Asiatic Garden Beetle as a field crops pest in the Great Lakes region

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Trouble-some Scarab beetles

June beetles (multiple species)

European chafer

Japanese

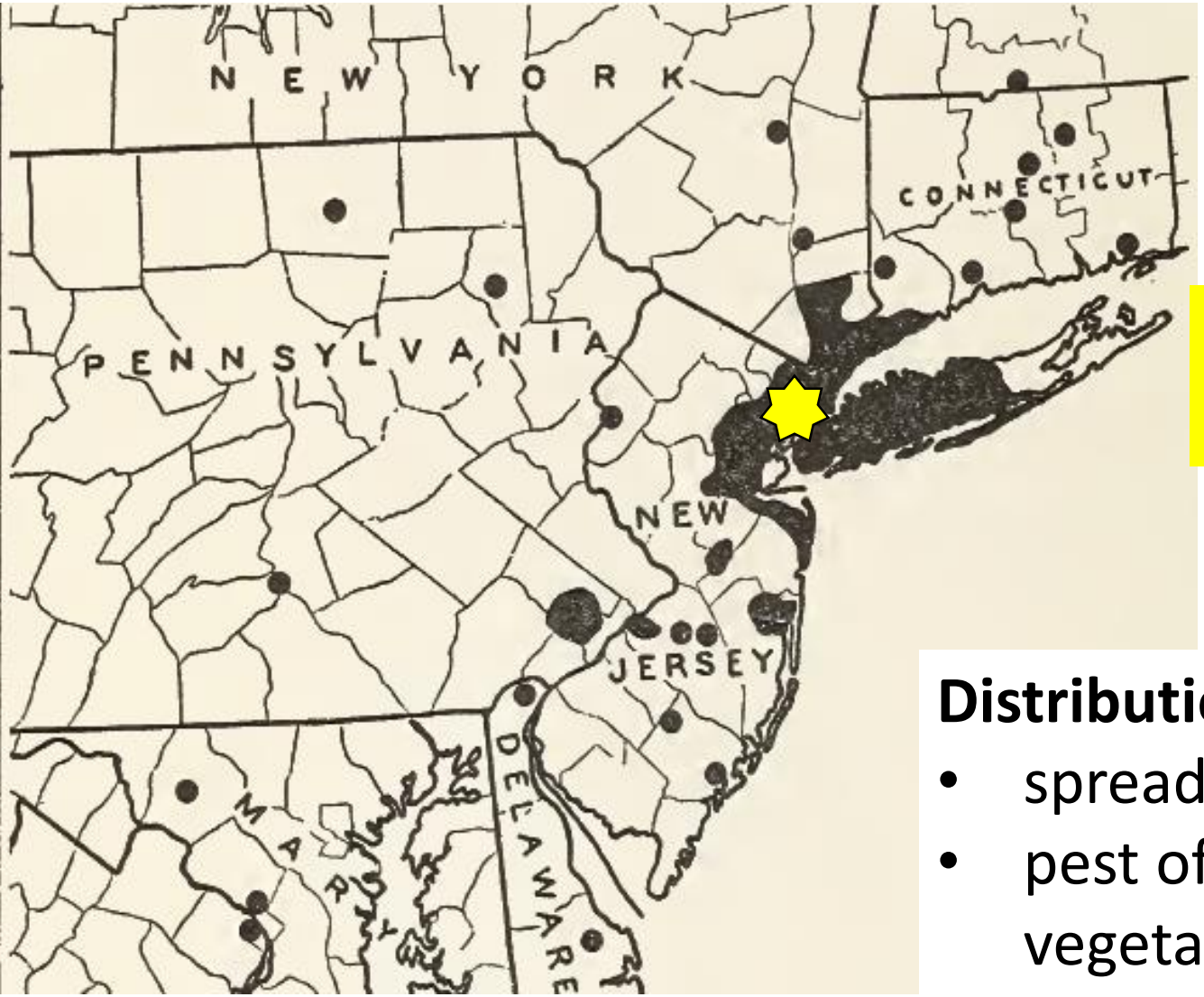
False Japanese

oriental

Asiatic garden

Aphodius

Asiatic Garden Beetle – a native of China & Japan



discovered in New Jersey, 1921

Distribution in 1935

- spread along the coast
- pest of ornamentals, vegetables, small fruit

"gave promise of becoming a serious pest"

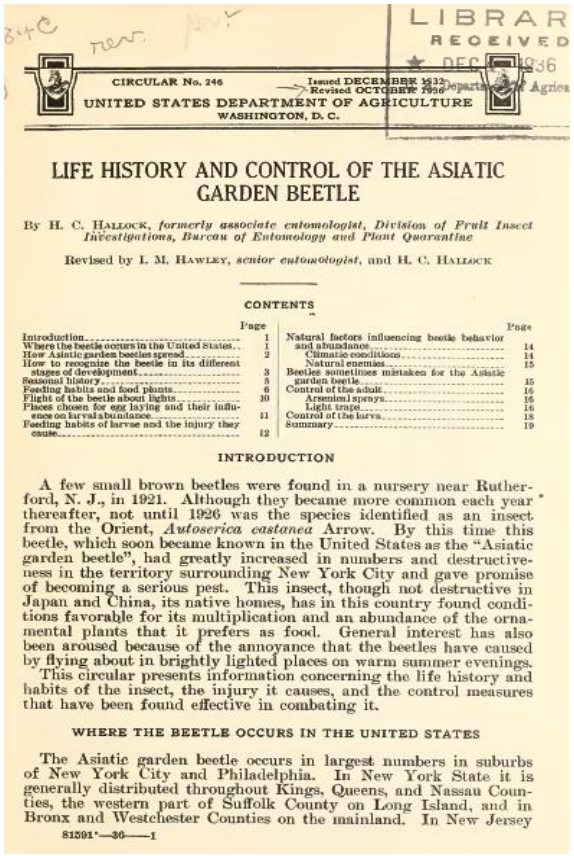
Observations from the 1930s

Life cycle

- annual (single year)
- peak adult activity is mid-July to mid-August
- 75% of grubs are third instar by fall

Adult host plants

- at least 80 species



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LIFE HISTORY AND CONTROL OF THE ASIATIC GARDEN BEETLE

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Revised by I. M. Hawley, *senior entomologist*, and H. C. Hallock

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INTRODUCTION

A few small brown beetles were found in a nursery near Rutherford, N. J., in 1921. Although they became more common each year thereafter, not until 1926 was the species identified as an insect from the Orient, *Autoserica castanea* Arrow. By this time this beetle, which soon became known in the United States as the "Asiatic garden beetle", had greatly increased in numbers and destructiveness in the territory surrounding New York City and gave promise of becoming a serious pest. This insect, though not destructive in Japan and China, its native homes, has in this country found conditions favorable for its multiplication and an abundance of the ornamental plants that it prefers as food. General interest has also been aroused because of the annoyance that the beetles have caused by flying about in brightly lighted places on warm summer evenings.

This circular presents information concerning the life history and habits of the insect, the injury it causes, and the control measures that have been found effective in combating it.

WHERE THE BEETLE OCCURS IN THE UNITED STATES

The Asiatic garden beetle occurs in largest numbers in suburbs of New York City and Philadelphia. In New York State it is generally distributed throughout Kings, Queens, and Nassau Counties, the western part of Suffolk County on Long Island, and in Bronx and Westchester Counties on the mainland. In New Jersey

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LIFE HISTORY & CONTROL OF ASIATIC GARDEN BEETLE
USDA circular 246, 1936
Hawley & Hallock

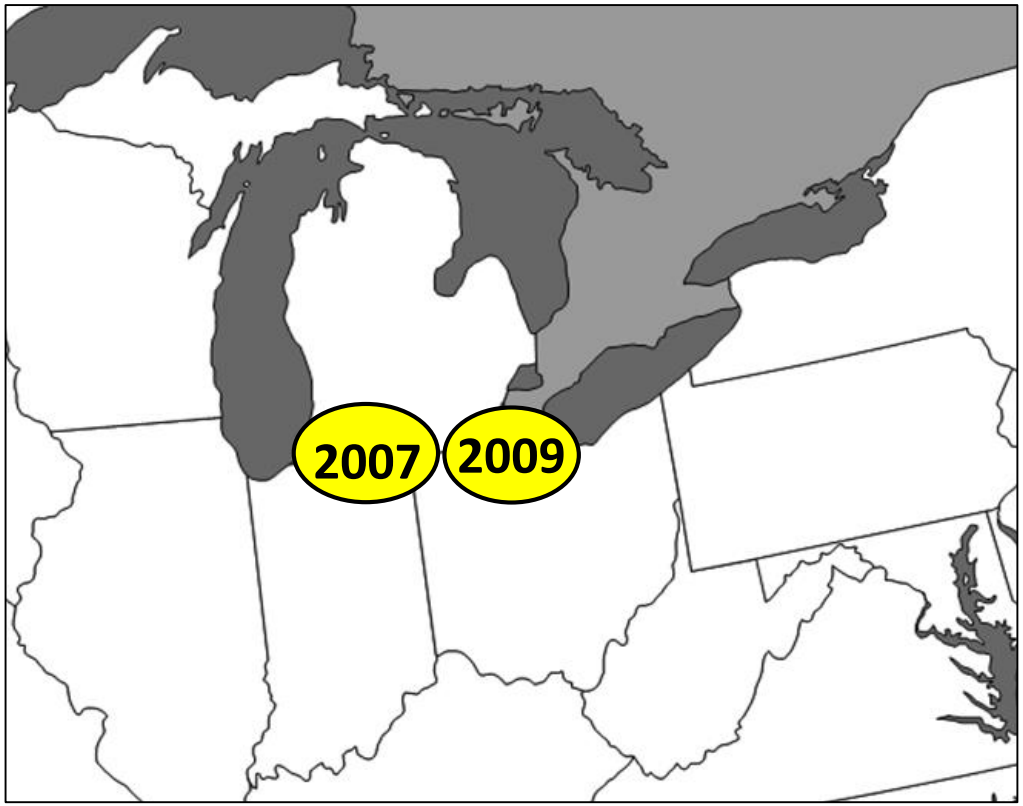
Larval Damage:

- sod, strawberry, vegetable seedlings, ornamentals
- “potatoes escape injury”

AGB spread west though the 1990s

Distribution in turf, 2000 (Dave Shetler, OSU)

- not considered very important in turf compared to other grubs



Indiana & Michigan 2007 field season

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first reports of damage to field corn

Stand Loss - 2007

SW Michigan

(B. MacKellar, MSUE)

Northern Indiana

(John Obermeyer, Purdue)

Other signs of AGB Damage

Deficiency symptoms

NW Ohio

(K. Tilmon, OSU)

uneven emergence

(B. MacKellar, MSUE)

Other crops with AGB Damage

alfalfa

potato
~$1 million
loss in
SW Mich
(2016)

Weeds & AGB

observed in both
in OH & MI

Pics from
B. Mackellar
VanBuren Co
June 2017
*large #s
feeding on &
hiding under
marestail

AGB adults are night-active

St Joe Co MSUE office in Centreville
(pics from B. MacKellar)

AGB grubs

- enlarged ‘bulb’ near the jaws
- ‘bitey’ behavior

Assumed life cycle from observations

June/July

Adults emerge & lay eggs

Aug/Sept

Grubs grow & feed

fall

grubs overwinter

next spring

grubs feed, then pupate

CROP

soy ***potato*** ***wheat***

DAMAGE

What growers & consultants say about AGB:

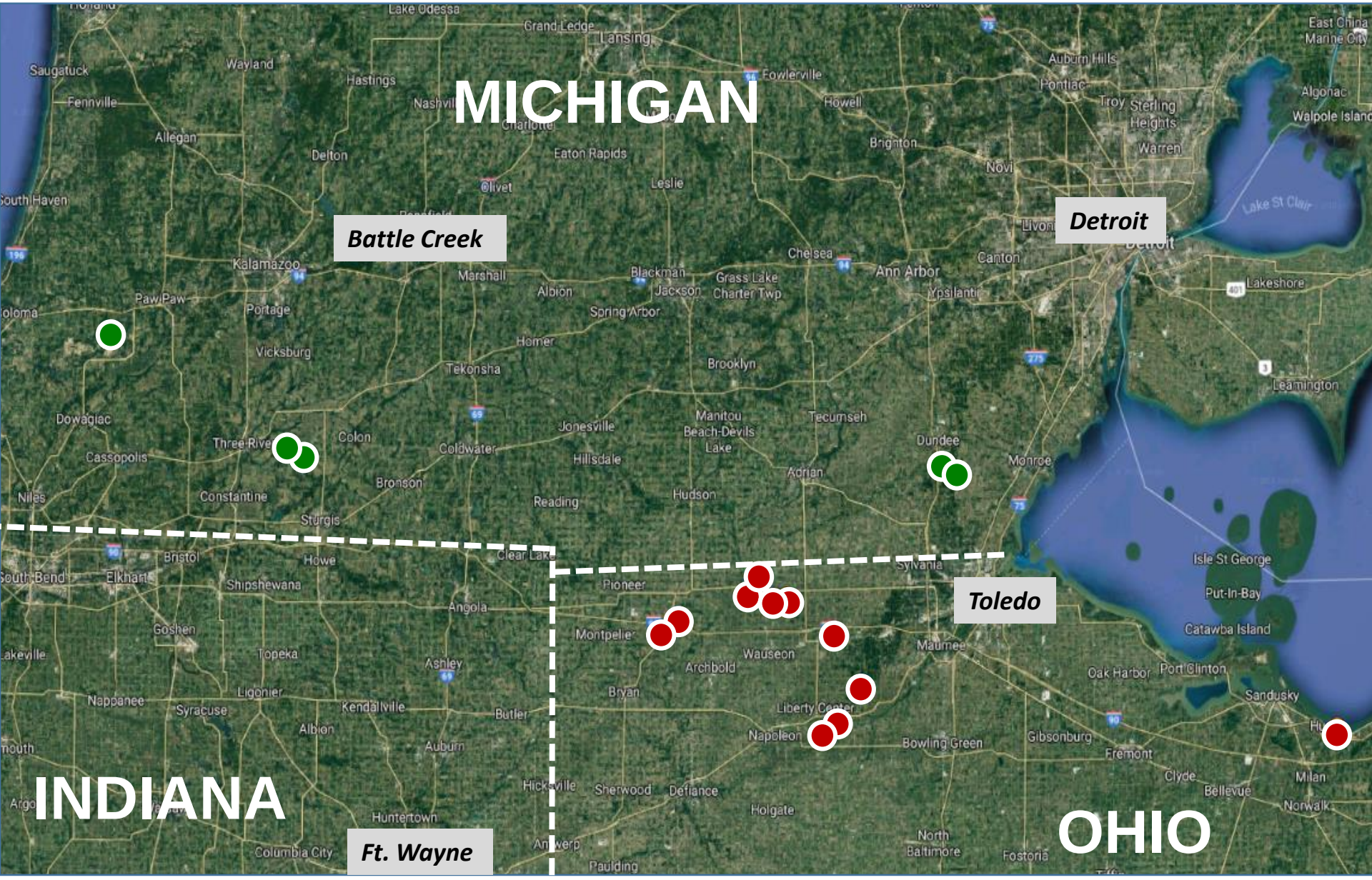
"I've experienced this **vicious little creature** first hand in my fields ..."

"Asiatic Garden Beetle is **becoming a big problem** for me."

"If we don't figure out a way to keep AGB in check, they will quickly become my **number one yield-robbing pest**."

"I am finding the AGB throughout the tristate area... I am **amazed at the populations** I have found."

Field work in 2018 -16 fields sampled



Grubs
& size/age

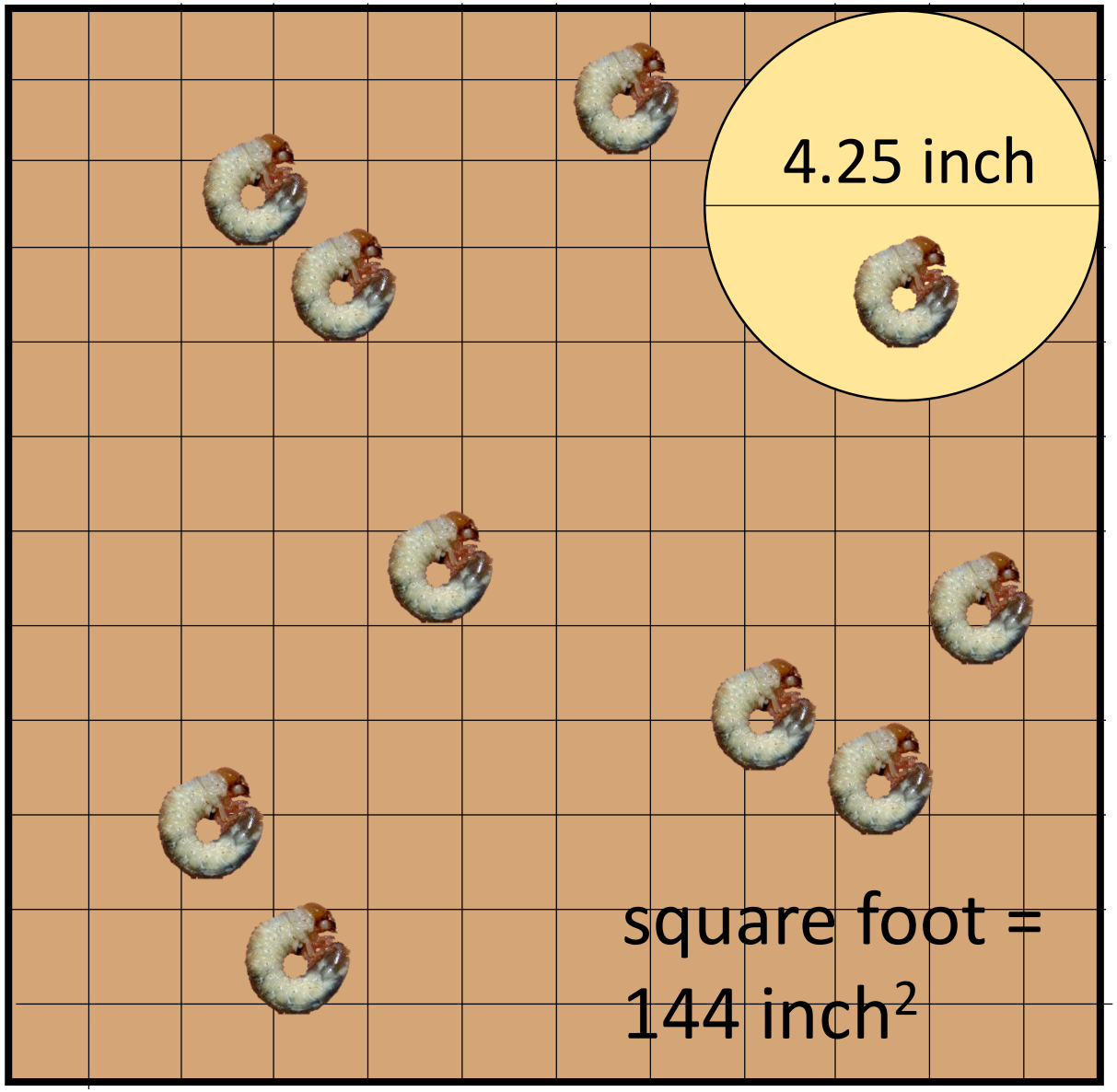
Beetles
& timing

soil type

weeds

Grub sampling with a golf course cup cutter

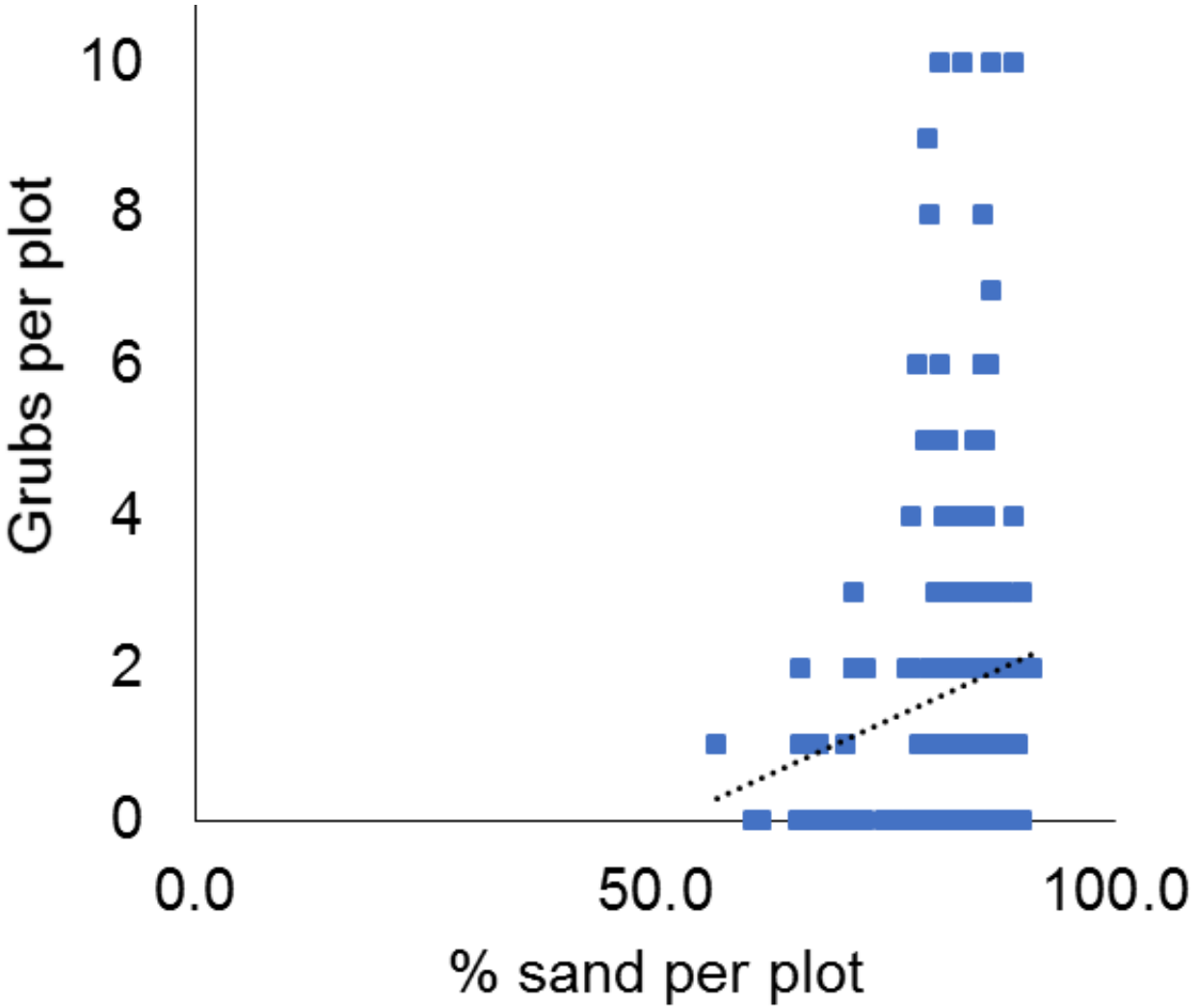
- standardizes sampling

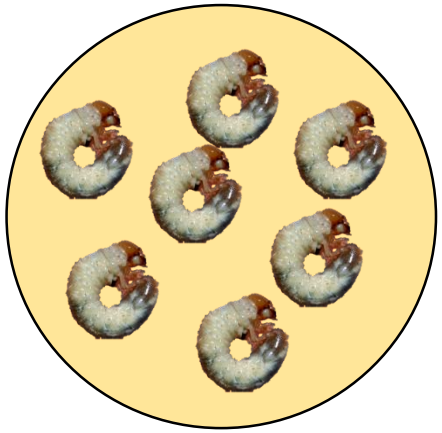


cup cutter
sample area:
14 inch²

cutter #
x 10 = ft²

AGB grubs per plot
+ correlated with % sand



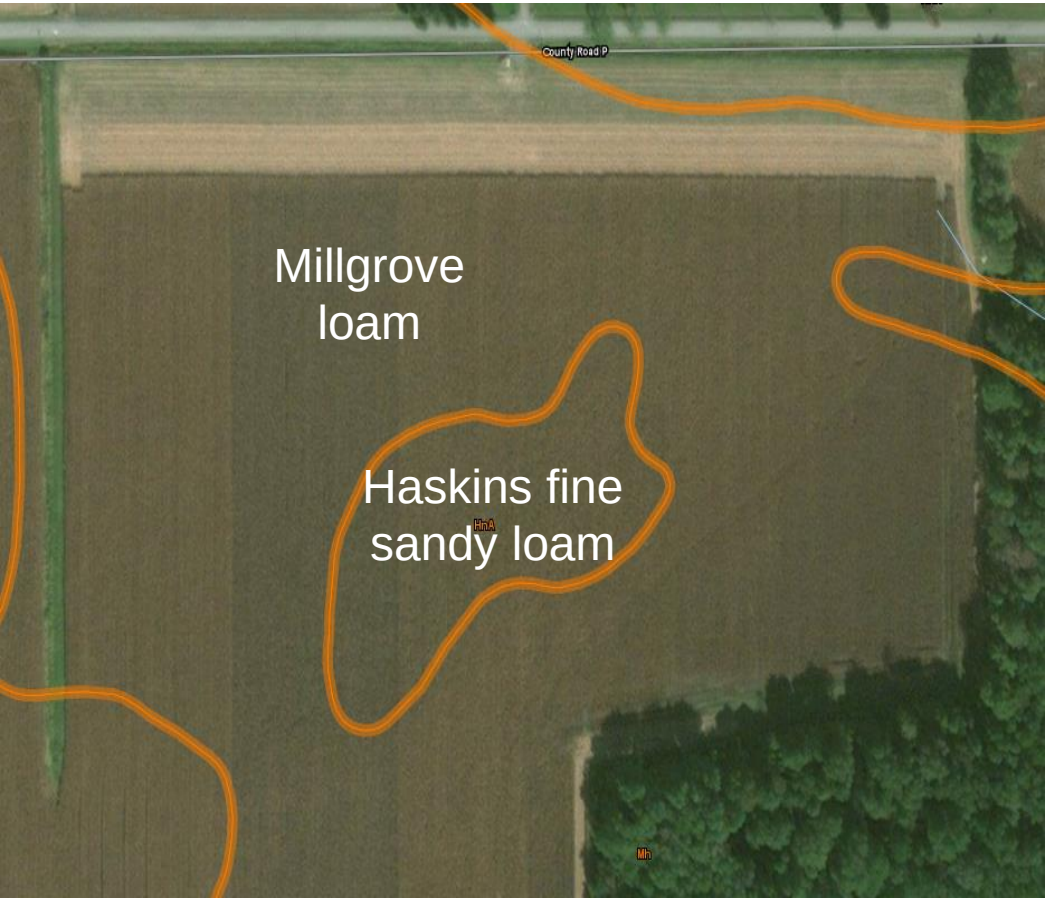


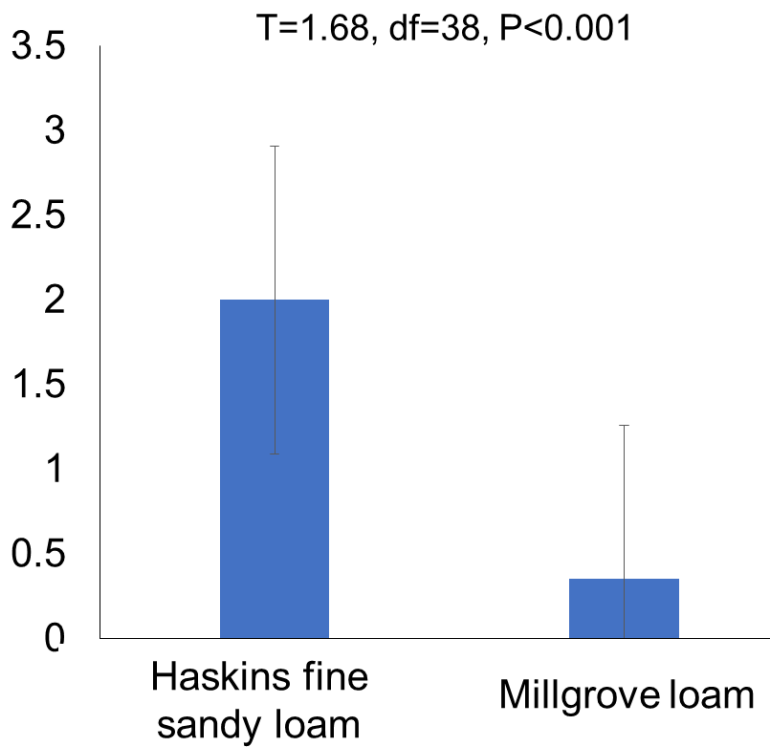
Record: 7 grubs in a single cutter sample!

(Pekarcik, OSU)

Example: a field in McClure, OH *(OSU data)*

- Avg # of grubs per cup cutter sample





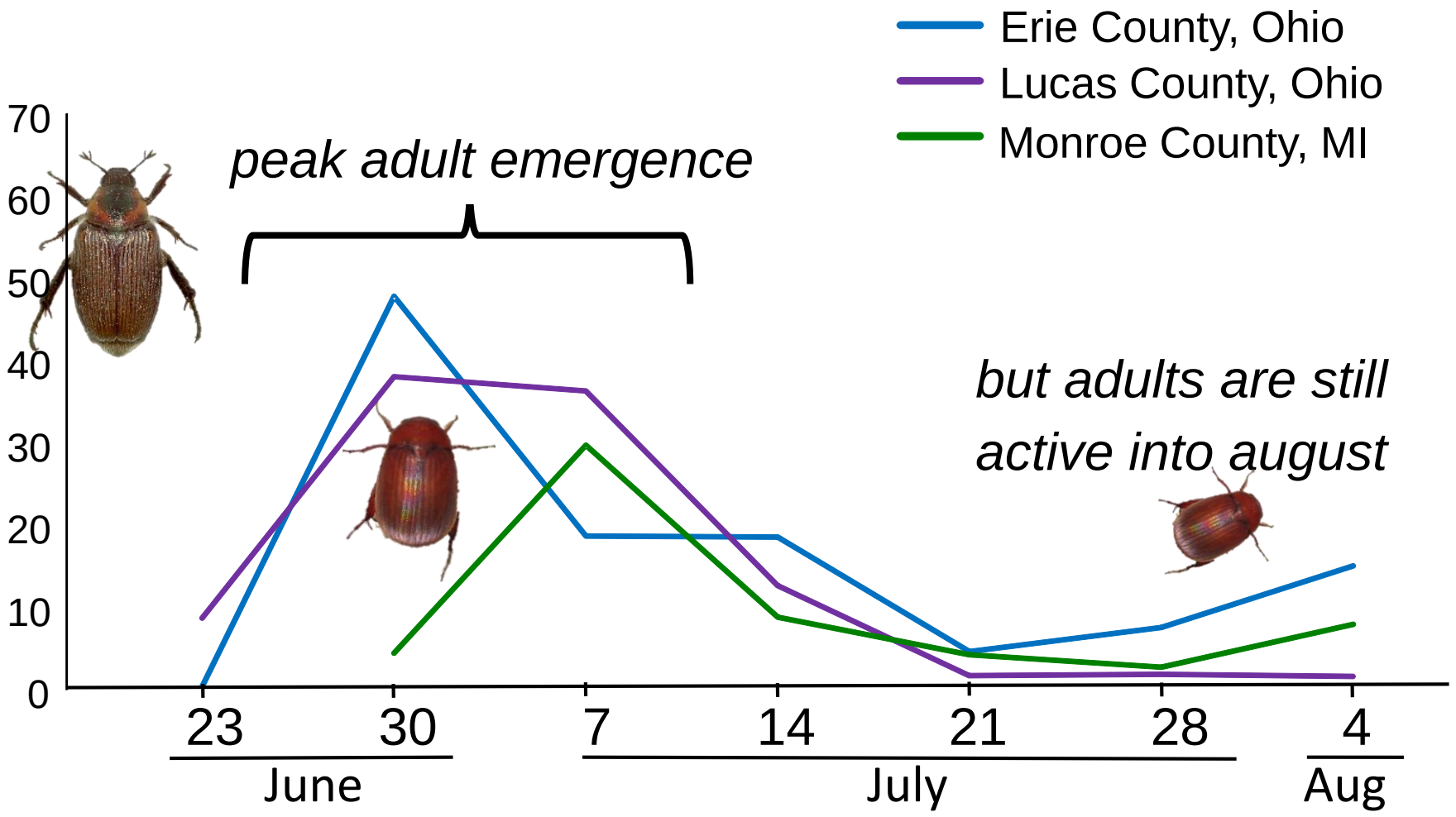
(Pekarcik, OSU)

Centreville, MI – AGB on sandy knolls

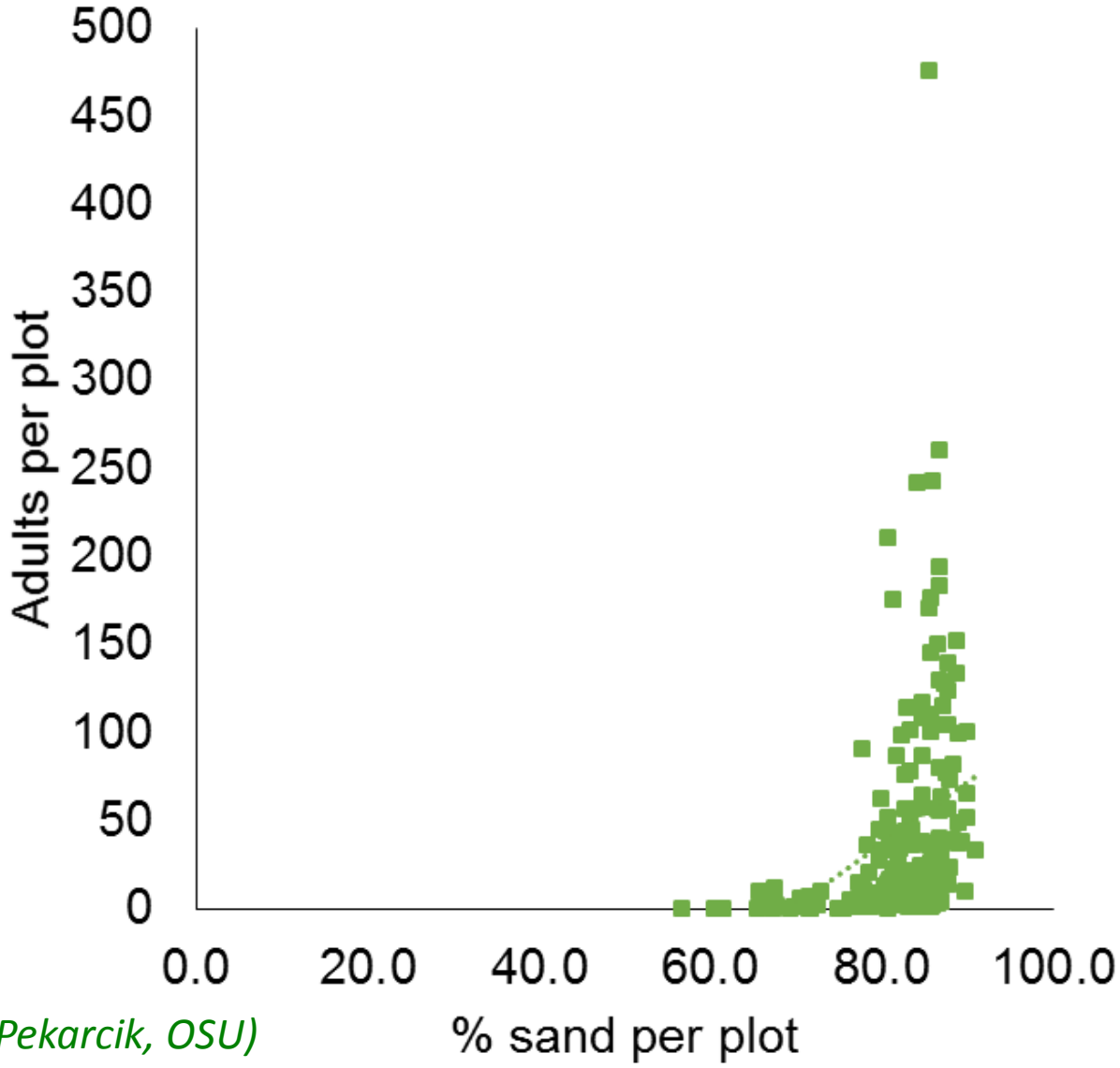
Adult sampling

- pitfall traps

Pitfall captures: Avg # of beetles per plot

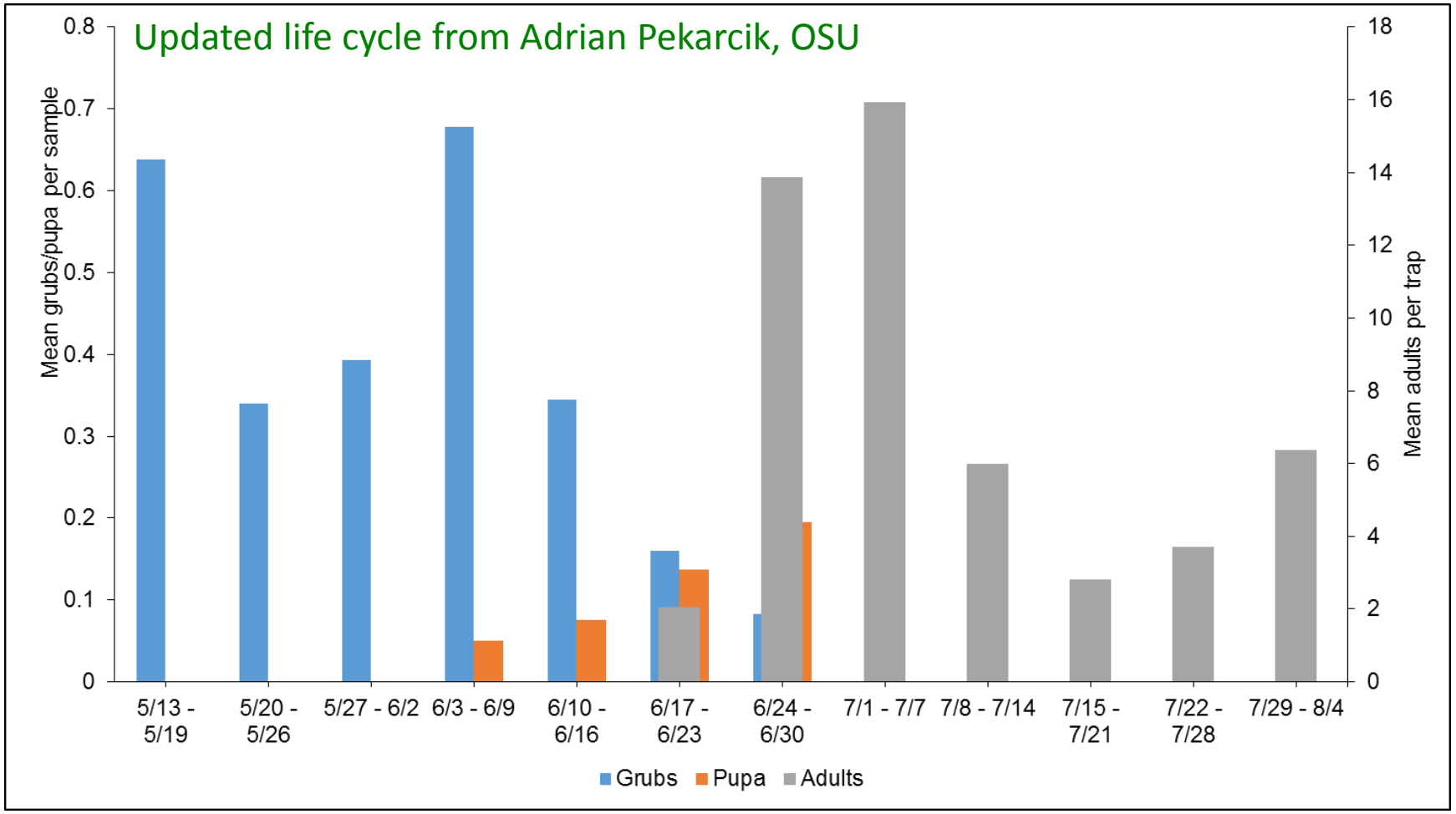


AGB adults collected per plot + correlated with % sand



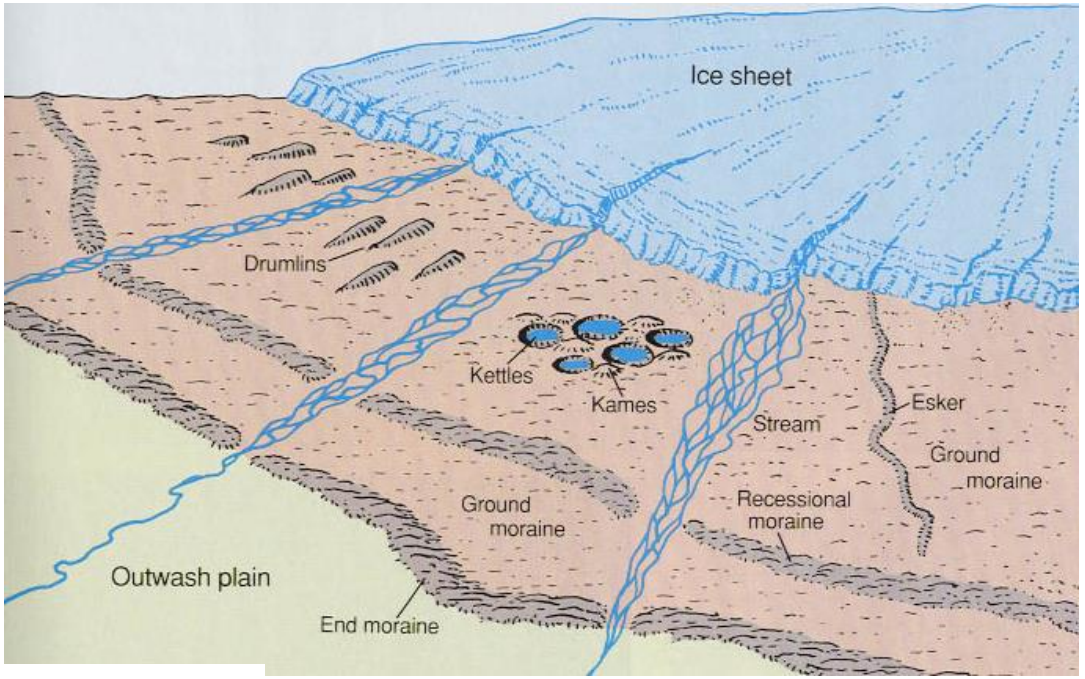
(Pekarcik, OSU)

Raccoons also like pitfalls



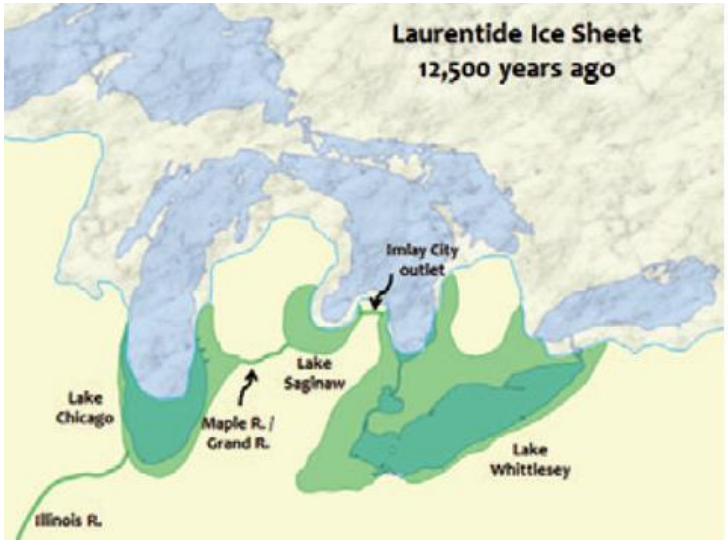
Life stage	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Grub - 1st												
Grub - 2nd												
Grub - 3rd												
Pupa												
Adult												
Egg												

Great Lakes, Great Times for AGB grubs



1. glaciation

2. older, higher lake levels



RESULT

sandy soil types

- more grubs or better survival

tremendous soil variability

- complicates sampling and management of grubs

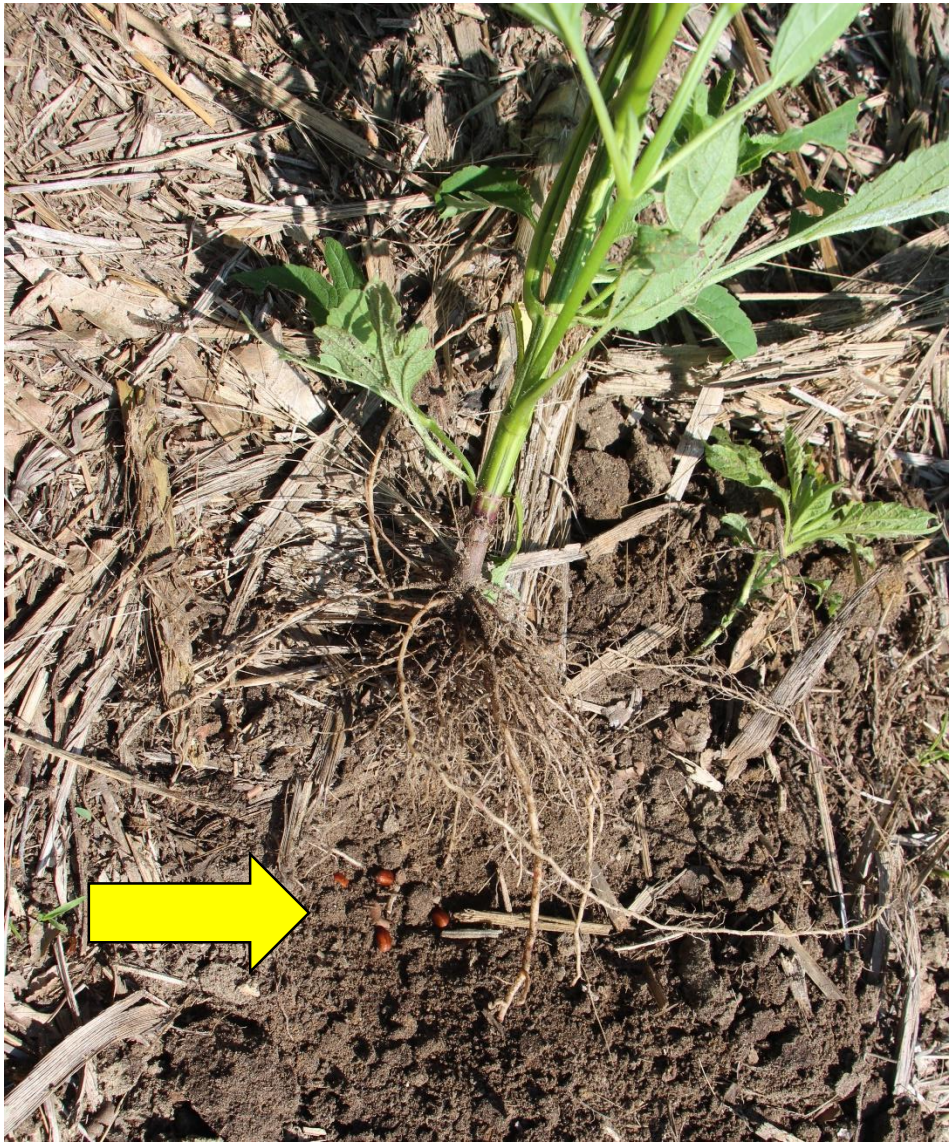
Weeds

lambsquarters

palmer amaranth
(Pekarchik, OSU)

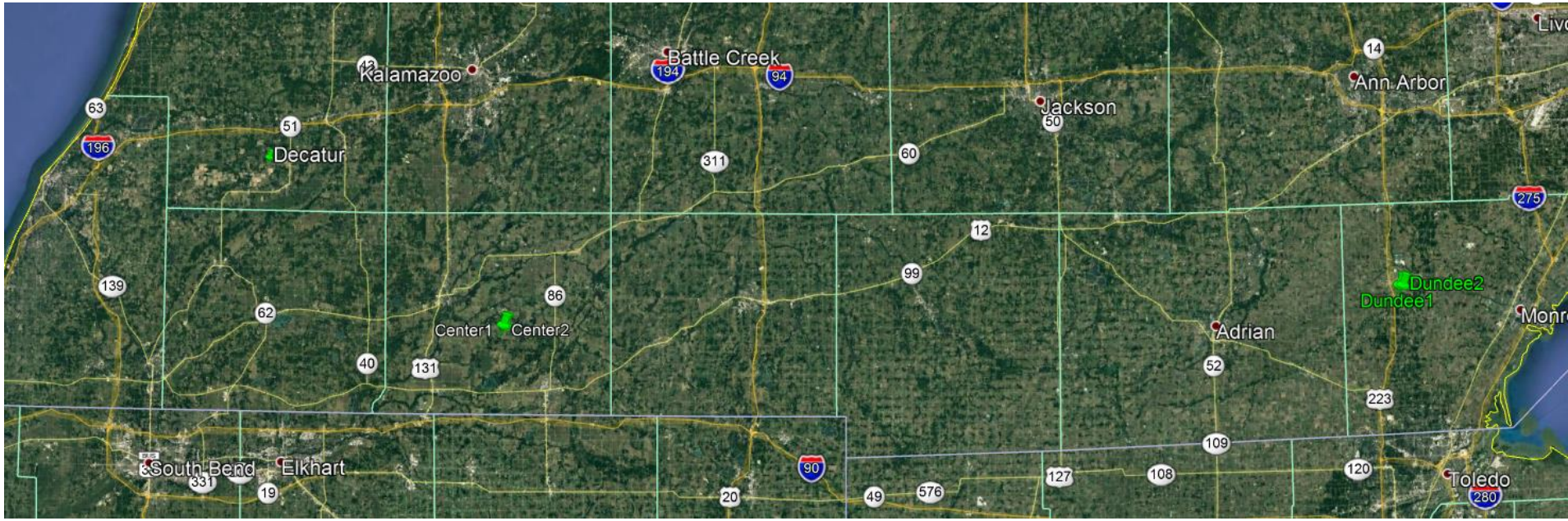
Note – NO feeding on corn leaves

Giant ragweed



Queen Anne's Lace

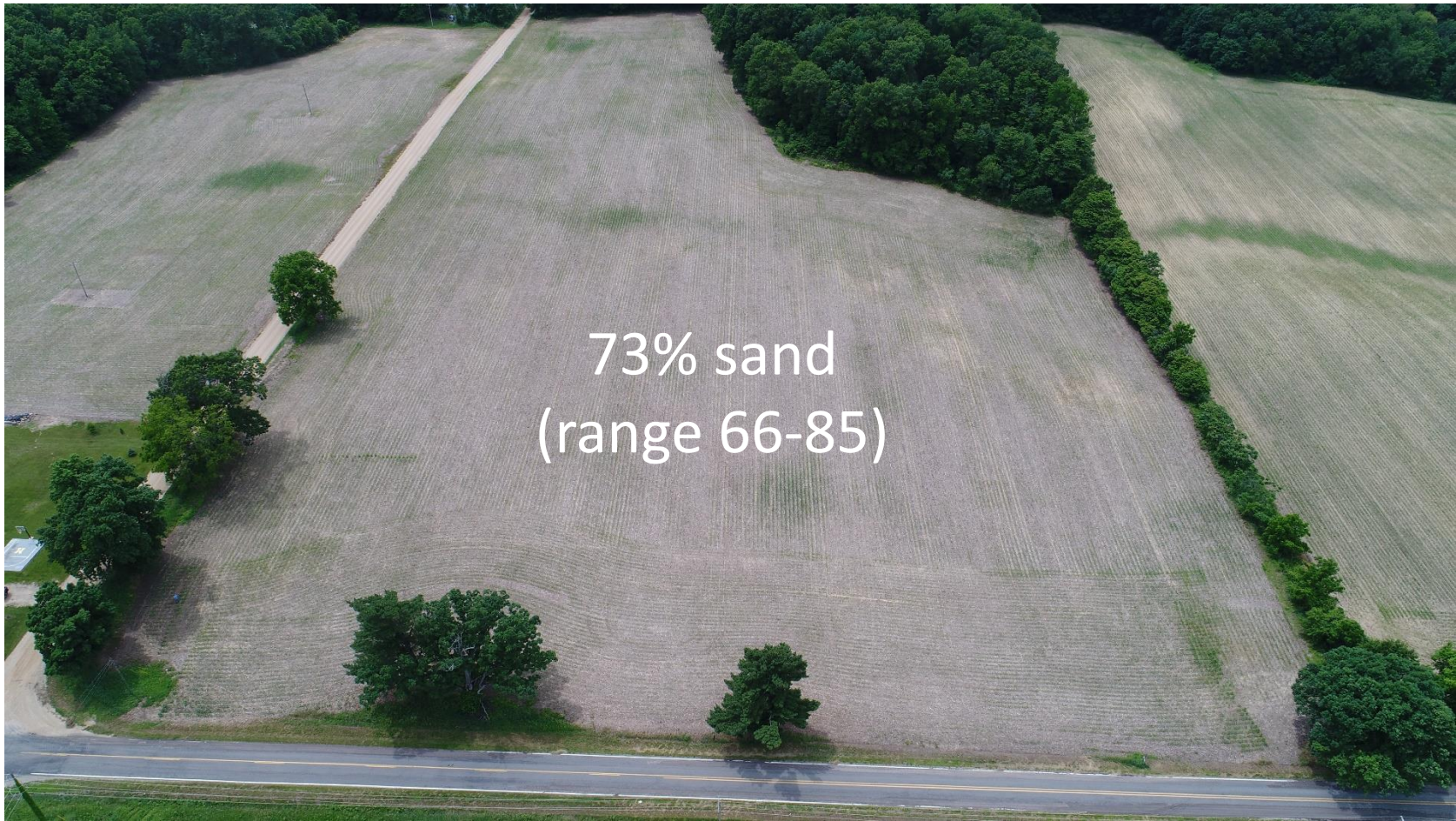
Some lessons / observations from Michigan locations



Decatur

- reported after planting
- stand not reduced & stage similar, but plant height affected

Grubs/cutter, spring	0.9
Adult beetle/pitfall	2
Grubs/cutter, fall	0.15




No grubs
Just ~1 grub per cup cutter

Centerville

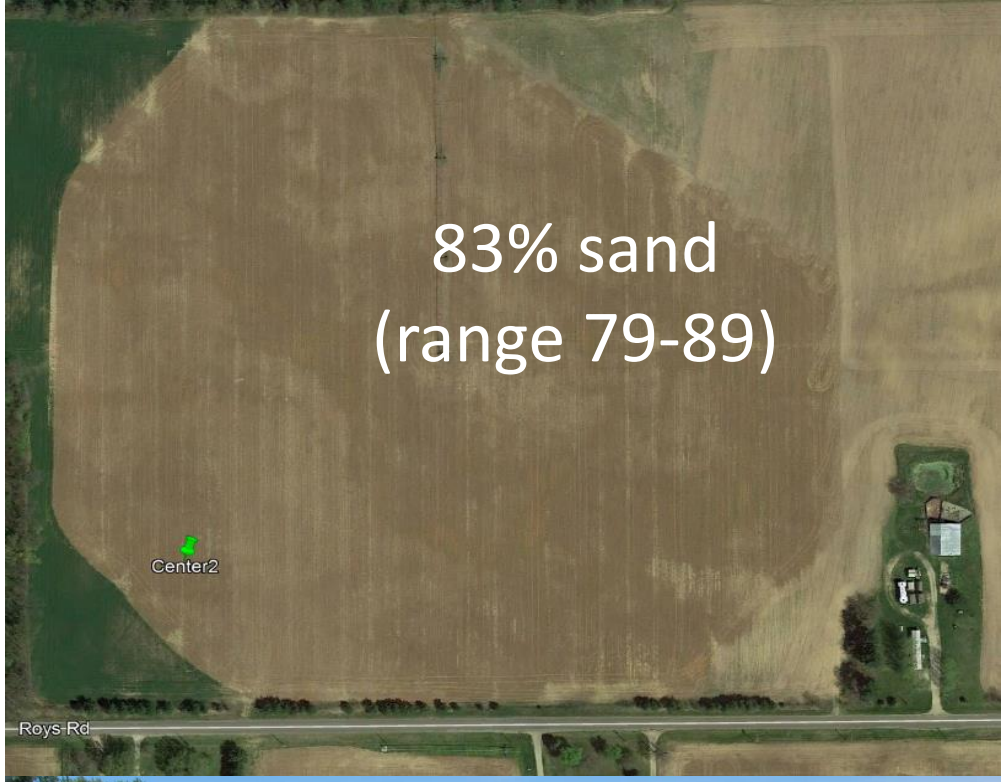
- treated at planting

500-rate ST + Kernel Guard + 8 lbs/ac Lorsban

- irrigated
- stand not reduced

Grubs/cutter, spring	1.4
Adult beetle/pitfall	10
Grubs/cutter, fall	0.05

- no apparent damage
- grower happy w/ yield @ 180 bu



Despite insecticide use, adult beetles still emerged, up to 17 dead adults per square meter in sandy areas

Centerville mole buffet

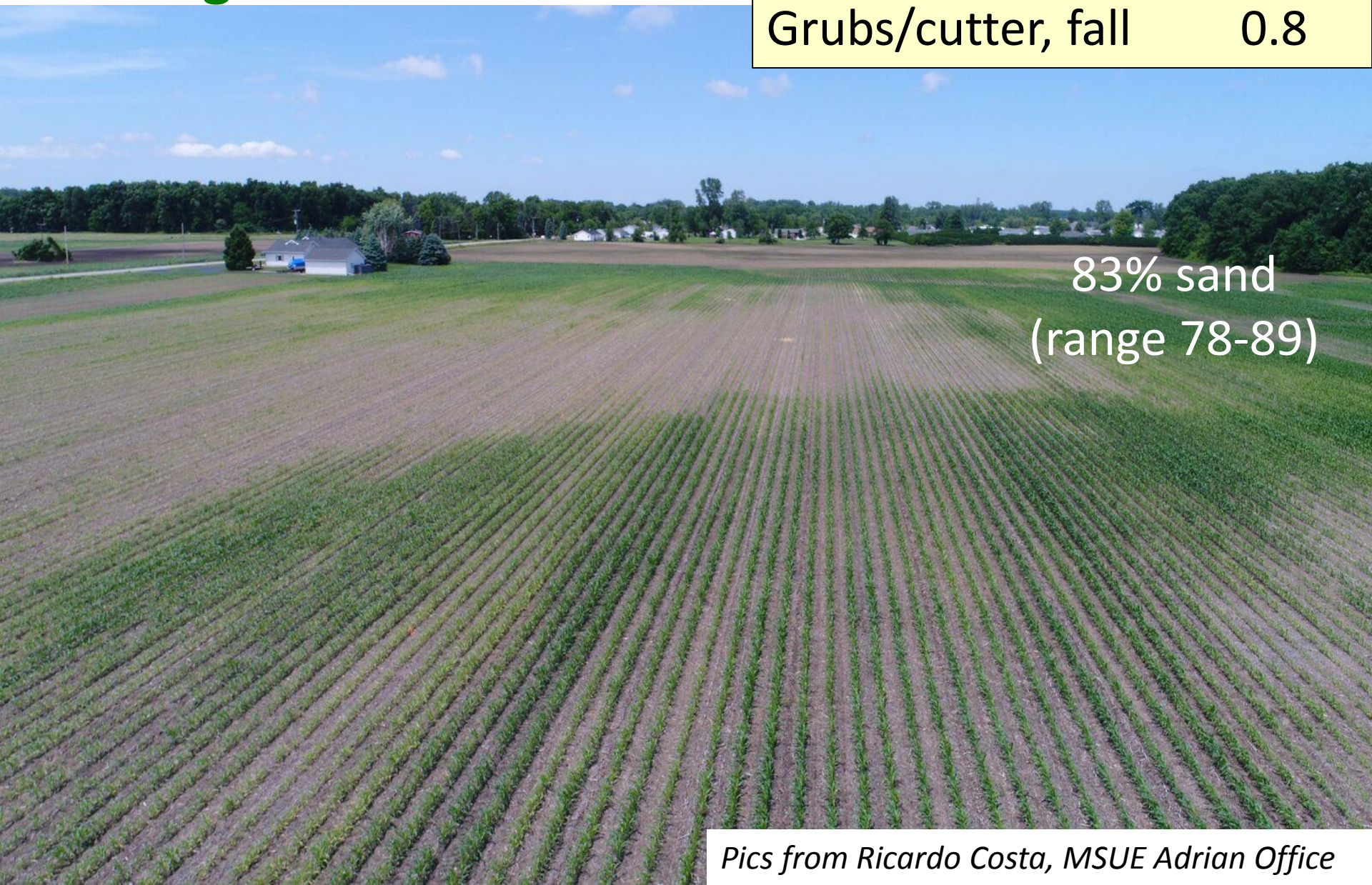
Monroe County
AGB nightmare 1

Grubs/cutter, spring	4
Adult beetle/pitfall	55
Grubs/cutter, fall	0.35

Pics from Ricardo Costa, MSUE Adrian Office

Monroe County
AGB nightmare 2

Grubs/cutter, spring	3
Adult beetle/pitfall	58
Grubs/cutter, fall	0.8



Pics from Ricardo Costa, MSUE Adrian Office

- grower replanted poor areas w/ 1250 treated seed
- planted over bad rows w/out ripping up previous stand

“I’ll never do that again”

Stand loss was an extreme (and rare) result of AGB, but uneven emergence was noticeable & common at many Michigan locations.

Result – plants out of synch

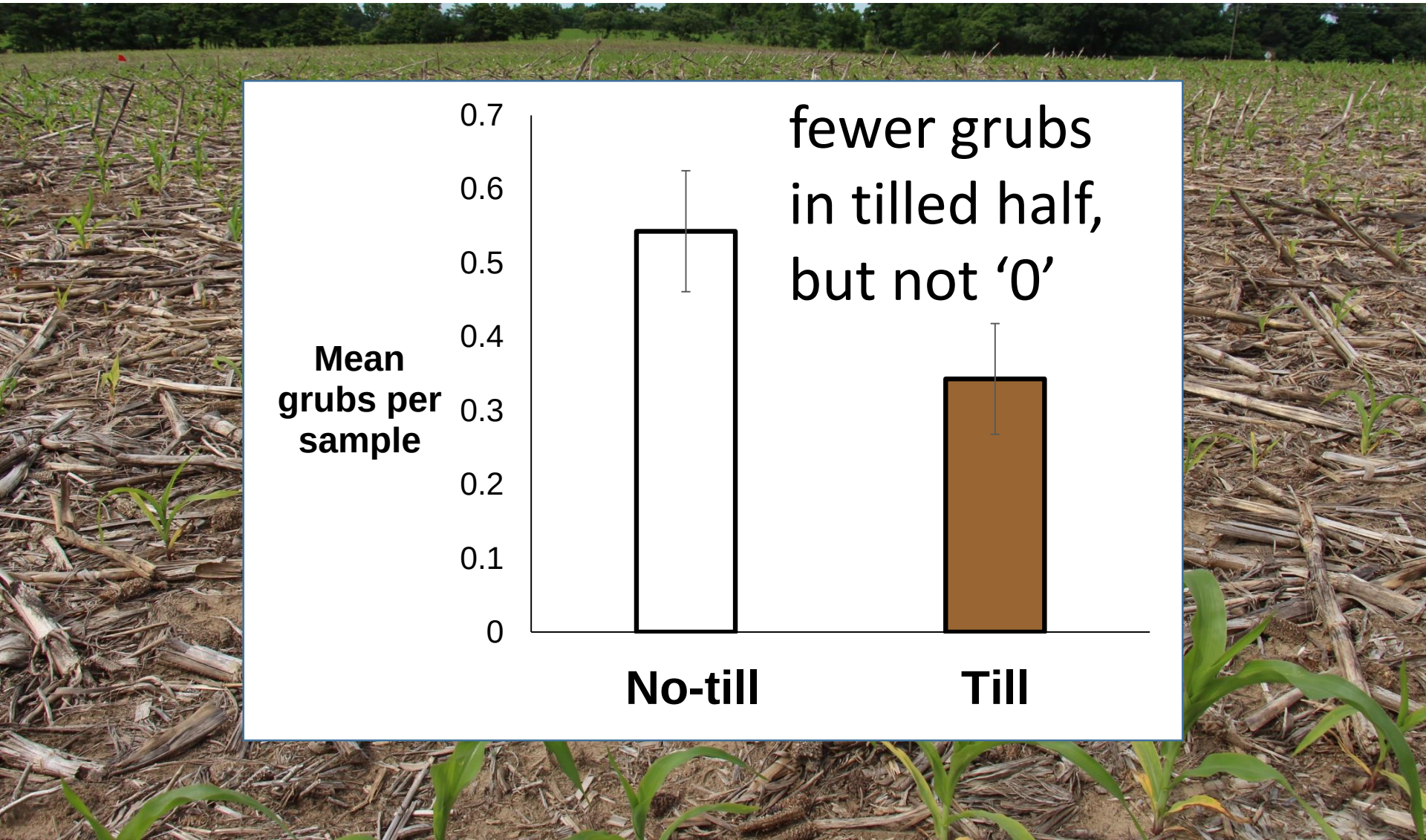
- insidious yield reduction

(Bruce Mackellar, SW Michigan, MSUE)

Other stuff

AGB & tillage (OSU trial)

- Wauseon, Ohio; half of a no-till field was tilled



*Flooding kills AGB grubs

* but many areas in S. Michigan left fallow after the wet spring = need better attention to weed control during the time of adult movement

AGB pupa under marestail plant *(adults don't just feed, but also lay eggs)*