An Improved and Simplified Terminology for Reproductive Classification in Fishes

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Accurate determination of the reproductive state of fishes is crucial for understanding reproductive potential and spawning seasonality. Histological inspection of gonadal tissue is the definitive method for accurately identifying both the reproductive class and if the fish has recently spawned. Unfortunately, there is a plethora of terminology in use to describe various reproductive classes in fishes, such that comparison among studies and communication among researchers and managers is often difficult and confusing. We propose the adoption of a simplified, universal reproductive classification system based on phases in the reproductive cycle that can be used with all male and female elasmobranch and teleost fishes: Immature, Developing, Spawning Capable, Actively Spawning, Regressing and Regenerating. The Developing phase signals the entry into the gonadotropin-dependent stage of oogenesis and spermatogenesis. Spawning Capable females are those with fully developed ovaries (late vitellogenic oocytes), but no histological evidence of recent spawning. Spawning Capable and Actively Spawning males have spermatozoa in the lumen of the lobules and/or sperm ducts and are not distinguished histologically. Actively Spawning females are those that show histological evidence of spawning within a 24 h period (i.e., females undergoing final oocyte maturation, hydrated and ovulated oocytes, or POF $\leq$ 24 h). Batch spawning females cycle between the Spawning Capable and Actively Spawning phases during the reproductive season. Regressing fish are found at the end of the reproductive season and are not spawning capable (females with predominance of vitellogenic oocytes undergoing alpha or beta stage atresia, males with testes undergoing minimal spermatogenesis and shrinking in size). Fish in the Regenerating phase have only primary growth oocytes or spermatogonia and are sexually mature but reproductively inactive. Researchers can incorporate their own classes within each of the new terms, allowing more specific divisions based on histological observations yet preserving the overall classification terminology for comparative purposes.

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