

# Tuning into the Insect Orchestra



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# BIML

Bee Inventory & Monitoring Lab

<http://www.pwrc.usgs.gov/nativebees/>

<http://marylandnaturalist.org/>



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# Insect Song

## Why Sing at all?





# Methods of sound production

- **Crepitation**-Sound produced by insects snapping their wings. Often used by short-horned grasshoppers as they fly to foil predators and sometimes to attract mates. Courtship
- flight displays use
- Crepitation.

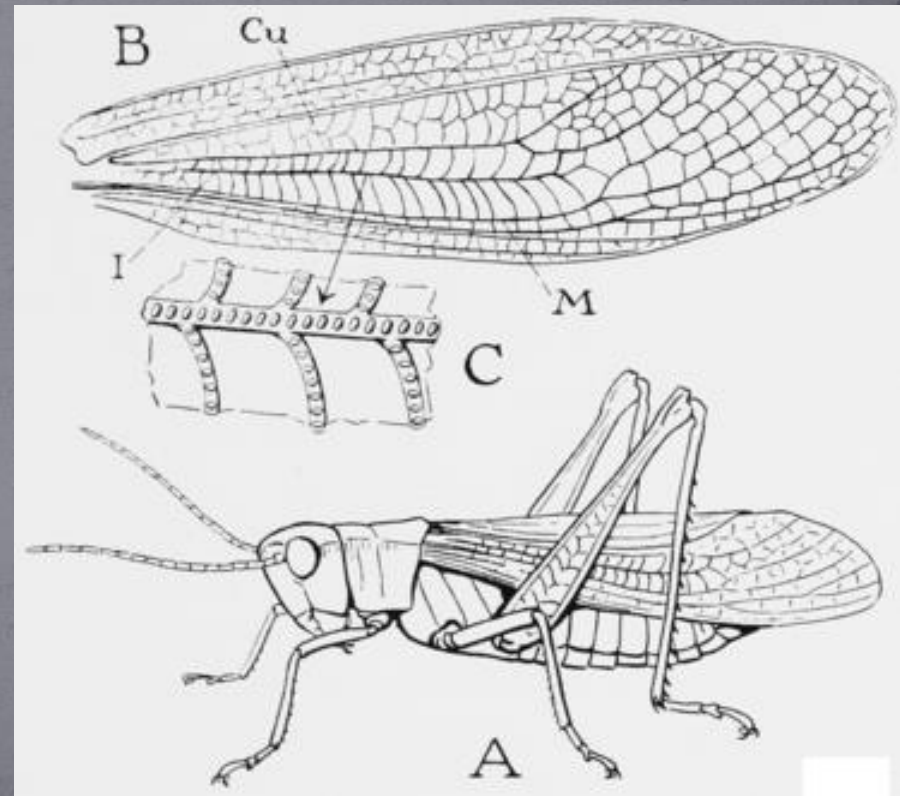


*Dissosteira carolina* Carolina Grasshopper

# Methods of sound production

- **Other Stridulatory methods-**

Males in the Acrididae family rub the femors against the wings to produce a high pitched day song. Many species produce a supersonic song that humans are not able to hear.





# Methods of sound production

- **Stridulation**-When a sound is produced by rubbing two surfaces of the body together. Crickets and Katydid use a similar
- stridulatory mechanism.
- Males rub modified wing edges together. This is true for all the sound producing species in Cricket and Katydid groups.

<http://songsofinsects.com/blog/long-spurred-stridulations>



Lang Elliot and Wil Hershberger

# Methods of sound production

- **Other!** Cicadas use a complex method of popping the tymbal or sound producing membrane in their abdomens rapidly to produce the buzz we associate with summer.

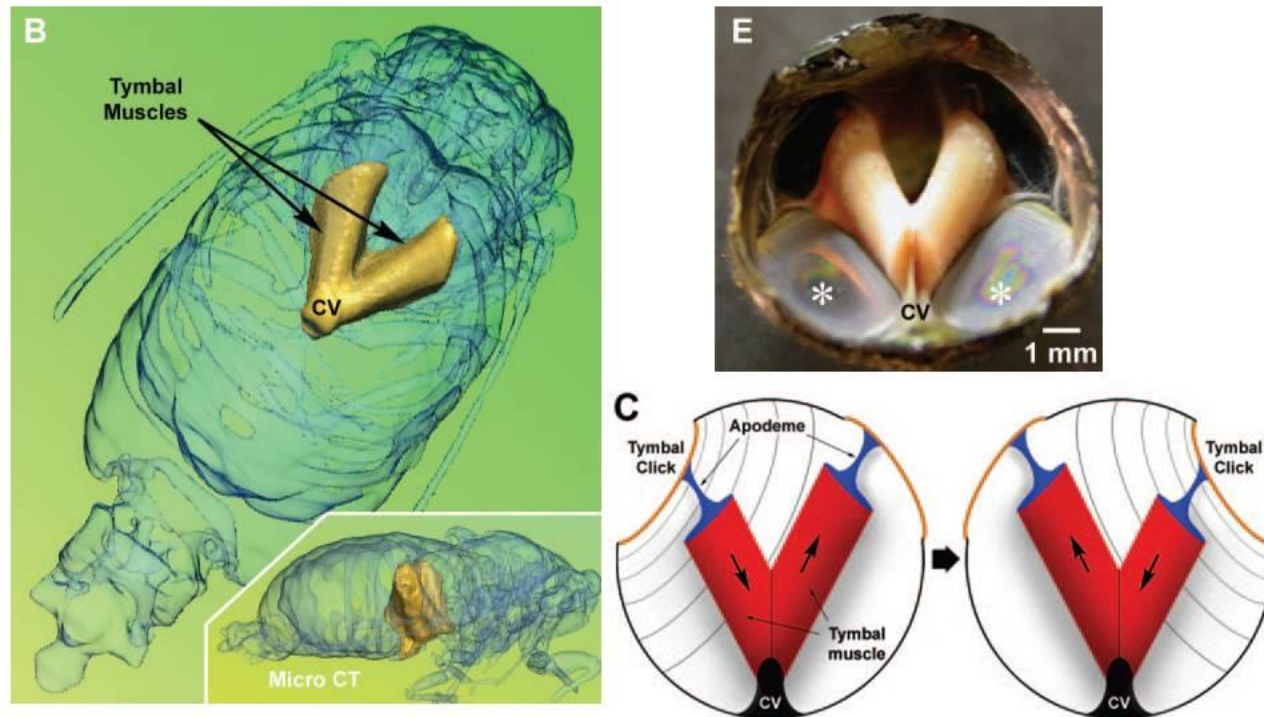


Photo courtesy of  
Amanda Hevel.



# Methods of sound production

## The secret behind the cicada buzz

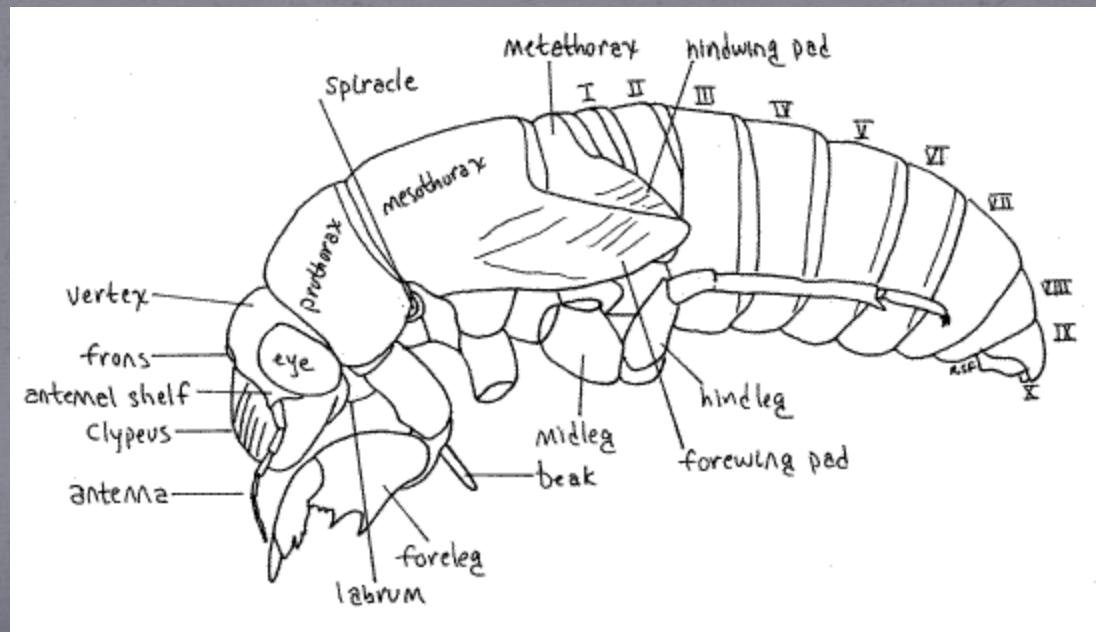


Nahirney, P. C., et al. What the buzz was all about: Superfast song muscles rattle the tymbals of male periodical cicadas. *FASEB J.* 20, 2017–2026 (2006)



# Cicadas

- Lifecycle and Habitat-
- Annual Cicadas- spend ~2 years in the ground as developing nymphs. They feed on plant roots with piercing sucking mouthparts. Adults emerge in summer, males call or sing and females use a sharp ovipositor to lay eggs in twigs of trees and shrubs.
- The tips of the twigs die and the 1<sup>st</sup> instar nymphs burrow into the soil.



# Cicadas



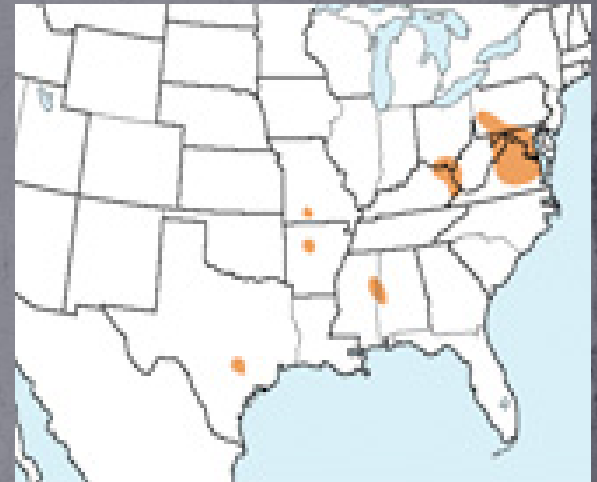
- Three common species in our area
- *Tibicen chloromera*, Swamp Cicada, morning
- <http://songsofinsects.com/cicadas/swamp-cicada>
- 
- *Tibicen linnei*, Linne's Cicada
- <http://songsofinsects.com/cicadas/linnes-cicada>
- 
- *Tibicen auletes*, Northern Dusk Singing Cicada
- <http://songsofinsects.com/cicadas/northern-dusk-singing-cicada>



# Cicadas

<http://songsofinsects.com/cicadas/robinsons-cicada>

Robinson's cicada is very localized and you can often hear this species along rivers in our area.



Lang Elliot and Wil Hershberger

# Crickets

- Order Orthoptera
- Super Family Grylloidea

Can sing night and day

Ecology, lifecycle and habitat vary by group.

Most are omnivores and scavengers.








Spring Field Crickets  
overwinter as juveniles and  
appear in April-May.

<http://songsofinsects.com/crickets/spring-and-fall-field-crickets>



Fall Field Crickets overwinter as eggs  
and start singing in June. All field  
crickets lay eggs in the soil and  
spend most of their time on the  
ground.



# Crickets

## Japanese Burrowing Cricket

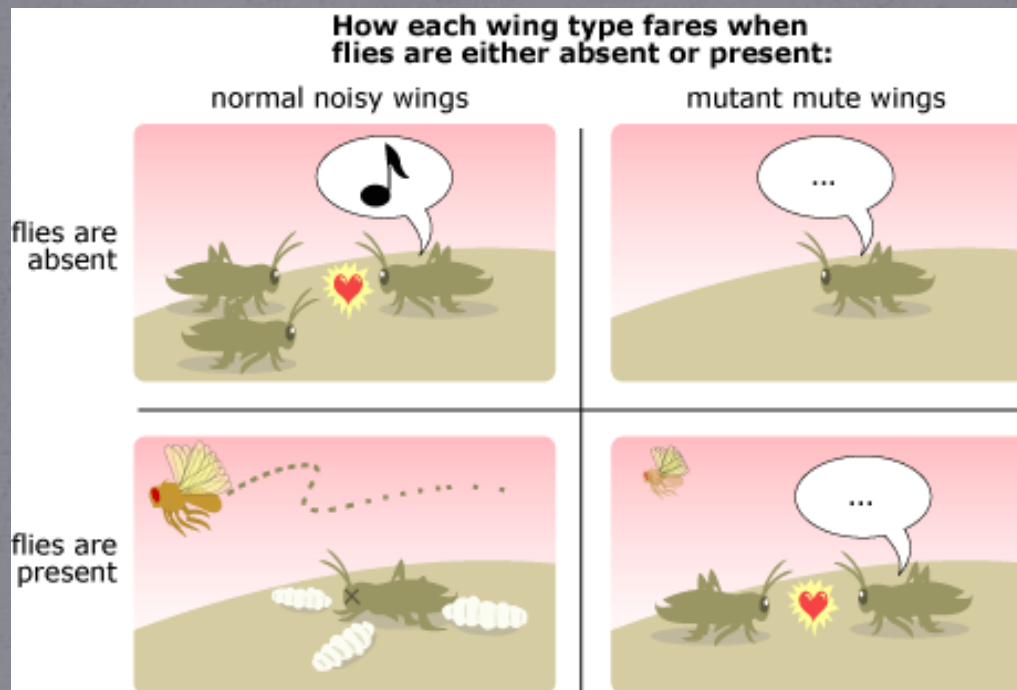


This species, native to Japan, was first discovered in the United States in 1959 ([Alexander & Walker 1962](#)). By 1977 it had become established in the District of Columbia and at least 23 counties in 6 southeastern states ([Walker 1977](#)). Its rapid spread was probably by overwintering eggs in soil in the root balls of ornamental shrubs shipped from nurseries near Mobile, Alabama. The largely suburban and spotty distribution of *V. micado* agrees with this scenario.



# Crickets

- *Teleogryllus oceanicus*- The tale of the silent cricket



[http://evolution.berkeley.edu/evolibrary/news/061201\\_quietcrickets](http://evolution.berkeley.edu/evolibrary/news/061201_quietcrickets)

# Crickets



- Oecanthinae-Tree Crickets

Two spotted tree cricket

- <http://www.oecanthinae.com/index2.html>



Tree crickets spend time in the foliage, males will sing from leaf perches and will sometimes chew holes in the leaves to sing from. Eggs are laid in late summer or fall and overwinter in plant stems, such as goldenrod. Nymphs emerge in the spring and mature by summer.



All photos on this page courtesy of Nancy Collins



# Crickets



Omnivores-will eat some insects like scales & aphids, fungi, decaying plant material.

Food gifts from the male.

Singing male Broad winged tree cricket

<http://www.youtube.com/watch?v=nd6AhWnc5oA>

# Crickets

- Eneopterinae-Bush Crickets
- Main food –leaves, flowers and fruit
- Occur in trees and shrubs, often abundant in urban and suburban settings. Easier to find as the year progresses.

Restless Bush Cricket-  
Males may offer their forewings as a courtship gift. Successfully mated males are often mutilated and unable to call for more females. Habitat moist or wet wooded areas.



Photograph of female, Levy County, Florida, by T. J. Walker, University of Florida.



## Jumping Bush Cricket



<http://ifasgallery.ifas.ufl.edu/entnem/walker/buzz/686sl.wav>

# Crickets

Trigonidiinae-Sword Tailed  
Crickets

Handsome Trig



Say's Trig

Found in mid shrub and tree layer of yards and natural areas. Female has sword shaped ovipositor. Inserts eggs in pithy plants.



# Crickets

## Nemobiinae-Ground Crickets

Carolina Ground Cricket- *Eunemobius carolinus*

These are the little crickets that scatter when you walk in the yard. They look like miniature field crickets. Very abundant. High-pitched bell like songs coming from the ground.

<http://songsofinsects.com/crickets/carolina-ground-cricket>



# Katydids

- Tettigoniidae
- Pterophylla-True Katydids
- One species in North America
- *Pterophylla camellifolia*- A true forest species found in the tops of trees, especially oaks. These insects have well developed wings but are incapable of flight. They eat foliage and may never leave the tree where they were born.
- Leaf mimics, males sing in continual choruses.
- Males leave nuptial gifts with sperm transfer. Truly nutritious for female or a ploy to keep her from mating sooner with other males? Candymaker evidence within Field Cricket species.





Common True Katydid



<http://songsofinsects.com/katydids/common-true-katydid>



# Katydids

False Katydid  
Phaneropterinae

Greater Anglewing  
*Microcentrum*  
*rhombifolium*



<http://songsofinsects.com/katydids/greater-anglewing>



# Habitat

You may not be able to provide habitat for forest loving Katydids but simple native plants like golden rods make excellent places to lay eggs, provide cover and provide perches for midlevel Orthoptera to sing. Keep winter stems up till April or May. Diversity in plant species and height layers are best. Leave a portion of the yard unmown. No pesticides!







In winter, the Carolina Chickadee's diet is about half plant, half animal. The rest of the year about 80-90 percent of their diet is animal (mostly insects). From Cornell



# Why Care About Them?

- <https://www.youtube.com/watch?v=kM2QxJGPi6I>
- Primary consumer, trophic importance, food for others. Frogs, toads, snakes, skunks, raccoons, fox, screech owls, various birds
- To understand variations & trends in populations we need baseline data for overlooked species.

# Cricket Crawl

## Washington DC Baltimore Cricket Crawl



[SLIDE TALK PDF](#)

[Why Should I Care?](#)

[How to Listen and Send in  
Your Results](#)

[8 Target Crickets and Katydid  
with Calls and Pictures](#)

[SoundCloud Download of 8 Target  
Songs](#)

ORGANIZERS WEBSITES

[Discover Life](#)

[Audubon Naturalist Society](#)

**DC/Baltimore Cricket Crawl August 21, 2015**

**[Real Time Data Map](#)**

**[Cricket Crawl Data Form Here](#)**

**[Join iNaturalist Singing Insects Atlas Project Here](#)**



[www.discoverlife.org/cricket/DC](http://www.discoverlife.org/cricket/DC)



# Cricket Crawl

## Songs of Insects

A Guide to the Voices of Crickets, Katydid & Cicadas

[Go!](#)[Home](#)[Biology](#)[Appreciation](#)[Identification](#)[Find & Watch](#)[Keep as Pets](#)[Insect MP3/CD](#)[About](#)[Blog](#)

### Our Insect Musicians:

#### Thumbnail Guide to All Species



#### Navigate to Species Pages:

[▶ Crickets](#)[▶ Katydid](#)

## Introduction

The high-pitched songs of crickets, katydids, grasshoppers, and cicadas are a prominent element of summer and early fall in most of North America. These wonderful musicians chirp, click, zip, rattle, and lisp from trees, shrubs, lawns, fields, woodlands — from just about all habitats, and sometimes from inside our homes.

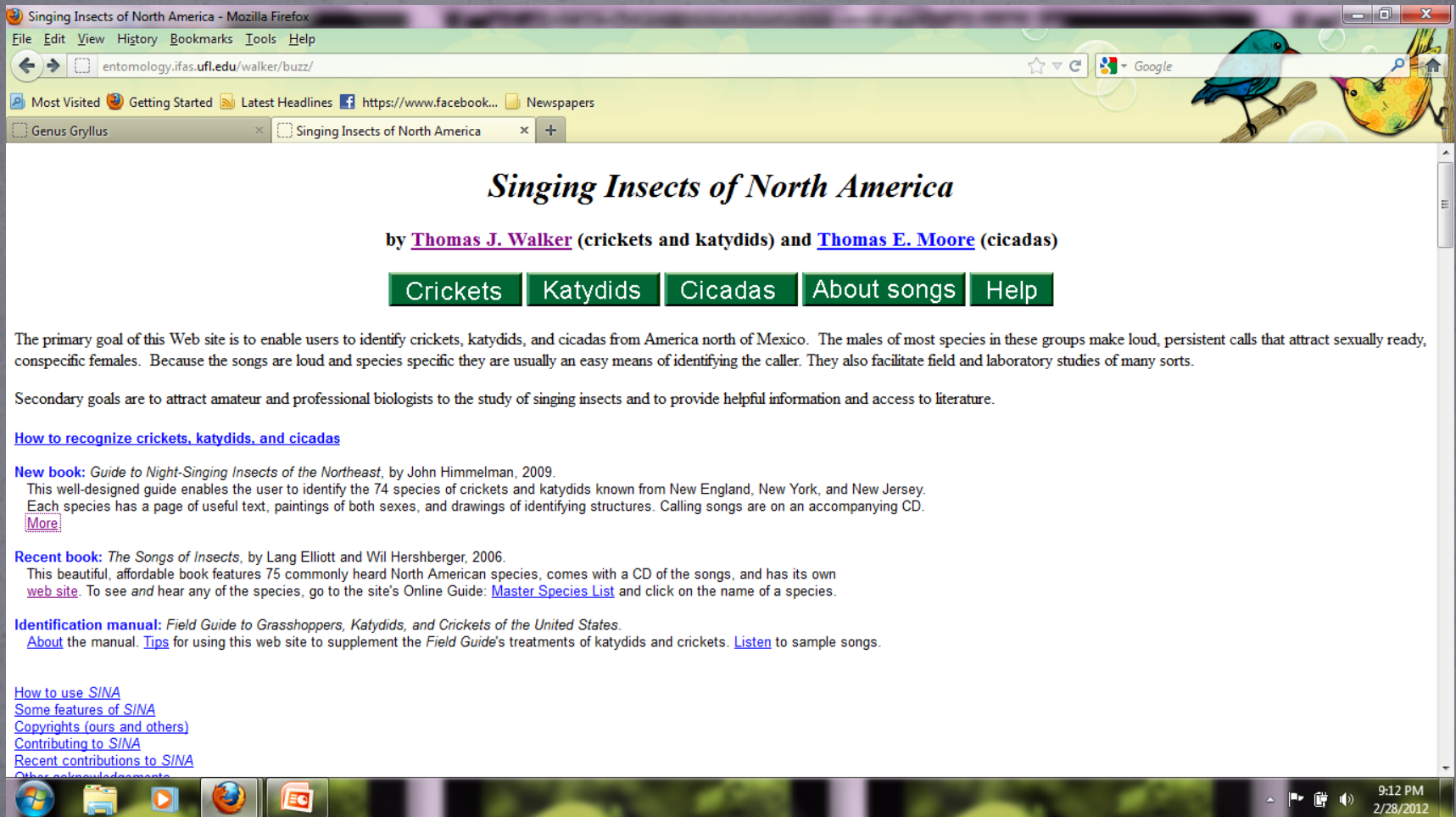
Finding and identifying a singing insect can be a wonderful challenge. These pages will expose you to over 70 common and widespread species, and will help you identify many of the singers that you will hear in your immediate surroundings and in the countryside far from home. With the help of a flashlight and considerable patience, you will be able to track down individual singers and perhaps even view a singing performance firsthand!

Learn more by watching our video introduction:



<http://songsofinsects.com/>

# Cricket Crawl





# Six Species



Japanese Burrowing Cricket

<http://songsofinsects.com/crickets/japanese-burrowing-cricket>



<http://songsofinsects.com/crickets/jumping-bush-cricket> Jumping Bush Cricket



<http://songsofinsects.com/katydid/lesser-anglewing>

Lesser Anglewing

# Six Target Species



Oblong Winged Katydid

<http://songsofinsects.com/katydid/oblong-winged-katydid>



Common True Katydid

<http://songsofinsects.com/katydid/common-true-katydid>



Greater Anglewing

<http://songsofinsects.com/katydid/greater-anglewing>



# Pre Crawl Fun



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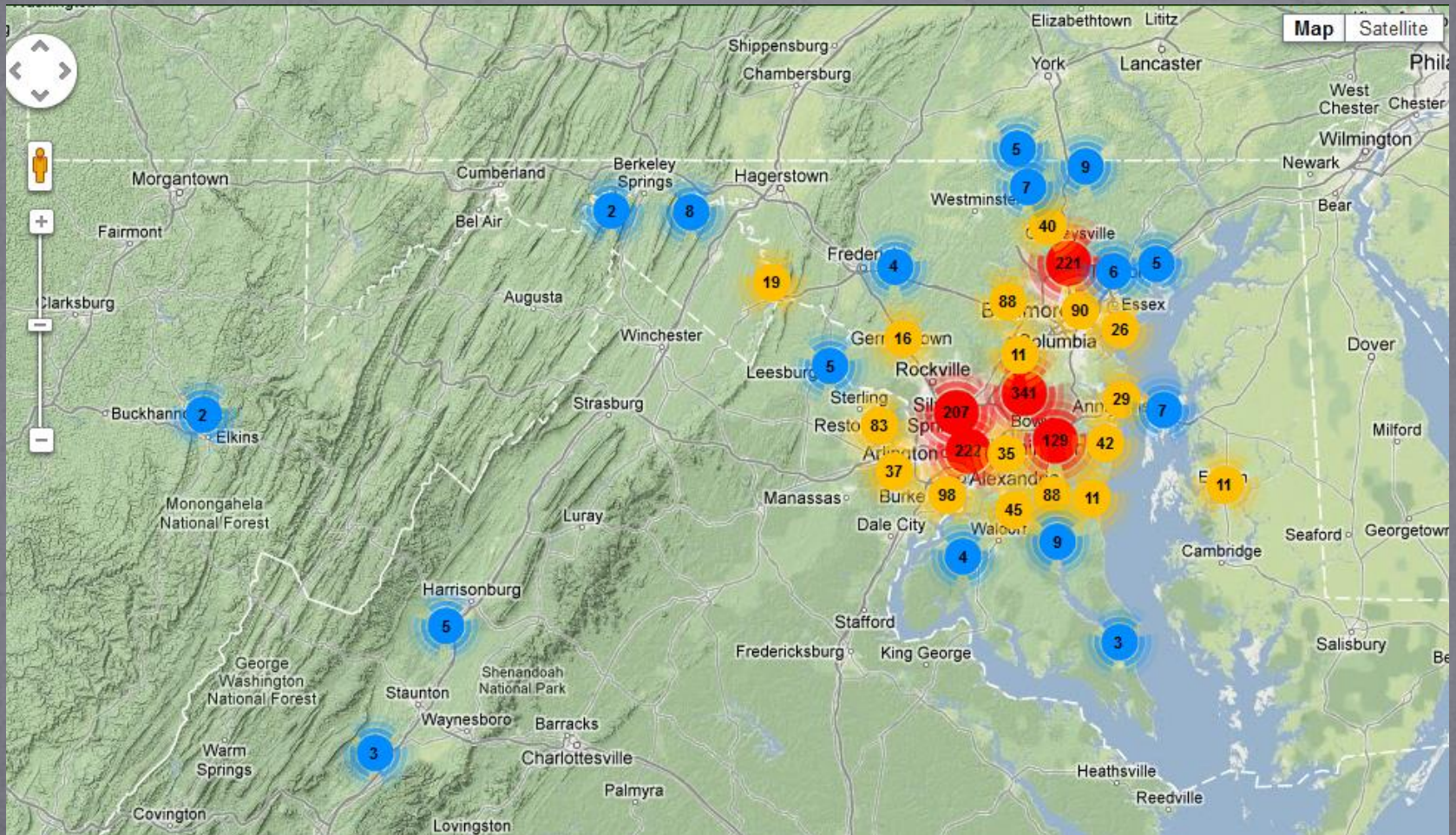


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Ultimately 1,974 data points gathered in the first DC/Baltimore Cricket Crawl ! **2012**



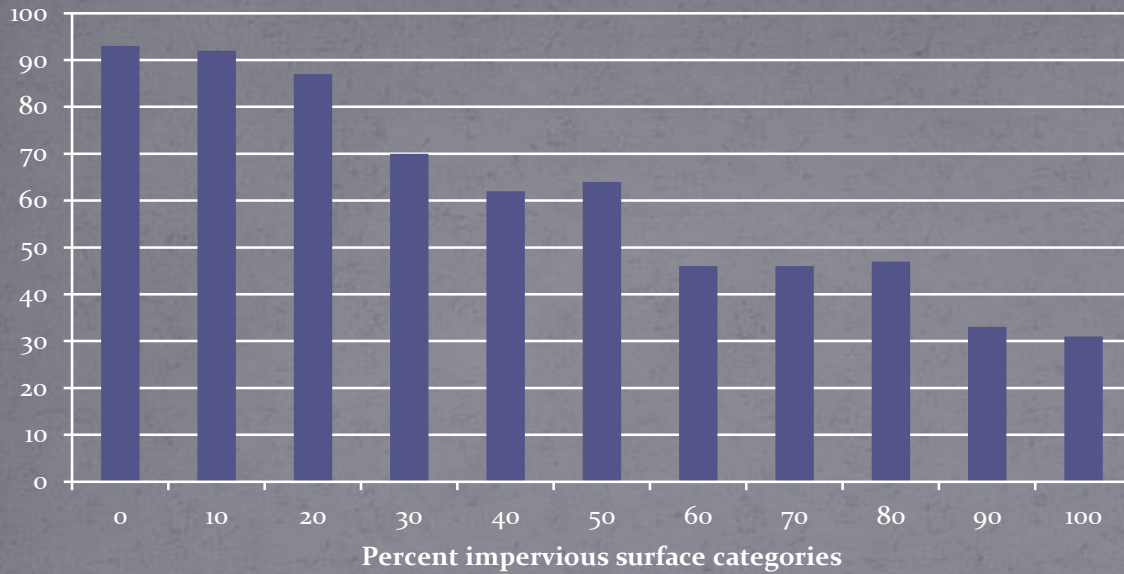


# What Happened?

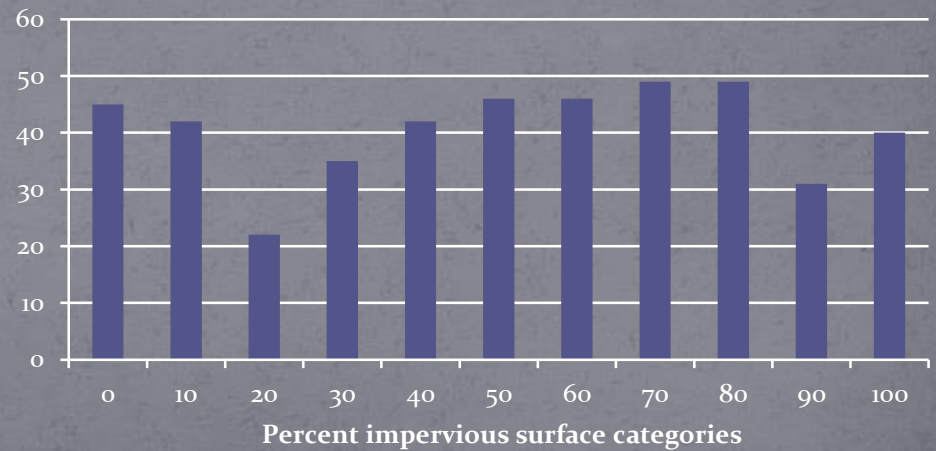
- ~150 groups took part in the Crawl
- Groups had 1-5 participants
- Over 1900 species observations recorded



## Percent of *P. camellifolia* present 2012

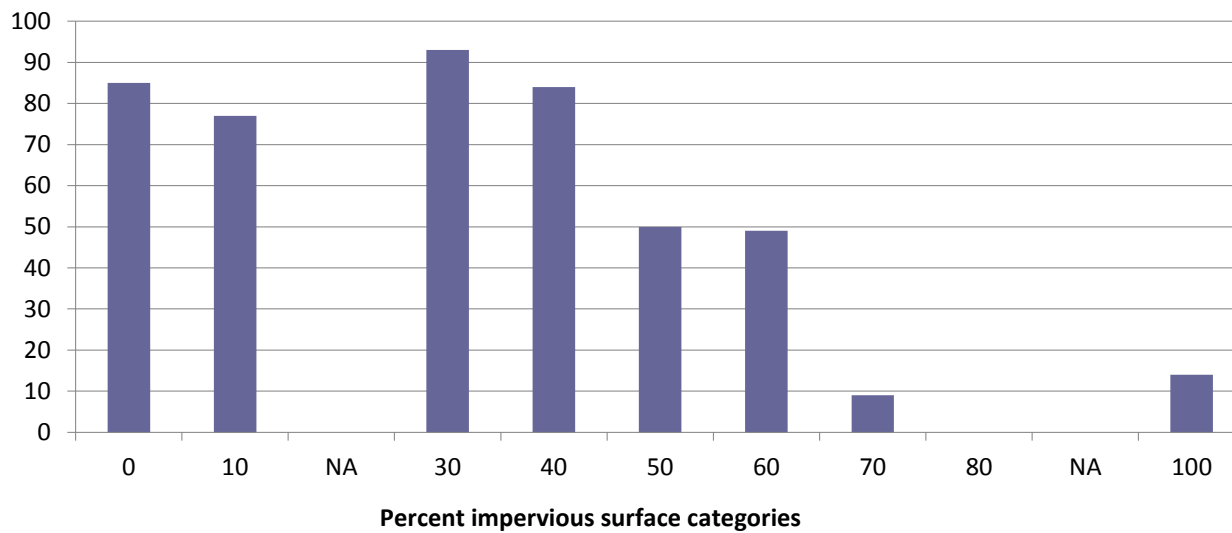


## Percent *V. micado* present 2012

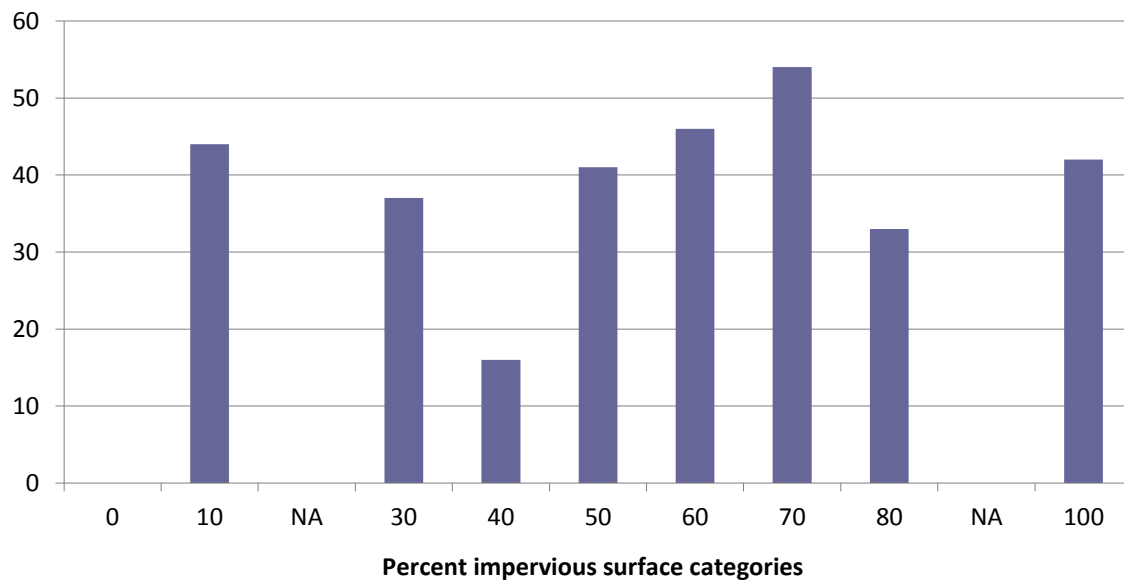




**Percent *P. camellifolia* present 2013**



**Percent *V. micado* present 2013**



# Resources

- [www.discoverlife.org/cricket/DC](http://www.discoverlife.org/cricket/DC) --Cricket Crawl 2018
- <http://songsofinsects.com/> ---Songs of Insects
- <http://entomology.ifas.ufl.edu/walker/buzz/> --SINA
- [www.oecanthinae.com](http://www.oecanthinae.com) ---Tree Cricket Site
- [http://www.magicicada.org/magicicada\\_i.php](http://www.magicicada.org/magicicada_i.php)
- --Periodical Cicada page
- <https://www.facebook.com/CricketCrawlDCBaltimore>
- Visit our Facebook site! Like us! Get updates on walks.



# Resources

- The Songs of Insects, Lang Elliott & Wil Hershberger
- Guide to Night Singing Insects of the Northeast, John Himmelman
- Field Guide to Grasshoppers, Katydid & Crickets of the United States,
- Crickets & Katydid, Concerts & Solos, Vincent Dethier
- Cricket Radio: Tuning in the Night-Singing Insects John Himmelman

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Society



# Cricket Crawl 2018

## August 24<sup>th</sup>



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Cricket Crawl Website

<https://www.discoverlife.org/cricket/DC>

Cricket Crawl Facebook

<https://www.facebook.com/CricketCrawlDCBaltimore>

