

**Singing Insects:
New Information Summary 2020
Carl Strang**

This report summarizes the 2020 results in an ongoing study of the singing insects (104 species of crickets, katydids, grasshoppers and cicadas with sound displays audible to humans) in the Chicago region, defined here as a 22-county area extending from southeastern Wisconsin, through northeast Illinois and northwest Indiana to Berrien County, Michigan (Fig. 1).

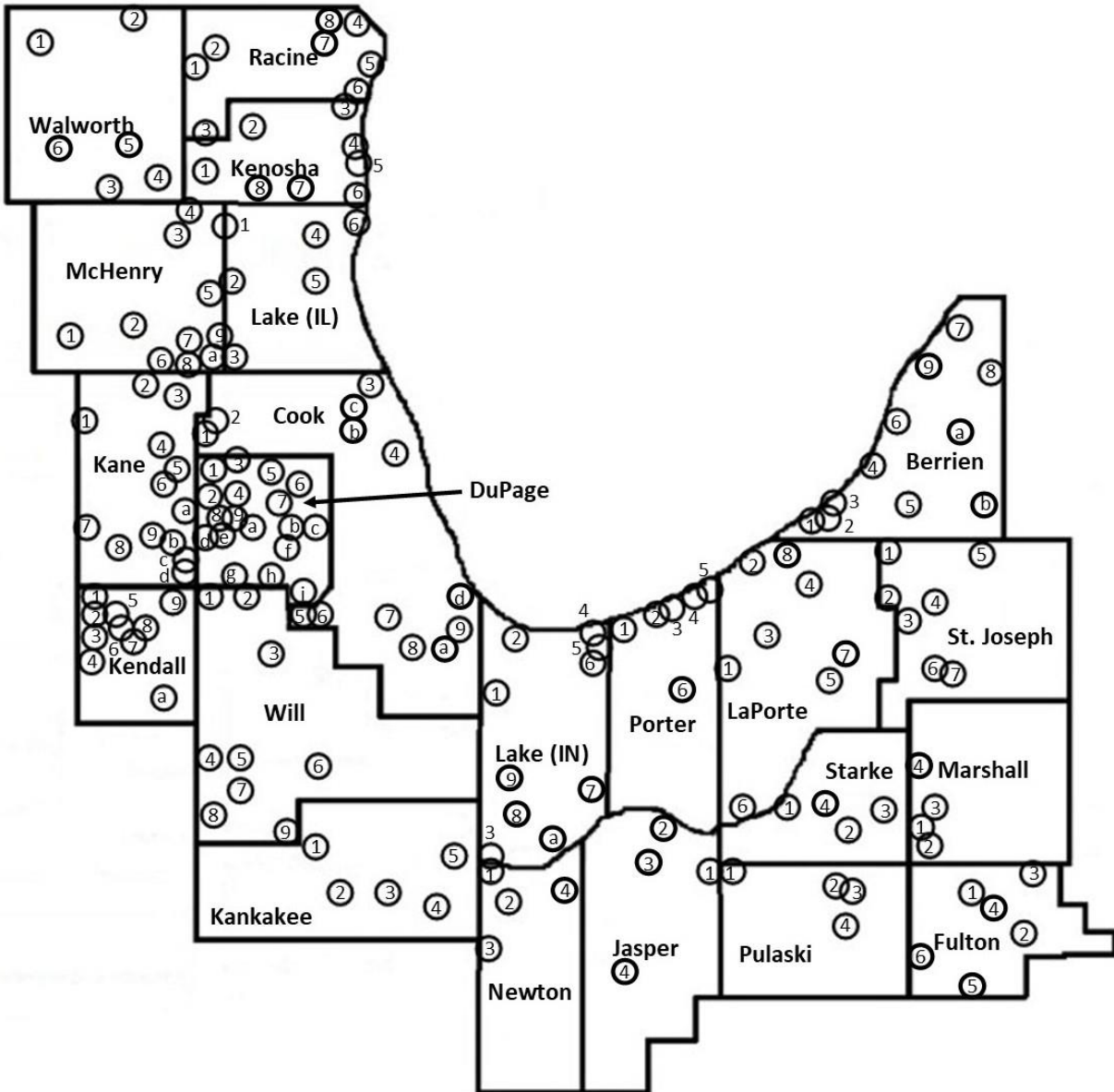


Fig. 1. Reference map of the 22 counties included in this study.

Key to sites, which include observations in adjacent areas: **Walworth County:** 1 Kettle Moraine; 2 Lulu Lake; 3 Linn; 4 Bloomfield; 5 Como; 6 Comus. **Racine County:** 1 Honey Creek; 2 Wadewitz; 3 Karcher; 4 Cliffside; 5 North Beach; 6 Sanders; 7 Nicholson; 8 Corney. **Kenosha County:** 1 New Munster; 2 Bong; 3 Petrifying Springs; 4 Alford; 5 Southport; 6 Chiwaukee; 7 Bristol; 8 Camp + Peat Lakes. **McHenry County:** 1 Coral Woods; 2 Pleasant Valley; 3 Glacial Park; 4 Elizabeth Lake; 5 Moraine Hills; 6 Exner Marsh; 7 Hollows; 8 Fox River Bluff; 9 Hickory Grove + Main Street Prairie; a Prairie Trail. **Lake County (IL):** 1 Chain O'Lakes; 2 Volo Bog; 3 Flint Creek; 4 Sedge Meadow; 5 Lake Carina; 6 Illinois Beach. **Kane County:** 1 Burlington Prairie; 2 Freeman Kame; 3 Fox River Shores; 4 Otter Creek; 5 Ferson Creek; 6 Horlock; 7 Lone Grove; 8 Prairie Kame; 9 Nelson Lake; a Fabyan; b Les Arends + Red Oak; c Shoemaker; d Oakhurst. **Cook County:** 1 Bluff Spring Fen; 2 Carl Hansen; 3 Somme; 4 North Park Village; 5 Sagawau; 6 I&M Trail; 7 Katherine Lake; 8 Gensburg Prairie; 9 Burnham; a Sand Ridge; b Belleau + Axehead; c River Trails + Beck; d Big Marsh + nearby parks. **DuPage County:** 1 Pratts Wayne; 2 West Chicago Prairie; 3 Hawk Hollow; 4 Timber Ridge; 5 Meacham Grove; 6 Songbird Slough; 7 Churchill; 8 Blackwell; 9 St. James Farm; a Herrick Lake; b Hidden Lake; c Fullersburg; d Big Woods; e McDowell; f Belmont Prairie; g Springbrook Prairie; h Greene Valley; i Waterfall Glen. **Kendall County:** 1 Plano; 2 Marramech; 3 Silver Springs; 4 Millbrook; 5 Subat; 6 Hoover; 7 Harris Woods; 8 Richard Young; 9 Jaycee Park; a Baker Woods. **Will County:** 1 Vermont Prairie; 2 Knock Knolls; 3 Lockport Prairie; 4 Des Plaines; 5 Midewin; 6 Laughton; 7 Forsythe Woods; 8 Braidwood; 9 Kankakee River SP. **Kankakee County:** 1 Kankakee River SP; 2 Gar Creek; 3 Hieland; 4 Kankakee Sands; 5 Momence Wetlands. **Lake County (IN):** 1 Hoosier Prairie; 2 Pine Station; 3 LaSalle; 4 Miller Woods; 5 Calumet Prairie; 6 Cressmoor Prairie; 7 Stoney Run; 8 Lowell; 9 Cedar Lake; a Shelby. **Porter County:** 1 West Beach; 2 Cowles Bog; 3 Indiana Dunes SP; 4 Great Marsh; 5 Central Ave. Beach; 6 Moraine. **LaPorte County:** 1 Bluhm; 2 Michigan City; 3 Pinhook Bog; 4 Springfield Fen; 5 Kingsbury; 6 Kankakee River FWA; 7 Fish Lake; 8 Wintergreen. **St. Joseph County:** 1 Spicer Lake; 2 Bendix Woods; 3 Jasinski; 4 Chamberlain Lake; 5 St. Patrick's; 6 Potato Creek; 7 Pleasant Lake. **Berrien County:** 1 Galien River; 2 Glassman; 3 Chikaming; 4 Warren Dunes; 5 Mud Lake Bog; 6 Grand Mere; 7 Sarett; 8 Butternut; 9 Riverview; a Wolf's Prairie; b Niles. **Newton County:** 1 LaSalle; 2 Kankakee Sands; 3 Willow Slough; 4 Roselawn. **Jasper County:** 1 Jasper-Pulaski; 2 Aukiki + NIPSCO; 3 Stoutsburg; 4 Rennselaer. **Starke County:** 1 Kankakee River FWA; 2 Round Lake; 3 Ober Savanna; 4 Knox. **Pulaski County:** 1 Jasper-Pulaski; 2 Winamac FWA; 3 Tippecanoe River SP; 4 Winamac. **Marshall County:** 1 Houghton Lake; 2 Maxinkuckee; 3 Memorial Forest; 4 Ancilla. **Fulton County:** 1 Germany Bridge + Ruth Kern; 2 Judy Burton; 3 Talma; 4 Menominee; 5 Fletcher; 6 Kewanna.

Highlights in 2020 were an intensive study of the 4-year-early emergence of periodical cicadas (*Magicalicada cassinii* and *M. septendecim*) in an area centering on eastern DuPage and west central Cook Counties; a more comprehensive understanding of the distribution of species resulting from a survey of rural ditch crossings, with a particular expansion of locations for Japanese burrowing crickets (*Velarifictorus micado*), northern mole crickets (*Neocurtilla hexadactyla*), and woodland meadow katydids (*Conocephalus nemoralis*); and a total of 26 county records for all species combined. The need to follow covid19 precautions, plus the related restriction of site access, limited activities somewhat, but this was nevertheless a successful year.

Looking ahead to 2021, my top priorities will be an early season search for periodical cicadas in the eastern part of the region, which historically was in the Brood X area, and a late season search to confirm the presence of slow-tinkling trigs (*Anaxipha tinnulenta*) in the region. If successful, I will need to begin redefining locations for tinkling ground crickets (*Allonemobius tinnulus*) vs. the trig.

Field Crickets

Each year I add increasing numbers of site and county records for Japanese burrowing crickets, an Asian species that has spread from coastal introduction sites. New county records in 2020 were Cook, Kankakee, Porter, LaPorte, Marshall, Pulaski and Berrien Counties. I now have found them in every county except the Wisconsin ones, the two Illinois counties bordering Wisconsin, and Fulton County. They likely are in Fulton, but as it is the most remote county from my home I do not get there often. I expect to find them in Fulton's largest city, Rochester, next year. So far I am finding them mainly in towns or along drainage ditches. Often they are associated with landscape or building materials, so some of their spread may be human-facilitated, but they also appear to be using the ditches as dispersal corridors.

Bush Crickets

I found jumping bush crickets (*Orocharis saltator*) in southern McHenry County in a residential area of Algonquin. This advance means that they now occur in all the region's counties except the Wisconsin ones. The disjunct group in Wauconda at the intersection of routes 59 and 12 has persisted for another year. So far these are the only ones I have found in Lake County IL.

Ground Crickets

On July 22 I heard spotted ground crickets (*Allonemobius maculatus*) singing half an hour after sunset, and on July 24 heard a confused ground cricket (*Eunemobius confusus*) singing more than an hour after sunset. These observations extended their daily singing periods, in my experience. During an August visit to the Nachusa grasslands I found confused ground crickets singing in a prairie area far from any woodland. Previously I had found them in prairies, sometimes, but generally close to wooded edges. As the season ended, I learned of the possibility that slow-tinkling trigs (see trigs section) may be in the region. This calls into question many of my records for tinkling ground crickets (*Allonemobius tinnulus*), as they were based on what I thought was an unambiguous song. I will need to clarify this next year.

Tree Crickets

I made no notable progress with tree crickets in 2020.

Trigs

I first became acquainted with Say's trig (*Anaxipha exigua*) in wetlands, where they can occur in large numbers in dense herbaceous vegetation. Over the years I have found them in a wide range of habitats, and they may be the region's most abundant cricket. Large choruses often assemble

in trees at woodland edges, where the canopy is thick. These choruses are spaced, situated in single trees or small groups of adjacent trees, their loud choruses giving them a lek-like quality reminiscent of the periodical cicadas. More scattered individuals sing in forest understories. I have begun to wonder if the wetland and woodland trigs might in fact be different species.

After the field season had ended, I learned that slow-tinkling trigs (*Anaxipha tinnulenta*), a recently described species, have a poorly defined range that could extend into the Chicago region. The similarity of their song to that of the tinkling ground cricket (*Allonemobius tinnulus*) is a complicating factor that needs to be resolved in coming field seasons. At various temperatures both species produce 2-8 notes per second, at a given temperature the trig 2 fewer than the ground cricket. Dominant frequencies likewise overlap, the trig ranging 5.0-8.4 kHz, the ground cricket 4.0-8.0 kHz. Wil Hershberger points out that there is a difference in the shapes of the two species' notes in sonographs that may prove useful, and this feature supports two of my recordings, in Will and Pulaski Counties, in fact being of the trig. I will need to seek out specimens to solve this problem. The slow-tinkling trig is described as a species of old fields and woods margins, so there is a habitat overlap.

Northern Mole Cricket

Last year I confirmed that I cannot hear the northern mole cricket's song above the running motor of my car. One goal in 2020 was to add more county and site records by stopping and listening at night along rural drainage ditches. I used road maps and GoogleEarth to select promising ditch intersections with rural roads, then went out at night and stopped at these bridges, listening. The results were mixed for mole crickets, but they gave me a clearer picture of this species' status in the region. I first found them in Kankakee County on August 6 at several ditches that are north tributaries of the Kankakee River. These were the first I have found in that county. I failed to find them in any other Illinois counties where I had no previous records, nor did I find them in the southern Wisconsin counties. I added county records for Fulton and Pulaski Counties in Indiana. I did not find them in St. Joseph or Berrien Counties, but the season was running late by then and I should try again earlier in another year. Potato Creek State Park in St. Joseph County and wetlands close to Lake Michigan in Berrien County are the respective best places to start. There are old records for both counties. A review of all my past observations of the species has the median time of sunset (range 2:10-10:30 p.m., 6:30 before sunset to 2:30 after sunset, with 16 of 23 observations within 1:15 before or after sunset), so they often begin to sing before dark.

An added benefit of this ditch hopping, as I called it, was to improve my understanding of the abundance and distribution of other singing insect species.

Meadow Katyids

As I began to have success in the search for northern mole crickets, I realized that in large rural agricultural portions of the Chicago region, ditches and streams had potential as habitat for singing insects within the sea of corn and soybeans. Early in my daytime checks of drainage ditch crossings I was surprised to discover woodland meadow katydids in Kendall County, an Illinois county I had dismissed as a possible location for the species. Subsequently I found them

at ditches in Will, Kankakee, Lake IN, Porter, St. Joseph, Newton and Fulton Counties. Generally they associated with grasses, but usually there were a few trees or shrubs nearby, though sometimes tens of meters away from the singing katydids (they are regarded as a woodland edge species, and have been observed ovipositing in decaying wood). The remaining counties where I expect to find them are LaPorte and Berrien. Bland reports that they can be found at edges between dune vegetation and woods along the edge of Lake Michigan, providing another habitat in which to seek them.

Wetlands north of the I&M Canal and Lemont Quarries in northwestern Cook County yielded county records for dusky-faced meadow katydids (*Orchelimum campestre*) and long-tailed meadow katydids (*Conocephalus attenuatus*).

I double-checked two sites in my search for nimble meadow katydids (*Orchelimum volantum*), at Lake Maxinkuckee in Marshall County and the Chain O'Lakes wetlands of Lake County, Illinois. On quiet days I confirmed that they no longer occur at these sites. I also kayaked through the wetlands of the lower Galien River in Berrien County, but found no unusual singing insects there. Two LaPorte County lakes remain to be checked, and Cedar Lake in Lake County, Illinois, may be worth the \$100 kayak launch fee to search for this and other rare wetland singing insects.

Otherwise, I added a county record for common meadow katydid (*Orchelimum vulgare*) at a ditch in St. Joseph County.

I reviewed my observations of gladiator meadow katydids (*Orchelimum gladiator*) to get a sense of when they sing. In summary I have made 33 morning observations, 27 at mid-day (noon-2 p.m.), 28 in the afternoon (2-6 p.m.), 3 early evening (6-8 p.m.), and 10 after 8 p.m. There may be a hiatus comparable to that of the common cicadas, but it also is true that I wasn't out making observations often in the early evening time period. There also could be differences at different points in the season. The earliest noted time was 8:00 a.m., the latest 9:00 p.m.

I found black-sided meadow katydids singing on 24 July. This is earlier than my other dates for them, but my hearing them is dependent on my use of the SongFinder.

Coneheads

I made no notable progress with conehead katydids in 2020.

False Katydid

I did not see or hear a single oblong-winged katydid (*Amblycorypha oblongifolia*) in 2019, the second year of the study in which this was the case (the other being 2010). This species shows a greater variability in numbers among years than is true for nearly all other species in this study. In some years they have been abundant and easily observed across the region. The implication is that they can delay hatching from their eggs for a year or more. According to Blatchley (1920), eggs are laid in the ground in moist soil, and take 2-3 years to hatch. In 2020 I heard two individuals on July 28, the first night of ditch hopping in Kendall County, but made only a few

scattered observations during the rest of the season. I still have not found them in Kankakee or LaPorte Counties but expect to do so in the next year when they again are abundant. Incidentally, Lisa Rainsong reported this species to be unusually common in northeastern Ohio in 2020.

In 2020 I added a county record for curve-tailed bush katydids (*Scudderia curvicauda*) in Cook County. This species is uncommon in the region, and seldom occurs in significant numbers.

I found that Texas bush katydids (*Scudderia texensis*) can have magenta hind tibiae, so this is not a unique feature.

Grasshoppers

On August 20 I found abundant clipped-wing grasshoppers (*Metaleptea brevicornis*) in the wetlands north of the Lemont Quarries and I&M Canal in Cook County. This is both my first record for them in Illinois and the earliest I have found them. One performed a crepitation display.

In a poor-grass area on what appears to be a deposit of industrial slag at Big Marsh, a Chicago park in southern Cook County, I found a second population of Kiowa rangeland grasshoppers (*Trachyrhachys kiowa*) and the first population of pasture grasshoppers (*Orphulella speciosa*) for the county.

Periodical Cicadas

Northeast Illinois is in the Brood XIII region of 17-year periodical cicadas. In 1969, 4 years ahead of the anticipated major emergence of Brood XIII, Dybas (1969) collected reports of the cicadas emerging in 80 suburban communities plus several locations in Chicago. He did not believe reproduction took place and regarded this as a curiosity only. However, *Magicicada* emerged in the same geographical area in 1986 (15 communities) and 2003 (35 communities) as listed by Illinois extension entomologist Phil Nixon. With the next emergence of Brood XIII expected in 2024, I surveyed this area in 2020 to get a sense of numbers involved and whether reproduction took place 4 years early.

I put out word through social media, requesting observations of mass emergences, and consulted iNaturalist for reports. I visited some of the areas where large numbers of cicadas were reported, mapping their extent and noting whether singing cicadas were in countable numbers, small choruses (too many males singing to count but too few to form synchronized choruses of *M. cassinii*), or wave choruses (*M. cassinii* organized into choruses with loud synchronization as volume of singing rose and fell on a period of a few seconds; Fig. 2). A few weeks after this survey I returned to places with wave choruses and walked them counting flags (twigs of trees and shrubs that had browned and often snapped, a sign of damage by ovipositing female cicadas) as an index of reproductive success. Walked routes totaled 53.8 km.

Periodical cicadas were documented in 83 communities including the city of Chicago. I personally observed wave chorusing in 18 of these communities (red dots, Fig. 2). In every case, the *M. cassinii* were accompanied by undetermined numbers of the second Brood XIII species,

M. septendecim. In general, this chorusing was sustained for at least 1-3 weeks. In 8 of these communities, egg-laying was documented while the cicadas still were singing, and eggs were seen in an additional 6 during the flag survey. In all 18 communities there were trees with sufficient oviposition damage to suggest that this splinter population will be ongoing for at least another generation and that it is composed of the descendants of the 2003 emergence and possibly of the 1986 and 1969 emergences. The numbers of cicadas and amount of reproduction in these residential communities in 2020 contrasted with forested parks in the same geographical area, where (with one short-lived exception) the wave chorus level never was achieved. This may be because residential communities are ecologically depauperate, dominated by lawns and non-native shrubs and herbaceous plantings that support few other insect herbivores and thus low numbers of the predators which presumably knocked forest cicada numbers down. Little predation activity was observed, densities of possible predators did not appear elevated, and I saw only one cicada infested with the parasitic fungus *Massospora cicadina*. A birder who lives in one of the wave chorus communities, River Forest, passed along her notes from the time of the 2007 emergence. She observed bird species in her neighborhood that in other years were not there: yellow-billed cuckoos and great crested flycatcher. Except for a crow I saw eating a cicada, the birds I observed in these communities were typical and at usual densities.

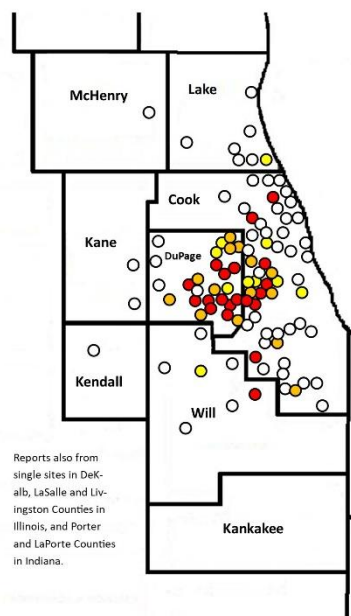


Fig. 2. Collected observations of periodical cicadas in 2020. White dots indicate towns or parks in which at least one or a few cicadas were documented. Yellow dots mark countable numbers, i.e. from one spot you could hear multiple cicadas singing. Orange dots mark small choruses (though sometimes occurring over large areas), in which the cicada songs were blended to the point where individuals no longer could be picked out, but the choruses were not organized. Red dots mark areas with full choruses, formed into periodic waves of song, loud and with both species audible.

All of this is consistent with Lloyd and White's (1976) hypothesis of nymphal overcrowding as a stimulus for the early emergence, and suggests that this splinter population has reached the sustained level they describe as the second stage of their model. The degree to which the urban-influenced climate results in a localized warming that could accelerate cicada development also needs to be considered (Dybas 1969; Marshall, Hill and Cooley 2017). But given that this pattern

of early emergence has happened repeatedly in the same area, with reproduction now documented, and without a subsequent appearance of cicadas 4 years earlier than this (as I sought and failed to find in 2016), observations seem to weaken support for this idea.

Marshall, Hill and Cooley (2017) present an interesting model, based on various studies, that points to the cicadas counting years in groups of four and making the decision to emerge a year ahead of time. Their study documented 13-year periodical cicadas emerging in 9 years, supporting this model. It removes emphasis on prime-number generation lengths, as the 17-year cicadas emerge a year after the fourth set of four years, 13-year cicadas emerge a year after the third set of four years, and their observed 9-year emergences a year after two sets of four years. The number 9 is not a prime.

Based on observations and reports from residents in 2007, I expected the adjacent communities of Addison and Wood Dale in DuPage County to be significant in having a large 2020 emergence in an area which lacked periodical cicadas in 2007. I made repeated visits to this area in 2020, but never found cicada numbers above the countable level in Addison or the small chorus level in Wood Dale. Wood Dale Grove Forest Preserve was the site of the small chorus in a forested park where no periodical cicadas were observed in 2007, but this chorusing lasted at most 3 days. Scattered flags are not easy to observe there; I saw at least 30, perhaps a sign that there was sufficient reproduction for another notable emergence in 17 years.

Communities with wave chorusing had flag counts of 3.1-10.5 per 100m walked, with highest numbers of flags in single trees ranging 6-33 (Fig. 3). The combination of repeated emergences at 17-year intervals, lack of predation, and large numbers of cicadas producing organized wave chorusing over a period of weeks support the possibility that these numbers are indexes that represent a sustained, independent population.

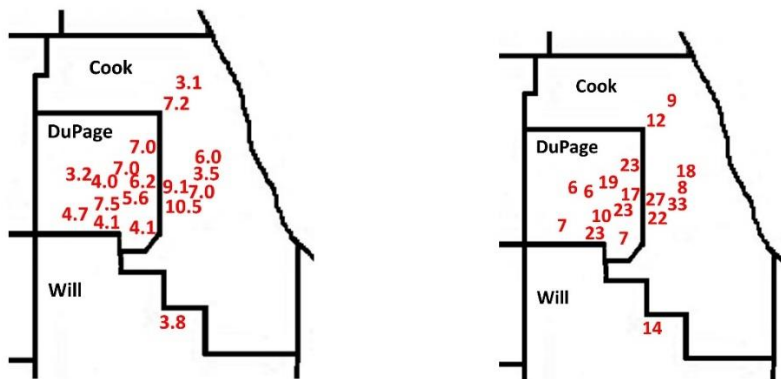


Fig. 3. Flag count data from the 18 communities in which wave chorusing was observed. Left, mean counts of flags per 100m walked. Right, high counts of flags in single trees.

Other Cicadas

After further study I have adopted the recently separated genus *Megatibicen* for Walker's cicada (*M. pronotalis*) and the northern dusk-singing cicada (*M. auletes*).

In 2018 I heard Walker's cicadas for the first time, one observation in Will County and one in Kane. This species reportedly occurs in riparian habitat, and such was the case for the Kane County individual along the Fox River. The Will County one was singing in an isolated tree half a mile from the Kankakee River, however, and in 2020 I made two more observations, both in Fulton County, both distant from any wetland. Furthermore, Cassi Saari of the Chicago Park District sent me a recording of a Walker's cicada she had made in a residential neighborhood of downtown Chicago. I now suspect that this uncommon species must wander widely to find a mate, facilitated by one of the loudest songs of any of the world's cicadas. The Fulton County observations taught me that the song is like that of an extra-loud Linne's cicada (*Neotibicen linnei*) when heard from a moving car. The underlying continuous drone that accompanies the vibrato portion of the song requires the car's motor to be turned off to be readily heard. Both Fulton observations were made at dusk, as was Cassi's recording, and I suspect that Walker's cicada sings mainly in the hour surrounding sunset.

After another failed attempt to find northern dusk-singing cicadas in the sandy portion of southern Cook County, I consider the book closed on that species. If I encounter them incidentally in the future I will add the records, but for now there are only historic records for the species in Cook and St. Joseph Counties.

First and Last Song Dates

A cold spring delayed first song dates somewhat for common species that mature in May, but after that the emergence dates generally were close to the medians for each month. Species that I have observed for more than 5 years with new earliest song dates were the Japanese burrowing cricket (by 15 days, to 16 August), Cuban ground cricket (*Neonemobius cubensis*) by 1 day, to 17 July, Forbes's tree cricket (*Oecanthus forbesi*) by 5 days, to 3 August, black-sided meadow katydid (*Conocephalus nigropleurum*) by 14 days, to 24 July, clipped-wing grasshopper (by 2 days, to 20 August), and Cassin's 17-year cicada (by 9 days, to 27 May).

Last song dates were a mix, with some species finishing earlier than ever, others lasting longer than ever. Earliest finishes were by the snowy tree cricket (*Oecanthus fultoni*) by 17 days, to 2 September, common true katydid (*Pterophylla camellifolia*) by 1 day, to 23 September, round-tipped conehead (*Neoconocephalus retusus*) by 9 days, to 23 September, Roesel's katydid (*Roeseliana roeselii*) by 1 day, to 25 June, and scissor-grinder cicada (*Neotibicen pruinosus*) by 2 days, to 14 September. Latest finishes were by the striped ground cricket (*Allonemobius fasciatus*) by 1 day, to 20 November, variegated ground cricket (*Neonemobius variegatus*) by 3 days, to 5 November, and Carolina grasshopper (*Dissosteira carolina*) by 9 days, to 6 November. The overall pattern likewise was a mix, with 35 species finishing earlier than their median last date, 18 species finishing later, and 4 right on their median.

County Highlights

Walworth County. No county records in 2020, and I concluded that I will not find mole crickets there. Ditch crossings were the only new sites visited. The one at Turtle Creek on Island Road northwest of Delavan is worth studying further.

Racine County. This and Starke were the only counties I did not reach in this covid19 year of 2020.

Kenosha County. No new county records, and again I found no mole crickets. New sites again limited to ditch hopping.

McHenry County. New county record: jumping bush cricket. New sites limited to ditch crossings, plus the neighborhood in Algonquin where I found the jumping bush crickets.

Lake County, IL. No new county records. No new sites visited.

Kane County. No new county records. Ditch hopping was the main activity. A wetland in a subdivision park north of Smith Road and west of Powis Road appears worth checking in daylight some time.

DuPage County. No new county records. The periodical cicada study and some ditch hopping were the main activities in this county.

Cook County. New county records: Japanese burrowing cricket, long-tailed meadow katydid, dusky-faced meadow katydid, curve-tailed bush katydid, clipped-wing grasshopper, pasture grasshopper, Walker's cicada. New sites visited: various residential communities in the periodical cicada study, some ditch hopping, Big Marsh Park, Indian Ridge Marsh.

Kendall County. New county record: woodland meadow katydid. New sites visited were ditch crossings.

Will County. New county record: woodland meadow katydid. New sites included residential areas in the periodical cicada study plus some ditch hopping.

Kankakee County. New county records: Japanese burrowing cricket, northern mole cricket, woodland meadow katydid. Ditch hopping the main activity.

Lake County, IN. County record: woodland meadow katydid. New sites visited were ditch crossings.

Porter County. New county records: Japanese burrowing cricket, woodland meadow katydid. New sites visited were ditch crossings. County Road 150W north of state road 8 is a gravel road that should be surveyed for grasshoppers (road closed at the ditch crossing, so essentially no traffic).

LaPorte County. New county record: Japanese burrowing cricket. New sites visited were ditch crossings.

St. Joseph County. New county records: woodland meadow katydid, common woodland meadow katydid. New sites visited were ditch crossings.

Starke County. This and Racine were the only counties I did not reach in this covid19 year of 2020.

Marshall County. New county record: Japanese burrowing cricket. No new sites visited.

Newton County. New county record: woodland meadow katydid. New site visited were ditch crossings.

Jasper County. No new county records. No new sites visited.

Pulaski County. New county records: Japanese burrowing cricket, northern mole cricket. New sites visited were ditch crossings.

Fulton County. New county records: northern mole cricket, woodland meadow katydid, Walker's cicada. New sites visited were ditch crossings.

Berrien County. New county record: Japanese burrowing cricket. New site visited: lower Galien River wetlands.

Permit Site Summaries

State of Illinois: The only collecting I did in 2020 was to pick up two dead *Magicicada cassinii* in Woodridge, and two more in Hinsdale, DuPage County, all on 16 June. On August 5 I caught, photographed, and released a Texas bush katydid (*Scudderia texensis*) at the Nachusa Grasslands in Lee County. On August 9 I caught, photographed, and released two pasture grasshoppers and a Kiowa rangeland grasshopper at Big Marsh Park in Cook County. On September 24 I caught a short-winged meadow katydid (*Conocephalus brevipennis*) at St. James Farm Forest Preserve, held the male overnight, and returned him after attempting to make a song recording.

Illinois State Parks: The only state park I visited in Illinois in 2020 was Chain O'Lakes for a kayak search, but found no new species for the site.

Illinois Nature Preserves: The only state nature preserve I visited more than once in Illinois in 2020 was West Chicago Prairie Forest Preserve in DuPage County. Nothing new to report there. Also nothing new from my single visit to the Momence Wetlands in Kankakee County on 29 August.

Indiana State Parks, Nature Preserves and Wildlife Areas: My ditch hopping brought me into a few state properties in 2020. I attempted to access Eddy Lake in Marshall County but found that it has been closed. I paid one visit to the Maxinkuckee Wetlands and added northern mole cricket to the site list. On a dusk visit to Fletcher Lake in Fulton County I added northern mole cricket to the site list. On my single visit to Kingsbury FWA in LaPorte County I added Japanese burrowing cricket to the site list. A single visit to the Kankakee River FWA in LaPorte County added nothing new.

Midewin National Tallgrass Prairie: I did not visit Midewin in 2020.

Indiana Dunes National Park: I did not visit the national park in 2020.

Indiana Nature Conservancy: I did not visit any Indiana Nature Conservancy sites in 2020.

Illinois Nature Conservancy: Nachusa Grasslands was the only Illinois Nature Conservancy site I visited in 2020. Species observed there: fall field cricket (*Gryllus pennsylvanicus*), Allard's ground cricket (*Allonemobius allardi*), striped ground cricket, Carolina ground cricket (*Eunemobius carolinus*), confused ground cricket (*Eunemobius confusus*), variegated ground cricket, Say's trig, slender meadow katydid (*Conocephalus fasciatus*), straight-lanced meadow katydid (*Conocephalus strictus*), broad-winged busk katydid (*Scudderia pistillata*), Texas bush katydid, Carolina grasshopper, and scissor-grinder cicada.

Acknowledgments

Without the resources provided by others, this project would not have been possible. I'll begin with Tom Walker, professor emeritus at the University of Florida, whose Singing Insects of North America website is unmatched particularly for the more obscure species not covered elsewhere in the general literature. Lisa Rainsong, who along with her partner Wendy Partridge is conducting a comparable singing insect survey of the Cleveland region, continues to be an important correspondent and sounding board. Nancy Collins is a dedicated student and promoter of all things tree cricket, and provides valuable information from her base in the northern portion of the Chicago region. Another researcher in tree crickets is Laurel Symes, who generously has shared her results, clearing up much of my confusion regarding *nigricornis* group tree crickets. Fellow nature blogger and outstanding Indiana field botanist Scott Namestnik has been a great collaborator on the Roesel's katydid range extension study, and introduced me to a variety of sites in northwest Indiana. As singing insects grow in interest among students of natural history, more projects and studies are emerging. The earliest of these, the New York Cricket Crawl, is a monitoring project led by Sam Droege. The Chicago Park District has begun its own singing insects monitoring program, led by Kathleen Soler, and the Cook County Forest Preserve District has followed suit under the leadership of Negin Almassi.

My early work was boosted by the Forest Preserve District of DuPage County's natural resources team, notably Scott Meister, Tom Velat and Rachel Reklau, who provided abundant support in my work on those preserves. I also need to mention their botanists, Scott Kobal and Wayne Lampa, whose definition and mapping of ecosystem units placed a habitat context around my fieldwork.

Beginning in 2012, as I extended the study outside DuPage County, I needed to obtain permits and support from others. This expansion of the study placed me in contact with many people who have helped with information, permitting, and other support. All were critical to my progress, and so the following list is in no particular order other than roughly alphabetical: Nina Baki (Forest Preserve District of Will County); Greg Behm, Stacy L. Iwanicki, C. Michael Moomey, Brad Semel, and Saki Villalobos (Illinois Department of Natural Resources); Craig Brabant (University of Wisconsin entomology collection), Gail Brown and Tom Simpson (McHenry County Conservation District), Brad Bumgardner and Roger Hedge (Indiana Department of Natural Resources), Greg Courtney (Iowa State University entomology

collection), Chris Dietrich (Illinois Natural History Survey), Nate Fuller (Sarett Nature Center), Bill Glass and Renee Thakali (Midewin National Tallgrass Prairie), Karl Gnaedinger and Rob Littiken (The Nature Conservancy in Illinois), Ralph Grundel and Sam Droege (U.S. Geological Survey), Dave Guritz and Judy Strohm (Forest Preserve District of Kendall County), Wil Hershberger (who continues to expand the Songs of Insects website, and came out to exchange ideas and pick up some live insects for photographing and recording at his studio), Scott Holaday (who welcomed me onto his Marshall County property); Jeff Holland, John T. Shukle, Alyssa Collins and Gino Nearn of Purdue University's entomology department; Dale Huizenga (Kankakee River Valley Forest Preserve District), Evie Kirkwood and Michael Klinger (St. Joseph County Parks), Joy Marburger, Gia Wagner, Kelly Caddell and Desi Robertson (Indiana Dunes National Park), Kelly L. Neal (Illinois Nature Preserves Commission), Gideon Ney (a University of Missouri graduate student who has taught me much about coneheads; we share a renewed frustration at our inability to find slender coneheads) and his colleague Nathan Harness; Mark O'Brien and Erika Tucker (University of Michigan entomology collection); Gary Parsons (Michigan State University entomology collection); John Shuey, Stuart B. Orr, Stephanie Frischie and Brian Dugan (The Nature Conservancy in Indiana), Bob Rieser (DuPage Forest Preserve volunteer), Cassi Saari (Chicago Park District), Gary Strang (who helped with early season fieldwork in 2016 and 2017), Mark Swanson (for information on some grasshoppers), Adam Thada and Mary Baird of The Center at Donaldson, and Jerry Ziegler (The Nature Conservancy in Wisconsin).

In 2020 I benefited from the many people who contributed observations of periodical cicadas to social media. Also I appreciate Phil Nixon's sharing of the reports he received in 1986 and 2003 at his entomological extension office. I was helped in my interpretation of those observations by John Cooley and David Marshall of the University of Connecticut cicada lab led by Chris Simon. As you can see it's a long list, and I very much hope I have remembered everyone.

Goals for 2021

Season-Long

- Continue noting first and last song dates.
- Make more sound recordings. Species for which I have no recordings or for which better recordings are desired: fall field cricket, Davis's tree cricket, long-tailed meadow katydid, short-winged meadow katydid, woodland meadow katydid, prairie meadow katydid, straight-lanced meadow katydid, long-spurred meadow katydid, rattler round-wing, greater angle-wing, curve-tailed bush katydid, fork-tailed bush katydid, northern bush katydid, broad-winged bush katydid (day song), Texas bush katydid (day song), Roesel's katydid, all grasshoppers except green-striped, northern dusk-singing cicada, dog day cicada, lyric cicada, Walker's cicada.
- Try recording *Conocephalus* spp. from the SongFinder headphones.
- Take advantage of night hike programs and campgrounds for night access in counties where this is limited (e.g., at Burnidge Forest Preserve in Kane County).
- Other new sites to check: Silver Lake Bog in Wisconsin; Ivanhoe Dune and Swale (Lake IN), Seidner Dune and Swale (Lake IN), Gavin Bog and Prairie (Lake IL), Trout Park Preserve (Kane), Holley Savanna (Newton), Koontz Lake Nature Preserve, Burnham Prairie (enter wetland), Wagner Fen, Grassy Lake Forest Preserve, Air Station Prairie, Calumet Prairie, McHenry Dam wetlands via kayak, the marsh in Aukiki Wetlands. Shaw

Prairie, reportedly virgin, within the Lake Forest Open Lands Skokie River Nature Preserve. Scott Namestnik mentioned Lydick Bog in St. Joseph County, also Thompson Bog and Yellow Birch Wetland. Healey Savanna (apparently in Spring Lake FP, Cook County, possibly on either side of Algonquin Road/Rt. 62, accessed via equestrian parking lot on Bateman Road, N of Algonquin Road and NW of the savanna), the wet meadow S of the river in LaSalle F&W Area, Barber Fen Nature Preserve (privately owned, McHenry County, on Nippersink Creek near Greenwood), the wetland in area L of Indiana Kankakee Sands, and Kiwani Marsh in Starke on Toto Road, listed in website: <http://www.igkmp.org/projects/kiwani-marsh>. Wadsworth Prairie, a remnant within a Lake County FP (via Leslie Berns). Just N of Wadsworth Road, at the river. Can park at the canoe launch and walk, or drive up the E side of the RR tracks. Wet, but worth checking at least for prairie cicadas. Shoe Factory Road Nature Preserve, Spring Creek Prairie at Barrington. Return to wetlands in southern Cook County: Indian Ridge Marsh, Hegewisch Marsh, Wolf Lake.

- Additional sites for grasshoppers: West Chicago Prairie through the season; the Hillside Prairie and East Main Street Prairie in Cary, McHenry County, where *Arphia pseudonietana* has been found in the past; Biesecker Prairie in Lake Co. IN (SE corner of the intersection of US231 and US41) where clouded grasshoppers have been found in the past (also at Gensburg Prairie, Shoe Factory Road Prairie, Conrad Savanna, and Clark & Pine); Tefft Savanna (within J-P, in two parts: the NW corner of County Roads 1100N and 500E, and along the W side of 400E S of 1100N) where *Encoptolophus*, *Psinidia fenestralis* (also at Braidwood, Clark & Pine), *Trachyrhachys kiowa* (also at Clark & Pine, Sand Ridge, Barnes Nature Preserve in Willow Slough, Conrad), *Chloealtis conspersa* (also Somme, Fermi, Wolf Road), *Orphulella pelidna* (also Braidwood, Clark & Pine, Conrad), and *Syrbula admirabilis* have been found; Romeoville Prairie (Will Co., *Encoptolophus* has been found there); Sand Ridge Savanna; parking lot 9 at Winamac Fish & Wildlife Area for dry-soil species; Cressmoor Prairie; the eastern area at Indiana Kankakee Sands, both earlier and later in the season; beaches of Montrose and southern Cook; Des Plaines Conservation Area, frontage road along I55. Alexander found short-winged toothpick grasshoppers on a little bluestem-covered hilltop at Wolf Lake, possibly in the north end of that area. County Road 150W north of state road 8 in Porter County. The area around the check station in the Kankakee F&W Area, LaPorte County.

April

- Mole crickets have been seen out in the open during the day in mid-April.

May 16-31

- Sulfur-winged grasshopper: seek in Kewanna and the broad sandy berm south of Germany Bridge. 25 May-15 June.
- Coral-winged grasshopper: old sites, especially northern ones, I have not checked in May-June, plus look in new ones, 25 May-15 June.
- Periodical cicadas: brood X reportedly once included every Indiana county; check that area late May to mid-June in 2021.

June 1-15

- Periodical cicadas: Check Indiana forests and towns. 5-15 June.

- Say's cicada: start looking in the first half of June. Visit Cleveland area and/or northern Wisconsin to gain experience with them. Cliffside Park another place to check for them. 5 June-15 July.

June 16-30

- Northern bush katydid: try night lighting for photos. 15-30 July.
- Follow up unresolved observations gleaned from field notes: the meadow katydids heard at the Illinois Kankakee Sands site on 28 June 2016.
- Continue surveying wetlands and other remote portions of Midewin. 25 June-10 September.

July 1-15

- Follow up unresolved observations gleaned from field notes: stridulating grasshoppers in dry habitats at Lulu Lake in mid-July (possibly sprinkled grasshopper).
- Can start checking out new sites listed above.

July 16-31

- Walker's cicadas: be alert for this species singing around dusk, not necessarily limited to riparian habitats. 15 July-30 August.
- Bike trails through Lyons in Walworth County and near North Judson in Starke County may provide access to additional areas.
- Keep an eye out for the lost plant *Thismia americana*, in marshes and prairie (especially Gensburg, Burnham, Clark & Pine, and W of Dead River). Tiny, white to pastel blue-green (no chlorophyll), 0.25x0.25", in dense shaded vegetation. Late July-September.

August 1-15

- Northern mole cricket: the book remains open in Berrien and St. Joseph Counties. Potato Creek State Park and coastal wetlands in Berrien the best bets. Could try ditches again, in case the 2020 search ran too late. 10-30 August.
- Nimble meadow katydid: sites remaining to be checked in Indiana are the lake at Ancilla (also seek black-sided mk in area B), and in LaPorte County, Lily Lake (z), and Pine or Stone Lake (z). Cedar Lake in Lake County IL needs to be further studied for this and other wetland species. Return to Fish Lake with the SongFinder and check the grassy inlet for other wetland meadow katydids. 10 August-10 September.
- Slow-tinkling trig: be on the alert for this species, which sounds much like tinkling ground crickets. I will need to get visuals and make recordings all across the region. Places where I have heard singing attributed to tinkling ground crickets in the past: Photos confirm the ground cricket for Lake County IL (IL Beach SP), Lake County IN (Miller Woods), Jasper and Pulaski Counties (parking lots in J-P). Other locations in notes: Walworth County (Lulu Lake kames), Cook County (Big Marsh), Kane County (Les Arends FP), DuPage County (Springbrook Prairie), Will County (Forsythe Woods, Braidwood Dunes, Midewin), Kankakee County (Kankakee River SP just one heard, Mskoda and Pembroke, Gar Creek, Hieland, Momence Wetlands N entrance), Lake County IN (Hoosier Prairie, Pine Station, Clark & Pine, Marquette Trail, Lowell Evergreen Park, Cedar Lake Potawatomi Park, Lemon Lake CP), Porter County (IN

Dunes NP campground, IN Dunes SP, Central Avenue Beach, West Beach, Mnoke Prairie), LaPorte County (Pinhook Bog, Kingsbury, Kankakee FWA, Washington Park), St. Joseph County (Spicer Lake, Chamberlain Lake, Potato Creek SP), Berrien County (Grand Mere SP, Niles Dam Park, Warren Dunes), Newton County (IN Kankakee Sands savannas, , Willow Slough, LaSalle FWA), Jasper County (J-P sand site and Tefft Savanna and Nature Conservancy site, NIPSCO Savanna, Aukiki Wetlands, Stoutsburg Savanna, Rensselaer Brookside Park), Pulaski County (Parking 6, 1 and 3 at Winamac F&WA, Sand Hill at Tippecanoe River SP, Winamac town park, Lake Bruce public access), Starke County (Round Lake, Ober Savanna, Knox town park), Marshall County (Houghton Lake, Maxinkuckee Wetlands, soybean fields near Culver, vicinity of E edge Bird Sanctuary, Pulaski County (Judy Burton, Ruth Kern, Talma public access, Menominee public access), and many at ditches.

- Four-spotted tree cricket: record trilling tree crickets in grassy meadows and prairies to fill out the range (still need county records in LaPorte, St. Joseph, Starke, Pulaski and Walworth Counties). 1-31 August.
- Spotted ground cricket: seek in Kenosha County forests. (also need Kenosha, Racine and Kendall for tinkling ground cricket). 1 August-30 September.
- Oblong-winged katydid: Drive rural roads at night in Kankakee and LaPorte Counties in a year when this species is again abundant in the region. 10 August-10 September.
- Narrow-winged and Davis's tree crickets: fill out their range in the region. 10 August-15 September.
- Other katydids with the potential to be found in several additional counties: long-tailed, black-sided, straight-lanced, dusky-faced, and stripe-faced meadow katydids; curve-tailed and Texas bush katydids. 10 August-30 September.
- Listen for dusky-faced meadow katydids with the SongFinder in native grass areas at Spicer Lake.

August 16-31

- Woodland meadow katydid: seek in forest edges near dunes in LaPorte and Berrien Counties. 20 August-5 September.
- Common meadow katydid: drive rural roads, seeking them in weedy dry open roadsides. Kendall, Porter, Fulton, Berrien, Walworth and Racine Counties. 15 August-15 September.
- Prairie meadow katydid: seek in black oak savannas in Will, Lake IN, Porter, Newton and Jasper Counties. 15 August-15 September.
- Fork-tailed bush katydid: test the possibility that they and other katydids fluoresce in UV light and might be found that way. Still need to find fork-taileds in Cook, Kendall, Will, Marshall, and Newton Counties. 15 August-15 September.
- Treetop bush katydid: look for stands of young conifers in Berrien County that might have this species.
- Handsome trig: be alert for them in Lake IL, Kendall, Kankakee, Porter, Newton and Jasper Counties. 15 August-30 September.
- Gray ground cricket: seek in Cook County. 20 August-15 September.
- Tamarack tree crickets: seek at Butternut Creek Fen, and Pinhook and Volo. Also, the St. Joseph County Lydick Bog Scott Namestnik mentioned, for sphagnum gc; check with

him before going. Koontz Lake Nature Preserve (Starke; oak savanna, marsh, tamarack bog).

- Grand Mere State Park in Berrien County is worth exploring for rare wetland meadow katydids. Check the lake via kayak (August-September). Also, the stranded oxbow in Tippecanoe River SP east of the nature center area. Also, the wetland in Dunham FP, DuPage County.
- Use net at Mskoda in Kankakee County to get a better idea of the grasshoppers there.

September

- Japanese burrowing cricket: seek in Rochester, Fulton County. 1-30 September.
- Broad-winged tree cricket: seek in McHenry, Walworth and Racine Counties. 1-30 September.
- Continue to trace the northern progress of expanding populations (or be alert for new northern locations) of jumping bush crickets.
- Clouded grasshopper (all except Kane, Will, Pulaski; Biesecker Prairie and Clark & Pine in Lake IN, Markham Prairie, Shoe Factory Road Prairie, Conrad Savanna (also, watch out for autumn yellow-winged), Area D&F, Tefft Savanna, Chamberlain Lake; Howe Prairie and Mnoke Prairie, National Lakeshore).
- Follow up unresolved observation gleaned from field notes: a small species of crepitating grasshopper at Bong Recreation Area's prairie in the first half of September. Probable autumn yellow-winged grasshopper at Chamberlain Lake power line corridor (would not be a county record unless it's something else).
- Consider a visit to the sedge meadow at Cedar Bog in Ohio to get experience with *Neoconocephalus lyristes* (Scott N. may wish to accompany).

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