

## Blondes do it better? A comparative study on the reproductive biology of blonde ray (*Raja brachyura*) and thornback ray (*Raja clavata*) in the Northeast Atlantic

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The Rajidae family of the hardnose skates are slow-growing K-strategists that reach sexual maturity at a late age (Ellis *et al.*, 2010). They are primarily caught as bycatch in otter- and beam-trawl fisheries and are also targeted, with lower effort, with gill- and trammel nets. In the context of various existing EU policies striving for sustainable fisheries, the identification of potential nursery and spawning grounds is a crucial component to improve management of commercially interesting species of rays and skates (EC, 2008). In 2019, blonde ray (*Raja brachyura*) comprised the largest proportion of skate landings in Belgian ports, followed by thornback ray (*Raja clavata*). Stocks of these two species are labelled as “data-limited” i.e., lacking population estimates from which catch options can be derived using the existing MSY framework. To improve stock assessments and advice for skates in the future, detailed life-history data are urgently required. In this comparative study, we investigated the reproductive biology of *R. brachyura* and *R. clavata* and explored potential nursery areas.

Within the framework of the EMFF project “Raywatch”, whole individuals were collected during trips on board of commercial beam trawlers and during scientific surveys in the Northeast Atlantic region. Morphometric measurements of total length, disc width, disc length and caudal length were taken. Sexual maturity of the skates was assessed based on the morphology of the reproductive tract. The following stages were discriminated: immature, developing, spawning capable, actively spawning, regressing stages for both sexes and additionally the regenerating stage for females (ICES Maturity Scale for Oviparous Elasmobranchs, 2020). For females, ovaries, oviducal glands, uteri and oviducts were measured in detail and weighed to the nearest decigram in mature individuals (Serra-Pereira *et al.*, 2011). Developing and yolky oocytes were counted and measured to the nearest millimetre, when possible (Capapé *et al.*, 2007; Serra-Pereira *et al.*, 2011). For males, clasper length was measured in all individuals following Collenot (1969). Measurements from epididymis and vas deferens were taken in mature individuals (Serra-Pereira *et al.*, 2011). Age was estimated by visual inspection of growth bands on the vertebrae (Coelho & Erzini, 2002). Following maturity and age assessment, size and age at sexual maturity were determined (Capapé *et al.*, 2007). With the resulting data, comparisons of reproductive biology between males and females of *R. brachyura* and *R. clavata* were made. Additionally, by assessing these reproductive traits for a large number of individuals and by comparing with previously published data for different geographical areas, we investigated any spatial or temporal changes in reproductive behaviour. Using the coordinates linked to each individual, areas of particular importance to the reproductive biology (e.g., nursery grounds) were mapped. The outcomes of this study are valuable for the development of robust stock assessment models for skates and delivering accurate catch advice.

### References

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