

The American Burying Beetle (ABB)

(Nicrophorus americanus Olivier)

What one beetle can tell us about death, romance, spousal cooperation, proper food preparation, child rearing, unintended consequences, and the resiliency of nature.

Chris Carlton, Louisiana State Arthropod Museum



How are these things related to the ABB?



Dead rats



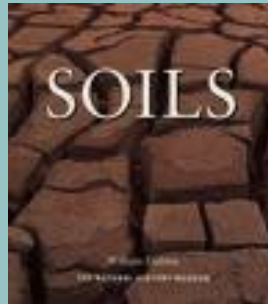
Mites



Flies



Locomotives



Soils



Passenger pigeons



Shotguns



Artificial light



Antibiotics

The ABB is a member of the family Silphidae (carrion beetles) that includes burying beetles and sexton beetles



Necrophila americana larva

The burying beetles, subfamily Nicrophorinae, genus *Nicrophorus*



16 North American species, all similar in appearance

The ABB is the largest North American carrion beetle (25-40 mm; 1.0-1.5 in.)



Ultrasensitive antennae find carrion items up to two miles away!

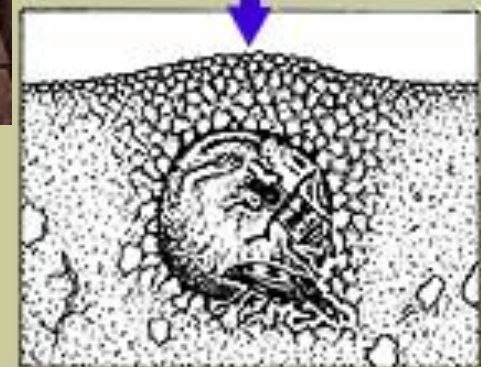
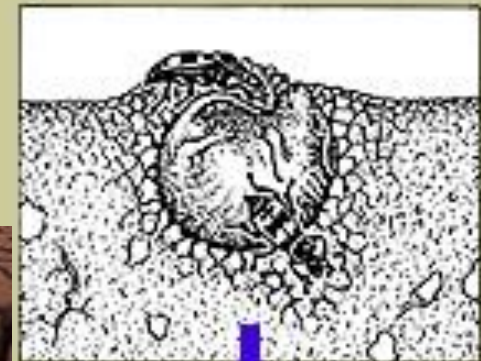
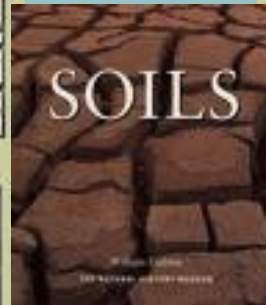
The key to understanding the ABB is knowing its biology



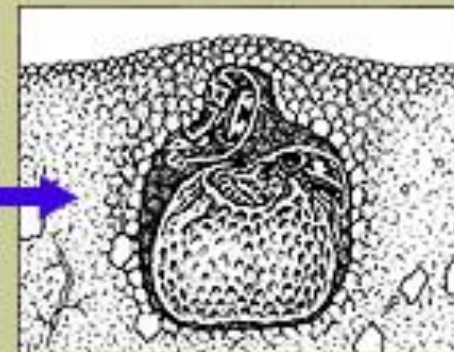
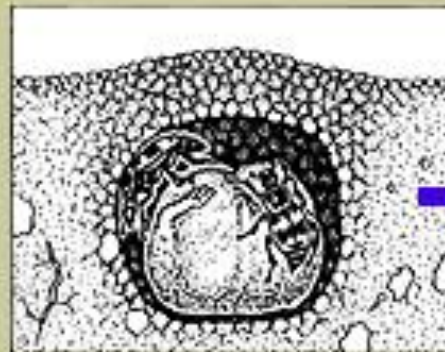
It all starts with a dead rat.



A couple of hours.



3-4 hours.



6-24 hours.

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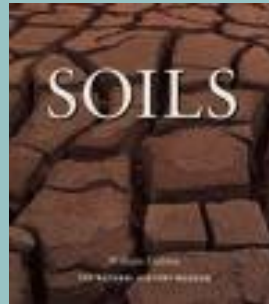
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Food item formed into a ball.



Coated with salivary secretions.



Young larvae are fed regurgitated food.



Older larvae feed themselves.

But wait! Don't animals that die start immediately decomposing? How can you raise children on them?



Antibiotics!

Salivary secretions of burying beetles contain natural antibacterial and antifungal substances.

Not so fast! Don't flies also rapidly invade dead animals and eat them? How do you raise children on them?



Mites!

Carrion beetles carry tiny phoretic mites that are predators of fly eggs and clear them from the carcass.

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Flies



Locomotives



Artificial light



Passenger pigeons

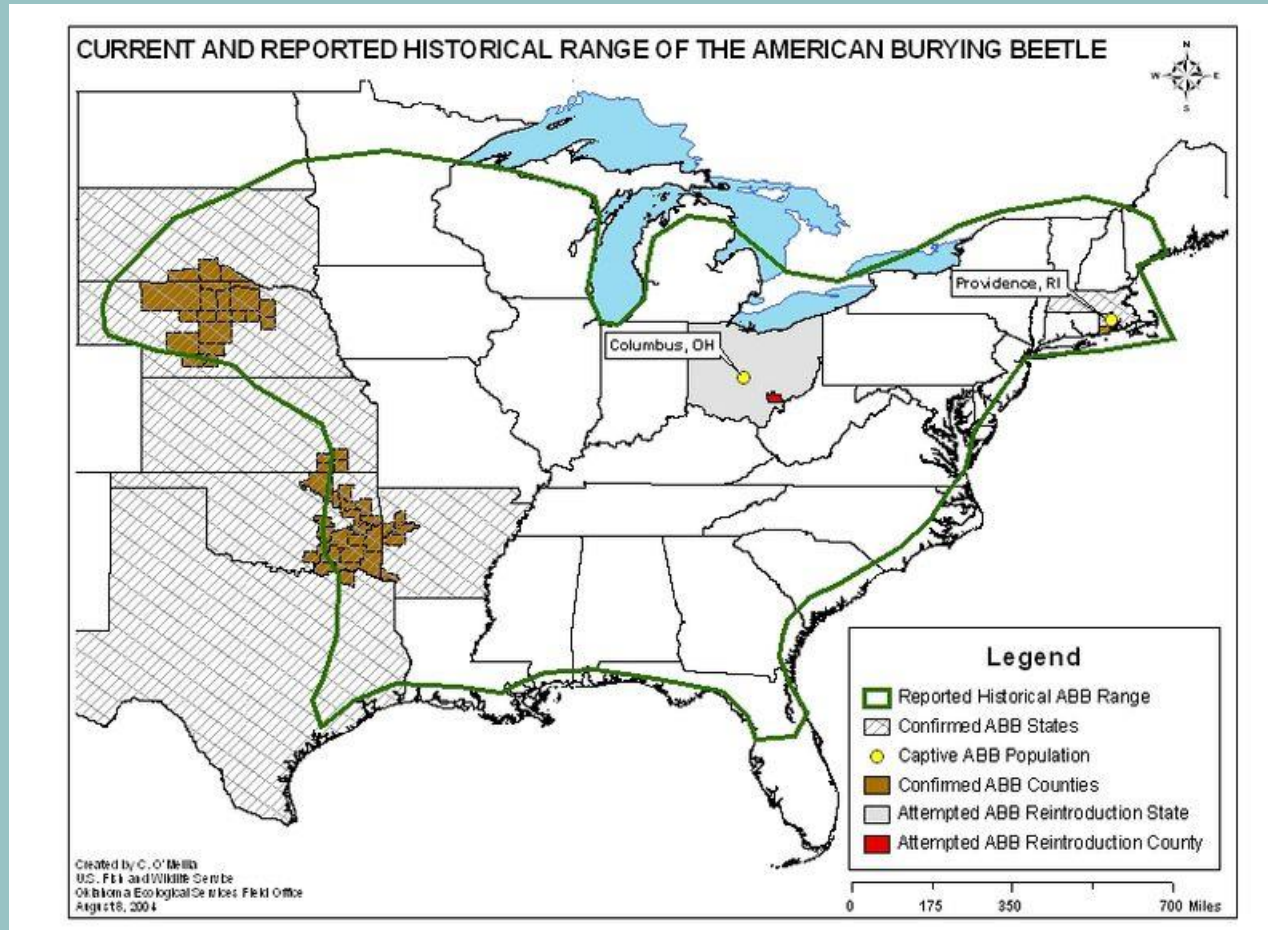


Shotguns



Antibiotics

The ABB is protected under the U.S. Endangered Species Act. Here's why.



Dramatic range reduction, past 100 years.

First noticed early 1980's by examining museum records.



Typical ABB museum specimen



Live ABBs in North Dakota pitfall trap



Tagged ABB ready for release

Subsequently confirmed by sampling across original range.

Why did the ABB decline so sharply?

Big is not always better.

- The ABB is the largest North American carrion beetle (1.0-1.5 in).
- It requires carrion items weighing 100-150 g (~4-6 oz) to successfully complete development.
- A limited subset of suitable small animals.



Pack rat



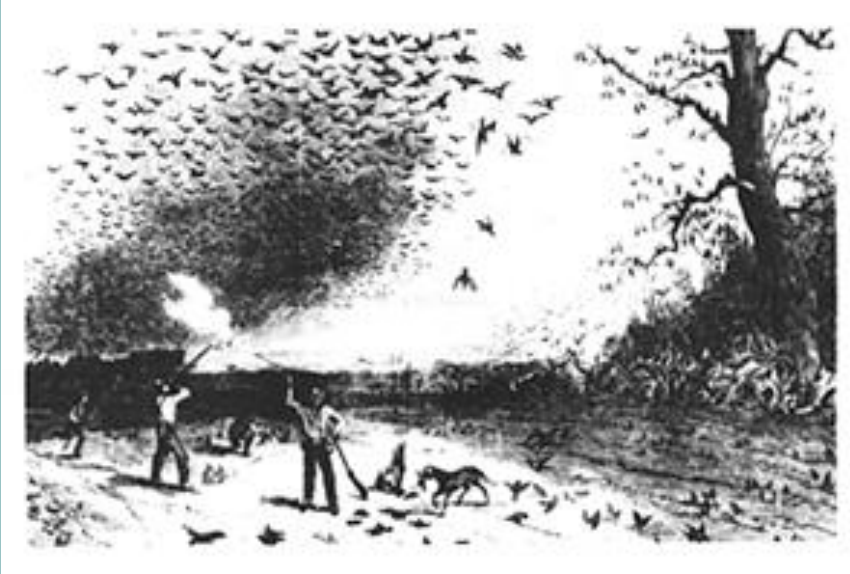
Ring-necked pheasant



Gray squirrel

But such creatures are still around,
what's your point?

Hypothesis: Yes, but the density of dead ones is
not sufficient to support populations across most of
the former range. What changed?



Immense pigeon flocks
once darkened U.S. skies.

Causal or correlational relationship?

The passenger pigeon was the right size, was a superabundant but spotty food source, and disappeared about the same time the ABB's decline began.



The last bird died in 1914.

They could easily be following by groups of hunters using the rails and killed in large numbers using the recently developed shotgun.

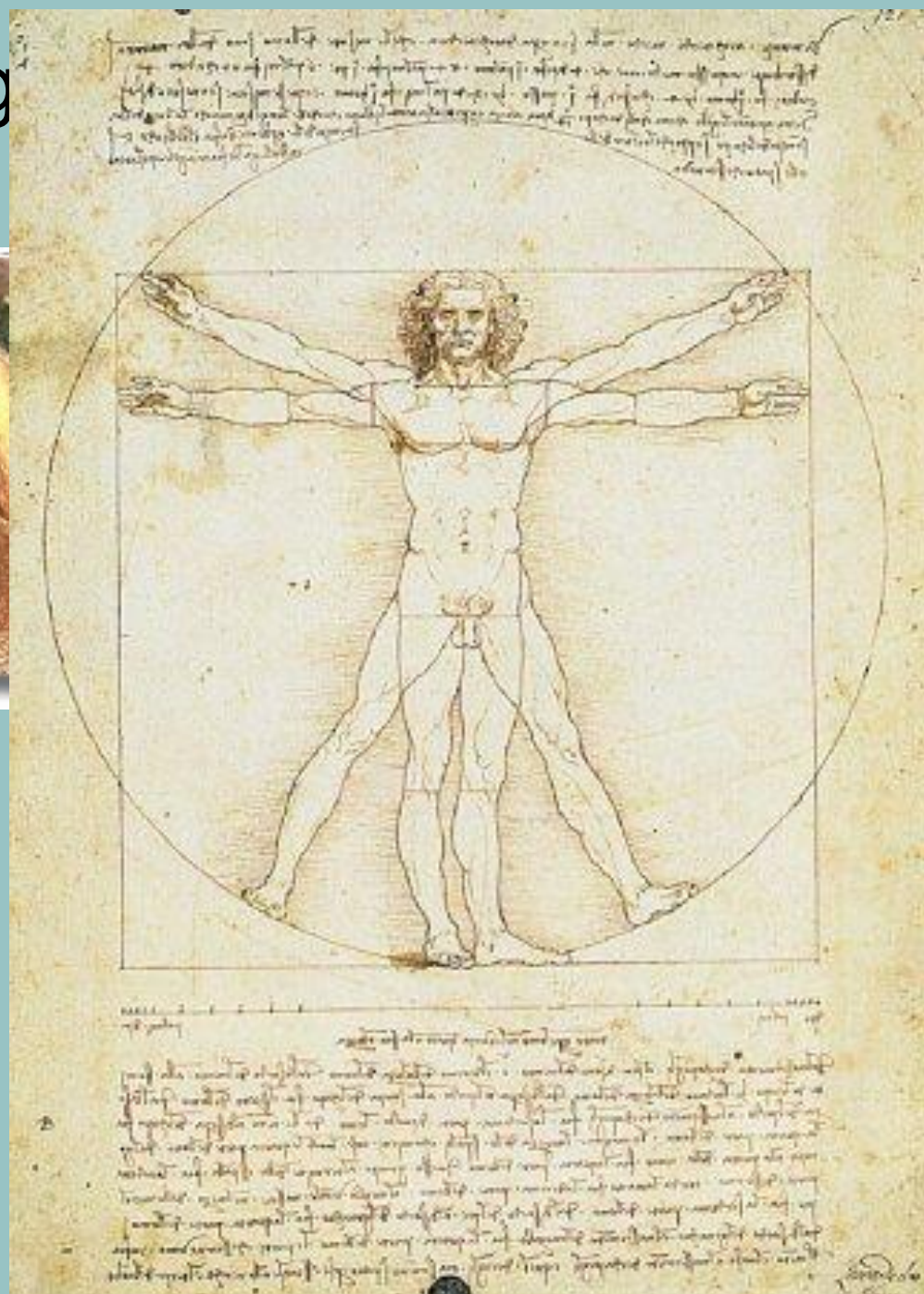


This is a g

keystone



Prairie dogs



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But, perhaps the story is more complicated.

Many have cited the ABB's phototropic tendencies as a contributing factor.



How are these things related to the ABB?



Artificial light

Other factors that have been suggested:

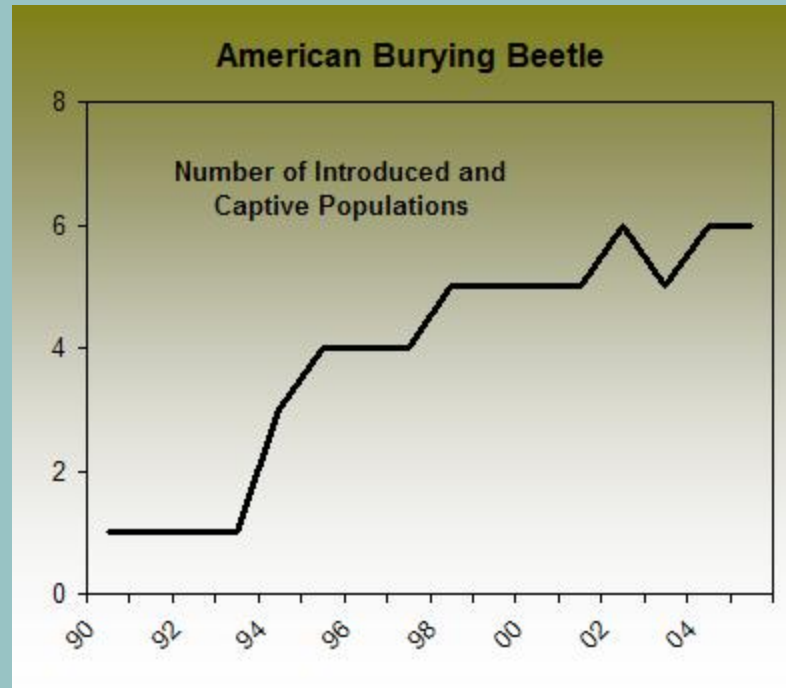
- Increased competition from scavengers.
- Changes in land use patterns.
- Possible genetic bottlenecks

We may never know for sure. But there is hope.



Positive steps to recovery

- Reintroductions to Ohio and Massachusetts
- Detailed life history studies
- Genetic diversity studies to inform breeding projects
- Public education



So, to recap, what have we learned?

- Death is sometimes a great way to start.
- Romance can happen in unlikely places (e.g., on a dead rat).
- Spousal cooperation is necessary for a proper brood ball.
- Proper food preparation: coat your food well with saliva.
- Child rearing: predigest prior to regurgitating
- Unintended consequences: beware of men on trains bearing arms.
- Nature's resiliency: we can save species on the brink if we put our minds to it!

A few useful references

http://en.wikipedia.org/wiki/Burying_beetle

<http://research.kahaku.go.jp/zoology/hane/data/hanegal/GL020.html>

<http://www-museum.unl.edu/research/entomology/endanger.htm>

http://www.esasuccess.org/reports/profile_pages/AmericanBuryingBeetle.html

<http://bugguide.net>

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