Calvin Klein perfumes and big cats: effect of olfactory stimuli on the behaviour of the Northern lynx (*Lynx lynx lynx*) at Riga Zoo

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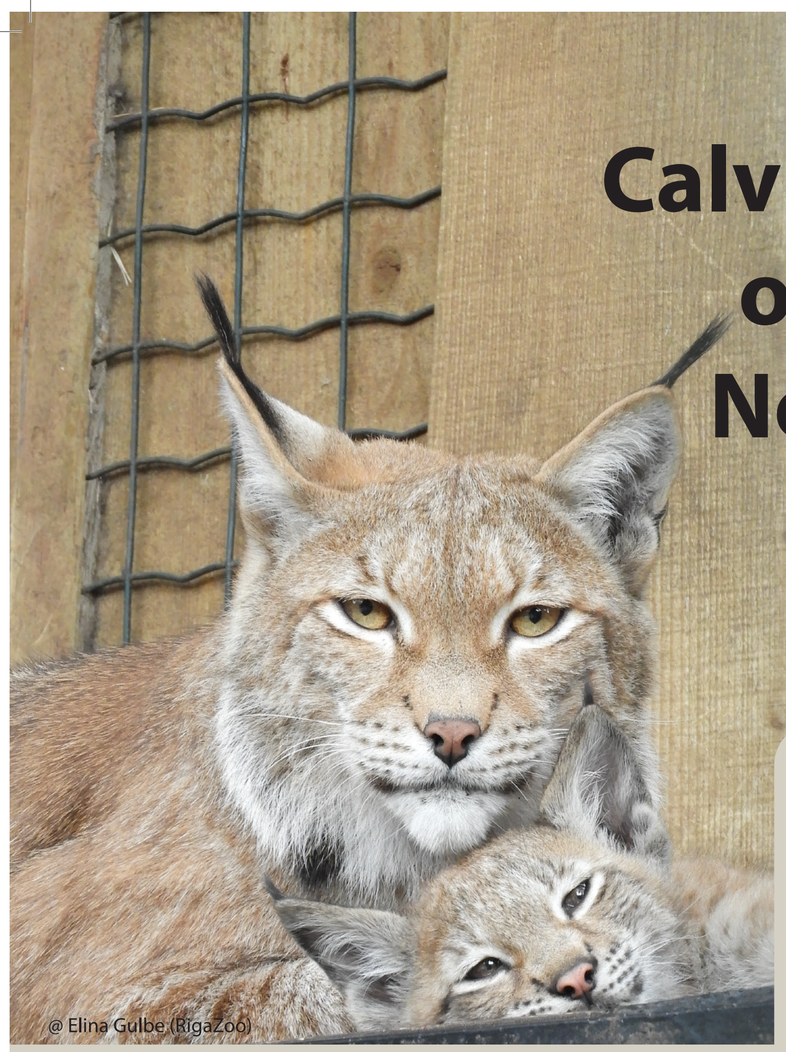

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INTRODUCTION

The genetic monitoring of northern lynx (*Lynx lynx lynx*) in Latvia was based mainly on hunted animals, but since January 2022 hunting has become illegal. To increase lynx detection through the use of photo-trapping cameras plant and animal derived scents are widely used in monitoring. In perfumery, substances of animal origin which naturally have the function of olfactory communication between individuals (deer musk, civetone, grey amber, castoreum) are used as perfume components (Ohloff & Pickenhagen, 2012).

The aim of the study was to investigate the effect of different olfactory stimuli on northern lynxes from Riga Zoo, and to evaluate the application of these stimuli for field monitoring. The study has been presented as a bachelor thesis in biology at the University of Latvia.

METHODS

We evaluate the effects of olfactory stimuli on behaviour of four individuals of the northern lynx (1.1 adults, 1.1 subadults) from Riga Zoo with commercial perfumes. The olfactory stimuli were presented in a paper bag filled with paper towel prayed with fragrances. The order of the olfactory stimuli was: a) control without fragrance; b) Calvin Klein (CK) "Everyone" (vegan commercial perfume); c) CK "One" (with deer musk); d) CK "Obsession for men" (deer musk and civetone); e) "Fonto de forto" tincture (castoreum). Three sessions were conducted.

On-site systematic observations with the method of recording binary behavioural data (One-zero animal sampling) (Lehner, 1992) were used to characterize the behaviour. Behavioural data were recorded in the protocol based on the developed ethogram.

RESULTS AND DISCUSSION

Resting behaviour was the predominant behaviour observed, followed by individual active behaviour (Figure 1). No stereotypic behaviour was observed.

During the study, the predicted probability of observation of the elements of active behaviour of interest in northern lynxes before and after the placement of each stimulus was determined. At a 95% confidence interval, 18% of the variability and 20% of the variance are explained (Figure 2). The study investigated how the active behaviours of interest (i.e. exploratory activity, scent marking, sniffing and manipulation of the olfactory stimulus object used in the study) cumulated for each individual from the Northern Lynx group before and after the insertion of each stimulus. At the 95% confidence interval, 23.1% of behavioural variability (cumulative linear model result) (Figure 3).

Although several studies found CK "Obsession for men" (deer musk and civetone) to be a good olfactory stimulus to attract felids (Gelin et al., 2017; Riley et al., 2017), our results show that lynx are more attracted by "Fonto de Forto" tincture (castoreum) stimulation, followed by CK "Obsession for men". A similar result has been reported by Tourani et al. (2020) in domestic cats. CK “One” (deer musk) seems to be attractive only in the first minutes. CK "Everyone" (stimuli without animal components) is less attractive, with similar curve to the control (Figure 2). The results seem to indicate that scents with a higher concentration of pheromone and a small number of other components are more likely to induce elements of the behaviour of interest. The interest of lynxes in civet pheromones may be connected to civets and lynx belonging to the same suborder - Feliformia, and the interest in beaver and musk deer pheromones might be connected with predator-prey relationships.

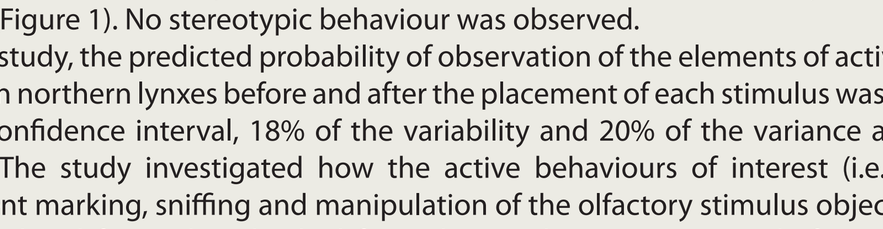

Figure 1. Number of recorded acts for the Northern Lynx in behavioural categories. MS – resting, IN – individual active behaviour, SO – social active behaviour, NT – observation disturbance, BU – fear behaviour.

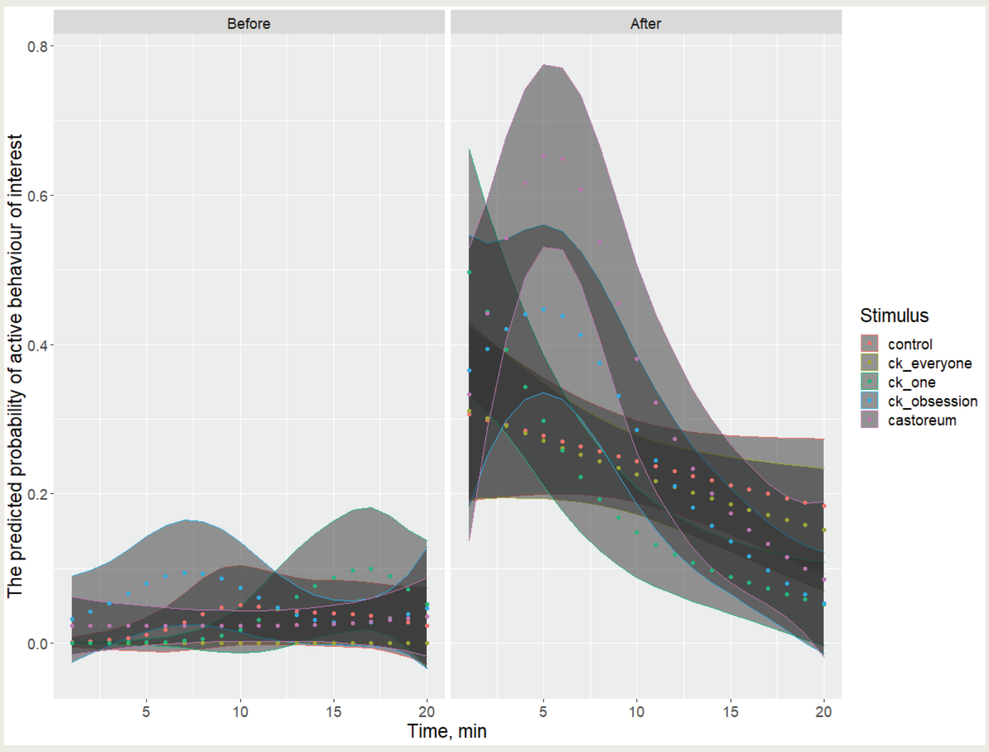

Figure 2. The predicted probability of an individual's active act of behavioural interest before and after each stimulus insertion. Additive model.

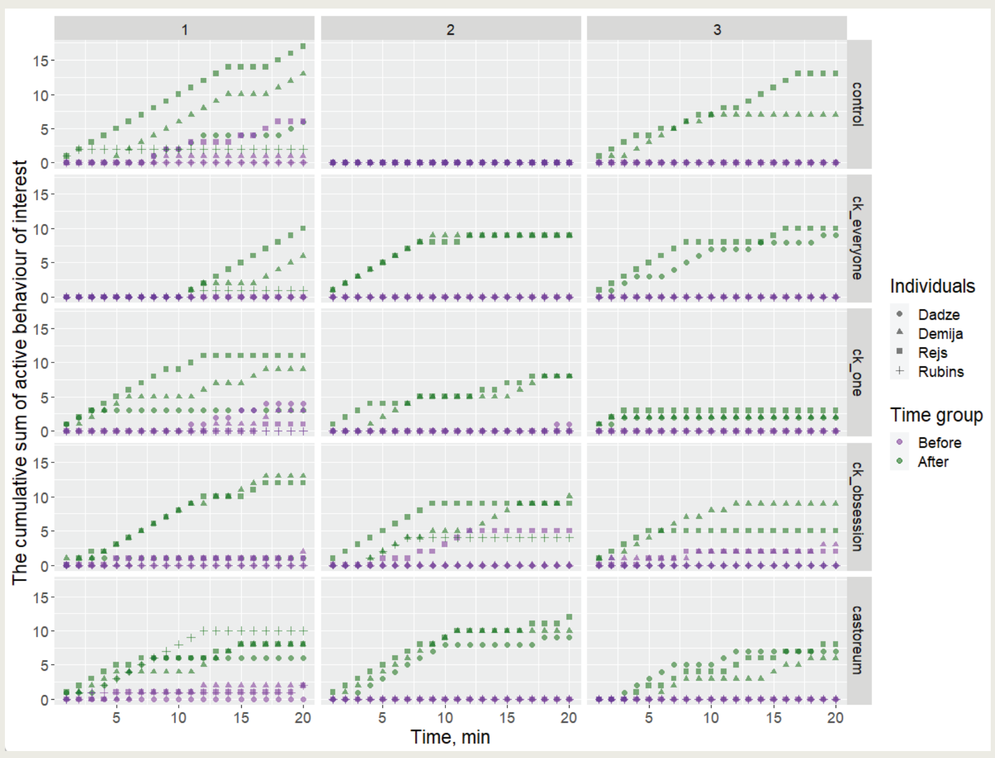

Figure 3. The cumulative sum of the individual's acts of active behaviour of interest before and after the insertion of each stimulus. Cumulative linear model.

CONCLUSIONS

Our study seems to confirm that "Fonto de forto" tincture (castoreum) is a good olfactory stimulus to attract lynxes. It may be useful for collecting non-invasive samples (hair, urine, footprints) for DNA extraction or to attract animals to photo-trapping cameras. Effects of combinations of fragrances (e.g., "Fonte de forto" and "CK Obsession for men") in a field study would be recommended to test the responses of the animals.

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