

Activity budgets of sympatric seaducks wintering in the Southern Baltic

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WHAT

During two consecutive winter seasons we deployed radio-transmitters on three diving duck species wintering in our study area: Common eider (*Somateria mollissima*), Long-tailed duck (*Clangula hyemalis*) and Tufted duck (*Aythya fuligula*). Foraging behaviour of tagged birds was recorded by automatic logging of transmitter signal presence and absence using the fact that regular transmitter signal disappears as soon as transmitter (i.e. duck) is under water and gets back as soon as duck re-emerges to water surface.

1600 hours of behavioural data of 59 individuals were used to identify diving activities in the course of bird wintering season aiming to evaluate bird foraging effort, energetic demands, and residence time in the wintering area.

Activity budgets were calculated for separate months by identifying individual dives, foraging bouts and surface time during 24-hour cycle.

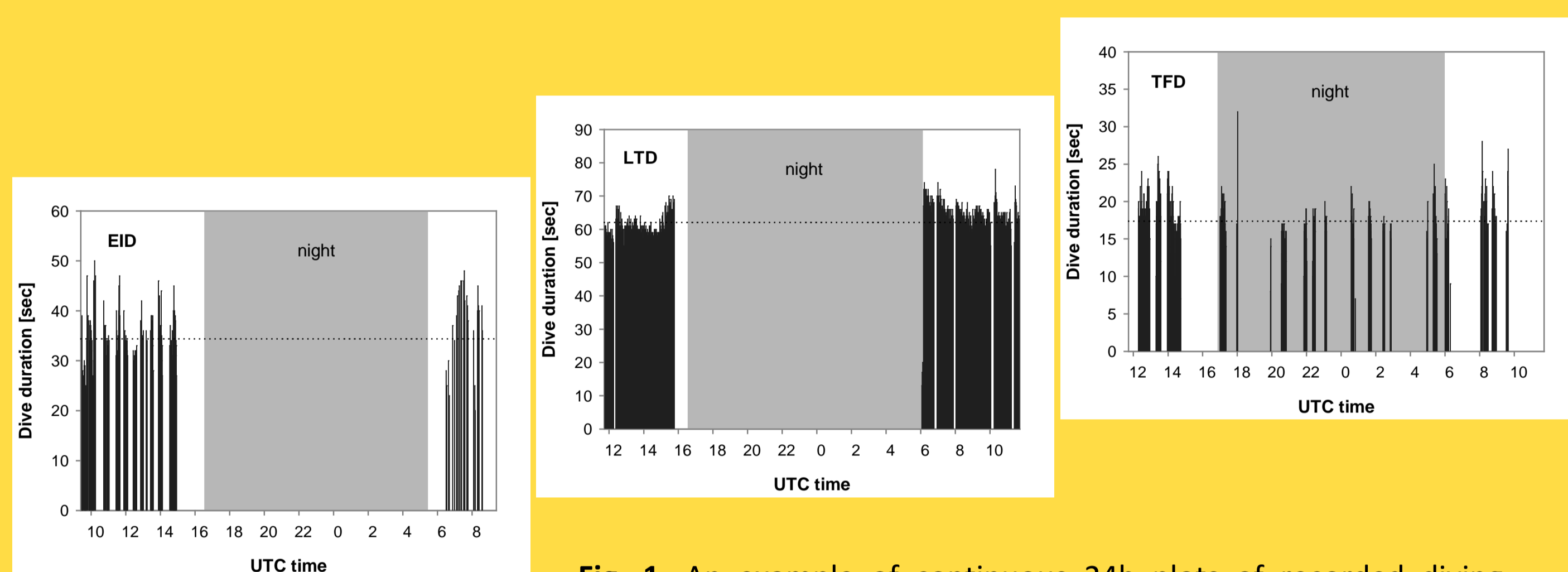


Fig. 1. An example of continuous 24h plots of recorded diving activity of studied duck species: EID Common eider, LTD Long-tailed duck, TFD Tufted duck.

WHERE



Fig. 2. Location of the study area - Fehmarnbelt. Ducks were captured and tagged in coastal waters around Fehmarn Island (centre of the zoomed-in picture) and vis-à-vis south of the Danish coast.

Our study took place in the Fehmarnbelt area which is located in the south-western part of the Baltic Sea between Denmark and Germany. Birds were tagged and tracked in various different habitats in Danish and German waters on both sides of the Belt. Tracking was conducted from shore and ships.

Eiders, Long-tailed ducks and Tufted ducks were captured from a small boat in coastal waters using night lighting technique; Tufted ducks were also caught using mist nets on their daytime roosting sites - freshwater ponds.

WHY

Our study is a part of the Environmental Impact Assessment for the planned fixed link construction between Denmark and Germany, which is funded by Femern A/S. An approximately 20 km long bridge or tunnel is planned to connect the two countries via the Fehmarnbelt.

At larger scale, the Fehmarnbelt is in the southern Baltic, which is an important wintering area for hundreds of thousands sea ducks. At least 200,000 wintering Common eiders are annually counted in the Fehmarnbelt area alone. Therefore, dedicated studies of sea ducks were important aiming to assess potential impacts of habitat change.

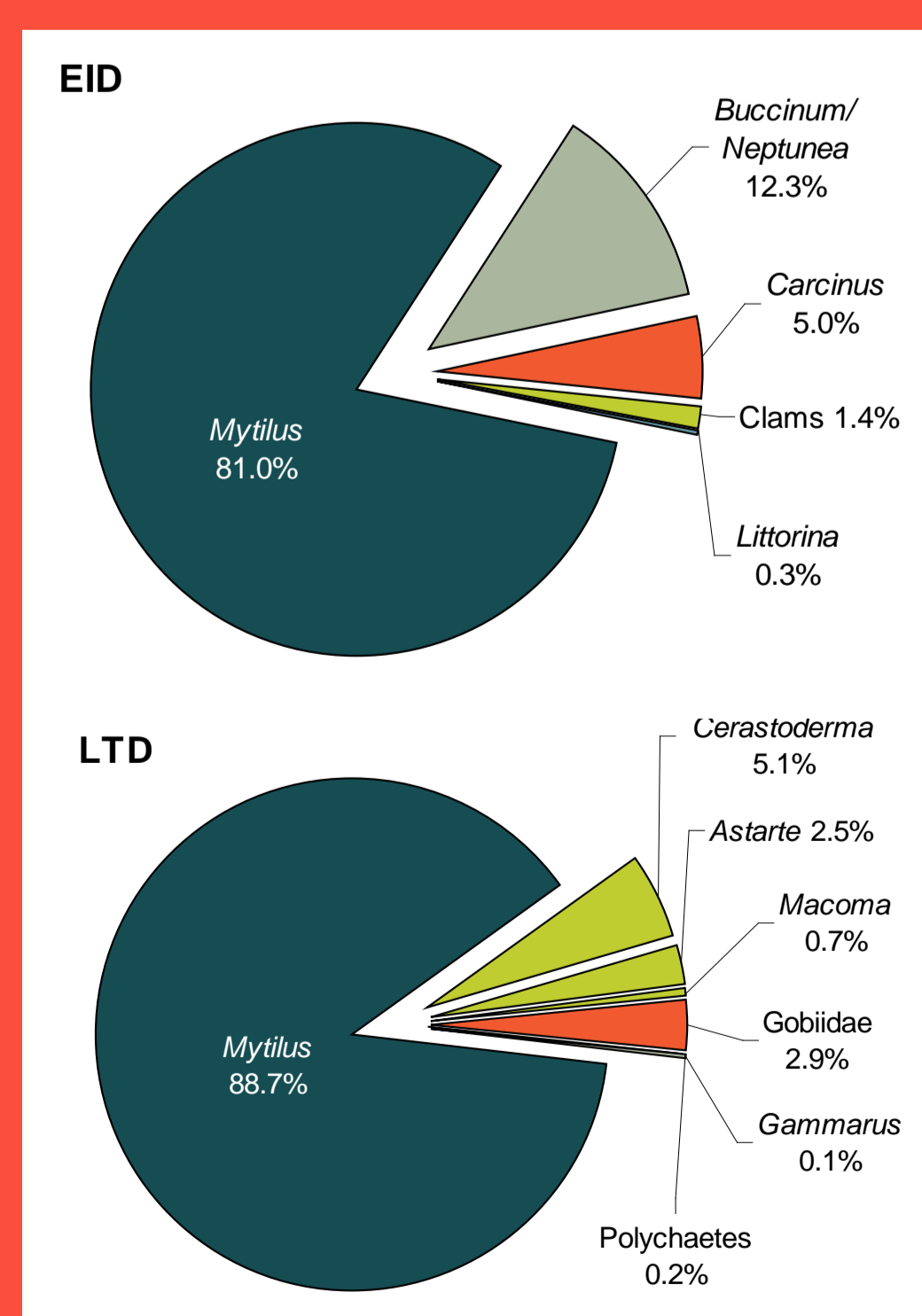


Fig. 3. Common eider (EID) and Long-tailed duck (LTD) diet composition in the Fehmarnbelt area (% of prey fresh weight).

Diet studies within our project showed that Blue mussel *Mytilus edulis* is the key prey species for several duck species occurring in high numbers in the Fehmarnbelt area. Besides Common eiders and Long-tailed ducks, mussels also played an important role in the diet of Common scoters and Tufted ducks.

Knowledge about feeding ecology of sympatric duck species is important as it provides baseline information about habitat quality and carrying capacity of the study area with respect to anticipated impacts of the fixed link construction works.

RESULTS

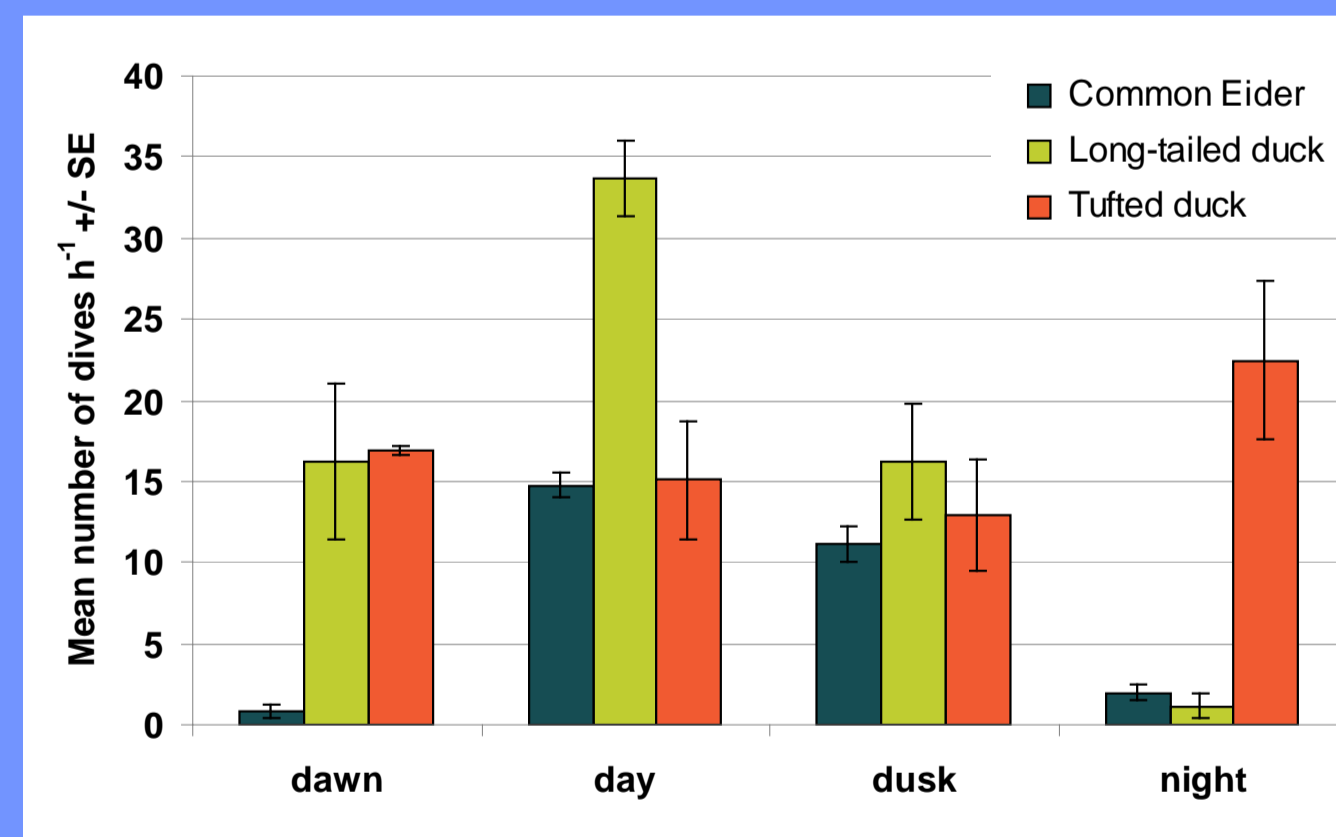
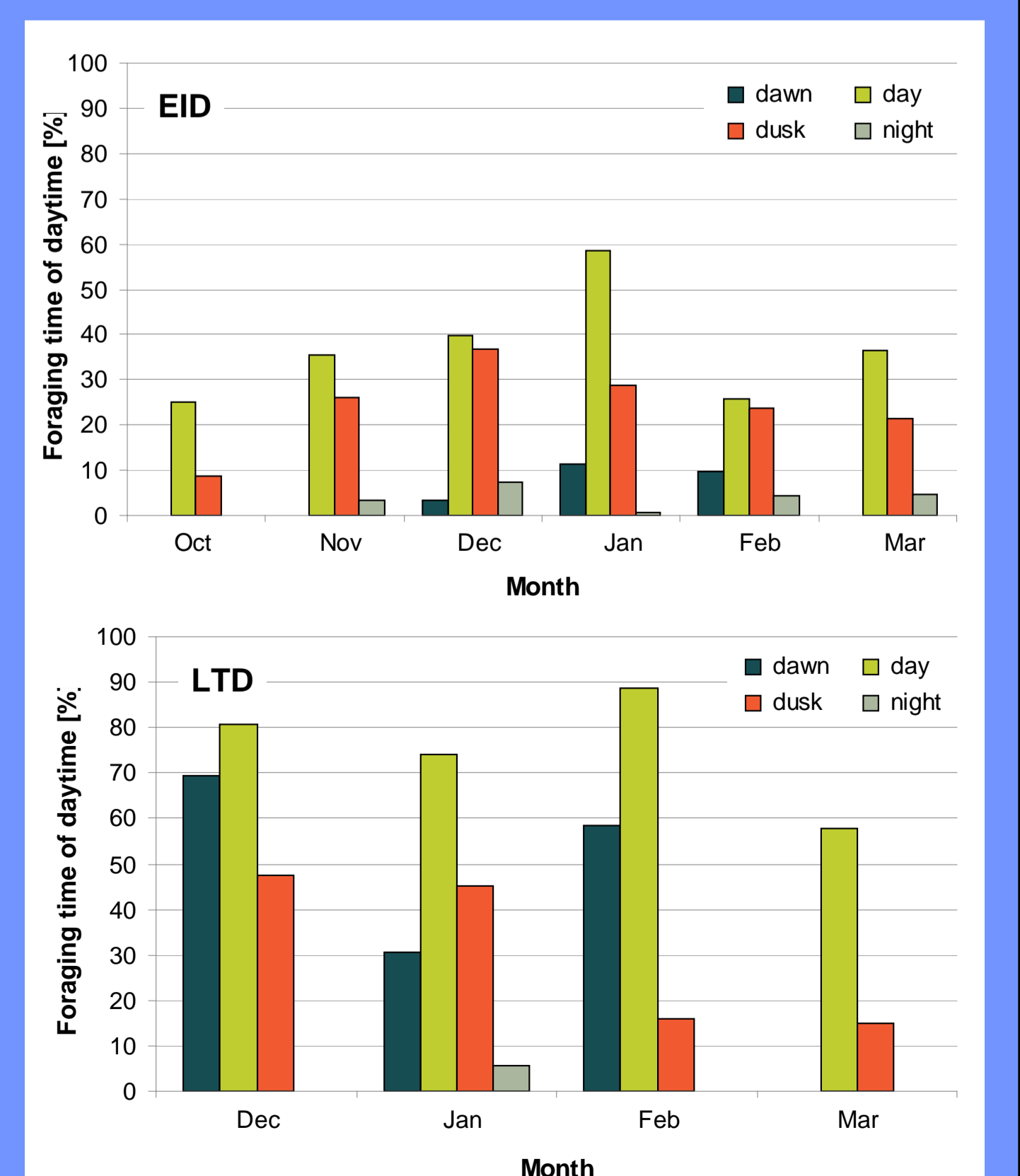


Fig. 4. Allocation of diving activity throughout different phases of a day in Eider, Long-tailed and Tufted duck.

Eiders and Long-tailed ducks were feeding almost exclusively during the daylight hours. Night-time feeding occurred only occasionally. Tufted ducks, which typically are night-time feeders, spread their diving activities almost evenly over day and night. Such foraging pattern was likely caused by severe winter conditions in 2010 when Tufted duck daytime roosting sites were frozen and thermoregulation demands increased.

Foraging effort of Common eiders and Long-tailed ducks differed substantially: eiders spent at most 60% of daylight hours foraging, while Long-tailed ducks started their day with the first light and spent up to 90% of daylight hours diving (Fig. 5). This suggests that Long-tailed ducks wintering in the Fehmarnbelt area possibly operate close to their physiological limits.

Fig. 5. Proportion of different daytime periods that Common eiders (EID) and Long-tailed ducks (LTD) spent feeding each month during the study period.



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