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

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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

(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)
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

Map showing the distribution of CJ’s non-native species in East Asia.
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.
**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
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

by KYW's David Madden

TRENTON, NJ (CBS) --- If you’ve ever been stung by a jellyfish, you

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TRENTON, NJ (CBS) --- If you’ve ever been stung by a jellyfish, you

WATCH: Cluster of clinging jellyfish found in Shrewsbury River

By Paul Milko | NJ Advance Media for NJ.com

MONMOUTH BEACH --- Boaters on the Shrewsbury River found 40 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 Signor, 19, her boyfriend and her parents returned to the dock behind the Signor family’s home on Columbus Drive when she spotted one of the distinctive, inch-wide invertebrates. Then another. And another.

More dangerous clinging jellyfish found along the Jersey Shore

By Paul Milko | NJ Advance Media for NJ.com

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.

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

By Paul Milko | NJ Advance Media for NJ.com

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COMMUNICATION:
INTERACTIVE MAP, FACT SHEET, AND MEDIA COVERAGE

NJDEP – OIRM, BGIS (2016)
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

Hickman et al. 1974
Nematocysts through stages of discharge... 3 msec!

(a) Undischarged
(b) Partially discharged
(c) Fully discharged

J. Rifkin, 1996

THE NEMATOCYST
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 symptoms can last for 3 -5 days, hospitalization may be required.
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 (Raccoon Creek, Shrewsbury River)