Asexual Reproduction Favored in Sea Nettles (*Chrysaora quinquecirrhra*)

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Abstract:
Histological techniques were used to assess four questions: 1) Are visual methods of sex identification accurate, 2) What is the sex ratio of nettles in Barnegat Bay, 3) How are they reproducing, and 4) Are they mature? Nettles were collected through trawling, seining, and dip netting and their gonads extracted and embedded on slides. These nettles were analyzed for sex, egg size, and the presence of ruptured sperm follicles. Visual methods were more accurate only when identifying males (98% error). Histologically, there were still more females than males in the population, although only 12% of males were mature. Asexual reproduction is more common and therefore polyp stages should be targeted for management purposes.

Introduction:
Early methods of sexing sea nettles using gonad color (pink gonads for males and yellow/brown for female) is potentially inaccurate1. Using these methods, populations appear predominantly female, indicating asexual reproduction and suggesting that the polyp stage should be targeted for management.

Objectives:
1. Compare visual and histological methods of sex determination
2. Determine sex ratio in Barnegat Bay
3. Indicate if nettles are reproducing sexually or asexually
4. Determine maturity

Results:

Sex Determination

Figure 2: Histology samples at 10x magnification: A) Male with no ruptured sperm follicles, B) Male with ruptured sperm follicles, indicated by arrows, C) Female with many eggs, characterized by a round shape and large nucleus, indicated by arrows.

Figure 3: Percent error of gonad color
Visual ID is only accurate when determining if a sea nettle is male.

Figure 4: Sex – determined by gonad color
Sex ratio of sea nettles determined using gonad color (according to Littleford 1939) suggests a higher proportion of females (78%), suggesting asexual reproduction.

Histology and Visual Comparison

Figure 5: Sex- determined by histology
Histology shows that 35% of males were incorrectly identified visually although there are still disproportionally more females in the population.

Maturity

Figure 6: Sexual maturity of males
Sexual maturity of males is determined by the presence of ruptured sperm follicles. 12% of males had ruptured follicles, indicating that sexual reproduction among males is not widespread.

Figure 7: Required number of egg measurements
Sexual maturity of females is determined by the presence of eggs ≥ 7 μm according to Littleford (1939). To determine the minimum number of eggs to measure to find mature eggs all eggs of four females were measured and plotted. This sample indicates that ~225 eggs will need to be measured in future samples.

Conclusions:
1. Visual ID only accurate for males
2. Population slightly skewed female
3. Asexual reproduction favored
4. Few mature males

References:

Acknowledgements:
This work was made possible by the National Science Foundation’s Rutgers Internship in Ocean Sciences and the Rutgers University Marine Field Station.