the latter areas. Extensive flagging was not evident in Brown County in late summer of 1974 to the extent that it was to the east in Bartholomew County and to the west in Monroe County in 1970.

An extensive survey was made in Brown County during the emergence and 17 stations at which cicadas were collected established. The area is bounded as follows: S. W., 3.0 mi. S. W. of Nashville on Ind. Hwy. 46; W., 0.3 mi. W. of Bean Blossom on Ind. Hwy. 45; N., 5.2 mi. N. of Bean Blossom on Ind. Hwy. 135; E., 5.0 mi. E. of Bean Blossom approximately along Clay Lick Road; S., vicinity of Lake Strahl within Brown County State Park. No signs could be detected to the east along Ind. Hwy. 135 south of Ind. 46. Outside the area bounded above cicadas could not be detected either by their calls or by examining the ground for emergence signs. Within Brown County State Park, the main emergence appeared to be along the west edge near Ind. Hwy. 46 and east to around the Abe Martin Lodge. Only a

few scattered individuals and nymphal skins were found near the Hoosier Nest area or in the vicinity of Kelp Post Office and Lake Strahl. The area of emergence in Brown County thus seems to be very sharply bounded and possibly isolated from any emergence in Morgan County. No signs of cicadas could be detected in Morgan, Johnson, Bartholomew, Jackson, or Monroe counties during May and June nor was any unquestioned cicada flagging observed in these counties in the late summer, but they were heard calling (Gene Kritsby).

The emergence in the southern counties appears to represent an extension of Brood XIV into the state from Kentucky where emergence was heavy and widespread in the eastern counties. Six stations were established in Harrison and Crawford counties for future studies. In addition recordings were made at approximately 1 mile intervals from Motts Station down Ind. Hwy. 135 to the Ohio River and northwest through Valley City to U. S. Hwy. 460 and the vicinity of Wyandotte Cave.

In addition to the observations and collections cited above, a survey was made of 12 stations in southwestern Indiana which were positive for periodical cicadas of Brood XXIII (13-year periodicity) in 1963. All of these stations were negative in 1974 although visited on May 31 when emergence was nearly completed in Harrison County and large scale choruses were in evidence. These stations were also visited in 1970 for the purpose of seeing if Brood X had emerged in the same places. Only one area and that not immediately at the station at which Brood XXIII was collected showed suspicuous signs of flagging in late summer.

Except possibly in Brown County State Park, little evidence of overlap of Brood XIV with Brood X or Brood XXIII was found in Indiana. However, in Trimble and Henry counties, Kentucky, *M. septendecim* and *M. cassini* were collected either at or very near stations positive for the same species in 1970. Stations on the Indiana University Campus (Young, 1971) were without exception completely negative for cicadas in 1974.

Other Broods of Periodical Cicadas in Indiana

The broods of periodical cicadas numbered by Marlatt (1923) have without exception been reduced in range since the early 1900's. This, of course, correlates with the fact that forest tracts have generally been reduced over vast areas during this period, and the periodical cicadas are closely related to trees upon whose roots the nymphs feed. Some of the numbered broods, however, either never existed or have been exterminated (Alexander and Moore, 1962). The broods and their next year of emergence (in parentheses) are as follows:

The 17-Year Broods

Brood I (1978): Reported by Marlatt in 1910 from Knox, Posey, and Sullivan counties. However, this emergence corresponded to that of the 13-year Brood XXII which could be expected in the southern Wabash Valley. The previous record of Brood I from Indiana in 1859 corresponds with that of Brood XXIII of 13-year cicadas which is known

to occur widely over the lower Wabash Valley. Specimens, unfortunately, seem to be lacking to confirm that the 1910 records are for *M. septendecim*, *cassini*, or *septendecula* rather than for the 13-year species *M. tredecim* (Walsh and Riley), *M. tredecula*, and *trecassini* (Alexander and Moore).

Brood II (1979): Reported from Dearborn, Fountain, and questionably from Posey County in 1911. This emergence corresponded with that of Brood XXIII of 13-year cicadas, and these records probably represent the 13-year species.

Broods III, IV, and V (1980, 1981, 1982) occur to the west or east of Indiana and have not been reported from the state.

Brood VI (1983): Reported by Marlatt in 1915 from Boone, Brown, Carroll, Grant, Johnson, Laporte, and Wells counties and by Deay (1953) from 24 Indiana counties. Emergence of periodical cicadas was observed in Monroe County and elsewhere in southern Indiana in 1966, but the numbers were small and probably represent a four year acceleration of Brood X which emerged in large numbers in 1970.

Brood VII (1984) was not reported for Indiana in 1967 but a single *M. septendecim* was purportedly found in Bloomington, Monroe County.

Brood VIII (1985) was not reported for Indiana in 1968 but a single *M. septendecim* was captured on the I.U. Campus in Bloomington, Monroe County. Brood IX (1985) has not been reported from Indiana.

Brood X (1987) is the major brood of 17-year periodical cicadas in Indiana. It has in the past been reported from every Indiana county, but in 1970 the emergence was considerably reduced (Young, 1971).

Broods XI and XII (1988, 1989) are of doubtful occurrence in Indiana although Brood XII is reported from Allen County by Marlatt in 1921 and from Orange County (Davis in Deay, 1953).

Brood XIII (1990) was recorded from Lake, LaPorte, and Porter counties in 1956, but it may occur in other counties in the northern part of the state.

Brood XIV (1991) is apparently now restricted in Indiana as detailed above.

Broods XV, XVI, and XVII (1975, 1976, 1977) have never been recorded from Indiana, and, in fact, may not exist (Alexander and Moore, 1962).

The 13-Year Broods

Only two of the 13-year broods of periodical cicadas have been recorded from Indiana.

Brood XIX (1985) is the largest of the 13-year broods and has been reported from Vanderburgh, Posey, and Warrick north to Newton and Jasper Counties (Deay, 1953). However, an extended search along roads in the counties bordering the Ohio River and in the lower Wabash Valley failed to uncover any evidence of emergence in May, 1972. Records were obtained, however, for Pope and Gallatin Counties, Illinois, during the same period.

Brood XXIII (1976): This brood has been recorded from Bartholomew, Daviess, Fayette, Floyd, *Gibson*, Jackson, Jennings, *Knox*, Montgomery,

Owen, *Posey*, Putnam, Ripley, *Spencer*, *Sullivan Vanderburg*, Vigo, and *Warrick* counties in 1911 by Marlatt. Those underlined were reconfirmed in 1963. (See also Hamilton and Cleveland, 1964).

Economic Importance of Brood XIV

Brood XIV caused relatively little damage in Indiana in 1974. Forest trees were not heavily flagged even in areas where emergence was considered heavy. In Kentucky and elsewhere, however, considerable damage to orchards and trees was reported (CEIR).

Voucher Specimens and Specific Localities

Voucher specimens for records included in this paper are deposited in the Field Museum of Natural History, Chicago, Illinois, and in the collection of Indiana University.

Anyone desiring specific locality records on the collecting stations and dates may obtain them in mineographed form from the author.

References Cited

ALEXANDER, R. D. and T. E. MOORE. 1962. The evolutionary relationships of the 17-year and 13-year cicadas, and three new species (Homoptera, Cicadidae, *Magicicada*). Misc. Publ. Museum of Zoology, University of Michigan, No. 121:59 pp., illus.

DEAY, H. O. 1953. The periodical cicada, *Magicicada septendecium* (L.) In Indiana. Proc. Indiana Acad. Sci. 62:203-206.

HAMILTON, S. 1957. *In* Cooperative Economic Insect Reports. U. S. Dept. of Agriculture. 7 (22):421.

HAMILTON, D. W. and M. L. CLEVELAND. 1964. Periodical Cicadas in 1963, Brood 23. Proc. Indiana Acad. Sci. 73:167-170.

MARLATT, C. L. 1923. The periodical cicada. U. S. Dept. Agric., Bur. Ent., Bull. 71:183 pp., illus.

MARSHALL, G. E. 1957. *In* Cooperative Economic Insect Reports. U. S. Dept. of Agriculture. 7 (22):421.

SPROAT, B. B. 1974. *In* Cooperative Economic Insect Reports. U. S. Dept. Agriculture 24 (31):609.

YOUNG, F. N. 1971. Observations on periodical cicadas (Brood X) in Indiana in 1970 (Homoptera-Cicadidae). Proc. Indiana Acad. Sci., 80:247-252, 1 map.