

19 - 21 juin 2018

Rennes

**Sfeca**
50 ans



48^{ème} colloque de la Société Française pour l'Etude du Comportement Animal

Organisé par :



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Sound playbacks reveal behavioural plasticity of long-finned pilot whales when detecting presence of fish versus mammal-eating killer whales

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Killer whales (KW) may be potential competitors and/or predators of other cetacean species. When encountering killer whales, the other cetaceans can exhibit various types of behavioural responses ranging from avoidance to approaches, defence behaviours, feeding associations or neutral interacting events. Since KW sounds vary among populations, we hypothesized that other cetacean species can acoustically discriminate among KW populations and adjust their behaviour accordingly to the perceived risk. We tested this hypothesis on free-ranging long-finned pilot whales (*Gobicephala melas*, PW) in the Norwegian sea where they compete with fish-eating KW for the same exploited food resource territories. To do so, we conducted sound playback experiments and exposed PW to i) familiar fish-eating KW sounds (fKW, n=7) simulating a known competitor, ii) unfamiliar mammal-eating KW sounds (mKW, n=6) representing a potential predation risk, and iii) two control sounds, a broadband noise (CTRL-, n=7) and a repeated upsweep 1-2kHz signal (CTRL+, n=5). We quantified the PW behavioural responses by using acoustic-and-motion tags (Dtag) and visual observations of the surface tagged whale behaviour and its group. We showed that PW barely changed their behaviour in response to CTRL- whereas they horizontally turned toward the sound source and exhibited spyhops in response to both KW sounds and CTRL+, probably to investigate the source. Moreover, parts of the behavioural responses were specific to both KW sounds and CTRL+, showing PW's ability to discriminate across these stimuli. PW aggregated with other subgroups and increased their surface synchrony and calling rate only in response to fKW, whereas they tightened individual spacing within their group and stopped feeding in response to mKW. We conclude that when detecting the sounds of KW, PW are able to discriminate between competition-risk and potential predation-risk contexts, enabling them to adjust their behavioural response strategy according to the perceived threat.

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