Growth rates suggest sea whip corals may require decades to recover from disturbance

SEA WHIP CORAL

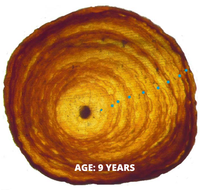
Sea whip corals *Leptogorgia virgulata* are a common structural component of both natural and artificial hard bottom reef habitats in the mid-Atlantic region and may serve as essential habitat for commercially valuable species. However, they are slow-growing, easily damaged, and especially vulnerable to damage by passive fishing gear, such as pots and traps. **Despite their potential importance, sea whips were generally understudied in this region until recently.**

STUDY LOCATION

THE STUDY

We examined the **colony complexity, length, age, and growth of sea whips from four artificial reef sites in the mid-Atlantic region** to gain a better understanding of their biology in the area. Age was estimated from annual growth ring counts.

ANNUAL GROWTH RING COUNT: BASAL CROSS SECTION OF CORAL UNDER MICROSCOPE



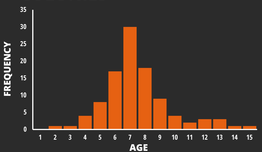
OUR FINDINGS

There were no significant differences in the bifurcation (R_B) and tributary to source (T/S) ratios between sites, with the $R_B \approx 3$ for all sites, indicating **similar complexity between sites**.

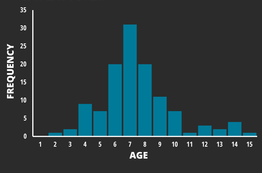
The **total length distribution** was 8.3 cm to 85.3 cm, and 50% of corals were in the range of 34.2 - 56.4 cm.

Age ranged from 2 to 15 years, with 50% of corals in the range of 6 to 8 years. According the growth function below, *L. virgulata* reaches **maximum individual length** at approximately **20 years of age**.

AGE FREQUENCY OF COLLECTED COLONIES



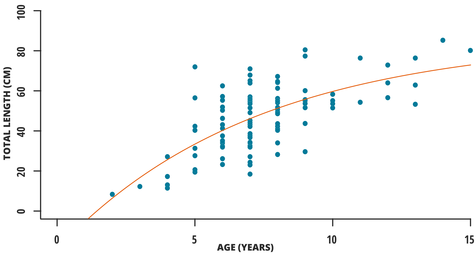
AGE FREQUENCY OF IN-SITU COLONIES



The large proportion of middle-sized and middle-aged corals suggests **episodic recruitment**. Age-length keys demonstrated that age increased with total coral length, and a von Bertalanffy growth model demonstrated size-dependent growth following the equation:

$$E[L|t]\ (\text{cm}) = 86.1(1 - e^{-0.14(t-1.44)}).$$

THE VON BERTALANFFY GROWTH MODEL FOR *LEPTOGORGIA VIRGULATA* COLONIES COLLECTED FROM ALL FOUR STUDY SITES.



CONCLUSION

This is the **first study providing the above data for sea whips in the coastal mid-Atlantic region**, and the baseline created will be a useful reference to study changes over time.

The evidence for episodic recruitment of *L. virgulata* shown in this study suggests that they do not recruit on a regular annual basis, and good recruitment years may only occur at intervals of a decade or longer. Thus, any **corals that are damaged or removed due to disturbance by human or natural events may require decades to recover**.

Future work is needed to examine to what degree fishing damages *L. virgulata* or affects its survival.

PeerJ

Sea whip coral *Leptogorgia virgulata* in the Mid-Atlantic Bight: Colony complexity, age, and growth
PeerJ 4:e8372 DOI: 10.7717/peerj.8372
http://peerj.com/articles/8372/

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