ASSESSING THE DISTRIBUTION OF A PREVIOUSLY UNKNOWN SPECIES TO NEW JERSEY: THE CLINGING JELLYFISH (*GONIONEMUS VERTENS*)

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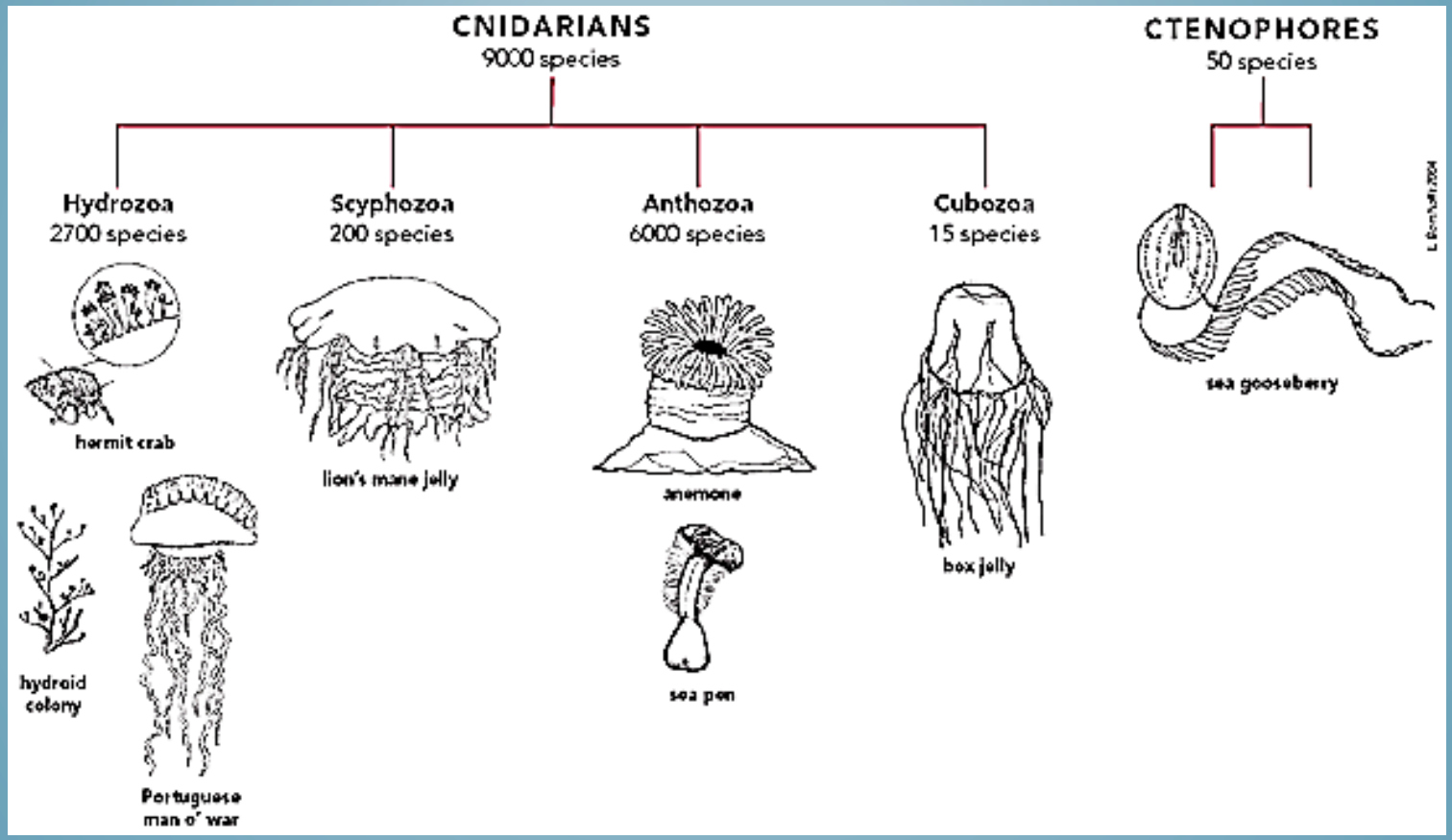
Division of Science, Research and Environmental Health

COMMON GELATINOUS ZOOPLANKTON ("JELLYFISH") IN NJ WATERS:

CNIDARIANS: LION'S MANE (*CYANEA CAPILLATA*)
SEA NETTLES (*CHRYSAORA QUINQUECIRRHA*)
MOON JELLIES (*AURELIA AURITA*)

CTENOPHORA: COMB JELLIES (*MNEMIOPSIS LEIDYI*)





CNIDARIANS
9000 species
CTENOPHORES
50 species
Hydrozoa
2700 species
Scyphozoa
200 species
Anthozoa
6000 species
Cubozoa
15 species
hermit crab
lion's mane jelly
anemone
box jelly
sea gooseberry
hydroid colony
Portuguese man o' war
sea pen


Scars from *C. Fleckeri* (Box jelly) sting

CNIDARIANS

(3 CLASSES OF JELLYFISH SPECIES HARMFUL TO HUMANS):

1. HYDROZOA (EG. *GONIONEMUS VERTENS*, *C. QUINQUECIRRHA*, *P. PHYSALIA*)

2. SCYPHOZOA (EG. *CYANEA* SPP.)

3. CUBOZOA (EG. BOX JELLIES – *CHIRONEX FLECKERI*)


YAMAHA
72
72
CAROLINA SKIFF 24

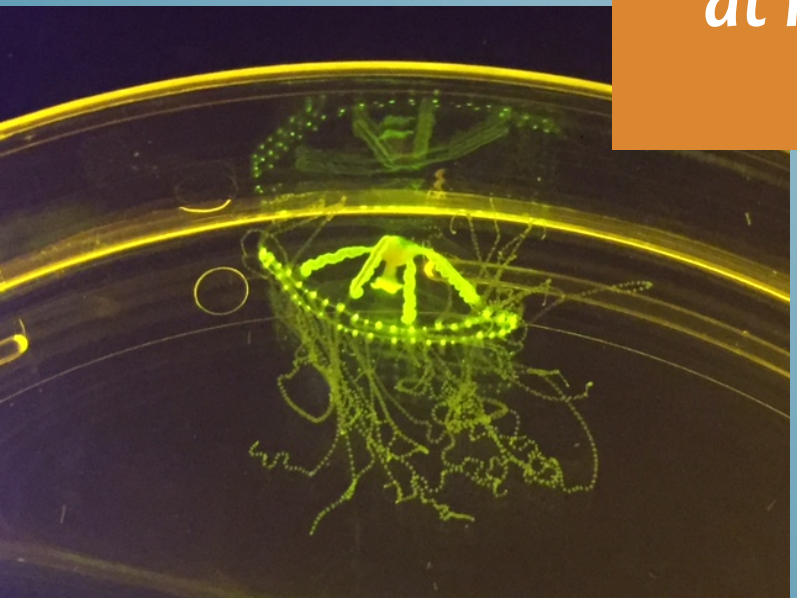
THE CLINGING JELLYFISH – *GONIONEMUS VERTENS*

FACTS:

- *Clinging jellyfish are small, the bell about dime to quarter-sized*
- *They come out at night in shallow, low velocity waters (coastal embayments)*
- *Daytime: hang onto vegetation and substrates like shells. The tentacles have adhesive pads that allow the jellyfish to 'cling' to various media*
- *CJ's do not have long tentacles, but have 60-90 that can extend out laterally to about 3 inches*
- *The tentacles contain nematocysts (or stinging cells) that can cause significant pain if touched*

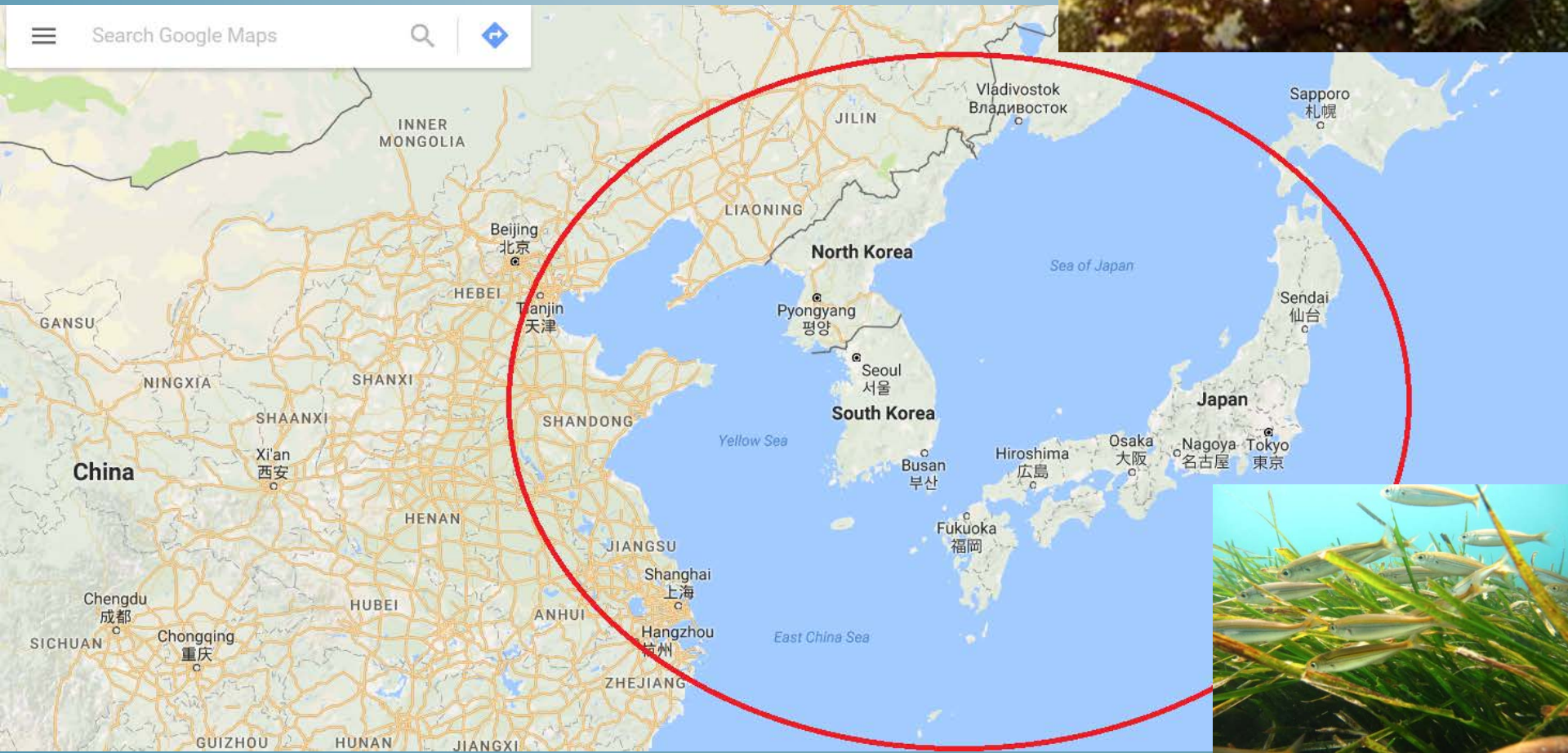
MORE CJ FACTS…

- *CJ's do NOT swim or migrate; populations are very localized. Introduction to new habitats is often the result of accidental translocation*
- *Feed upside down*
- *Bioluminescent! CJ's can be detected at night using UV light*



CJ'S – NON-NATIVE SPECIES

HABITAT: SHALLOW, BACKBAY AREAS WITH EELGRASS



HOW DID THEY GET HERE?

- *First observed in eastern Atlantic at Woods Hole, MA (1894). Likely introduction from pacific oysters containing polyps or ship ballast water.*
- *Spread to other locations along MA and CT until 1920's.*
- *Almost was wiped out by the 1930's due to SAV dieback (wasting disease), but made a recovery during late 1960's.*

FIRST TIME IN NJ

- *June 2016: First observation in New Jersey (Manasquan River at Point Pleasant Canal). Likely source… from marine vessel that spent time in MA and contained attached polyps on surface, or potentially in ballast.*
- *Since June, all subsequent sightings have occurred in the Shrewsbury River estuary.*
- *Since July, almost no CJ medusae have been observed… likely due to high Sea Nettle presence and predation.*

CLINGING JELLYFISH DISTRIBUTION IN NJ:

FIELD ASSESSMENT AND STUDIES

Field Assessment:

1- DSREH and BMWM: Initial sweeps in areas where sightings first reported via plankton tows and off-bow observations

2 - Montclair State University: 30 day assessment of distribution and abundance in the Manasquan and Shrewsbury River Estuaries, along with Northern Barnegat Bay

- Plankton tows, seine-pulls in SAV, "JAD's", dock swabs (DNA)

Study (PHASE I and II):

1- MSU: Along with field assessment of medusae, look at

a. polyp settlement and population potential

b. DNA analysis for genetic identifiers (is this a unique population or the same as from MA/CT)

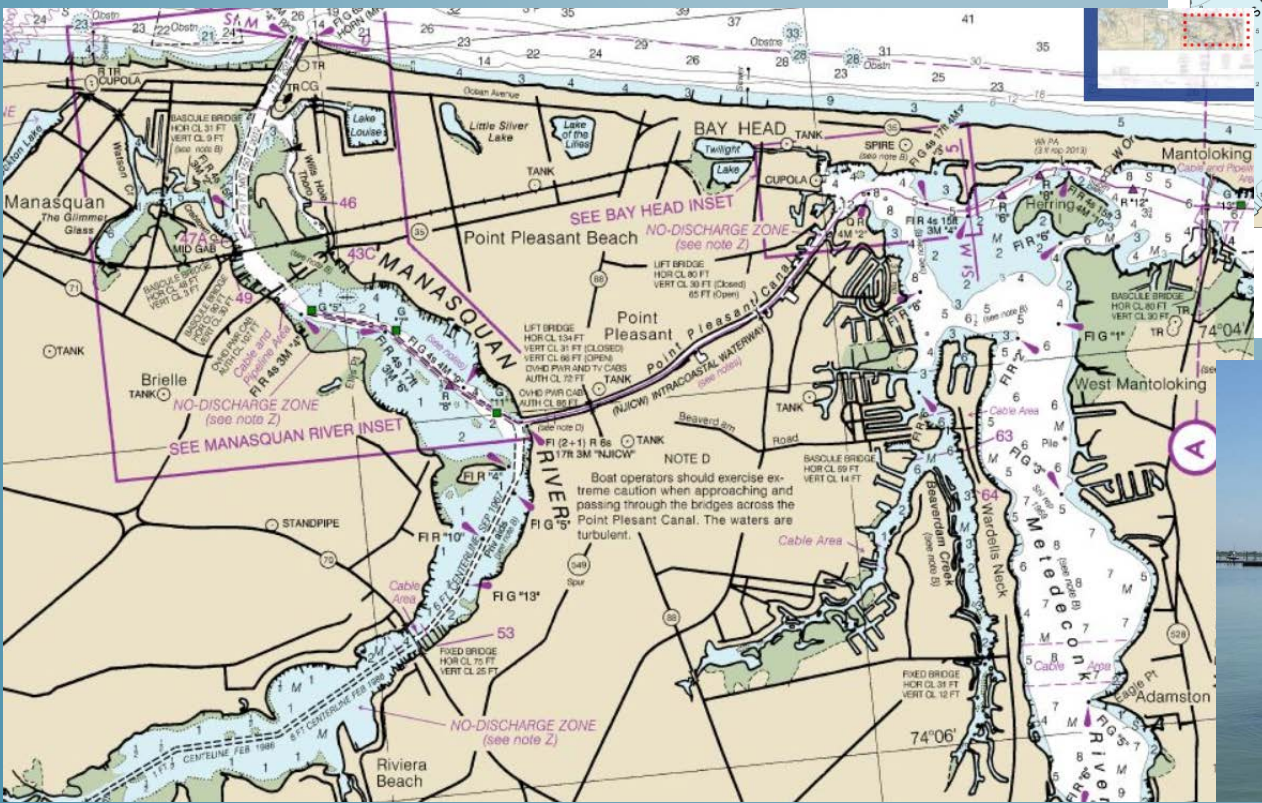
c. Reproductive potential: presence of larval DNA in areas where medusae not observed?

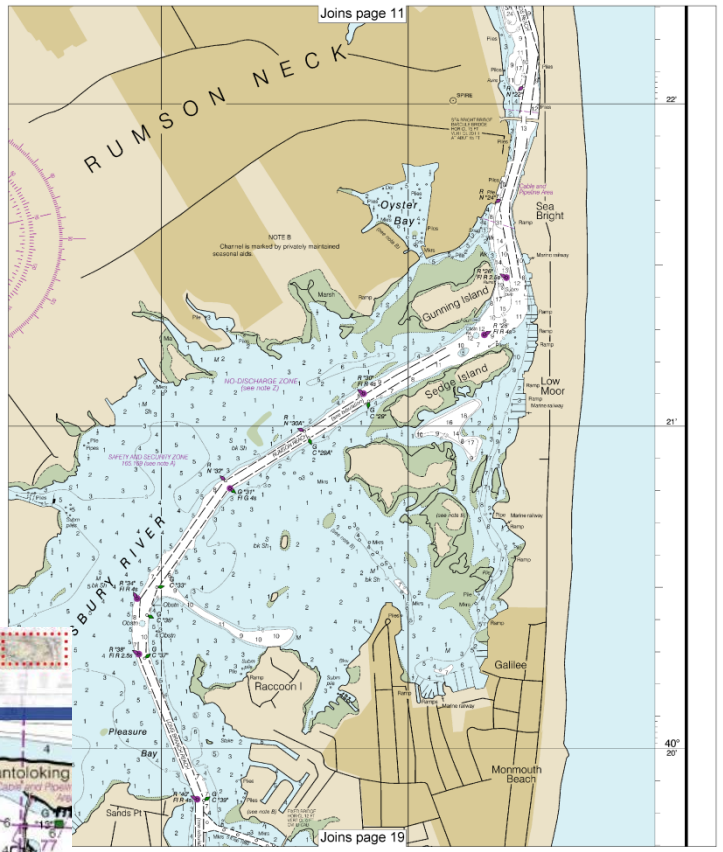
OBJECTIVES:

- *What is the extent of CJ distribution in the Shrewsbury and Manasquan Rivers?*
- *Provide estimate of density per transect/area*
- *Are adults (medusae) being transported to other waters?*

FIELD ASSESSMENT:

SHREWSBURY AND MANASQUAN RIVER ESTUARIES, NORTHERN BARNEGAT BAY






MONTCLAIR STATE
THE GRADUATE SCHOOL

DNA ANALYSIS

1. *Identification of CJ polyps vs. other species*

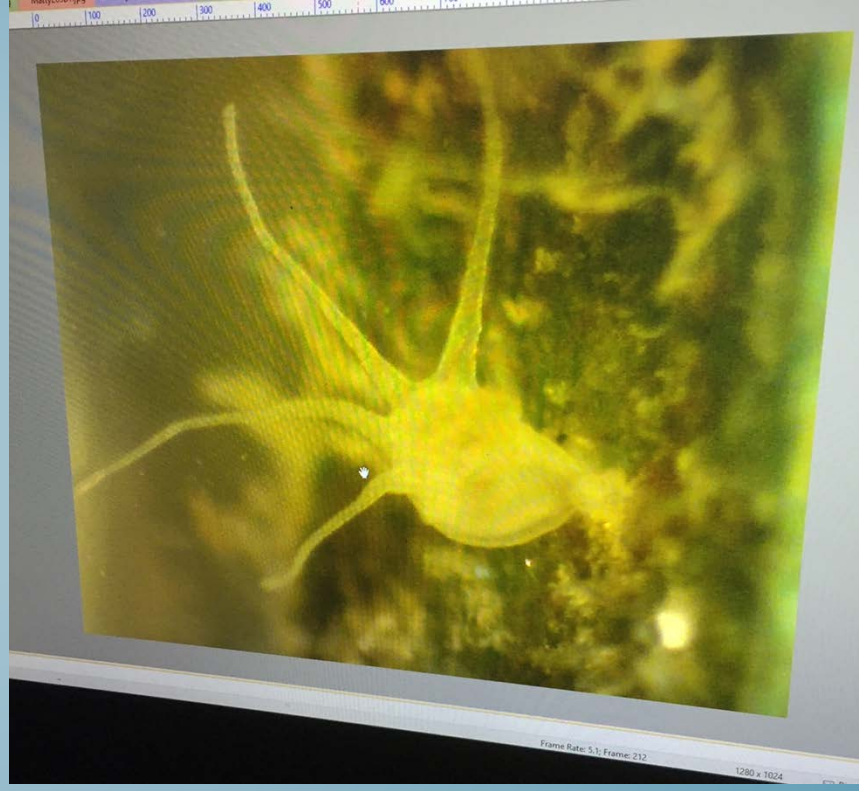
    - Create DNA primers for specific CJ sequence (16S ribosomal DNA – gene locus CO1 - Cytochrome c oxidase subunit I) use for phylogenetic studies

2. *Presence vs. absence*

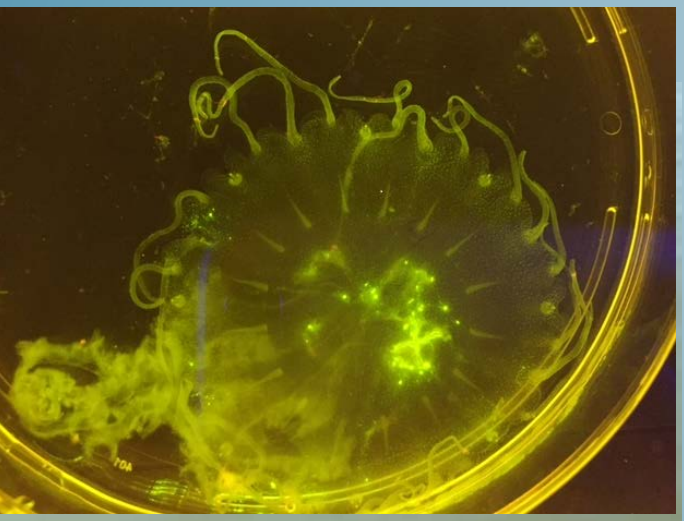
    - Look for CJ larval/ephyra DNA in water column from various locations

3. *Phylogentics: Ascertain similarities between NJ population vs. MA/CT populations, Sea of Japan?*

4. *Is the CJ presence the result of a single or multiple invasions*



RESULTS (TO DATE):



- *Evidence that CJ's in Shrewsbury and Manasquan Rivers are the same population, most likely from a single invasion event.*
- *Sea Nettles have been observed to feed on CJ's in the lab.*
  - *Coincidentally, CJ medusae 'disappeared' from the Shrewsbury following Sea Nettle bloom in July 2016.*
- *CJ polyps have been collected from the Shrewsbury, showing that CJ's can successfully reproduce in NJ waters.*
  - *CJ's may have become "resident".*

MEDIA BLITZ!

Jellyfish Are Biting, In Rivers, In North Jersey

July 9, 2016 9:00 PM

Filed Under: David Madden, Jellyfish, New Jersey

LISTEN LIVE

CLICK HERE TO ENTER TO WIN!

FOLLOW US ON

by KYW's David Madden

TRENTON, NJ (CBS) — If you've ever been stung by a jellyfish, you

CLINGING JELLYFISH MULTIPLYING IN NEW JERSEY RIVERS

SCIENCE

EMBED +/- MORE NEWS VIDEOS

A dangerous species of jellyfish appears to be multiplying at the Jersey Shore. (WPVI)

Thursday, June 23, 2016

MONMOUTH, N.J. (WPVI) -- Clinging jellyfish are multiplying in the river waters of New Jersey.

...h-goers will have little reason to worry. The New Jersey Department of ... Protection says the jellyfish have only been found in interior rivers, where ...ere have been no beach sightings.

RELATED

- Dangerous clinging jellyfish found in NJ, LI Sound
- More dangerous clinging jellyfish found along the Jersey Shore
- More reports of clinging jellyfish found along the Jersey Shore

SCIENCE

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WATCH: Cluster of clinging jellyfish found in Shrewsbury River

Russ Zimmer , @RussZimmer 1:35 p.m. EDT June 21, 2016

Tiny jellyfish with a big, poisonous punch appears to be much more common than previously believed. Wochit

(Photo: Provided by Brian Miller)

MONMOUTH BEACH - Boaters on the Shrewsbury River found 45 clinging jellyfish just off their dock Saturday afternoon, another sign that the venomous creatures packing a painful sting might be here to stay.

After a morning on the river, Emily Sgro, 19, her boyfriend and her parents returned to the dock behind the Sgro family's home on Columbus Drive when she spotted one of the distinctive, inch-wide invertebrates. Then another. And another.

TOP VIDEOS

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1:27

WJLP NewsBreak
0:54

NewsBreak: Minnesota officer charged in the death of Philando Castile; Neptune shooting investigation
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nj.com True Jersey.

Sting from dangerous clinging jellyfish lands N.J. man in hospital

34

1.7k shares

By Paul Milo | NJ Advance Media for NJ.com

Email the author

on June 15, 2016 at 10:39 PM, updated June 16, 2016 at 5:17 PM

Print Email

MONMOUTH BEACH — The week after a specimen was discovered in Barnegat Bay, three more clinging jellyfish have been found in the Shrewsbury River, the Monmouth Beach Office of Emergency Management said in an alert Wednesday.

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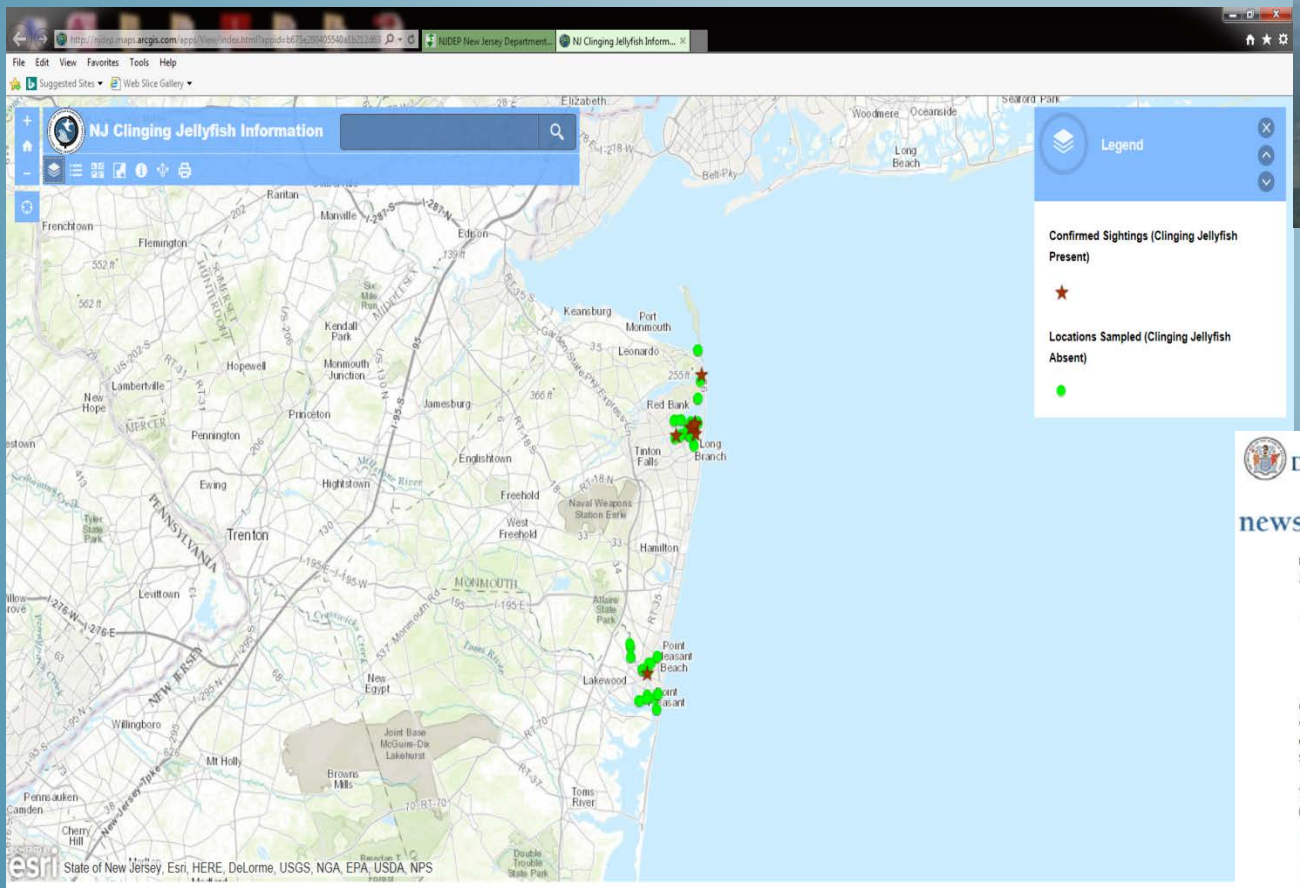
MOST READ

Missing Connecticut man, 26, reportedly found dead in N.J.

COMMUNICATION:

INTERACTIVE MAP, FACT SHEET, AND MEDIA COVERAGE



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FOR IMMEDIATE RELEASE
June 23, 2016

Contact: Lawrence Hajna (609) 984-1795
Bob Considine (609) 292-2994
Caryn Shinske (609) 984-1795

DEP, MONTCLAIR STATE UNIVERSITY TO CONDUCT STUDY OF CLINGING JELLYFISH IN MONMOUTH AND OCEAN COUNTY RIVERS AND BAYS

STUDY AIMS TO DETERMINE PREVALENCE OF TINY JELLYFISH WITH POTENT STING

(16/62) TRENTON – The Department of Environmental Protection has authorized a study in partnership with Montclair State University to determine the distribution and prevalence of clinging jellyfish, a dime-to-quarter sized and invasive jellyfish that packs a powerful sting that has been reported mostly in the Shrewsbury River in recent weeks.

The jellyfish, a native to the Pacific Ocean, is very difficult to spot in the water. A sting can produce severe pain and other localized symptoms and, in some cases can result in the need for hospitalization.

Multiple specimens have been observed and collected in the Shrewsbury River, while a single clinging jellyfish has been confirmed in the Manasquan River. The studies will be conducted in these waterways, as well as northern portions of Barnegat Bay – where the jellyfish has not, as yet, been observed.

No clinging jellyfish have been found on coastal beaches, nor are they anticipated, as they prefer to cling to vegetation found in sheltered bay and estuarine waters.

NJDEP – OIRM, BGIS (2016)

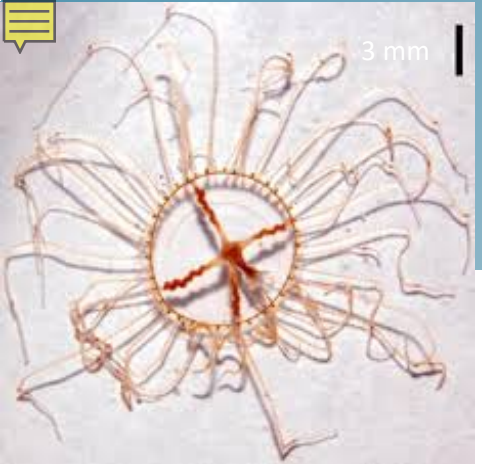
SMALL BUT NASTY!

The CJ Sting:

- ***NOT Deadly**, but CJ can pack a **powerful sting***
- *CJ's do not actively attack… firing of the nematocyst is purely mechanical (designed to fire when contacted)*
  - *CJ's have been observed to "swarm" when physically disturbed from their substrate, but this is thought to be a flight response*

- ***Sting Symptoms:***
  - *Visible: swelling or a reddened whelt at point of contact, similar to "Irukandji Syndrome"*
  - *Systemic: intense pain at and around sting, other physiological and psychotic effects (eg. Feeling of "impending doom").*

ANATOMY OF THE CLINGING JELLYFISH



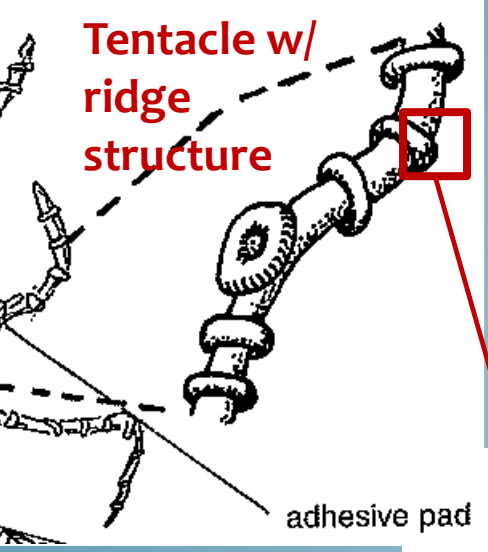
Gonionemus vertens (Agassiz, 1862)

Ridge w/ nematocysts

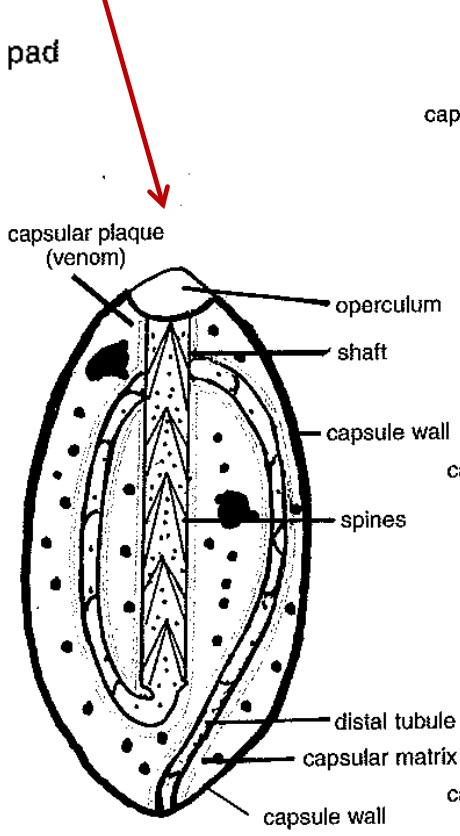
radial canal
mouth
ring canal
manubrium
gonads
gastrodermis
tentacular bulb
statocyst
adhesive pad
nerve rings
velum

Hickman et al. 1974

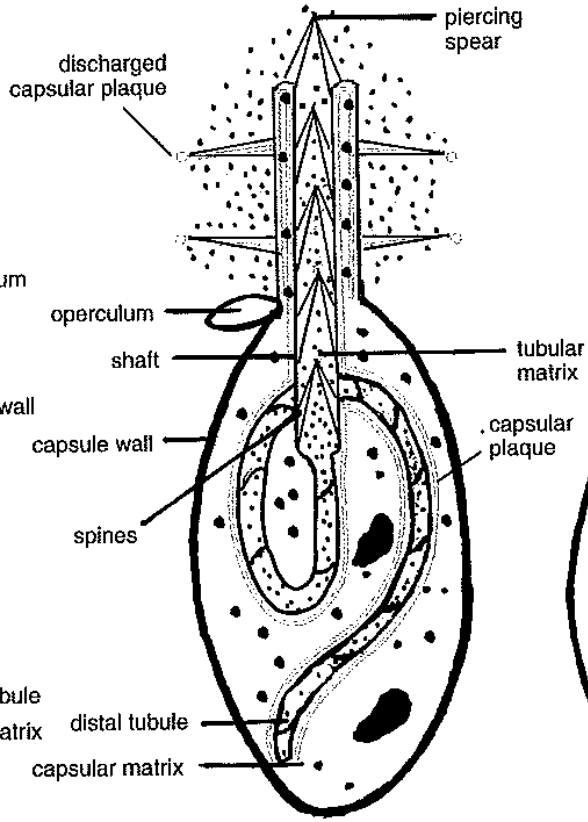
THE NEMATOCYST



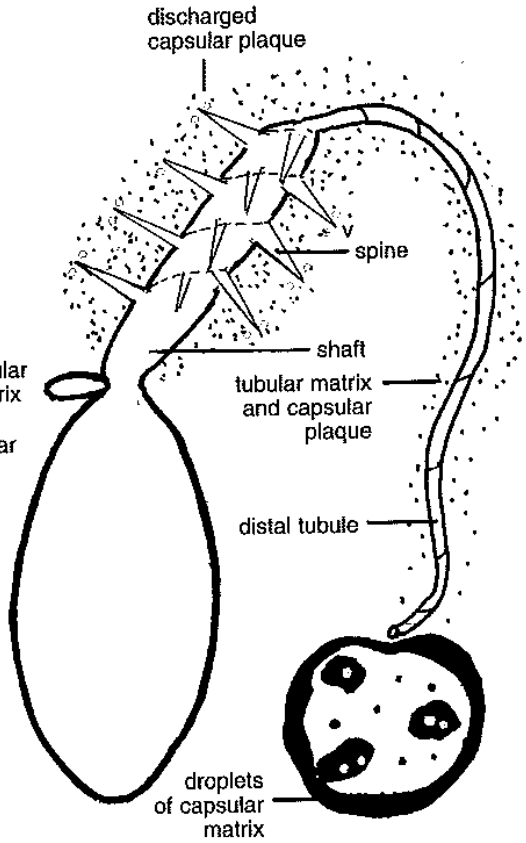
Nematocysts through stages of discharge… 3 msec!



(a) Undischarged



(b) Partially discharged



(c) Fully discharged

J. Rifkin, 1996

SYMPTOMS (SIMILAR TO "IRUKANDJI SYNDROME"):

…AFTER 30 MINUTES…

1. *Severe lower back pain*
2. *Excruciating muscle cramps*
3. *Reduced control of extremities*
4. *Sweating*
5. *Anxiety*
6. *Restlessness*
7. *Nausea/Vomiting*
8. *Headache*
9. *Irregular heart beat*
10. *Hypertension*
11. *Pulmonary edema*
12. *Heart dilation*

Pain and other symptonms can last for 3 -5 days, hospitalization may be required

Caruki barnesi – "box jellyfish"

WHAT TO DO IF STUNG?

- *Apply white vinegar to the affected area to immobilize any remaining stinging cells.*
- *Rinse the area with saltwater and remove any remaining tentacle materials using gloves, a plastic card or a thick towel.*
- *Cold packs or ice can then be applied to alleviate pain. A hot compress may also be effective.*
- *If symptoms persist or pain increases instead of subsiding, seek prompt medical attention.*
- *10-15% Lidocaine application has also been observed as effective to alleviate pain.*

Warning sign for Box Jellies in North Queensland, Australia.

FUTURE WORK

- MSU Report on 2016 Study
- Field Investigation in Spring 2017
- Continued Outreach

ACKNOWLEDGEMENTS

- ***Drs. Paul Bologna, Jack Gaynor,*** *and* ***Dena Restaino*** *(Montclair State University)*
- ***Bob Schuster, Lonnie LeVance, Ken Hayek,*** *and* ***Bruce Freidman*** *(DEP, Div. of Water Monitoring and Standards, Bureau of Marine Water Monitoring)*
- ***Bob Considine*** *and* ***Bob Bostock*** *(DEP, Communications)*
- ***Dave Glass*** *(DEP, Deputy Commissioner)*
- *The* ***residents of Monmouth Beach****, NJ (Racoon Creek, Shrewsbury River)*