

# The effect of the golden jackal on nest survival of ground-breeding birds in Estonian coastal grasslands



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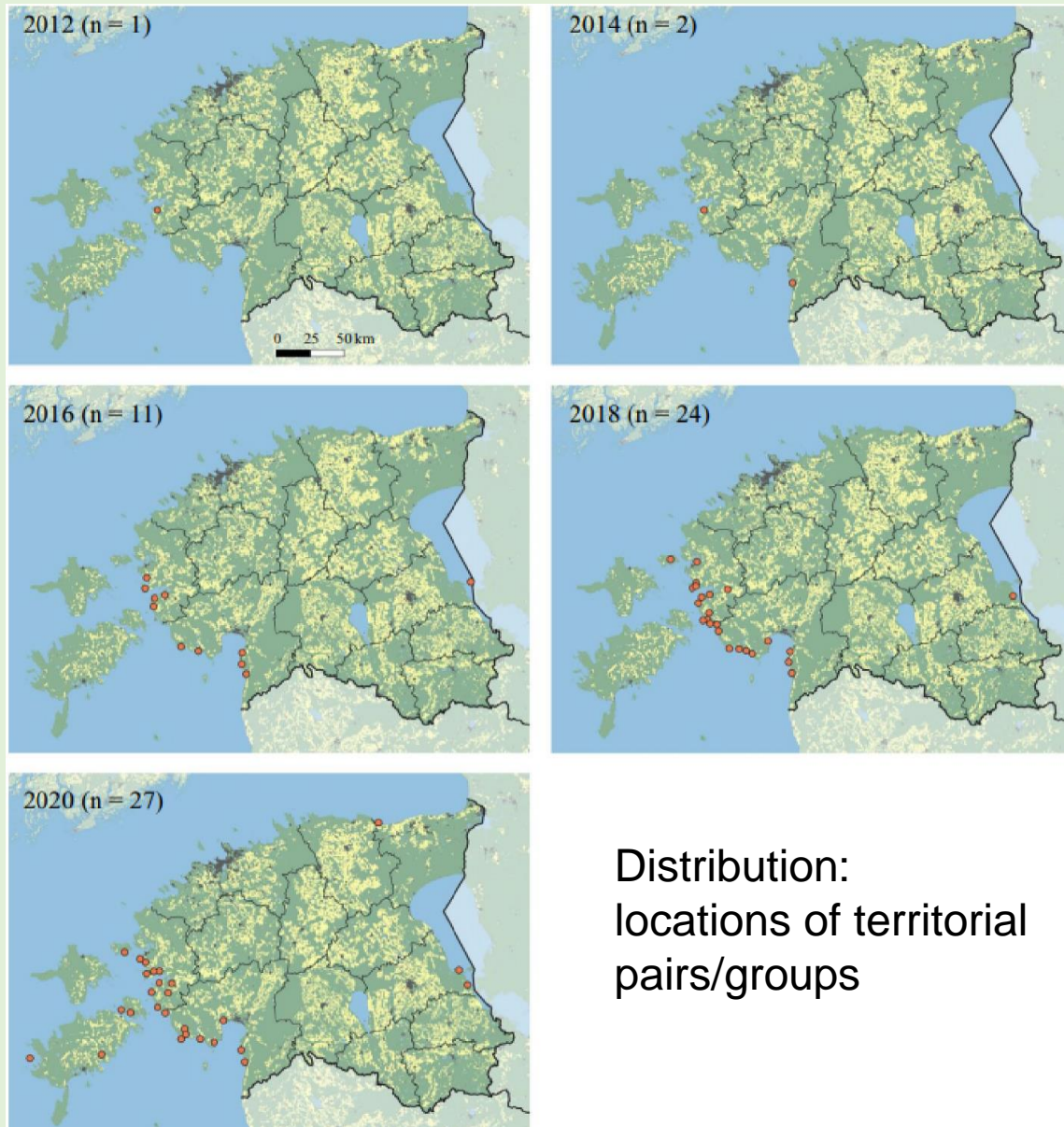
# Background: jackal appearance



Photo: Eugen Kaur, August 2015

First record of jackal/jackal reproduction in Estonia in 2012

# Background: development of local jackal population



Männil, P., Ranc, N. (2022). Golden jackal (*Canis aureus*) in Estonia: development of a thriving population in the boreal ecoregion. *Mammal Research* **67**, 245-250.

# Background: suitable coastal habitats



reed beds



alvars with juniper



pastures



coastal meadows

# Background: waders or shorebirds *Charadriiformes*



Black-tailed godwit (*Limosa limosa*)



Dunlin (*Calidris alpina*)



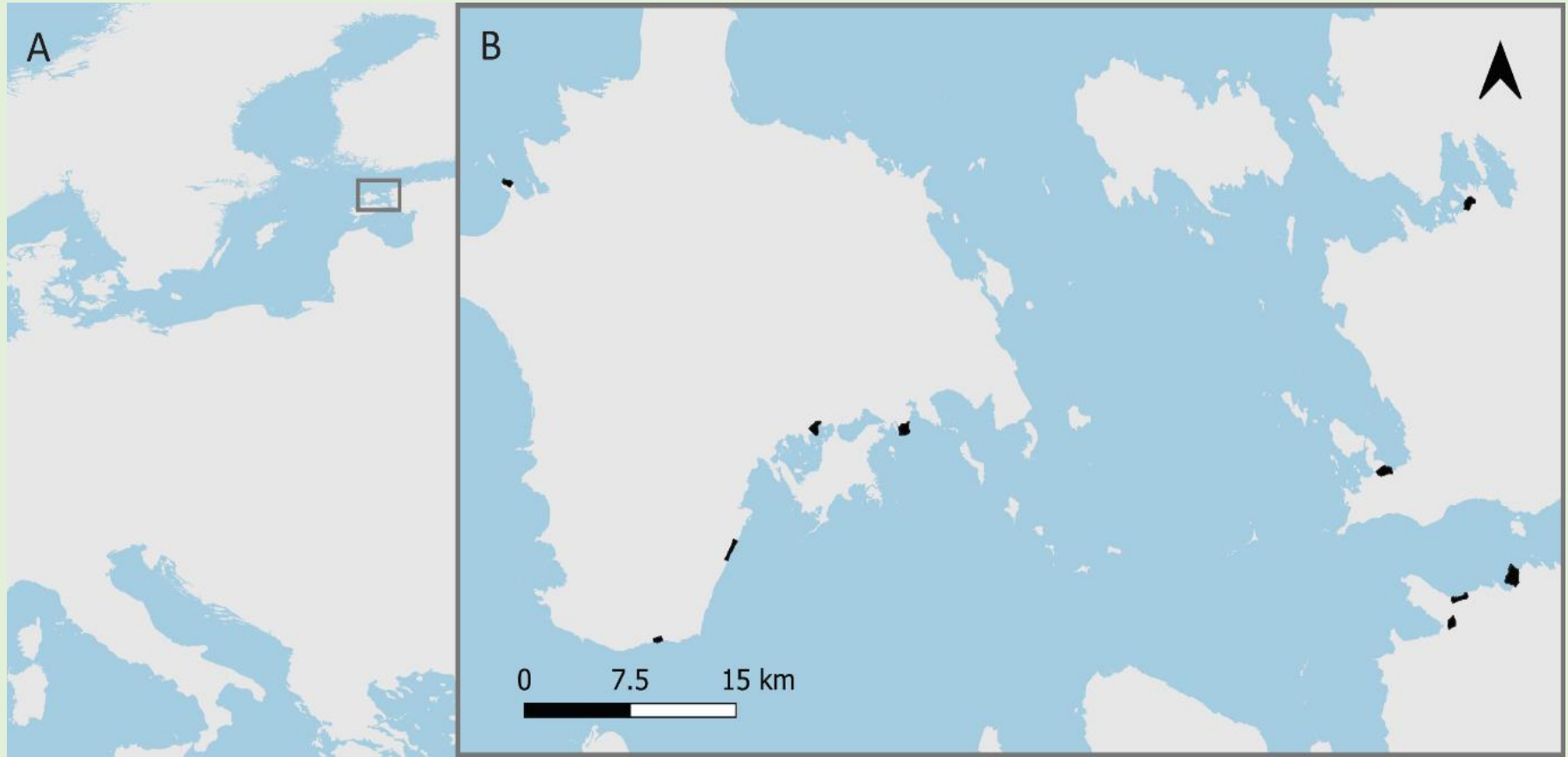
Several wader species in Estonia are threatened!

# Background: *Kaasiku et al 2022*

- In 2018-2020 753 nests of 10 wader species observed
- Low hatching rate (ca 30 %)
- 89 % of hatching failures caused by nest predation

Kaasiku, T., Rannap, R., Männil, P. (2022). Predation-mediated edge effect reduce survival of wader nests at a grassland-forest edge. *Animal Conservation* 25/5, 692-703

# Study area



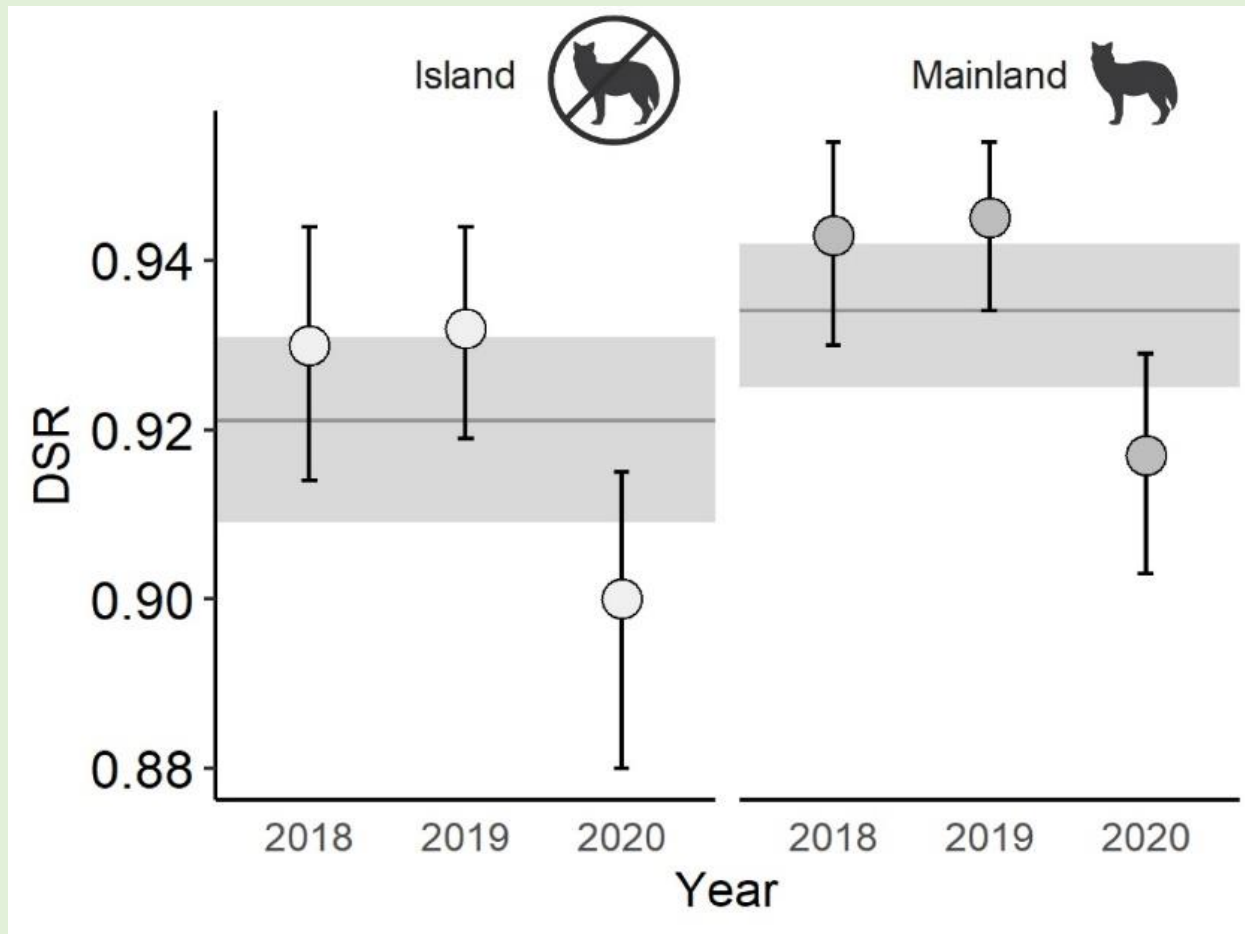
(A) Study location in Europe, (B) ten study sites marked as black polygons; left island Hiiumaa without jackals, right the mainland with jackals

# Methods

- Camera traps placed to observe natural wader nests (n=81)
- 32 and 24 nests in 2019, and 13 and 22 nests in 2020, on island and mainland, respectively.
- Statistical analyse by MARK model (*Region, Forest Cover, Year*)
- Nest daily survival rates (DSR)
- Winter snow track index and hunting bag size of red fox in mainland and island
- Camera trap detection rate of red fox



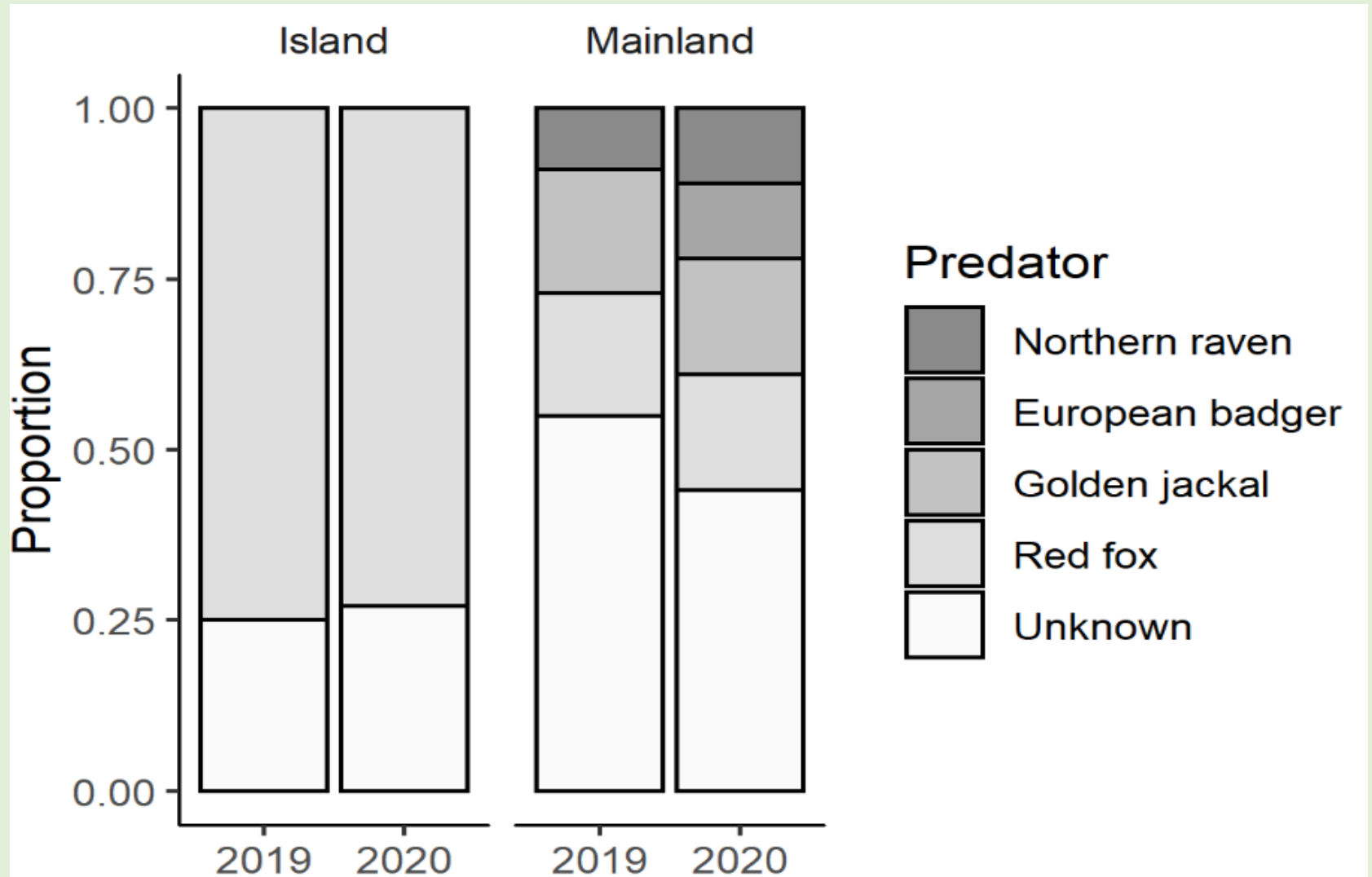
# Results



Daily survival rates DSR by region and year (with 95% confidence intervals)

- If converted to the 27 days of laying and incubation period, 11% of nests on island and 16% on mainland hatch

# Results



Proportion of depredated nests by predator species, region, and year



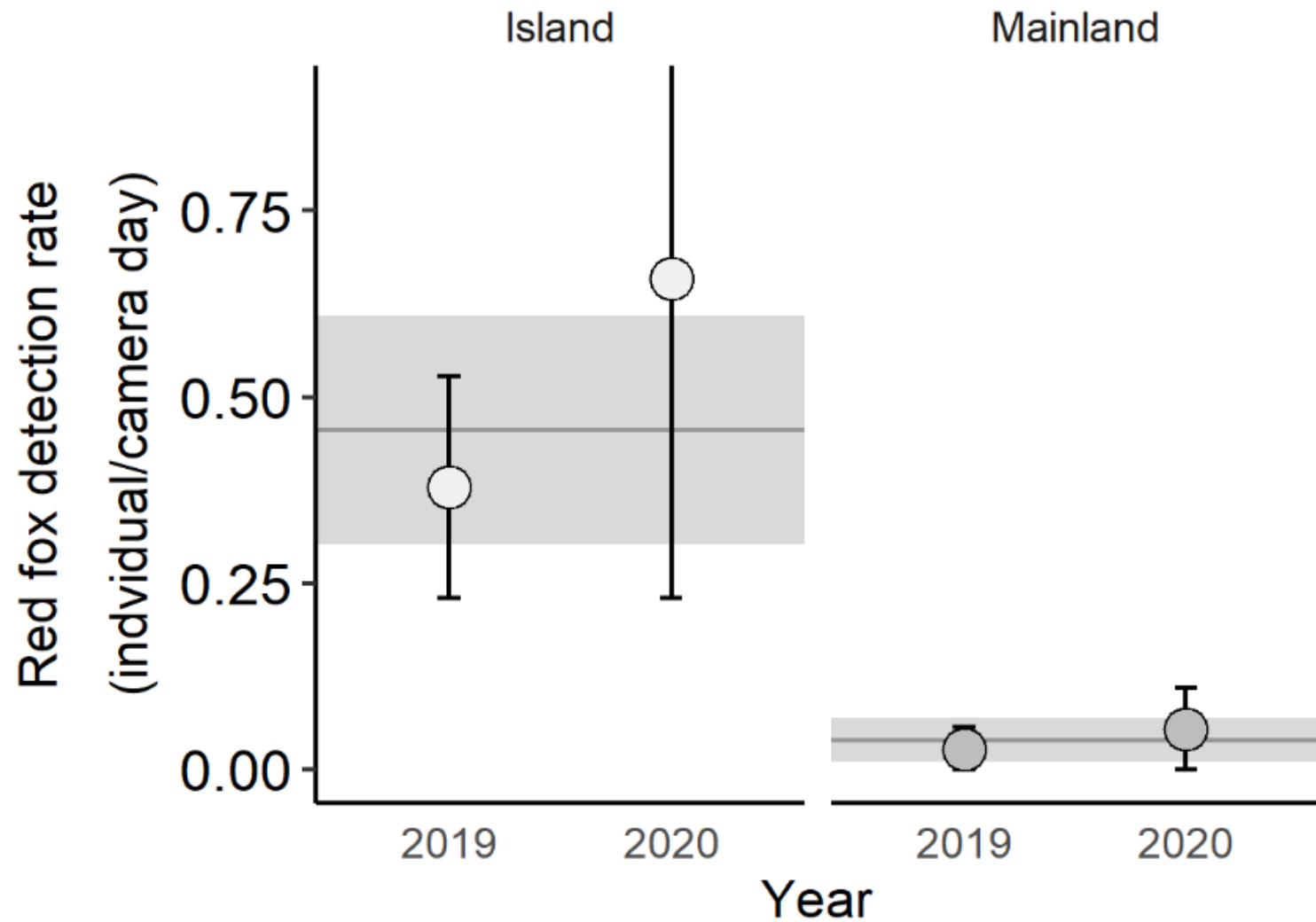
Red fox and lapwings (*Vanellus vanellus*)



Pair of golden jackals predating on lapwing (*Vanellus vanellus*) nest

# Results: red fox density indexes

- Winter snow track index (tracks per 1 km of transect) ca 2x higher on mainland (in 2018)
- Hunting pressure (killed fox per km<sup>2</sup>) 2 and 2,4 times higher on mainland (in 2019 and 2020, respectively)
- Indexes taken from hunting areas that cover study sites
- Camera trap detection rate of red fox (individuals per camera day) in study sites was 14 and 12 times higher on island (in 2019 and 2020, respectively)



Red fox detection rate: individuals per camera day

# Conclusions:

- Red fox is the main nest predator of waders in Estonian coastal grasslands
- Nest predation by jackal is compensatory due to reduction of presence of red fox
- Nest predation by jackal could be additive if the fox density is low by other reasons
- Intraguild interactions between golden jackal and red fox could be much better expressed if the population is not under strong hunting pressure



Thank you for your attention!