

# Sexual and unisexual Australian carp gudgeons (Hypseleotris, Gobioidi: Eleotridae): insight from cytogenetics

Zuzana Majtanova<sup>1\*</sup>, Tariq Ezaz<sup>2</sup>, Petr Rab<sup>1</sup> and Peter J. Unmack<sup>2</sup>

<sup>1</sup> Institute of Animal Physiology and Genetics (ASCR), Czechia

<sup>2</sup> Institute of Applied Ecology (IAE), University of Canberra, Australia

The genus *Hypseleotris*, the most abundant and the most enigmatic group of native fish in Australia, represents a model system where interspecific hybridization among sympatric produces unisexual lineages behaving reproductively as so-called ‘sexual parasites’. The perpetuation of such lineages requires mating with a sexual congener, despite not passing any of its genes onto progeny. Based on the previous research, there are several puzzling evolutionary outcomes providing a significant challenge to the standard paradigm underpinning sexual parasitism. Here, we present cytogenetic analysis in five sexual species and two hybrid biotypes of *Hypseleotris* using standard and molecular cytogenetic protocols. We describe significant differences among and inside lineages (diploid chromosome number, chromosome morphologies and variability on the sub-chromosomal level). Moreover we observed unexceptional interindividual variability in males from different lineages. Differences were observed in chromosomal numbers and morphology between metaphases obtained from testes and somatic tissues suggesting unusual system of meiotic division. Our cytogenetic description of this unique unisexual fish species complex helps to disentangle of processes leading to origin and maintenance of uni/sexual lineages and contributes to general understanding of sex evolution.

---

---

## Acknowledgements

Project No. MSM200451701 from the CAS, EXCELLENCE CZ.02.1.01/0.0/0.0/15\_003/0000460 OP RDE, RVO: 67985904, Australian Research Council DP 150100608

---

**Keywords:** unisexuality, Sexual parasitism, Meiosis, genome elimination, Cytogenetic (CG) analyses

**Conference:** XVI European Congress of Ichthyology, Lausanne, Switzerland, 2 Sep - 6 Sep, 2019. **Presentation Type:** Oral

**Topic:** EVOLUTION AND ECOLOGY OF FISH WITH ASEXUAL REPRODUCTION, HYBRID COMPLEXES AND POLYPLOIDY, WITH SPECIAL FOCUS ON LOACHES (COBITOIDEI)

**Citation:** Majtanova Z, Ezaz T, Rab P and Unmack PJ (2019). Sexual and unisexual Australian carp gudgeons (Hypseleotris, Gobioidi: Eleotridae): insight from cytogenetics. *Front. Mar. Sci. Conference Abstract: XVI European Congress of Ichthyology*. doi: 10.3389/conf.fmars.2019.07.00034

**Copyright:** The abstracts in this collection have not been subject to any Frontiers peer review or checks, and are not endorsed by Frontiers. They are made available through the Frontiers publishing platform as a service to conference organizers and presenters.

The copyright in the individual abstracts is owned by the author of each abstract or his/her employer unless otherwise stated.

Each abstract, as well as the collection of abstracts, are published under a Creative Commons CC-BY 4.0 (attribution) licence (<https://creativecommons.org/licenses/by/4.0/>) and may thus be reproduced, translated, adapted and be the subject of derivative works provided the authors and Frontiers are attributed.

For Frontiers' terms and conditions please see <https://www.frontiersin.org/legal/terms-and-conditions>. **Received:** 20 Jul 2019; **Published Online:** 14 Aug 2019.

\* **Correspondence:** Mx. Zuzana Majtanova, Institute of Animal Physiology and Genetics (ASCR), Prague, Czechia, majtanova@iapg.cas.cz