



Ovarian structure and mode of egg production as a phylogenetic constraint on mating patterns in Syngnathids

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Syngnathids are unique among teleost fish not only in their remarkable adaptations for paternal care, but also in their ovarian structures which consisted of a rolled sheet with stem cell compartments, called the germinal ridge, running along the entire length of the sheet. Distinct differences are seen in the ovarian structure and mode of egg production among promiscuous, monogamous and polyandrous species. Promiscuous *Syngnathus* pipefishes have a single germinal ridge and produce mature eggs asynchronously and continuously. On the other hand, monogamous (e.g., genus *Corythoichthys*) and polyandrous (e.g., genus *Nerophis*) species have two germinal ridges and produce mature eggs synchronously with a single or multiple ovulations, respectively. If ovarian structure is a prime determinant of the mode of egg production and mating pattern, we can expect clear phylogenetic patterns among them. I reconstructed the evolution of ovarian structures and mode of egg production to study evolutionary patterns of mating in syngnathids, and found that the ancestral syngnathids which have two germinal ridges and produce mature eggs synchronously with a single ovulation reproduce monogamously. Evolution of multiple from a single ovulation occurred in several branches independently, leading to polyandrous mating pattern. Furthermore, evolution of a single germinal ridge and asynchronous egg production was inferred to occur in common ancestor of *Syngnathus* pipefishes. I will also introduce a simulation-based study which shows that the direction and strength of sexual selection is partly explained by the interaction between the mode of egg production in female and egg brooding in male.