# How do males choose a mate in the Mangrove Rivulus?

Merrit Newton, Jeffrey Guerra, Cassie Nicotera, & Katie E. McGhee
Department of Biology, The University of the South, Sewanee, TN

Females often use male coloration, courtship displays, body size and armaments in their mate choice decisions in order to choose the highest quality mate. Although less studied, males also show mate choice and often prefer larger and more fecund females. In this study, we examined male mate choice in the mangrove rivulus fish. We hypothesized that males would prefer younger hermaphrodites over older ones because they produce more unfertilized eggs when they are younger, increasing the chances of outcrossing with a male.

We used a standard dichotomous choice test where a young and an old hermaphrodite were paired within a genetic lineage. The hermaphrodites were randomly put at either end of the tank in containers that allowed both visual and chemical cues. Males could choose to freely associate with either partner, and we recorded how much time the male spent with either hermaphrodite over a 10 minute trial. Our study will help us understand the role that male mate choice plays in this unique mating system.

1. Acclimation
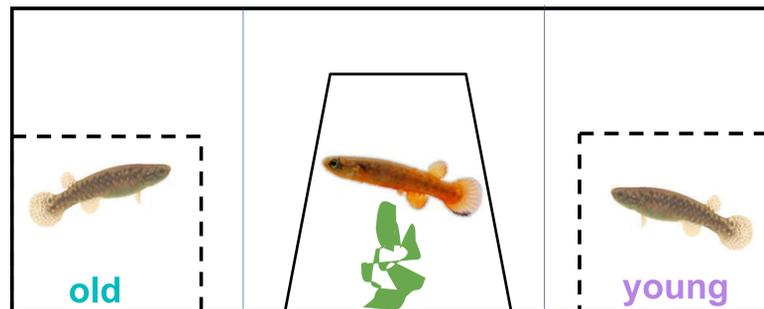
An old and young hermaphrodite from the same genetic lineage were put into containers that allowed both chemical and visual cues. The male acclimated in a clear cup for 60 sec, allowing him to look at both hermaphrodites.

2. Association
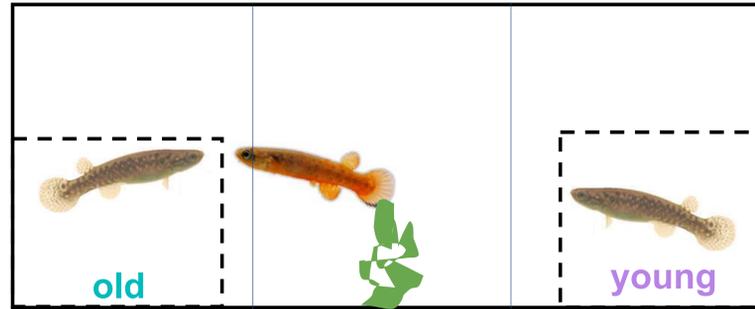
For 10 minutes, we recorded the amount of time that the male spent associating with each hermaphrodite. We tested 20 males (each twice) with 40 different hermaphrodite pairs from 4 genetic lineages (80 different hermaphrodites total for 40 choice trials).
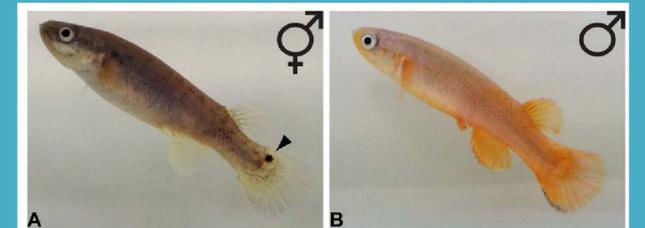
### Mangrove Rivulus
Kryptolebias marmoratus

- Most are self-fertilizing hermaphrodites, but males are also produced and are capable of outcrossing with hermaphrodites.
- Male Rivulus fish are vibrant orange (B) while hermaphrodites are brown with a tail spot (A).
- Found mainly in subtropical and tropical climates and tolerates a wide range of environmental conditions.

Conclusions

- Males spent most of their trial time associating with their hermaphrodite partners
- Males did not consistently prefer young over old partners
- Instead, male preference for young and old partners depended on the the genetic lineage of the hermaphrodites

- *Future Questions:*
  - How do old and young partners differ across lineages?
  - Are there other traits that affect male preferences besides age?

Males spent most of their time with the hermaphrodites and this did not differ among genetic lineages.
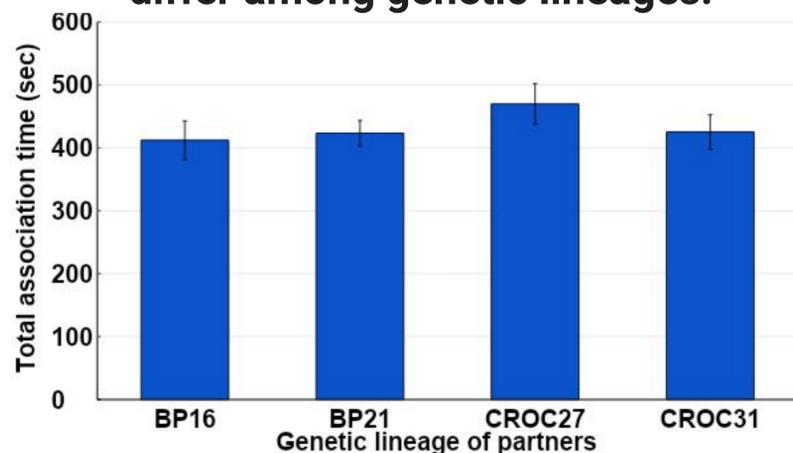
Shown are the average ± SE total amount of time spent associating with either partner over 600 sec trials. Each lineage had 10 pairs of hermaphrodites, N = 40 choice trials.
Lineage: $F_{3,40}$=0.27, P=0.842
Random effects of Male: LRT=0, P=1

The preference males showed for old vs young partners depended on the genetic lineage of the partners.
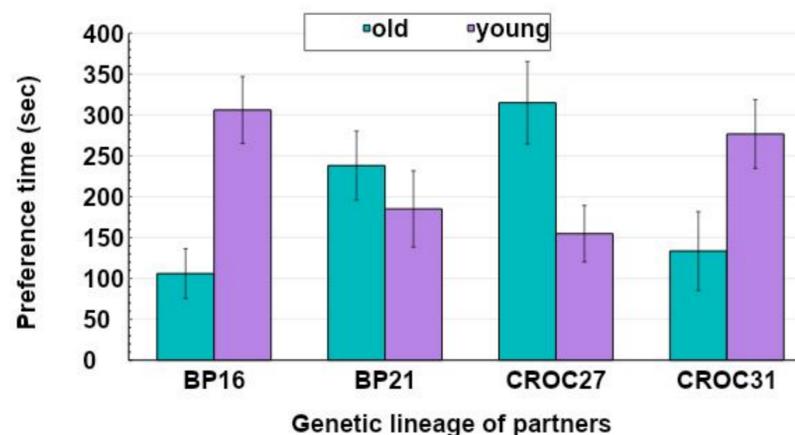
Shown are the average ± SE time spent associating with either an old partner or a young partner over 600 sec trials. Each lineage had 10 pairs of hermaphrodites, N = 40 choice trials.
Age of partner: $F_{1,80}$=2.18, P=0.144; Lineage: $F_{3,80}$=0.05, P=0.984;
Age of partner x Lineage: $F_{3,80}$=9.91, P<0.0001
Random effects of trial: LRT=0, P=1; Male: LRT=0, P=1