AN UPDATE ON *OCHLEROTATUS JAPONICUS*

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HOW LONG HAS IT BEEN IN THE UNITED STATES?

- Initial collections were in 1998 in CN, NJ, and NY
- By the end of 1999 it had been detected in a number of sites in PA, and as far west as southern Ohio.

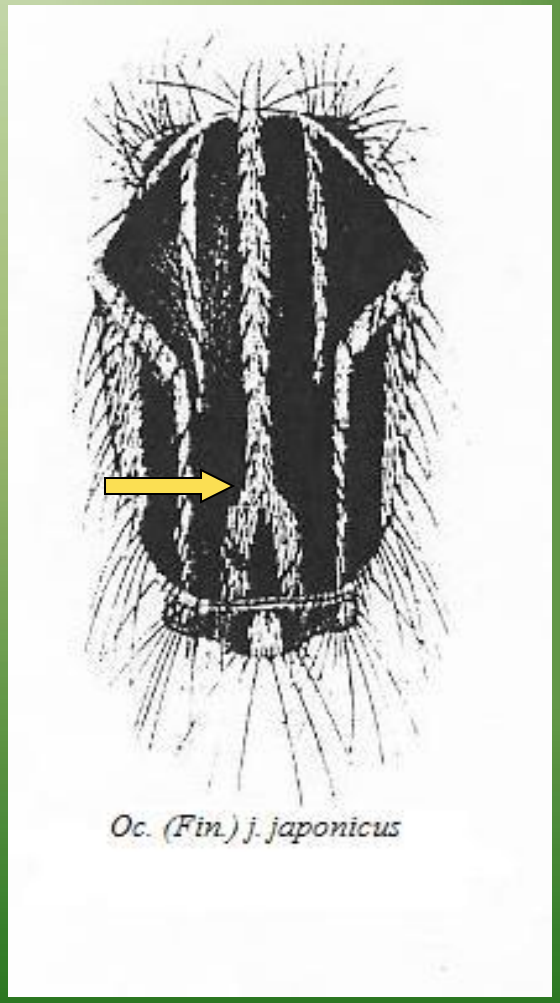
EVIDENCE TO SUPPORT EARLIER INTRODUCTIONS

- Pennsylvania mosquito surveys in 2000 made over 1,100 different collections of this species in a very wide range of habitats and in every county.

- Fonseca et al. (2001) conducted PCR studies that indicate 2 distinct genetic populations of *Oc. j. japonicus* occur in the eastern U.S. (Multiple introductions?)

- Andreadis et al. (2001), studied Connecticut populations and they suggested this species was introduced into CN between 1992 and 1998.

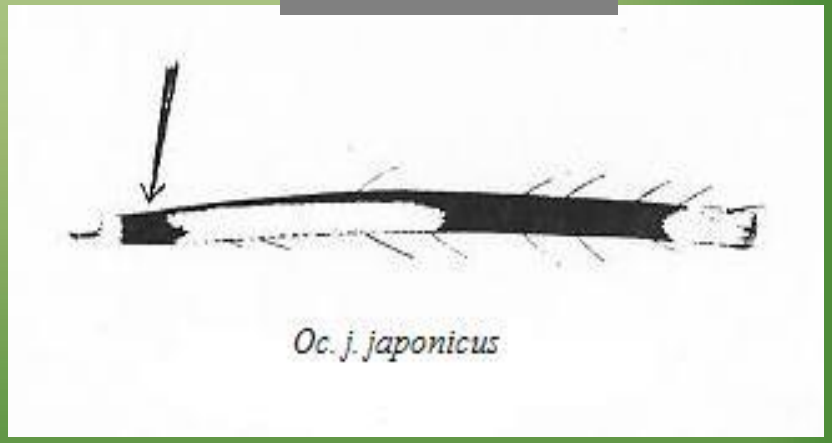
ADULT CHARACTERS: THORAX (SCUTUM)



ADULT CHARACTERS: LEGS

Hindtarsi

Hindfemur



ADULT CHARACTERS: ABDOMEN AND HIND FEMUR

ADULT SURVEILLANCE METHODS

- Gravid traps (BEST)
- Little black oviposition jars (excellent)
- Modified CDC LT (with CO_2) (poor)
- New Jersey light trap (poor)
- UV light/aspiration (?- only one collection)
- Landing/biting (fair)

PUBLISHED FEMALE ACTIVITY: DIURNAL VS. NOCTURNAL

- BITING:
  - late afternoon
  - crepuscular
  - 1-2 hr after dark
- OVIPOSITION:
  - Unknown!
  - However, since gravid traps are the best trapping method, they must be coming to the gravid traps at night to oviposit.

ADULT FEEDING PREFERENCES IN LITERATURE

- MAMMALS
  - mice (lab.)
  - hamster (lab.)
  - deer (Japan and U.S.)
  - horse (U.S.)
  - sheep (Japan)
  - humans (Japan and U.S.)
- BIRDS
  - young chickens (lab.)
  - still no blood-meal evidence of natural feeding on birds
- REPTILES & AMPHIBIANS
  - NO SUCCESS!
  - Attempts made with 5 snake species and 3 frog species.

ADULT BEHAVIOR OBSERVATIONS IN NC IN 2004

- Biting humans indoors
  - 2(April), 8:45 - 10PM
- Biting " outdoors
  - 2(April), 8:30PM
  - 1(May), 11AM
  - 1(June), 6PM
  - 1(Sept), 7PM
- Biting dog outdoors
  - 1(Sept), 6:50PM
- Resting indoors
  - 2(April, July)

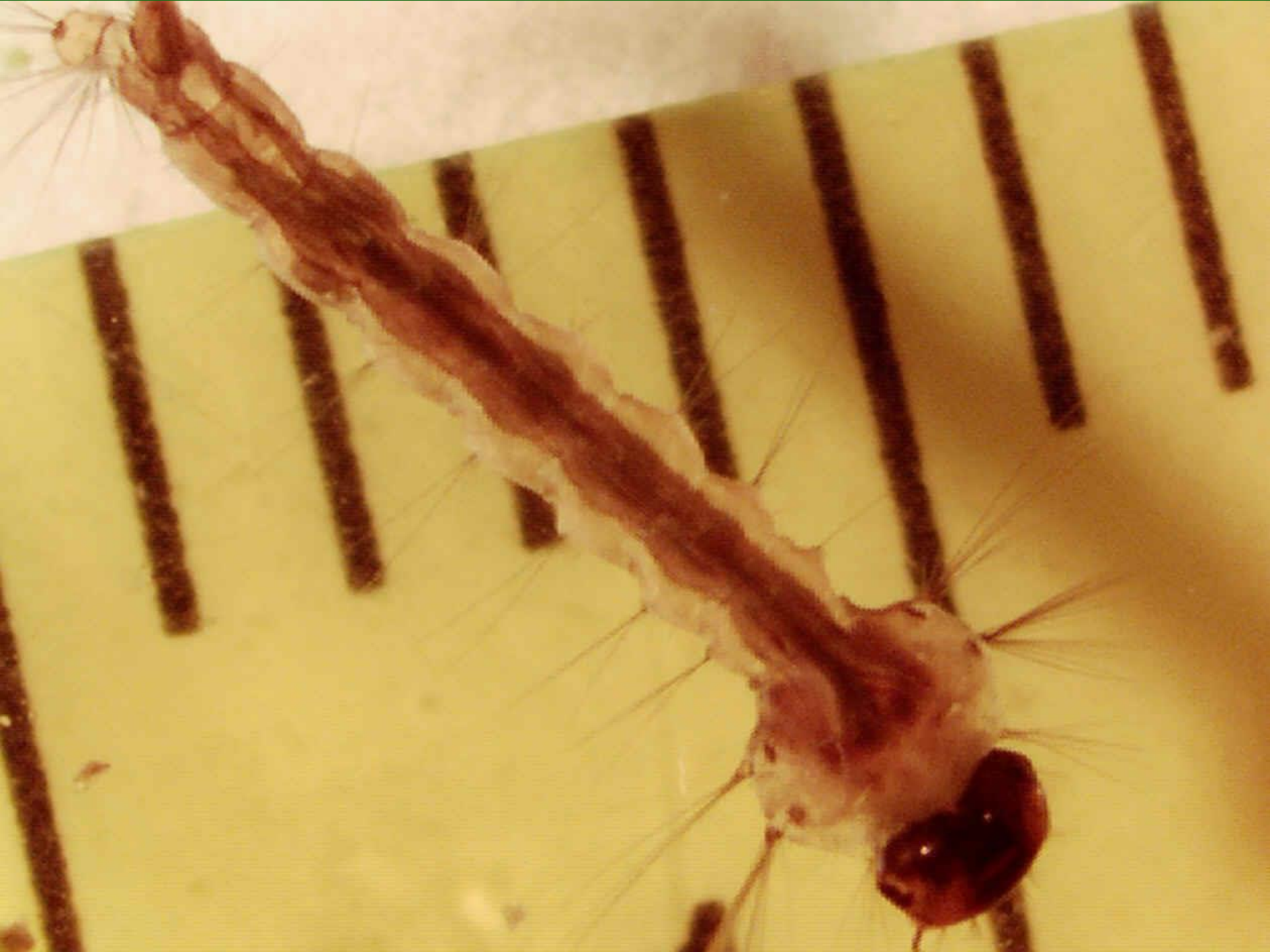
    engorged
- CDC L.T. + dry ice
  - 1(Sept) in rural area

SOME THOUGHTS ABOUT *OC. JAPONICUS* BITING BEHAVIOR

- There are several publications claiming this species is “reluctant” to bite humans.
- I disagree! They are not “reluctant”, but cautious in approaching the host and are easily scared off, which is much like *Oc. triseriatus.*
- They definitely are not aggressive like *Ae. albopictus.*
- If you plan landing collections for this species, be prepared to spend more time for *Oc. japonicus* to come in to bite.
- NOTE: I have not experienced this species coming in large numbers to bite.

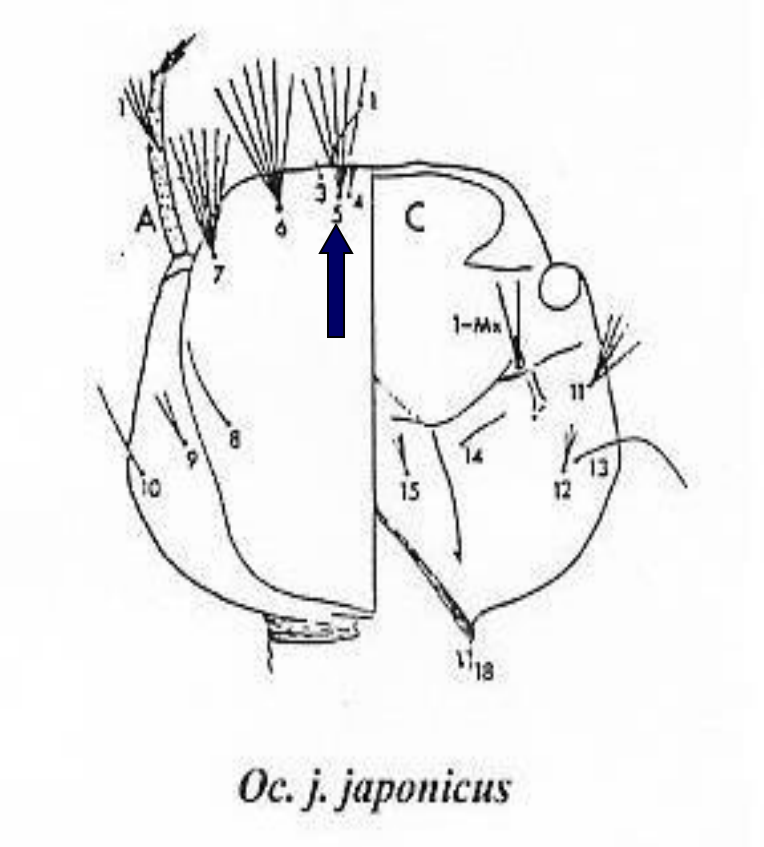
OC. JAPONICUS LARVAE

- APPEARANCE: long and active like the larvae of *Ae. albopictus*, *Oc. atropalpus*, and *Oc. triseriatus*
- COLOR: dark brown, gray or tan colored more like *Oc. atropalpus,* with dark brown head
- SIPHON: about 2.5 to 3 times as long as wide, with pecten extending nearly to tip and with ***siphon tuft inserted within the pecten***
- ACTIVITY: very sensitive (also pupae) to light and vibrations, will dive to bottom if disturbed and stay there for 1-2 minutes

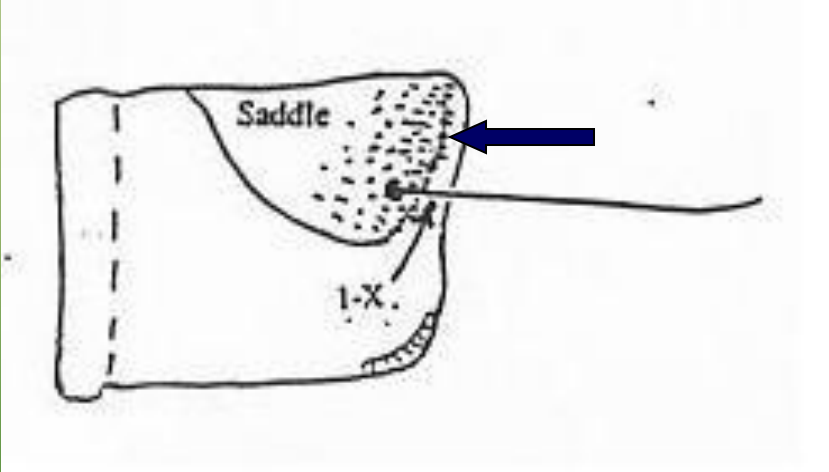


Oc. japonicus

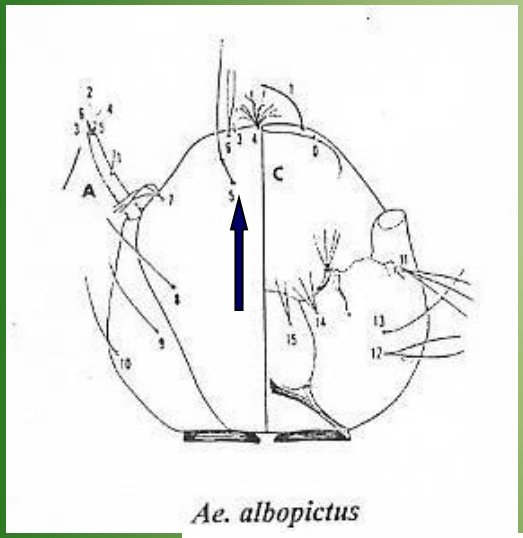
OC. JAPONICUS
LARVAL CHARACTERS



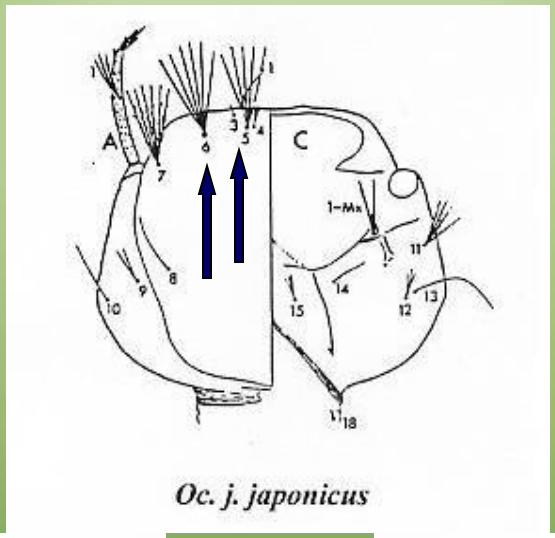
Oc. j. japonicus



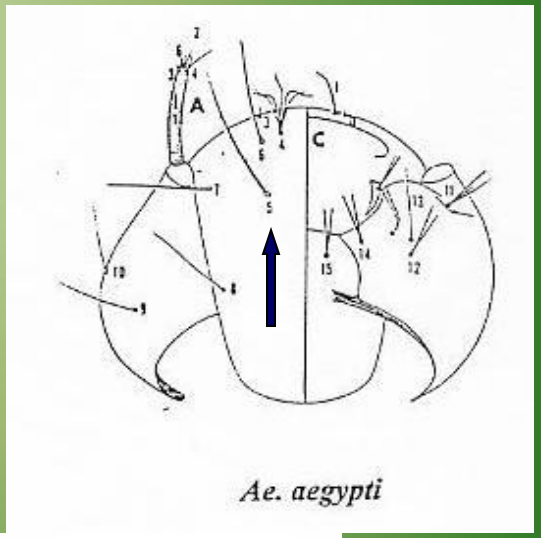
LARVAL HEADS: *JAPONICUS* AND OTHERS



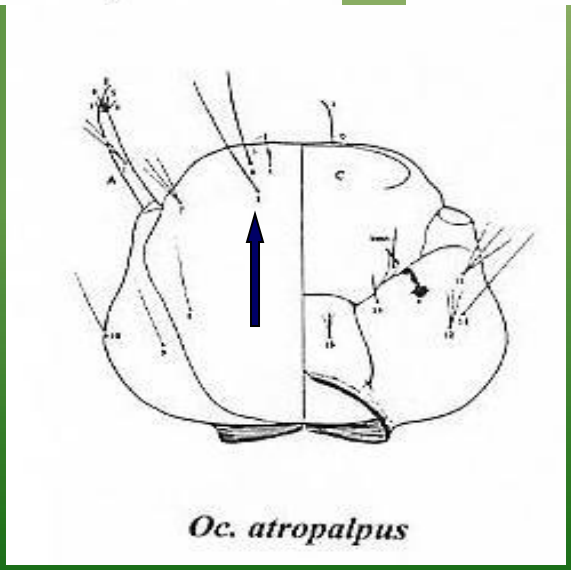
Ae. albopictus



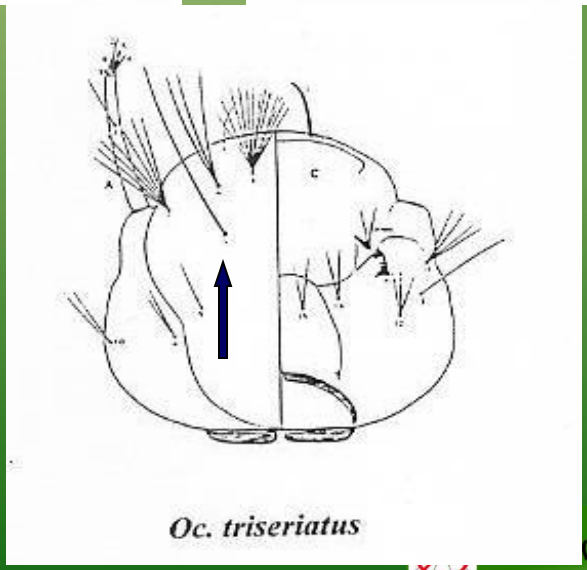
Oc. j. japonicus



Ae. aegypti



Oc. atropalpus



Oc. triseriatus

OCHLEROTATUS JAPONICUS
LARVAL HABITATS

- Rock pools
- Rock holes
- Bird baths
- Porcelain containers
- Concrete Containers
- Catch basins
- Stone-earthenware
- Street gutters
- Tarps
- Tree holes
- Used tires
- Barrels
- Metal cans
- Wheel barrows
- Buckets
- Plastic pipes
- Plastic dishes
- Plastic bottles
- Temporary ground water pools
- Tire ruts
- Seepage depressions

LARVAL HABITATS UTILIZED IN NORTH CAROLINA IN 2004

- Rock pools or holes - 15 collections
- Tires (auto) - 6 collections
- Tires (tractor) - 1 "
- Buckets - 3 "
- Flower pots - 2 "
- Tarp or plastic - 2 "
- Plastic bin - 1 "
- Hollow tree on ground - 1 "
- Septic tank on ground - 1 "
- Auto gas tank on ground - 1 "
- Retention pond* - 1 "

* Probably from eggs in a container washed into pond.

LARVAL ASSOCIATIONS IN NORTH CAROLINA IN 2004

-By itself (all but 1 in early spring)	- 5	Collections
-*Ae. albopictus*	- 6	"
-*Oc. triseriatus*	- 5	"
-*Cx. restuans*	- 3	"
-*Oc. atropalpus*	- 1	"
-*Cx. pipiens* complex	- 1	"
-*Cx. salinarius*	- 1	"
-*An. punctipennis*	- 1	"
-*An. quadrimaculatus s.l.*	- 1	"
-*Cx. erraticus*	- 1	"
-*Ps. columbiae*	- 1	"

Cement Septic Tanks

Rock Pools and Holes

ROCK POOLS

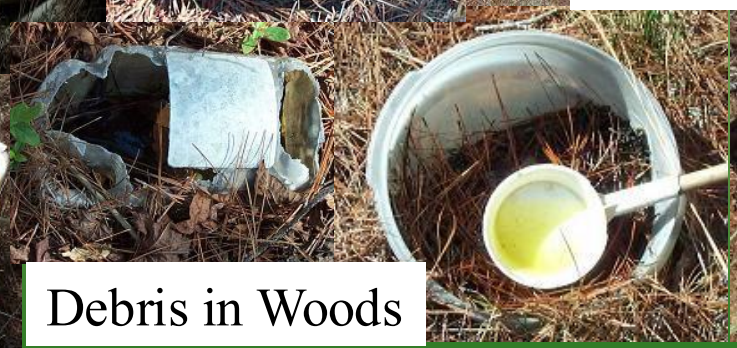
Horse Trough

MANY VERY IMPORTANT VECTOR SPECIES BREED IN CONTAINERS

Tire Piles

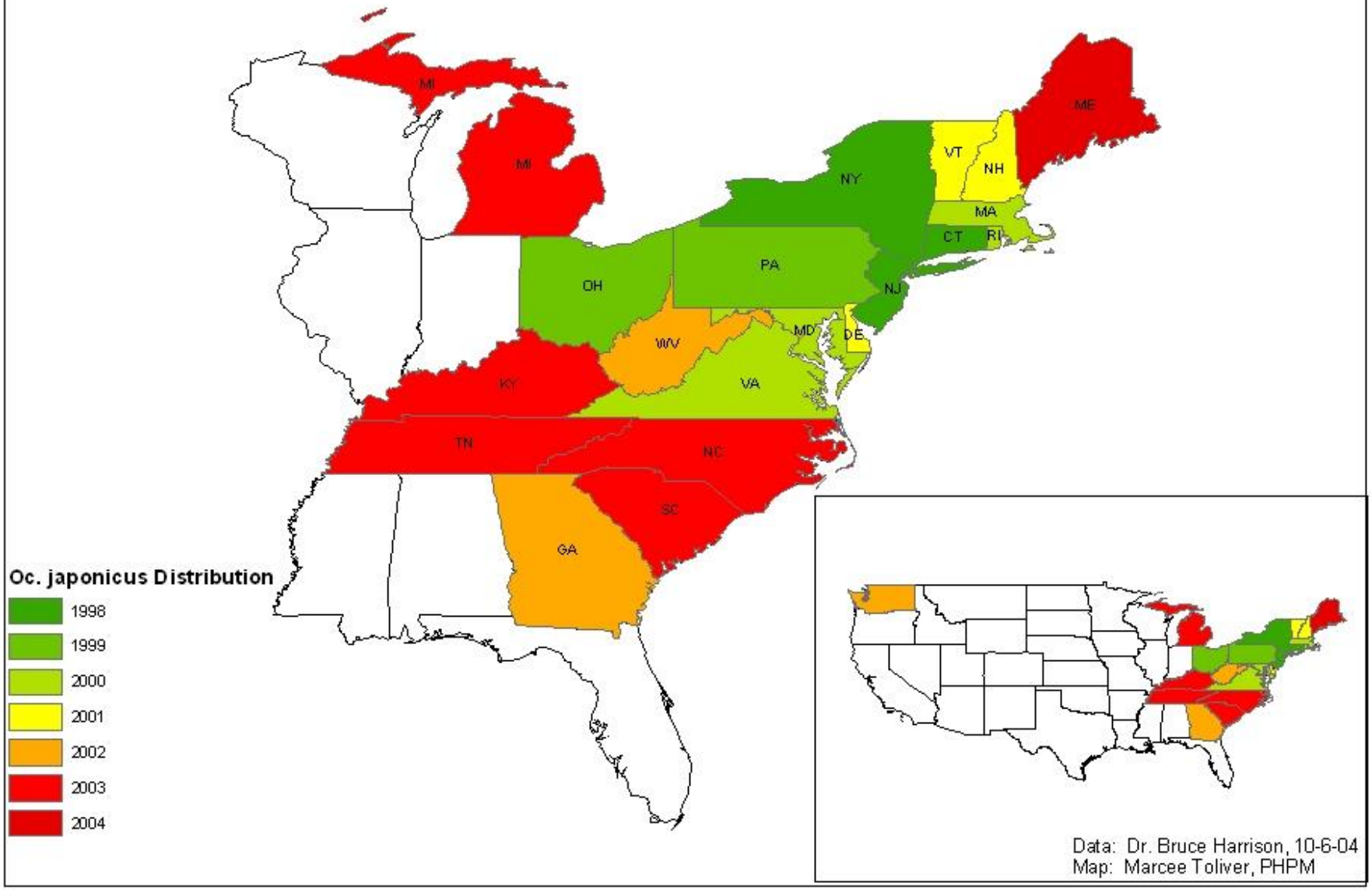
Back Yard Clutter

Buckets



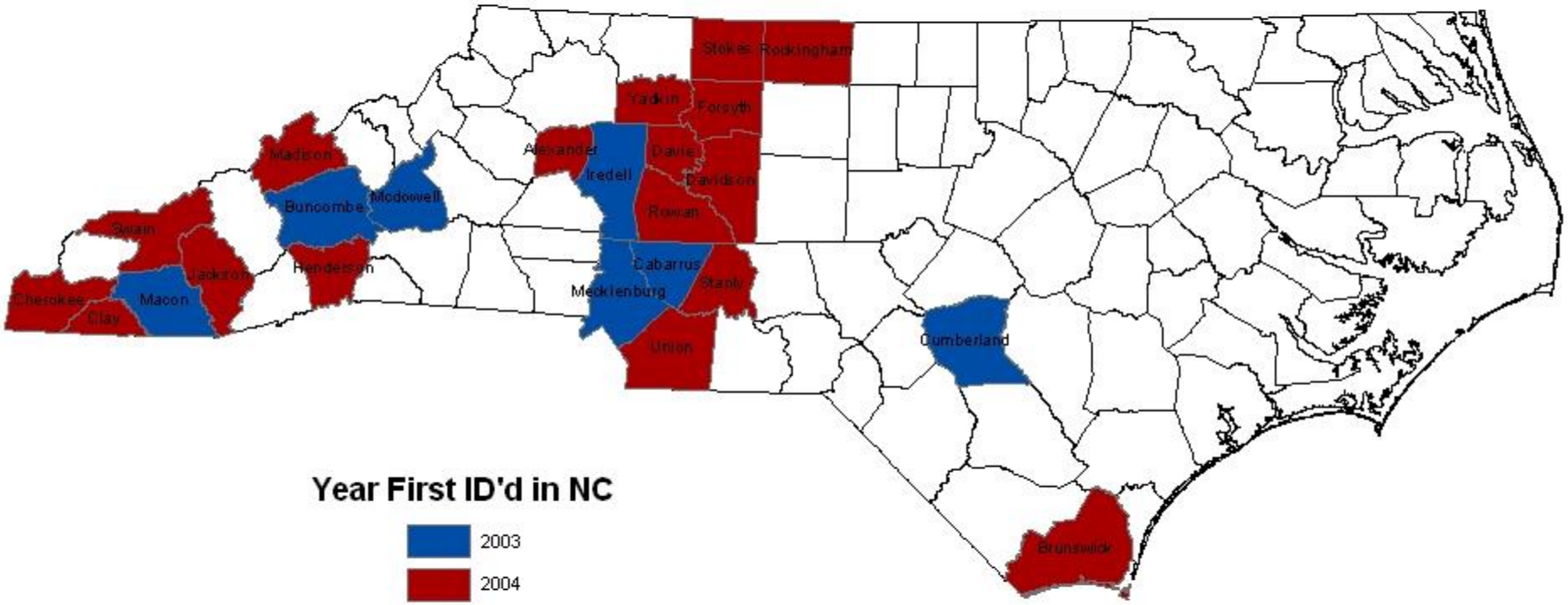
Debris in Woods

Oc. japonicus Distribution in U.S.



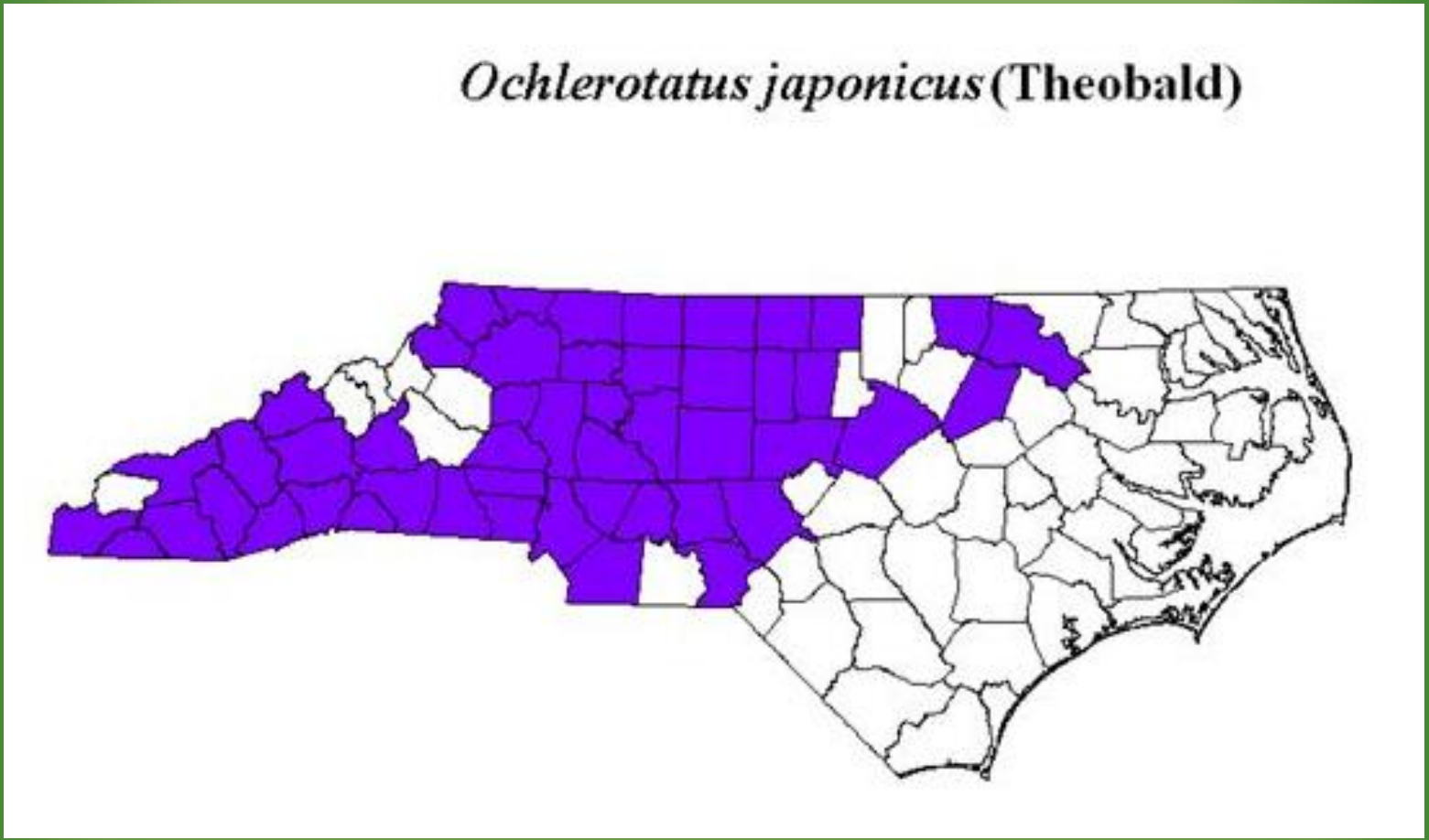
Oc. japonicus

Identified in North Carolina



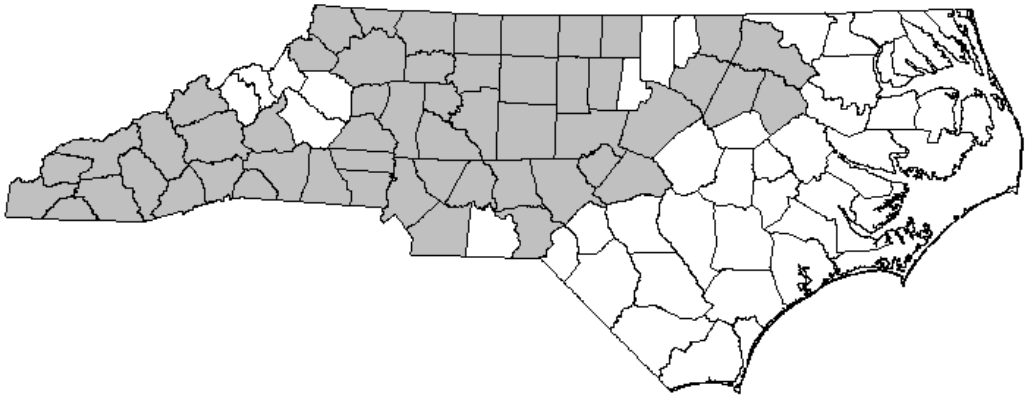
Data: Dr. Bruce Harrison, PHPM
Current as of 10-26-04
Map: Marcee Toliver, PHPM

2007



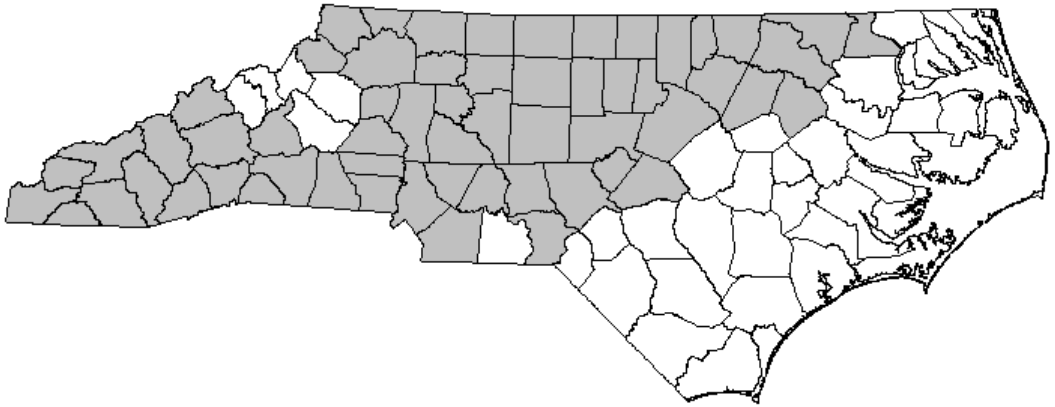
2008

Ochlerotatus japonicus (Theobald)



2011

Ochlerotatus japonicus (Theobald)



VECTOR POTENTIAL OF *OC. JAPONICUS**

WNV- Excellent lab vector (better than *Ae. albopictus*), *many positive pools in nature*, MIR of 1.88 in 2002 (1 per 532 specimens)

SLE- Excellent lab vector (2X better than *Cx.pipiens*), *no natural infections*, could be enzootic or bridge vector

LAC- Excellent lab vector (= *Oc. triseriatus*), *no natural infections*, likely bridge vector

EEE- Moderately good lab vector, no natural infections, *could function as bridge vector*

* Based on studies by Sardelis, Turell and others at Ft. Detrick, MD

CONCLUSIONS

- *Oc. japonicus* is a potentially dangerous species that is spreading rapidly
- Very likely that high population densities of *japonicus* in certain sites will impact the number of human cases of mosquito-borne viruses in the eastern U.S.
- More information is urgently needed about the behavior and feeding habits of *japonicus*.
- Increased efforts are needed to eliminate solid waste and artificial containers
- Increased surveillance is needed to track and document the spread of *japonicus* in the U.S.

CHANGING PRIORITIES – HOW QUICK WE FORGET

- The focus of the WN virus epidemic between 1999 and 2002 was in the eastern U.S.
- In 2003 – 2004 the focus shifted to the mid-western and western U.S.
- Earlier this year CDC indicated the WNV epidemic is dissipating in the eastern U.S., based on a much lower number of human cases in the east in 2004.
- Has this caused a waning of interest and support for the program in your area?