How does male pregnancy impact mating behaviors and reproductive investment in Northern Pipefish (Syngnathus fuscus)?



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brooklyn

IN DIAN

ecology

and

environment

- compete for mates
- pregnancy
- pregnancy²
- pregnancy than females? investment (Table 1)
- provisioning during pregnancy
- placed into 12 breeding pairs

Aim 1

Investigate the level of male investment of *S. fuscus* during pregnancy



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Introduction

Sexual selection is the evolutionary preference of certain traits through competition for and choice of mates • Typically females invest more in offspring while males

• Pipefish and seahorses are atypical in that they exhibit male

• Syngnathus fuscus was chosen in the initial 2019 study¹ due to evidence that females compete for the acquisition of mates and that males provide nutrients to offspring during

• S. fuscus females produce relatively nutrient poor eggs³ Do S. fuscus males invest more in offspring during

• The patrotrophic index⁴ was calculated to determine male

• Lipid content was analyzed to gauge male nutrient

• 77 S. fuscus were collected (50 M, 27 F) and 26 fish were

Objectives

Aim 2 Determine whether *S*. *fuscus* exhibits monogamous behavior

Methods

weight



| | Δ |
|--|---|
| | |
| | |
| | |





Results

Figure 7. Calibration curve for the determination of lipid content ($R^2=0.9662$)

2. Kvarnemo, C., Mobley, K.B., Partridge, C., Jones, A.G., & Ahnesjo, I. (2011). Evidence of paternal nutrient provisioning to embryos in broad-nosed pipefish Syngnathus typhle. Journal of Fish Biology, 78, 1725. 3. Ripley, J., & Foran, C. (2006). Differential parental nutrient allocation in two congeneric pipefish species (Syngnathidae: Syngnathus spp.). The Journal of Experimental Biology, 209(6), 1112-1121. 4. Skalkos, Z.M.G, Van Dyke, J.U. & Whittington, C.M. Parental nutrient provisioning during male pregnancy in the seahorse Hippocampus abdominali. Journal of Comparative Physiology B, (2020) 190:547–556.



Table 1. Patrotrophic Index for 2021 and 2019

 breeding pairs.

| Pair ID | Patrotrophic Index |
|-------------|--------------------|
| M3C/F4C | 1.30 |
| M1C/F4C | 9.23 |
| 19 Average* | 1.10 |
| | *N=10 |

Conclusion

Aim 1: Only lipids were detected in all samples. Protocol change may be required.

• Higher lipid content detected in fry than in eggs, contrary to past studies³

• High male mortality rate (90%) indicates subpar health in the population which may have affected nutrient provisioning and offspring development

Aim 2: Female polygamy observed in 3 breeding pairs. Female monogamous behavior in the wild may be due to low partner availability.

Future Directions

Nutrient Analysis Power Analysis The minimum sample Test different methods of size for effective determining nutrient

results is ~12 mating pairs.

Male monogamy

Genotyping

content in eggs/offspring

Confirm parentage of offspring

Experimental Design Lower population density per tank to avoid propagation of disease

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References

1. Mey, K., Horn, S., Wilson, T. (2019). Pulling Your Weight: Do Male Northern Pipefish (Syngnathus fuscus) Contribute More to Pregnancy than Females? BUEE 2019.