

Lecture 6: Reproduction

I. Introduction

A. Objectives

1. Appreciate diversity of reproductive adaptations, from the individual's point-of-view
2. Recognize the many tradeoffs that go into reproductive strategies
3. Set the stage for understanding population- level implications of reproductive strategies (more later)

B. Significance

C. Energetic tradeoffs

II. Fecundity

A. Definition

B. Ecological determinants

C. Egg number vs. egg size

D. Single vs. batch spawning

E. Geographic and phylogenetic patterns

III. Spawning synchronicity

A. What all has to happen

B. Stimuli

IV. Reproductive guilds (or at least a subset of them)

A. Non-guarders

1. Broadcast spawners

2. Brood hiders

B. Guardians

1. Substrate choosers

2. Nesters

C. Bearers

1. External bearers

2. Internal bearers

V. Life on the spawning grounds

A. 2 systems to meet a mate: social schooling and territoriality

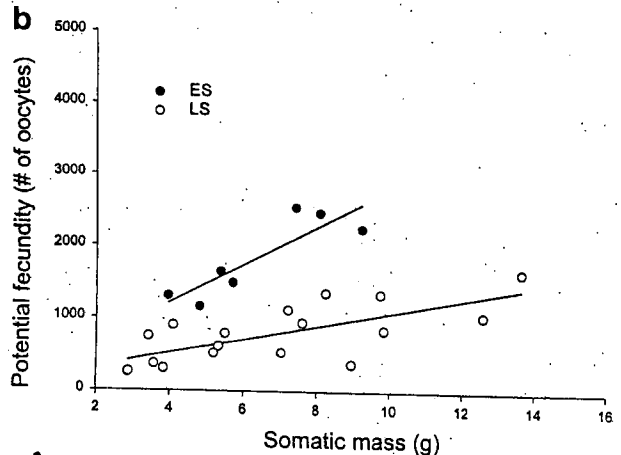
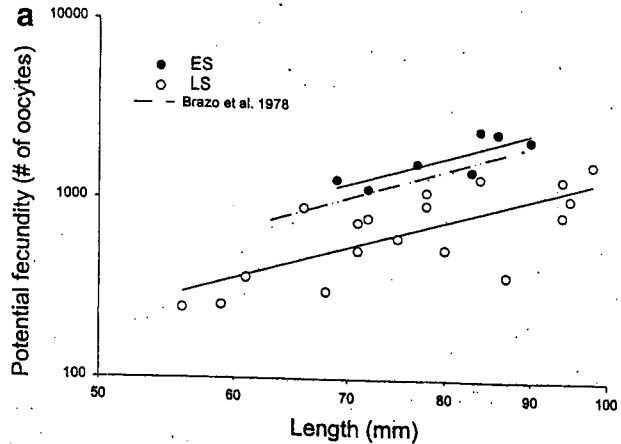
B. Male – female interactions

1. Enticement and inducement

2. Polygamy, polyandry, and polygyny

3. The mottled sculpin example

1



↑ Longnose dace in Coweeta Cr., NC →

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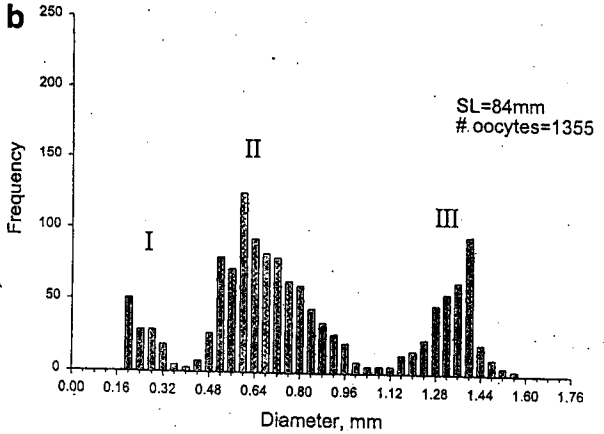
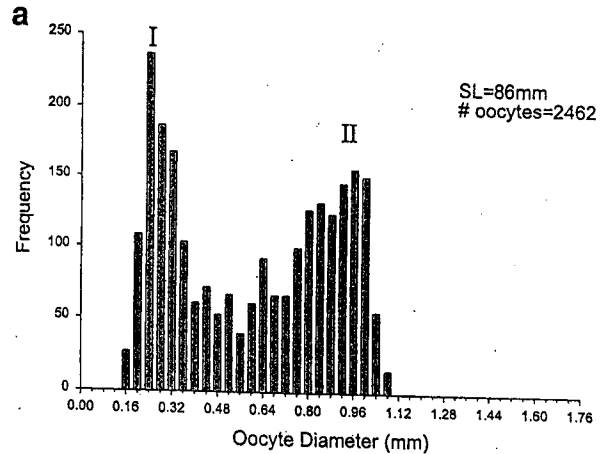


Fig. 3. Oocyte diameter distributions for typical ES (a) and LS (b) longnose dace. We used dace of similar length to control for size effects.

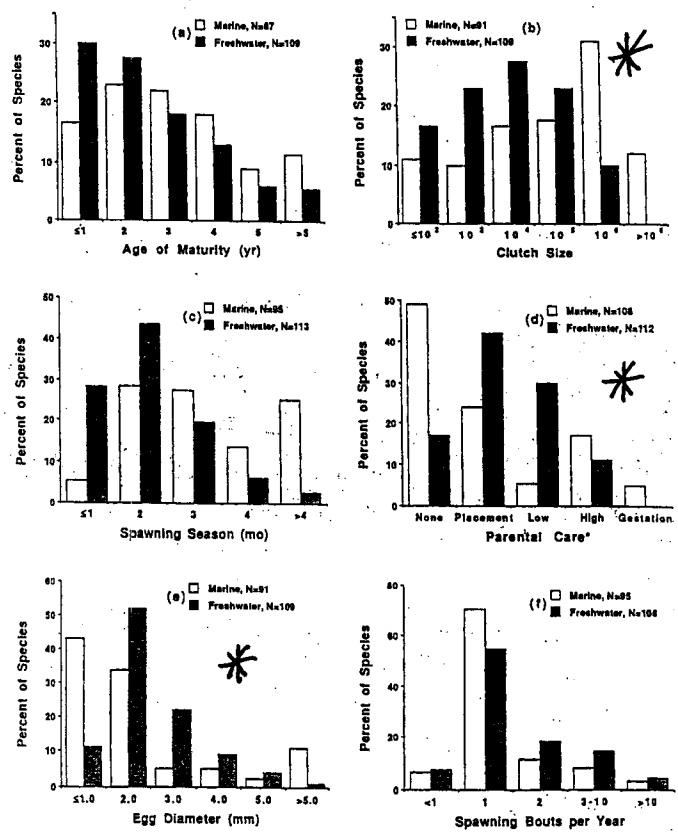


FIG. 1. Frequency distributions of (a) average age at maturation, (b) average clutch size, (c) average duration of the spawning season, (d) parental care (defined under Materials and Methods), (e) average diameter of mature eggs, and (f) average number of spawning bouts per year for fish species classified as either predominantly freshwater or marine.

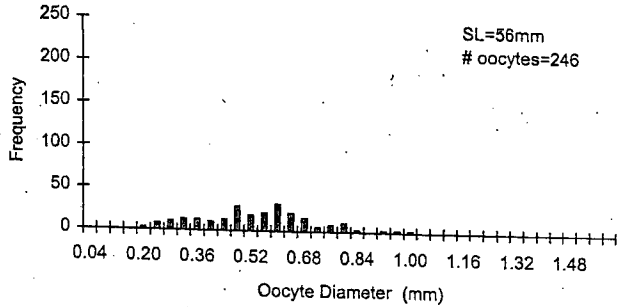
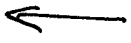


Fig. 4. Oocyte-diameter distributions representative of longnose dace that have almost completed spawning (i.e., one or two small clutches remaining).

3

From 216 representative North American fish species

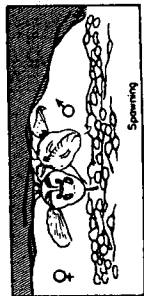


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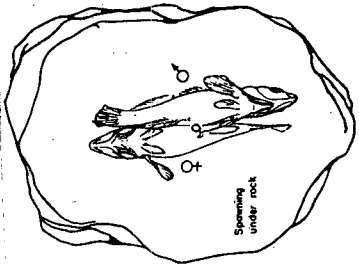
TABLE 9-1 A CLASSIFICATION OF REPRODUCTION (1975, 1984) Guilds following Balon

- I. Nonguarders of eggs and young
 - A. Open substrate spawners
 - 1. Pelagic spawners
 - 2. Benthic spawners
 - a. Spawners on coarse bottoms (rocks, gravel, (1) Pelagic free embryo and larvae (2) Benthic free embryo and larvae
 - b. Spawners on plants
 - (1) Nonobligatory
 - (2) Obligatory
 - c. Spawners on sandy bottoms, etc.
 - 3. Terrestrial spawners
 - B. Brood hiders
 - 1. Benthic spawners
 - 2. Crevice spawners
 - 3. Spawners on invertebrates
 - 4. Beach spawners
 - 5. Annual fishes
- II. Guardians
 - A. Substratum choosers
 - 1. Rock tenders
 - 2. Plant tenders
 - 3. Terrestrial tenders
 - 4. Pelagic tenders
 - B. Nest spawners
 - 1. Rock and gravel nesters
 - 2. Sand nesters
 - 3. Plant material nesters
 - a. Gluermakers
 - b. Nongluermakers
 - 4. Froth nesters
 - 5. Hole nesters
 - 6. Miscellaneous materials nesters
 - 7. Anemone nesters
- III. Bearers
 - A. External bearers
 - 1. Transfer brooders
 - 2. Auxiliary brooders
 - 3. Mouth brooders
 - 4. Gill-chamber brooders
 - 5. Pouch brooders
 - B. Internal bearers
 - 1. Facultative internal bearers
 - 2. Obligate internal bearers
 - 3. Embryonic cannibal bearers
 - 4. Livebearers

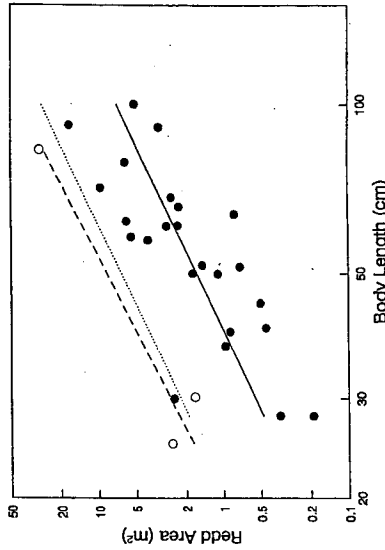
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egg clustering in fantail darters



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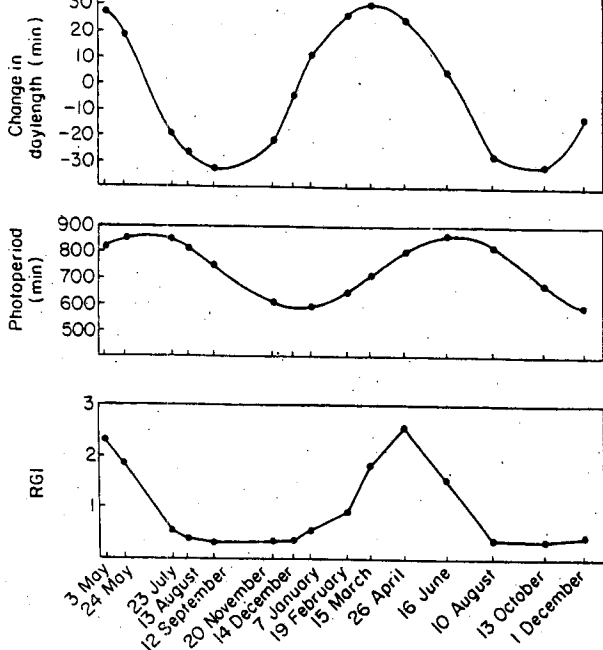
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Mouth-brooding cichlid

tilefish in South Atlantic Bight, USA

4



Smallmouth bass in North Anna River, VA

5

