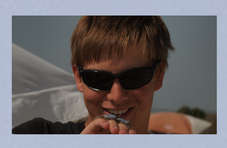
Dung arranged around Black Lark nests – a tool to influence microclimate?



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Male Black Lark displaying on a pile of horse dung during monitoring work in North-Central Kazakhstan.

Why do Black Larks collect and arrange dung around their nest?

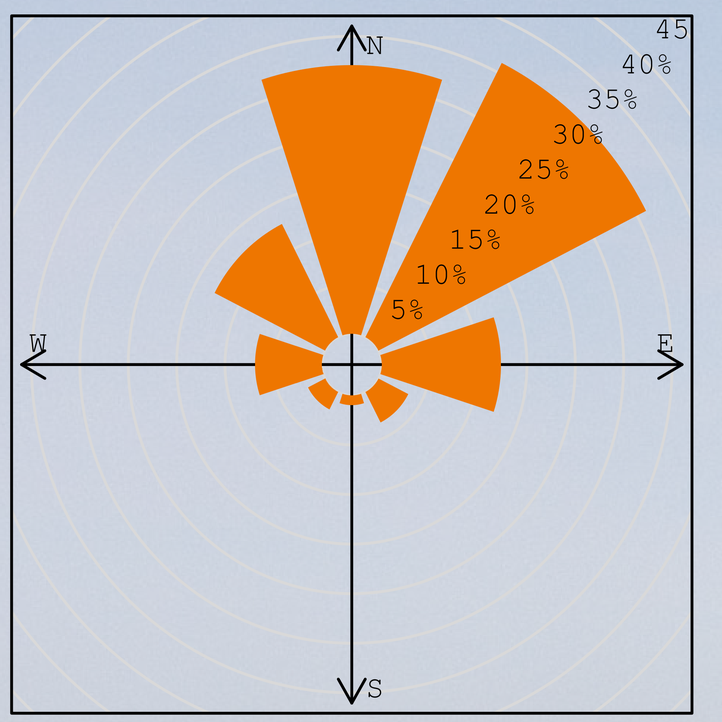
Recently it has been discovered that Black Larks, living on the Eurasian steppes in Kazakhstan, transport dry dung to their nests and arrange it in large 'pavements'. The fact that most of these pavements have a NE orientation suggests a wind effect is important. The dung might provide a **buffered microclimate** in the nest, or could **prevent predators** to find the nest by camouflaging the nest, both visually and by odour. Historically, wild ungulates were extremely abundant and nowadays, cattle and horses are common on the steppe. As grazers avoid dung patches whilst grazing, a dung pavement might reduce **trampling risk** of the nest.

In 2011 and 2013 we monitored Black Lark nests in North-Central Kazakhstan. We recorded nest variables including dung and vegetation parameters around the nest. Nests were visited every 3 days to monitor nest status. Experiments were conducted using artificial nests with and without dung pavements, to investigate trampling risk and temperature buffer effects.

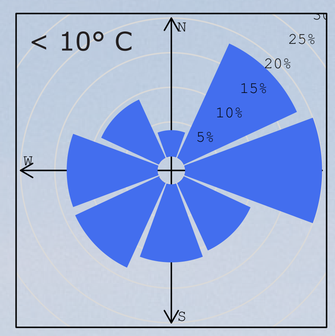
Female Black Lark collect dry dung (mainly horse dung) and arrange it pavements around their nest.

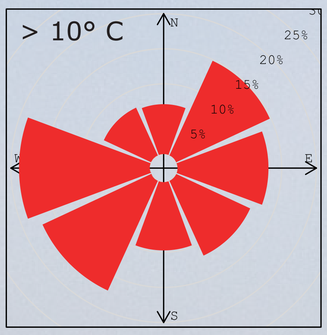
MICROCLIMATE

Orientation of dung pavements



Average wind direction



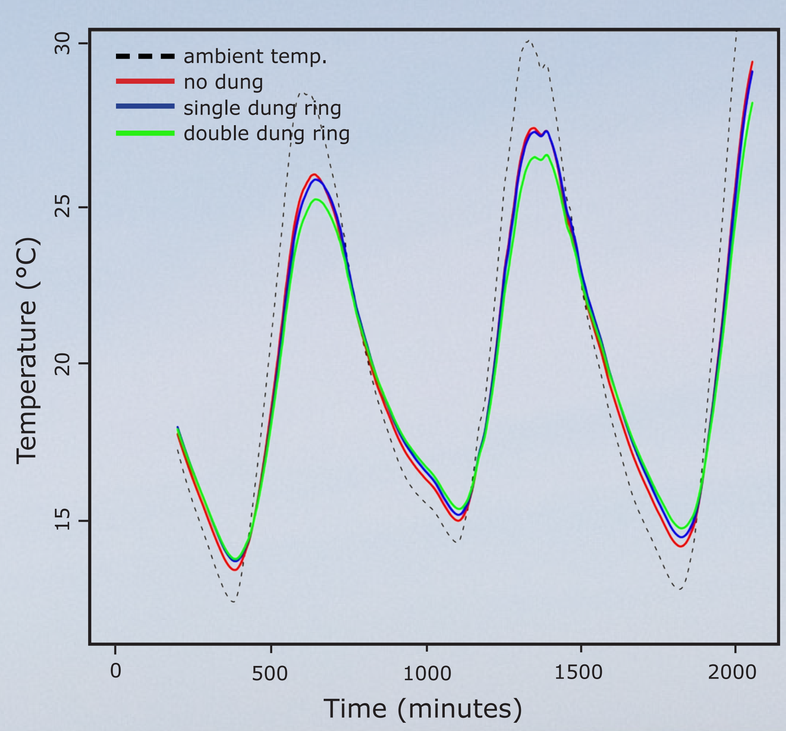


Orientation of the dung pavement corresponded largely with the coldest winds (<=10°C) measured in Apr-May 2010-2012. For the 220 nests monitored in 2011 and 2013, 97.3% had dung collected around the nest.

Experimental set-up

12x no dung
12x single dung ring
12x double dung ring

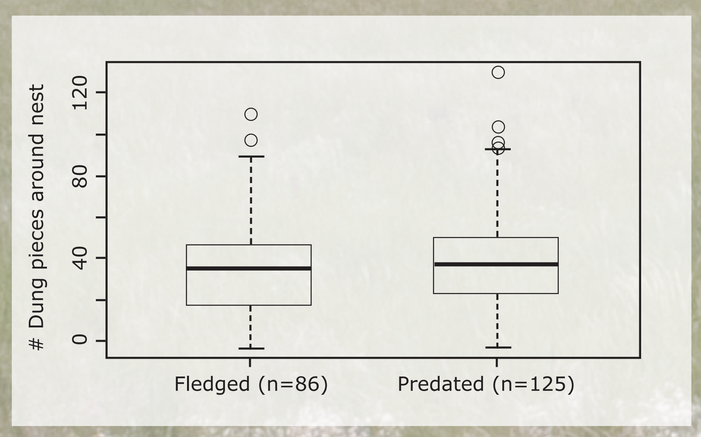
Artificial nest temperature



Dung buffers artificial-nest temperature in an experiment with 36 artificial nests with three treatments. Nest temperature (Ibuttons) was measured every two minutes for three days. Lines represent smoothed moving averages of artificial nest temperatures in the treatment (n=12) and ambient temperature (n=1)

PREDATION

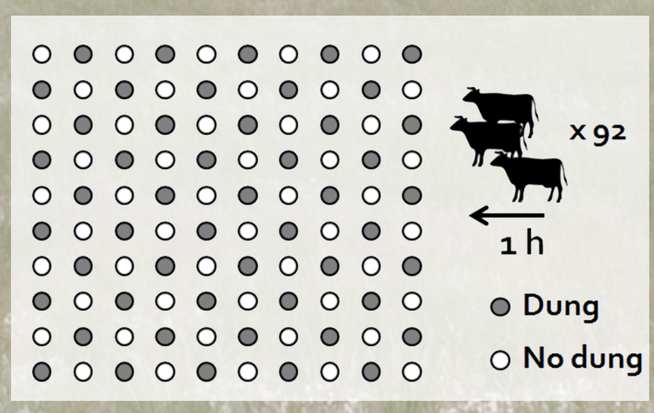
Predated nests related to dung



Daily nest survival was independent of number of dung pieces or surface of dung around the nest (model selection in RMARK).

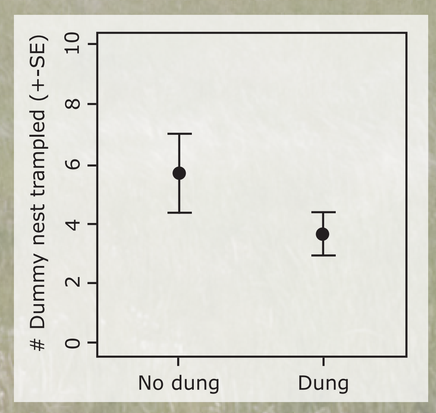
TRAMPLING

Experimental set-up



A herd of 92 cows grazed freely in a grid of 100 X 100 meter for the duration of one hour. In a regular grid, every ten meter a dummy nest was placed, alternating with or without dung to a total of 100 dummy nests. The experiment was repeated six times.

Trampled nests



The mean number of dummy nests trampled per trial was marginally significant (binomial mixed model, trial as random factor, p=0.09, z=-1.7), suggesting that dung pavements could play a role in reducing trampling risk.

CONCLUSIONS

- Dung pavements around the nest buffer the nest temperature.
- Orientation suggests shelter of the nest from coldest winds.
- Predation risk is not affected by the amount of dung pieces or pavement cover around the nest.
- Dung pavements around the nest might reduce trampling risk of the nest.

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