

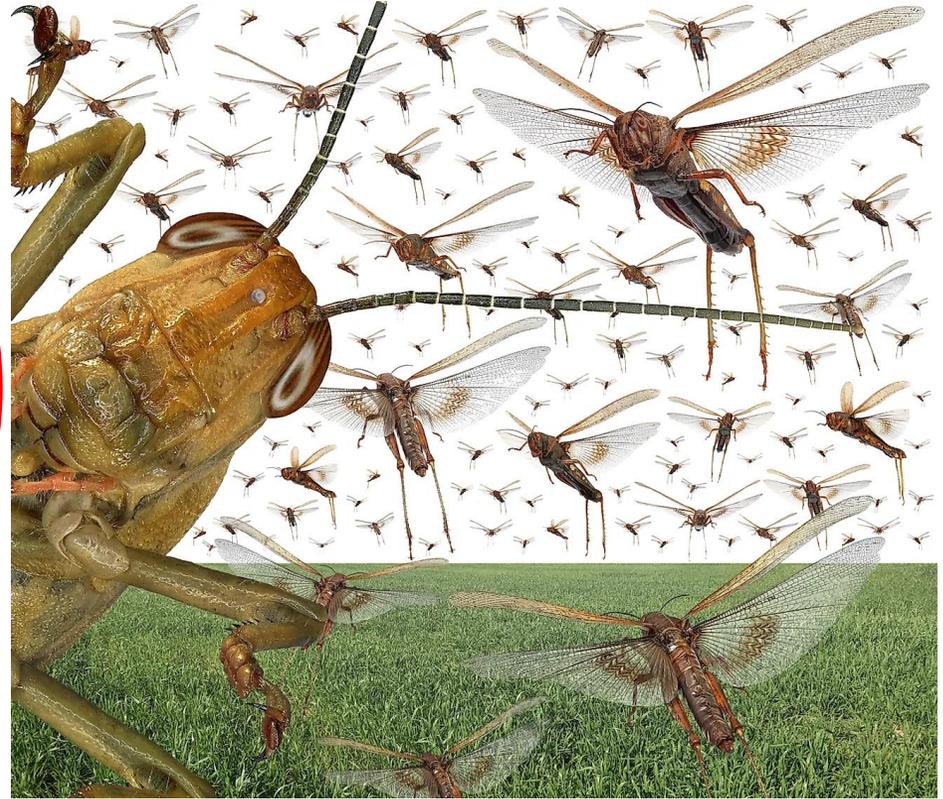
A close-up photograph of a tree branch heavily infested with cicadas. The cicadas are dark blue-black with prominent red eyes and yellowish-brown wings. They are clustered together, covering the branch and leaves. The background is a soft-focus view of more branches and leaves, creating a sense of a large-scale infestation.

THE CICADAS ARE COMING!
THE CICADAS ARE COMING!

...TO DINNER?!?

-Dr. Don Sudbrink, APSU Dept. of Agriculture

First off: **CICADAS ARE NOT LOCUSTS!**

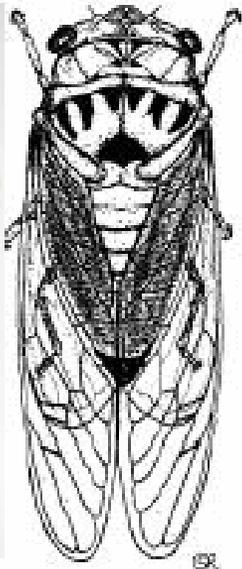
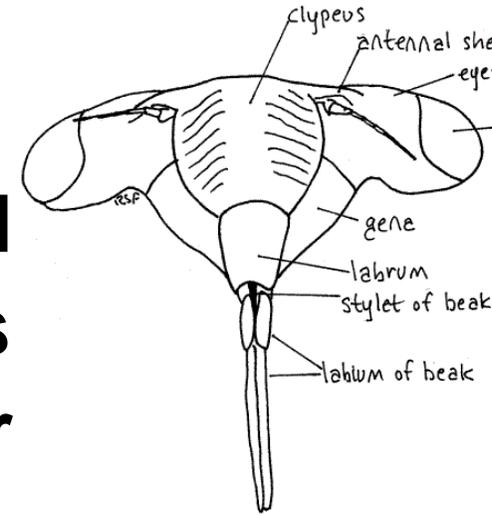


LOCUSTS are related to grasshoppers, crickets & katydids

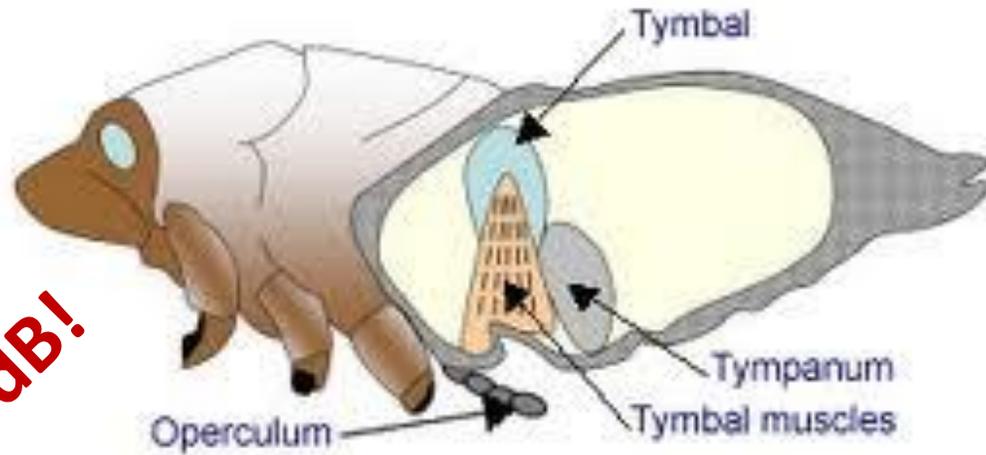
ORDER: ORTHOPTERA

CICADAS (Order: HEMIPTERA, Family: Cicadidae)

- Related to plant hoppers, aphids & scales
- Plant-feeding insects: ~3,000 spp. in world
- Drink plant sap with straw-like mouthparts
- Include annual cicadas seen each summer
- Best known for the songs sung by male cicadas...



MALE CICADAS CALL TO FEMALES WITH VIBRATING MEMBRANES: TYMBALS



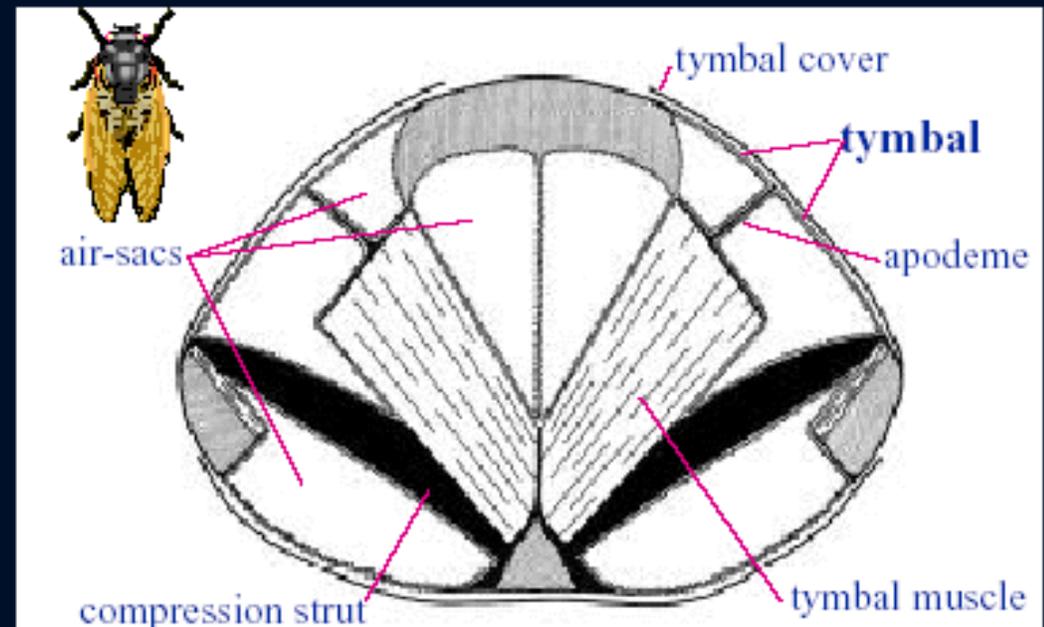
Males sing by flexing their tymbals: drum-like organs found in their abdomens.

Up to 100 dB!

Small muscles rapidly pull the tymbals in and out of shape. The cicada's primarily hollow abdomen intensifies the sound.

<https://www.cicadamania.com/cicadas/cicada-songs-audio-sounds-noise/>

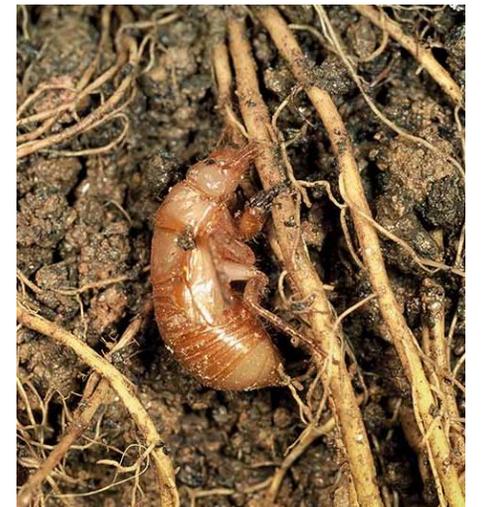
Sound Production by a Vibrating Membrane



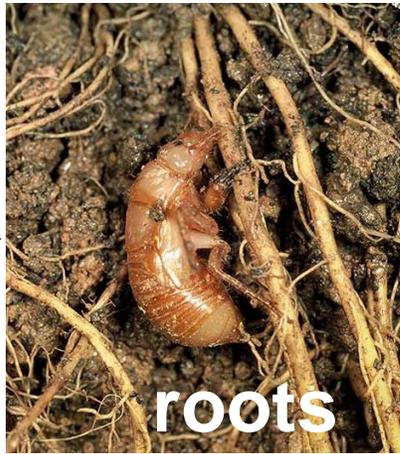
Cross section of the 1st abdominal segment of a cicada

PERIODICAL CICADAS

- Seven species in Genus: *Magicicada*
- Periodically emerge in the billions in 13-yr &/or 17-yr “Broods” in different years in various parts of the eastern US.
- 17yrs = Longest known insect life-cycle on earth
- Adults usually emerge in May... mate, lay eggs in tree twigs and die off in June.
- Immatures then hatch out and drop into the ground to feed on tree root sap for more than a decade.

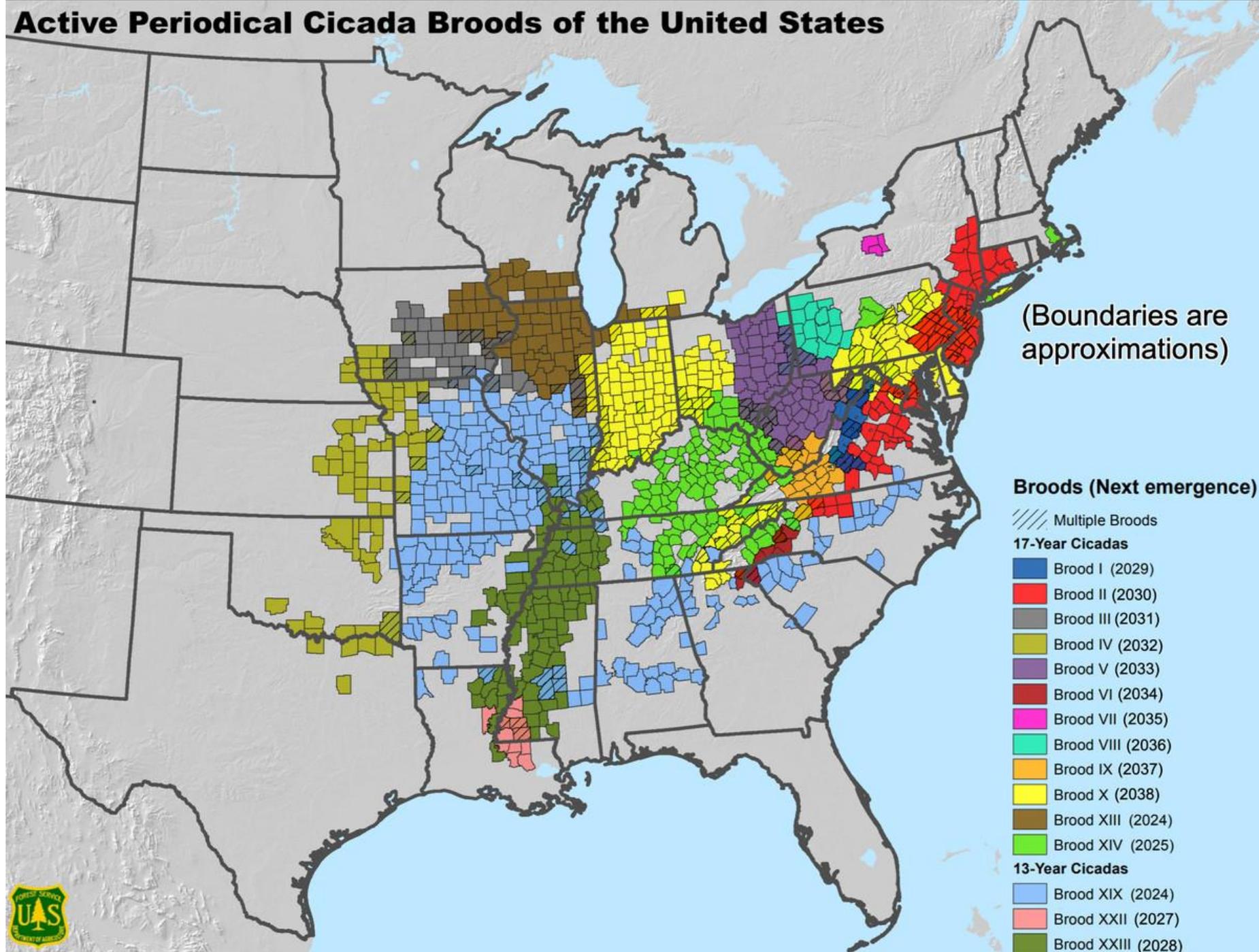


CICADA LIFE STAGES

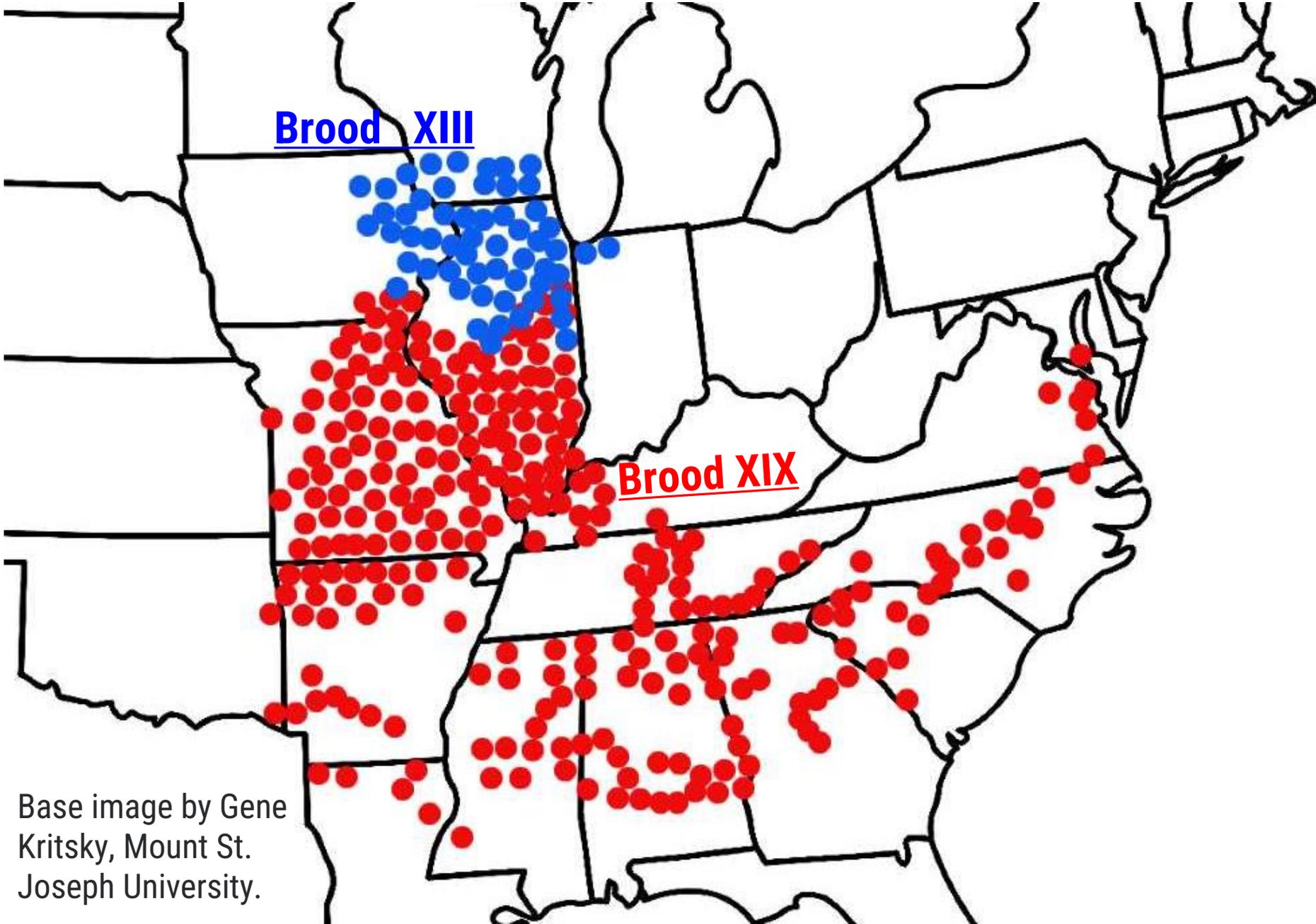


Photos: Gene Kritsky, Mike Raupp (eggs),) IN-DNR, Frank Hale (adult emerged & Don Sudbrink (adult)

Active Periodical Cicada Broods of the United States



Map of where **Broods XIII (17-yr)** and **XIX (13-yr)** occur.



Base image by Gene Kritsky, Mount St. Joseph University.

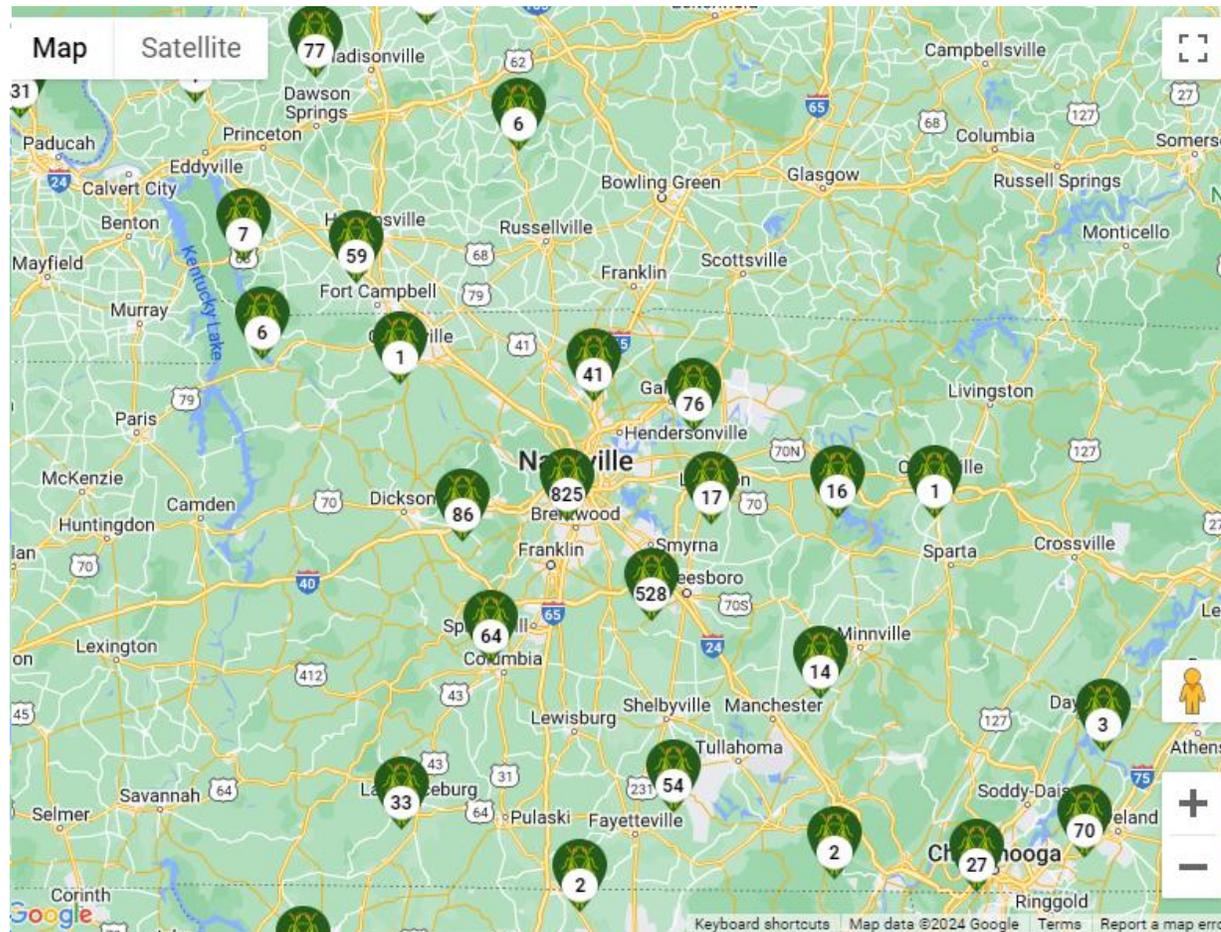
Cicada safari App

Citizen science to help record emergence

<https://www.cicadasafari.org/>

Records submitted to [Cicada Safari](#)

Data not field checked. Not to be redistributed or published without prior written permission.



**Cicada Safari map
of XIX Emergence
as of 5/6/2024**



<https://cicadamap.msj.edu/>



A quick guide to telling the difference between the 4 types of *Magicicada* species.

There are always exceptions to the rule, but these rules are pretty good.



M. cassini (17yr)
M. tredecassini (13yr)
Black abdomen.

M. septendecula (17yr)
M. tredecula (13yr)
Black abdomen with narrow orange stripes.

M. septendecim (17yr)
M. neotredecim (13yr)
Black abdomen with thick orange stripes. Orange between eye and wing insertion.

M. tredecim (13yr)
Almost entirely orange abdomen. Orange between eye and wing insertion.

Visit <https://www.cicadamania.com/cicadas/where-will-17-13-year-periodical-cicadas-emerge-next/> to compare sounds.

Visit <https://cicadas.uconn.edu/rcd/> to learn about the song differences of the “decim” cicadas. Huskies love cicadas.

- Attenborough

<https://www.youtube.com/watch?v=tjLiWy2nT7U>

- Fungal parasites

- 13 vs. 17 yr cycle evolution <https://www.youtube.com/watch?v=mSmD43tS900>

https://www.youtube.com/watch?v=1q_-bKO9Hqs



A large number of cicadas on a tree. Photo by Gene Kritsky, Mount St. Joseph University.



PREDATOR SWAMPING “satiation”

- Outproduce, overwhelm and satiate any and all predators over time.
- \approx 1 Trillion cicadas across US in 2024:
1,000,000,000,000!
- Up to 1.5 Mill. cicadas per acre
- They can actually alter food webs



Cicada emergences have Ecosystem Impacts on Birds, Caterpillars and Trees

- They can actually alter food webs!
- They provide a satiation for birds and other insectivores
- This can leave forest caterpillar populations unchecked
- In 2021, 80 bird spp. switched foraging to include X cicadas
- Caterpillar damage in forests can increase, altering primary production and energy flow.



Getman-Pickering et al. 2023. Periodical cicadas disrupt trophic dynamics through community-level shifts in avian foraging. *Science*. Vol 382: 320-324

CICADA DAMAGE TO TREES

Tree with branches that have flagged (damaged by cicada egg nests).

Photo by Gene Kritsky, Mt. St. Joseph University.



- Can damage small trees when laying eggs in twigs



- Small trees and fruit trees can be protected with a fine mesh cover <math><1/4''</math>



CICADA ENTOMOPHAGY?

Can you eat
cicadas?!?



**Brooklyn
Bugs**
Feed Your Curiosity

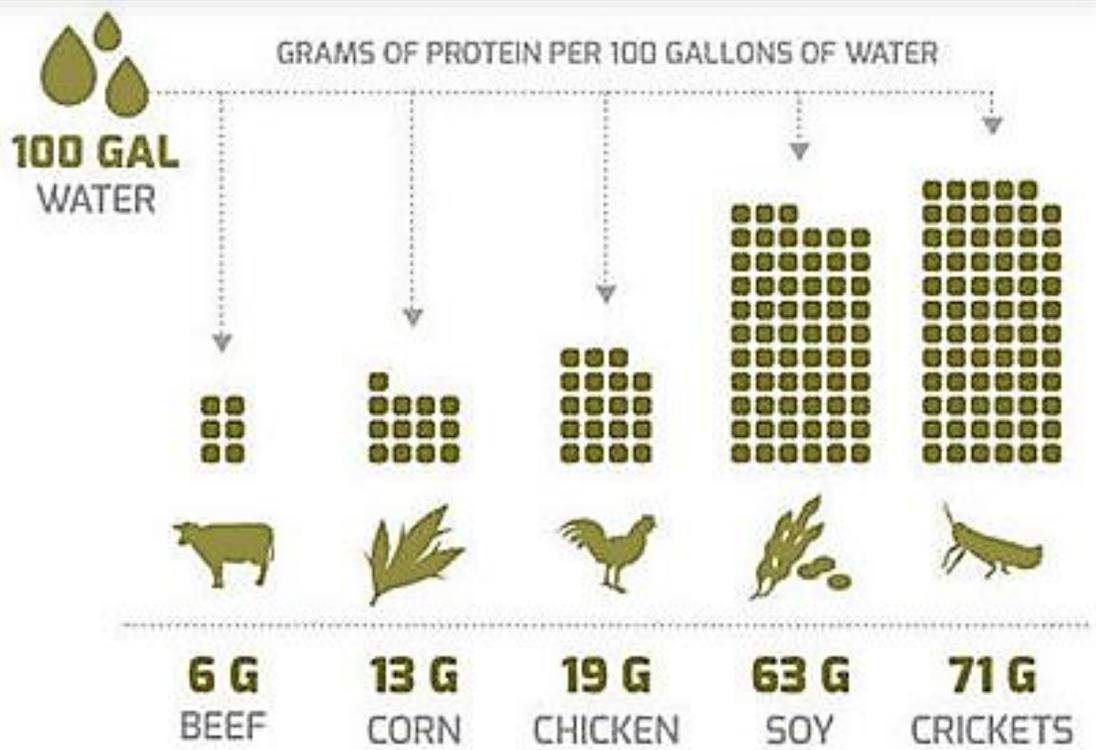
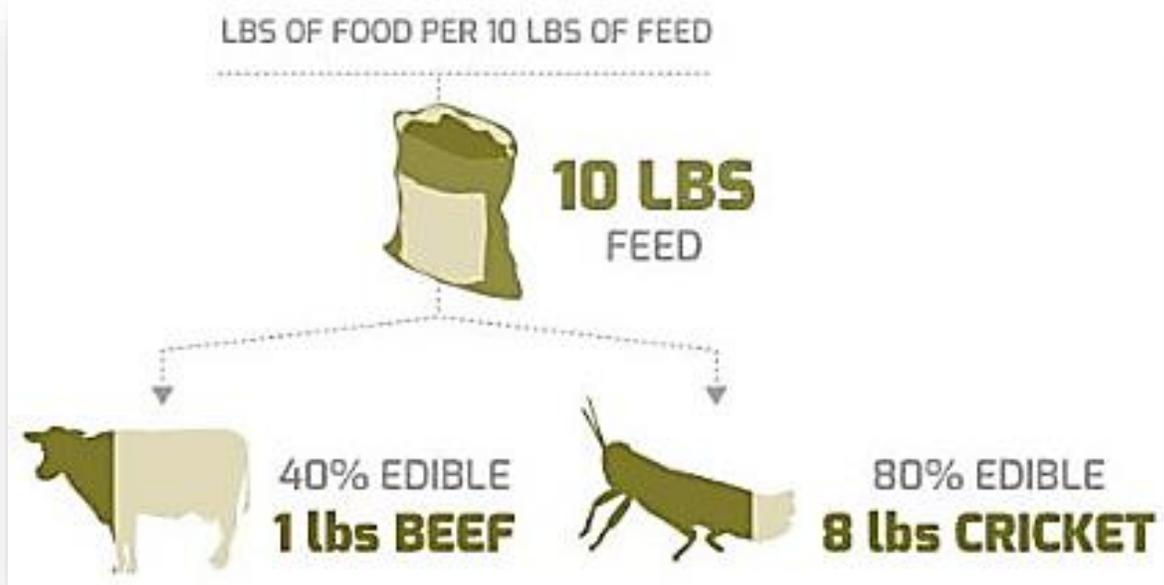
CICADA NYMPH SPRING SALAD

ENTOMOPHAGY: Insect Livestock for Food and Feed

- MUCH OF THE WORLD EATS INSECTS!
- More than 2 Billion people worldwide eat insects in regular diet (29%)
- 80% eat them occasionally
- Demand for animal protein to rise 75%



- **INSECTS ARE HIGHLY EFFICIENT AT CONVERTING FEED TO PROTEIN**
- **USE A SMALL FRACTION OF THE WATER.....**
GOOD FOR DRIER WATER LIMITED AREAS



EARLY EXPERIENCE: **CICADA COOK-OUT** (Brood-X: 1987)

with **Dr. Doug Miller, Systematic Entomology Lab & Smithsonian Entomology,**
Cicada tacos & Cicada Teryaki
as seen on Local News broadcast Channel 4 (Washington DC)



“Fresh, unsprayed cicadas are fine for human consumption* (cleaned & cooked) and relatively safe for pets (if they don’t overdo it)”**

**-Floyd Shockley,
Smithsonian entomologist**

***Unless one has a shellfish allergy**

****Sometimes dogs eat too much**

Recipes **CICADA-LICIOUS: Cooking and Enjoying Periodical Cicadas**

- Jenna Jadin and the University of Maryland Cicadamanians, 2004.

<chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://www.tullabs.com/cicadaworld/cicadarecipes.pdf>

CICADA-LICIOUS:

Cooking and Enjoying Periodical Cicadas



Created by Jenna Jadin
and the
University of Maryland Cicadamanians

© 2004 University of Maryland
2nd edition

Maryland Cicadas

Ingredients:

1/2 cup Old Bay® Seasoning
2 tablespoons salt
4 quarts water
1 (12 fluid ounce) can beer (optional)
8 red potatoes, quartered
2 large sweet onions, cut in wedges
2 pounds lean smoked sausage, cut in 2-inch lengths
8 ears fresh corn, broken in half
4 pounds large cicadas

Directions:

1. In an 8-quart pot, bring Old Bay, salt, water and beer to a boil. Add potatoes and onions; cook over high heat for 8 minutes.
2. Add smoked sausage to potatoes and onions; continue to cook on high for 5 minutes. Add corn to pot; continue to boil for 7 minutes. Add cicadas, cook for 5 minutes.
3. Drain cooking liquid. Pour contents of pot into several large bowls, shallow pails or mound on a paper-covered picnic table. Sprinkle with additional Old Bay if desired.

Yield:

8 servings

El Chirper Tacos

Ingredients:

2 tablespoons butter or peanut oil
1/2 pound newly-emerged cicadas
3 serrano chilies, raw, finely chopped
1 tomato, finely chopped
1 onion, finely chopped
1/2 tsp ground pepper or to taste
1/2 tsp cumin
3 tsp taco seasoning mix
1 handful cilantro, chopped
Taco shells, to serve
Sour cream
Shredded cheddar cheese
Shredded lettuce

Directions:

1. Heat the butter or oil in a frying pan and fry the cicadas for 10 minutes, or until cooked through.
2. Remove from pan and roughly chop into 1/4 inch cubes. Place back in pan.
3. Add the chopped onions, chilies, and tomato, and season with salt, and fry for another 5 minutes on medium-low heat.
4. Sprinkle with ground pepper, cumin, and oregano, to taste.
5. Serve in taco shells and garnish with cilantro, sour cream, lettuce, and cheddar cheese .



**Teneral
stage**

Taste testing insects with The Food Initiative

Served and rated insect dishes at *The Food Initiative's* "Summer Chow" season-end events for students & families



Students & families rated insect dishes at Summer Chow event

	INSECT-DISH-RATINGS – 5-PT. SCALE			5 = delicious, 1=distasteful
Chips & Salsa/Guacamole	Chocolate Chirp	Corn-Mealy Bread	Cicada Jambalaya	
Mealworms	Cookies			
Mean = 4.6	Mean = 4.9	Mean = 4.5	Mean = 4.1	



CAUTION: IF YOU HAVE A SHELLFISH ALLERGY, DON'T EAT CICADAS!!

- Insects and crustaceans share similar proteins and chitin that can be a problem for those who suffer shellfish allergies.



Yep! We have to say it!

Don't eat #cicadas if you're allergic to seafood as these insects share a family relation to shrimp and lobsters. go.usa.gov/xHg69



Posts Subgroups Files Ask the Allergist Q Join



If You Have a Shellfish Allergy, Don't Eat Cicadas No Matter How Tasty They May Look

AAFA Community Services · 4/5/24 @ 3:30 PM
Improving Your Asthma and Allergy Health

This block contains a navigation bar with links for 'Posts', 'Subgroups', 'Files', 'Ask the Allergist', a search icon, and 'Join'. Below the navigation bar is a large image of a cicada on a green leaf. Underneath the image is a text overlay with the title 'If You Have a Shellfish Allergy, Don't Eat Cicadas No Matter How Tasty They May Look' and a timestamp 'AAFA Community Services · 4/5/24 @ 3:30 PM'. At the bottom of the text overlay is the tagline 'Improving Your Asthma and Allergy Health'.

Questions?



Courtesy, F. Hale, UT E&PP