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# Editorial: The biology and conservation of elasmobranchs and chimaeras

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## Editorial on the Research Topic

### [The biology and conservation of elasmobranchs and chimaeras](#)

Encompassing a staggering array of species, elasmobranchs (sharks and rays) and chimaeras are ecologically vital creatures that have long played an important role in maintaining healthy marine ecosystems. Hailed by some as God-like creatures (Baughman, 1948), they have been feared by others due to their negative portrayal throughout history. Unfortunately, as is the case with many aquatic species, in recent years climate change, anthropogenic pressures, and habitat degradation have significantly threatened their populations. On top of this, their life traits and opportunistic feeding behaviors make them vulnerable to commercial fishing (Bengil and Basusta, 2018). As a result, today many species are endangered, some are data-deficient or nearly extinct and urgently need knowledge for their conservation (Dulvy et al., 2014, 2021). Sadly, the IUCN has already declared the first elasmobranch, *Urolophus javanicus* (Martens, 1864), the Java Stingaree, as extinct due to human activities (Constance et al., 2023). Therefore, producing information on elasmobranchs through scientific sampling or contemporary approaches, is crucial. Any contribution to their biology, ecology, distribution, migration and many other aspects is essential knowledge that will provide a basis for action, globally, regionally or locally.

## But at what cost?

Conventionally, the methodologies commonly used to produce scientific information are mostly lethal but effective (Heupel and Simpfendorfer, 2010) and “convenient”. However, does this justify lethal sampling? Traditionally, the primary objective of the majority of studies is not conservation but simply to produce scientific information. Such efforts target a few charismatic species, resulting in the “neglect” of Data-Deficient species while overstressing the focused populations (Ducatez, 2019). A recent study by Ducatez (2019) analyzed research efforts on 509 shark species, showing biases toward subjects, taxa, and species, and shedding some light on species and areas in urgent need of information. In addition to correctly addressing information gaps and planning “efficient” sampling -with minimal sample size but high information yield-, studies like this can minimize the pressure of lethal scientific sampling. Utilizing bycaught individuals can provide “samples” for further biological examinations if retained (Wosnick et al.), and if alive when released could provide ecological information.

Such opportunistic sampling has proven effective in some aspects of species physiology and bioecology, but has its pros and cons (Braccini et al., 2006; Bengil, 2020; Rosa et al.).

## Is there any other way?

The diversity of elasmobranchs is increasing relatively quickly with new discoveries (Randhawa et al., 2015). Smartphones and the “to post” have provided a new digital database for scientists (Eryasar and Saygu, 2022) and aided these discoveries. People, whether members of the public, recreational divers, or fishermen, are eager to share on social media what they have observed, seen, or caught (Kabasakal and Bilecenoglu, 2020; Boldrocchi and Storai, 2021; Eryasar and Saygu, 2022; Saltzman et al., 2022; O’Keefe et al.). These “posts” reveal public perception, species distribution, morphology (in some cases), evidence of predation, or basically presence (Barnes et al., 2016; Roemer et al., 2016; Kabasakal and Bilecenoglu, 2020; Bengil et al., 2021; Boldrocchi and Storai, 2021; Saltzman et al., 2022). Additionally, utilizing local ecological knowledge (LEK) from fishers or on-board observations can provide information on reproduction, aggregation areas, general ideas about population trends, etc (Bengil, 2020; O’Keefe et al.). Citizen science, leveraging LEK and social media, is now pinpointing critical habitats for endangered species, like the recent discovery of new areas for guitarfish in the eastern Mediterranean (Bengil et al., 2018; Giovos et al., 2018; Bengil et al., 2020). Studies utilizing local news alongside social media and LEK have effectively tracked species biodiversity, status, habitat use, and public perception (Roemer et al., 2016; Kabasakal and Bilecenoglu, 2020; Boldrocchi and Storai, 2021; Papageorgiou et al., 2022; Saltzman et al., 2022, Rosa et al., O’Keefe et al.). Saltzman et al. (2022) have emphasized how social media posts have helped raise awareness of endangered elasmobranch species that have had conservation efforts implemented, which would otherwise have been unknown or less known. Data mining is also a good method to understand population status, trends, and shifts in addition to compiling, analyzing, and simplifying classic sources (Tsikliras and Stergiou, 2014; Colloca et al., 2017; Carpenter et al.).

One of the recently practiced non-invasive manual methods, which can also easily be performed by fishermen, is returning egg cases that have live embryos (Hof et al., 2018). This can provide information on the egg-laying grounds of some egg-laying species. Additionally, researchers have altered technologies or developed methodologies to determine maturity to provide information on reproductive status such as pregnancy without harming the individual (Carrier et al., 2003;

Awruch et al., 2008; McMillan et al., 2019; Campbell et al.; Hoyos-Padilla et al.) or from carefully stored samples (Anderson et al.). Acoustic monitoring (Simpfendorfer and Heupel, 2004), photo identification (Meekan et al., 2006), mark-recapture (Simpfendorfer et al., 2008), baited remote underwater video surveys (Brooks et al., 2011), mucus swabs for genetic sampling (Lieber et al., 2013), and diet composition identification with DNA metabarcoding from cloacal swabs (van Zinnicq Bergmann et al., 2021) are some other non-lethal methodologies.

On the other hand, the importance of scientific surveys cannot be disregarded because of their analytic value; however, we should keep our minds open to such contemporary approaches and possible new technological integrations. Nonetheless now more than ever these types of contemporary approaches for biological or ecological information are important as scientific surveys, are a destructive methodology in terms of fishing operations, in addition to being logistically difficult to obtain and expensive (Bengil and Basusta, 2018; Bengil, 2020). Furthermore, given their continued commercial value, there is an opportunity to test and refine new contemporary approaches in locations where they are fished sustainably. Local or regional knowledge gaps can be reduced by supplementing gathered knowledge with different data sources, allowing conservation measures or management plans to be implemented more quickly.

## Author contributions

EB: Conceptualization, Methodology, Visualization, Writing – original draft, Writing – review & editing. NB: Conceptualization, Writing – original draft, Writing – review & editing.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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