A Few Firsts

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Who ID's First Instars?

Inspections & Field Surveillance

Pesticide Resistance Testing

Targeting *Culex*

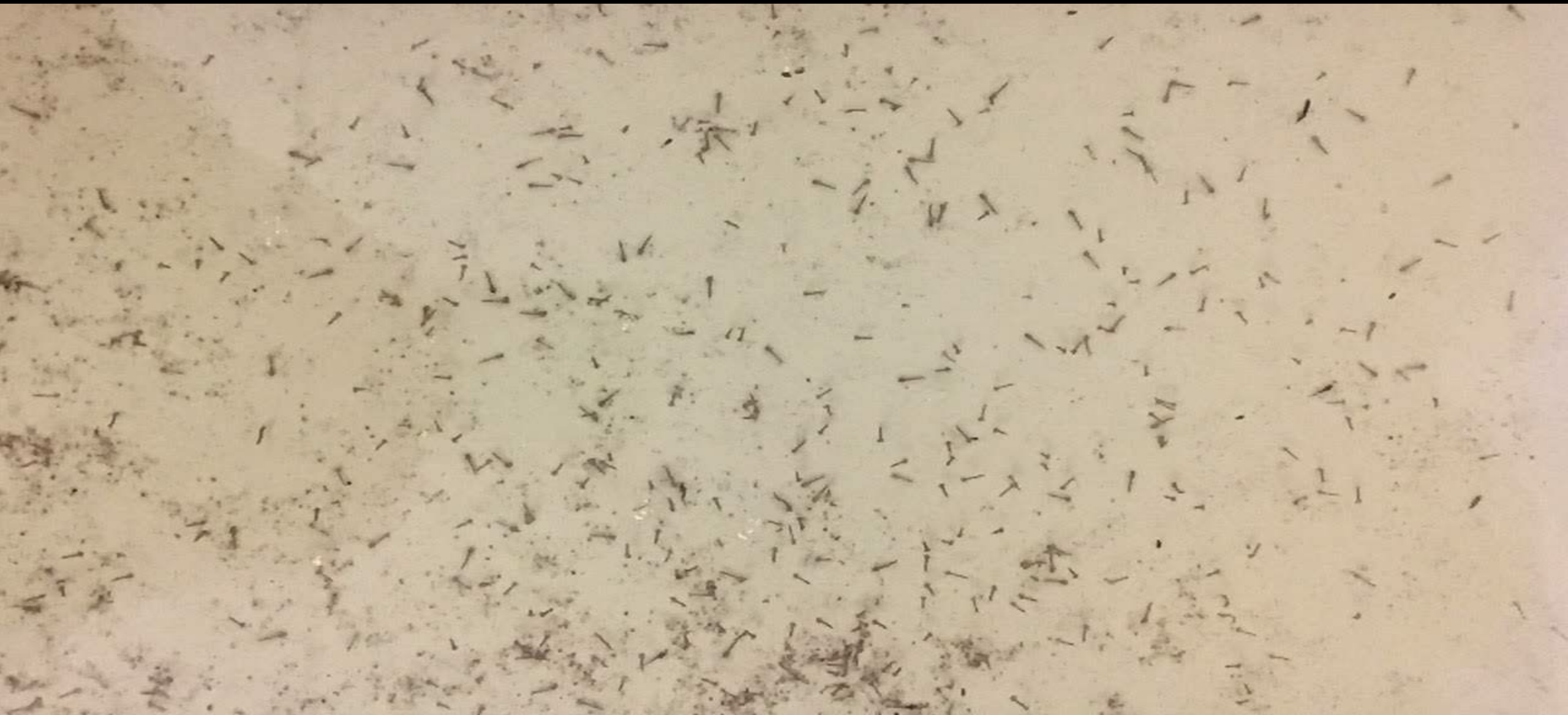
Pesticide Resistance Testing

Did you get the right *Culex*?

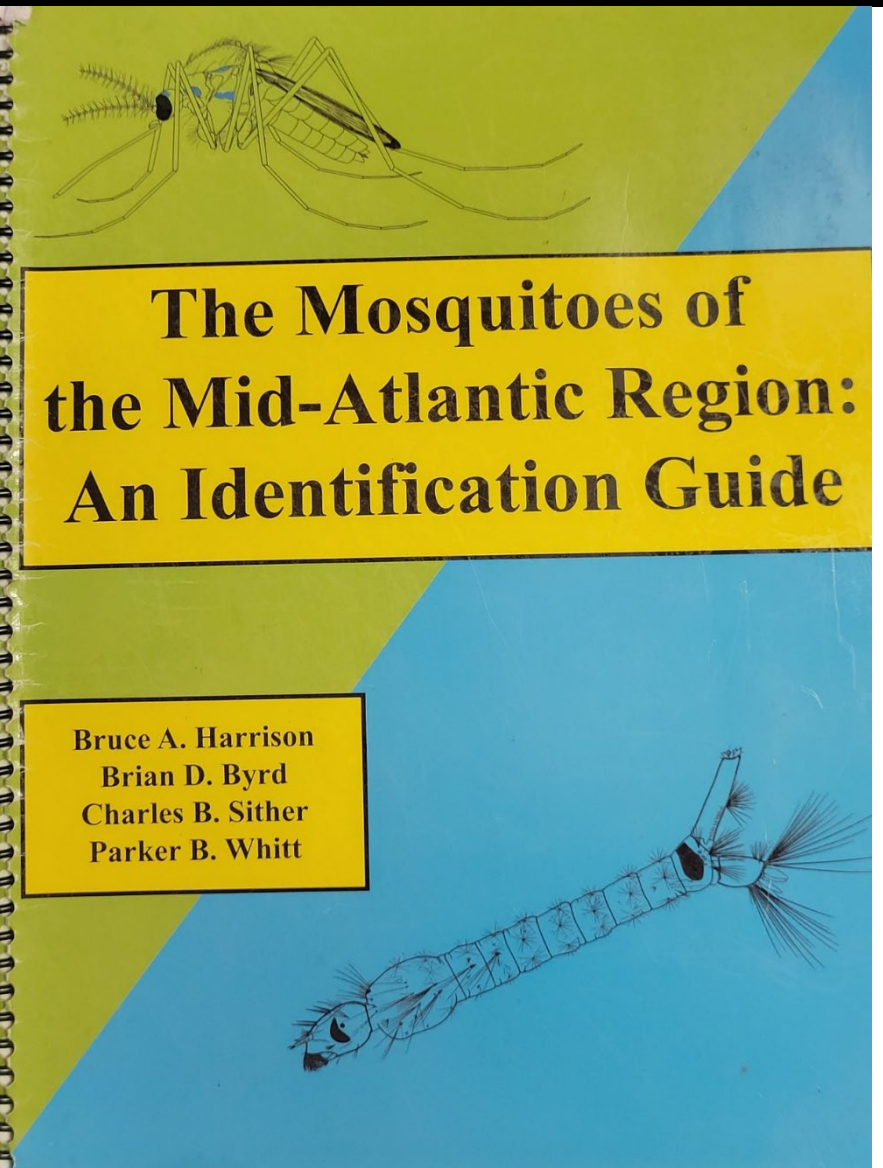
No reliable method for ID as egg raft

So we wait for them to hatch…

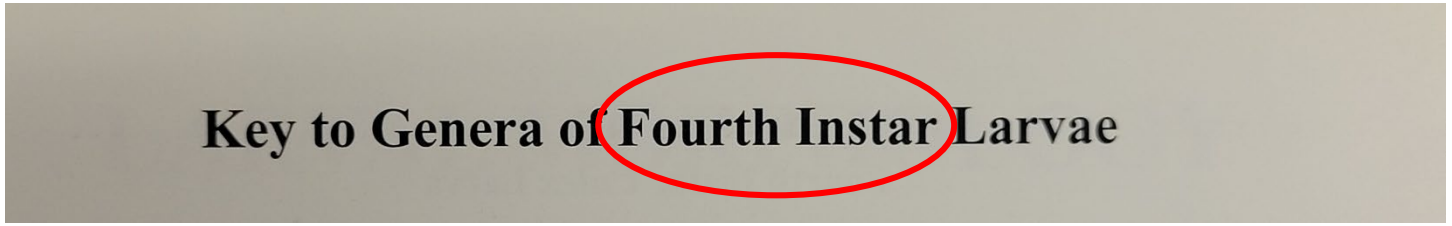
They've hatched! What do I look for?



Follow the key



Unfortunately, not our beloved key from Dr. Harrison



Follow this key – Reiter 1986

Table 1. Key for the rapid determination of first-instar larvae from egg rafts of mosquitoes likely to be collected with hay infusion in the eastern U.S. and Canada (mainly after Dodge 1966).

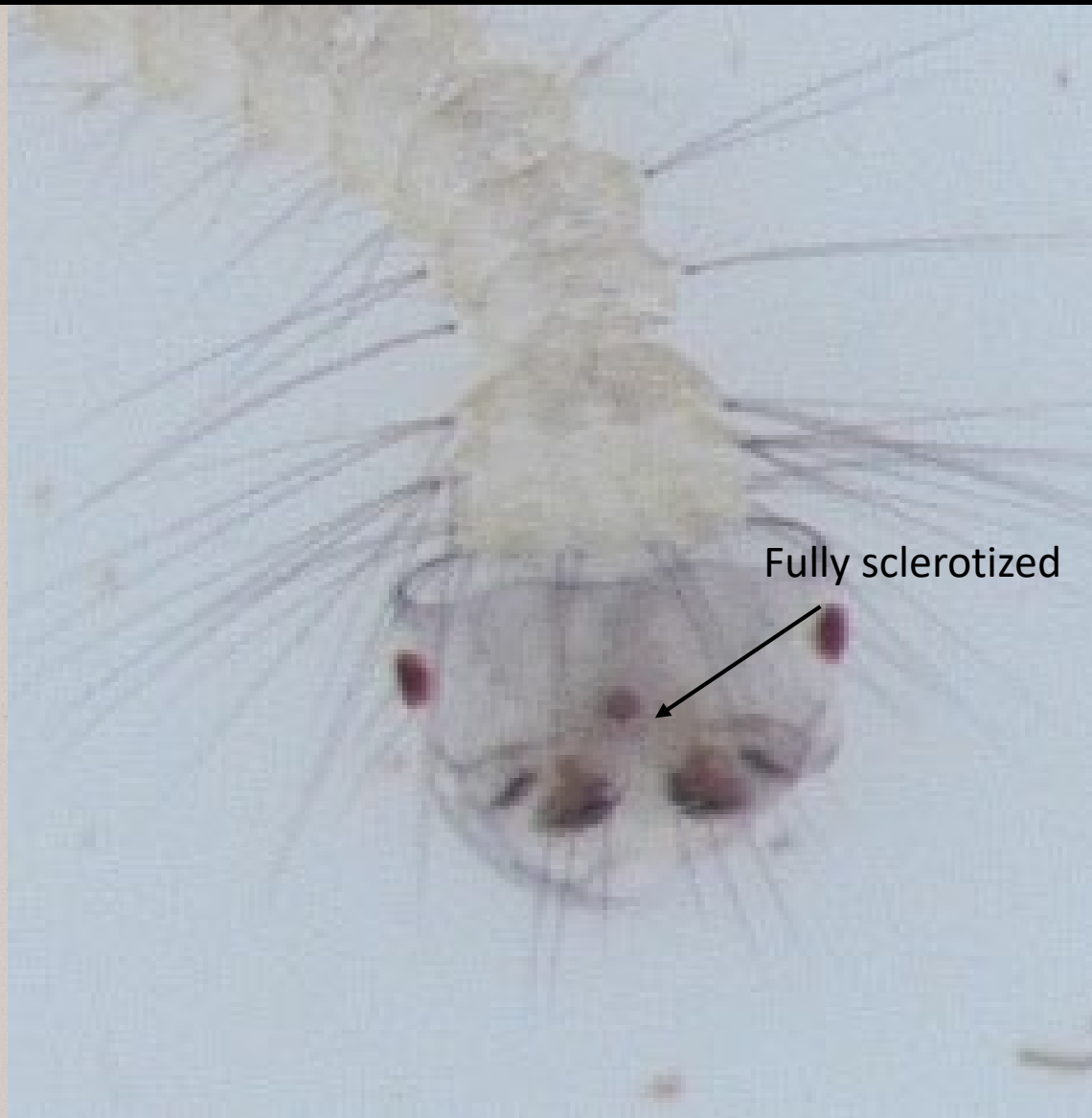
1.	Egg breaker preceded by completely clear (transparent) "window" area	2
	Egg breaker not preceded by transparent "window" area	4
2(1).	Transparent "window" in front of egg breaker with larger diameter than width of egg breaker	3
	Transparent "window" in front of egg breaker same width as egg breaker; siphon short, with 0.2 sclerotization;[1] antennal setae trifid; terminal spines of antenna shorter than shaft	*Culex (Culex) tarsalis*
3(2).	Siphon of medium length (3:1),[2] approx. 0.33 sclerotized with definite bulge near base; antennal seta bifid; head setae (C-5,6,7) in straight transverse row	*Culex (Culex) restuans*
	Siphon long (4:1) with dark sclerotization 0.5, antennal seta single and long	

Reiter P. 1986. A standardized procedure for the quantitative surveillance of certain *Culex* mosquitoes by egg raft collection. *Journal of the American Mosquito Control Association*, 2(2): 219-221.

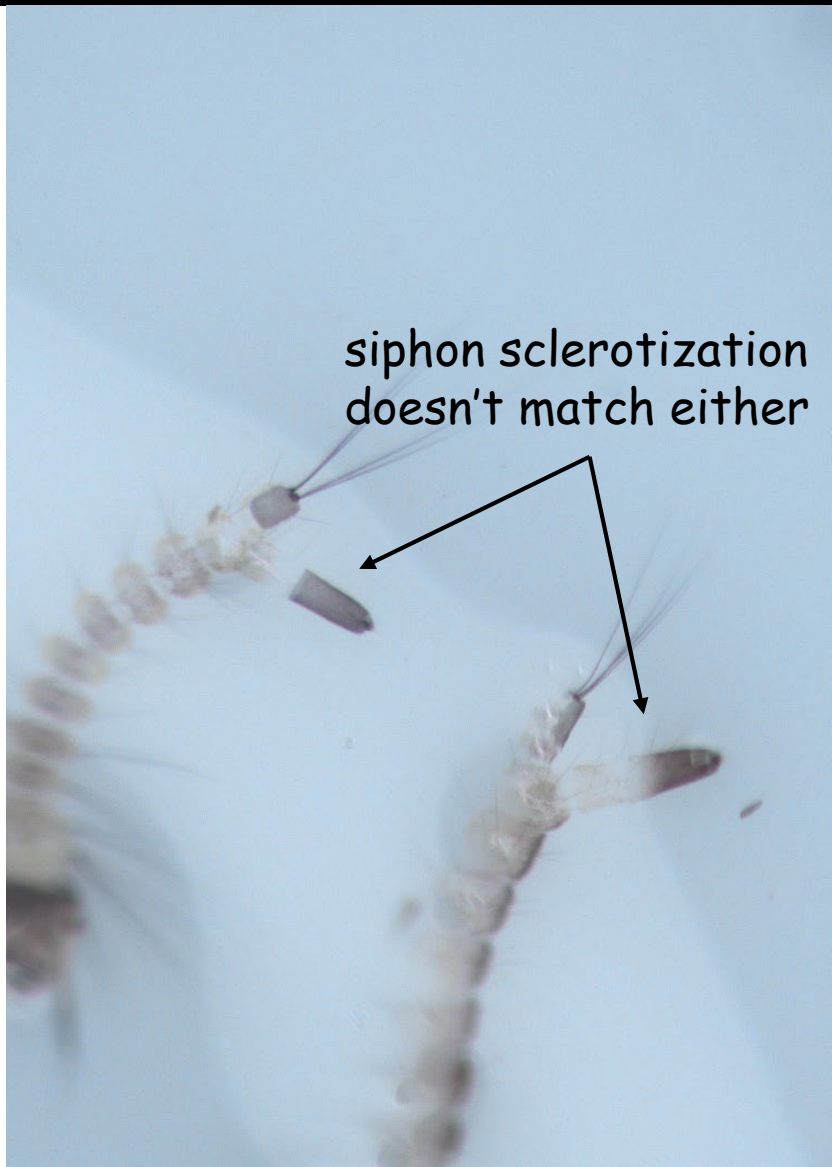
Is there a window?

Photo credit FMEL (UF)

Or no window?



But what about these?



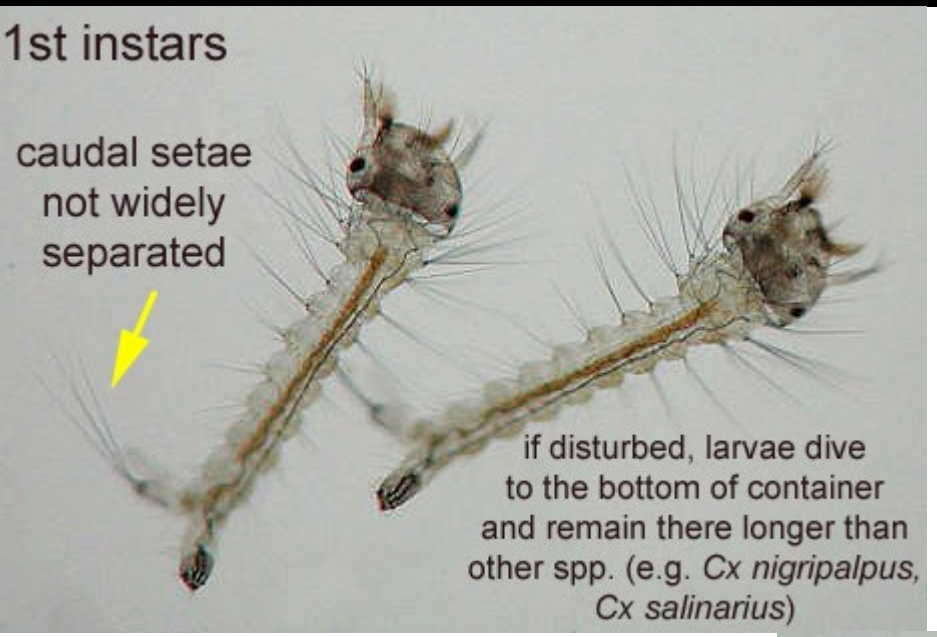
Look closer…

Head to Head

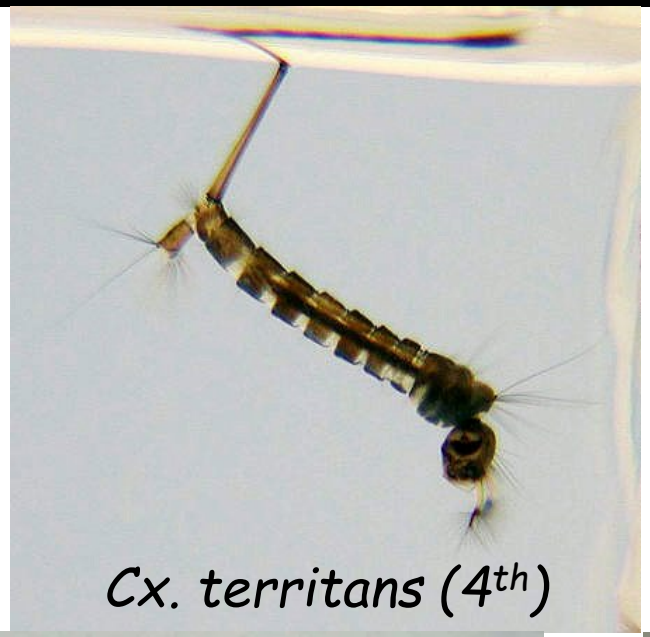
Look closer…

Side by Side

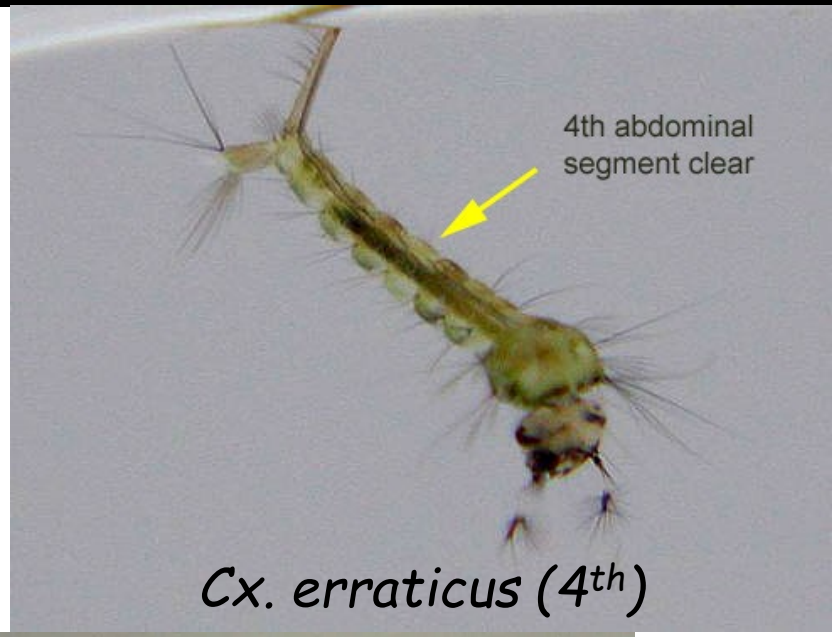
What could it be?



Cx. quinquefasciatus (1st)

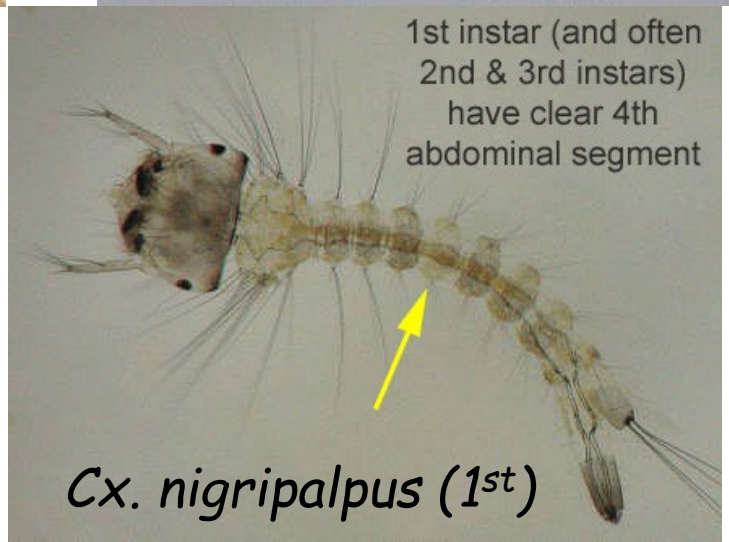


Cx. territans (4th)



Cx. erraticus (4th)

Cx. salinarius (4th)



Cx. nigripalpus (1st)

All photos from FMEL (UF)

Go back to the key

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Transparent "window" in front of egg breaker same width as egg breaker; siphon short, with 0.2 sclerotization;[1] antennal setae trifid; terminal spines of antenna shorter than shaft . . . . . *Culex (Culex) tarsalis*

3(2). Siphon of medium length (3:1),[2] approx. 0.33 sclerotized with definite bulge near base; antennal seta bifid; head setae (C-5,6,7) in straight transverse row . . . . . *Culex (Culex) restuans*
Siphon long (4:1) with dark sclerotization 0.5, antennal seta single and long . . . . . *Culiseta (Climacura) melanura*

4(1). Terminal antennal spines equal to or shorter than shaft of antenna 5
Terminal antennal spines longer than shaft of antenna 7

5(4). Siphon stout, less than 3:1; apex of siphon and head both black; antennal seta single; sclerotization of siphon 0.5 . . . . . *Culiseta (Culiseta) inornata*
Siphon (3:1) or longer 6

6(5). Siphon long (4:1) with sclerotization 0.5; head setae (C-5,6) longer than antennal shaft . . . . . *Culex (Culex) nigripalpus*
Siphon medium (3:1), approx. 0.33 sclerotized; antennal setae and terminal spines 0.5–0.75 of shaft . . . . . *Culex (Culex) pipiens* s.l.

7(4). Siphon lightly sclerotized almost to base, long (at least 4:1) and tapered; antennal seta triple or quadruple . . . . . *Culex (Culex) salinarius*
Siphon heavily sclerotized 0.5 with distal half parallel-sided; egg breaker bordered on either side by parenthesis-shaped mark; prothoracic seta 3 is 0.66 of setae 1 and 2 . . . . . *Culex (Neoculex) territans*

[1] Proportion of total length of siphon which is sclerotized.
[2] Ratio of length of siphon to width at base.

Let's measure!

Spine > Shaft

	Left	Right
spine	79.21	76.95
shaft	57.98	66.97

Spine < Shaft

	Left	Right
spine	37.91	33.49
shaft	54.15	53.06

There appears to be a difference!

Back to the key again

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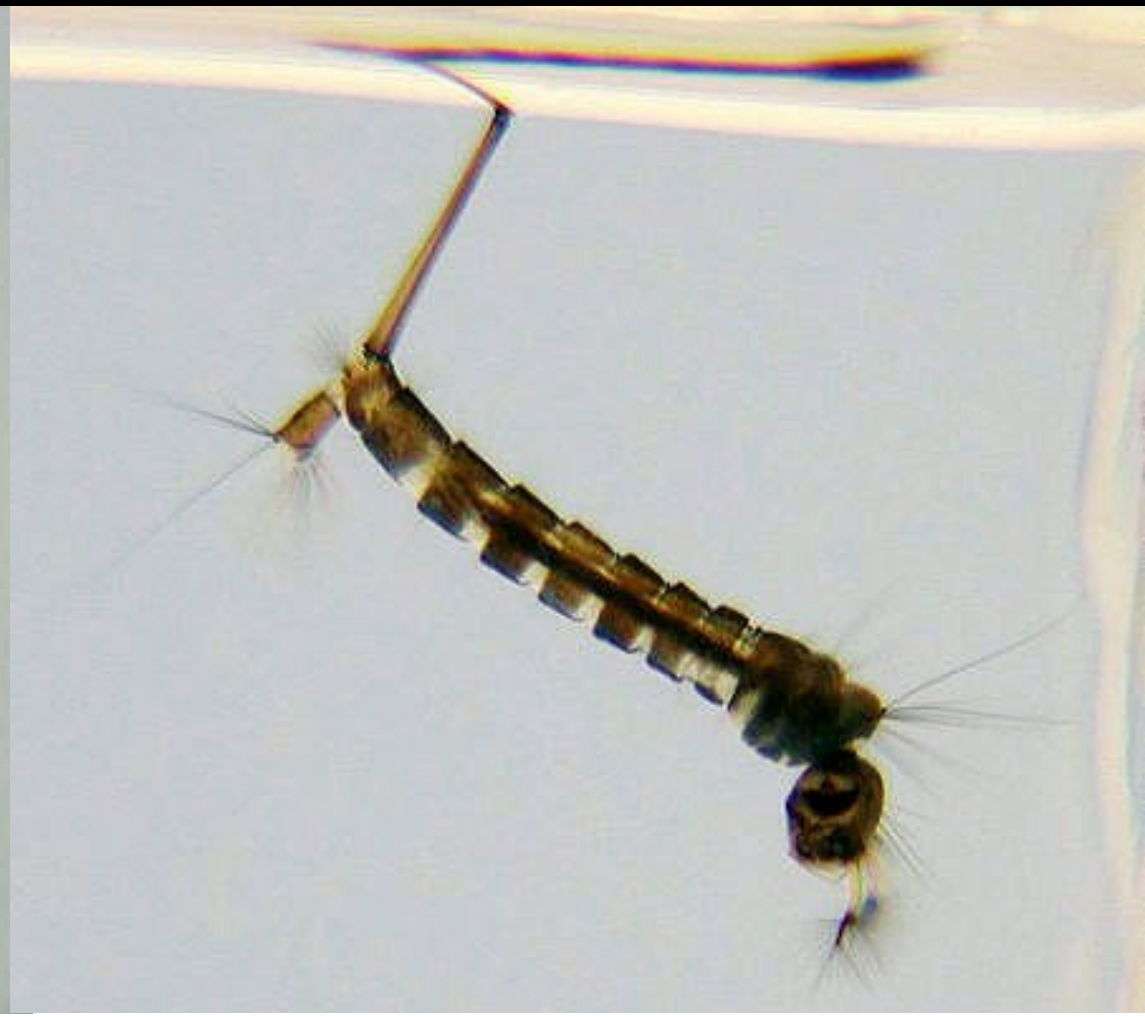
	Siphon long (4:1) with dark sclerotization 0.5, antennal seta single and long	*Culiseta (Climacura) melanura*
4(1).	Terminal antennal spines equal to or shorter than shaft of antenna	5
	Terminal antennal spines longer than shaft of antenna	7
5(4).	Siphon stout, less than 3:1; apex of siphon and head both black, antennal seta single, sclerotization of siphon 0.5	*Culiseta (Culiseta) inornata*
	Siphon (3:1) or longer	6
6(5).	Siphon long (4:1) with sclerotization 0.5; head setae (C-5,6) longer than antennal shaft	*Culex (Culex) nigripalpus*
	Siphon medium (3:1), approx. 0.33 sclerotized; antennal setae and terminal spines 0.5–0.75 of shaft	*Culex (Culex) pipiens* s.l.
7(4).	Siphon lightly sclerotized almost to base, long (at least 4:1) and tapered; antennal seta triple or quadruple	*Culex (Culex) salinarius*
	Siphon heavily sclerotized 0.5 with distal half parallel-sided; egg breaker bordered on either side by parenthesis-shaped mark; prothoracic seta 3 is 0.66 of setae 1 and 2	*Culex (Neoculex) territans*

[1] Proportion of total length of siphon which is sclerotized.
[2] Ratio of length of siphon to width at base.

What's your guess?



Cx. salinarius or *Cx. territans* … or something else?

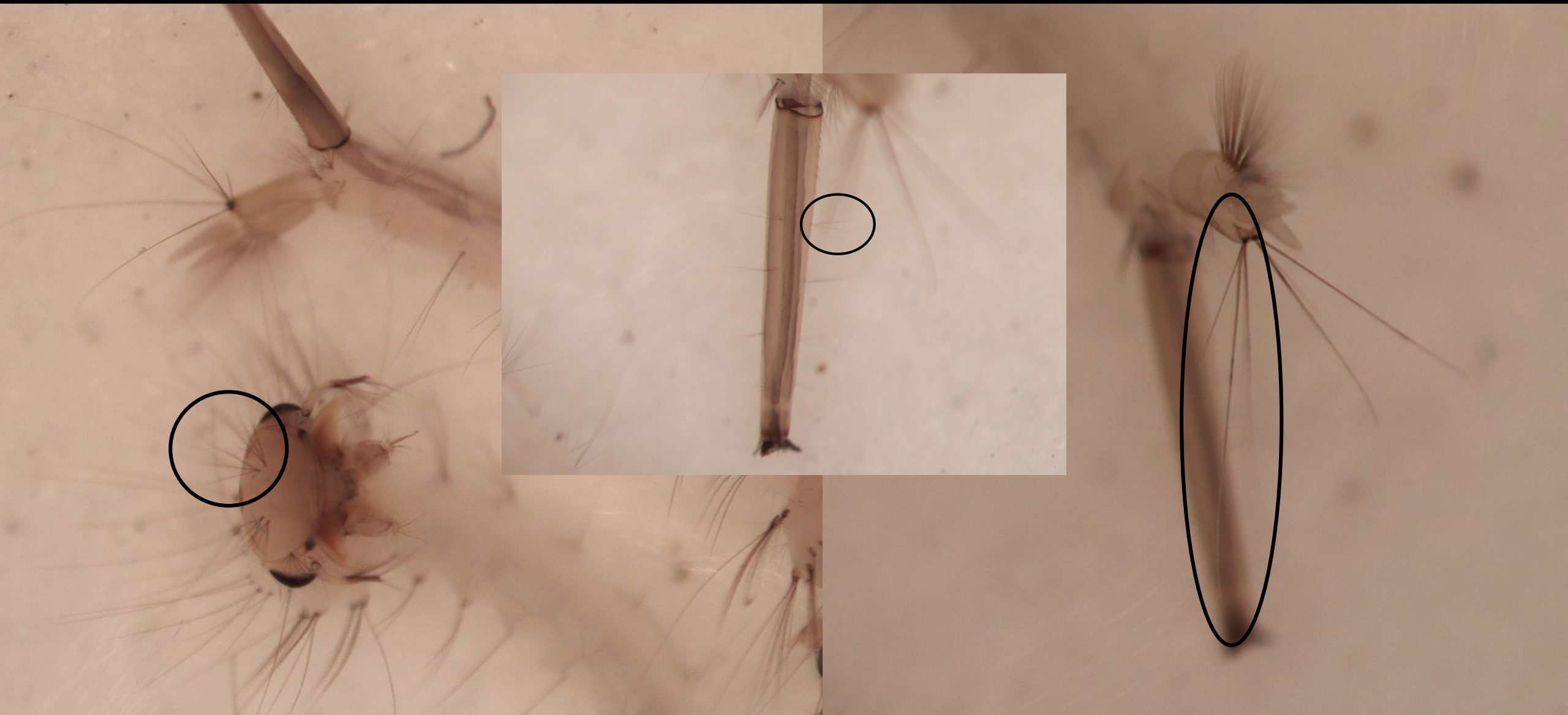
We have 4ths!

Time for the Harrison et al. 2016 key!

Hello,…

salinarius!

Cx. salinarius 4th instar characters



Adults = Extra Assurance

Were you correct?

Note

Out of **THOUSANDS** of egg rafts collected over the past 5 years doing IR, this was the first year we found *Cx. salinarius* rafts (We verify adult ID after all testing).

In 2022, out of 584 rafts, only 6* (1%) were confirmed *Cx. sal.* and they all came from the same site.

*suspect 1 more in early Aug (diff site); was not confirmed

Thank you!

Acknowledgment

Jay Kiser, Suffolk MC for the initial doubt and debate 😅
followed by verification of 4th instars & adults

Final Words

If you can, take the time to really look at your samples.

Talk to your coworkers or colleagues – fresh eyes, different experiences and observations.

If you think something is off, stick with it,
grow those larvae, and hatch the adults!

Always preserve what you can-
having a reference collection is so helpful!