**Ambient temperature affects mammalian predator-prey interactions in an African savanna**

# Cover letter

Dear Editor,

We enclose a manuscript entitled ‘Temperature affects predator-prey interactions in an African savanna’ which I hope you will consider for publication in Oikos.

The enclosed manuscript explores the impact of temperature on predator-prey interactions between a medium sized predator, the African wild dog (Lycaon pictus), and both a smaller-bodied and a larger bodied prey species – dikdik (Madoqua guentheri) and impala (Aepyceros melampus) respectively - in an African savanna ecosystem. This is novel and interesting work, which we believe would be of great interest to readers of your journal for the reasons outlined in our supporting statement, namely:

- This paper looks at species interactions across a number of spatiotemporal scales.

- The study uses detailed data on species behaviour to explore the mechanism behind climate change threats previously identified by a number of the authors, that is, the fall in recruitment and survival observed in African wild dogs at high temperatures.

- The findings of this study contrast with previous assumptions about the response of endothermic predators and prey to rising temperatures.

- The observed prey switching behaviour has ecosystem level implications, and highlights the potential for rising temperatures to alter prey composition and browsing pressure through the influence of temperature on predator behaviour.

- The study has implications for conservation of not only African wild dogs under climate change, but of predator species more generally, which may use prey switching to cope with higher temperatures, and also of herbivore species, which may face increased predation risk under shifting climatic regimes.

We have requested that one researcher does not review this manuscript. This is a result of instances in the past where they have not treated the review process with the respect or confidentiality that would normally be expected. The final decision on reviewers ultimately remains yours, however.

Thank you for your consideration, we hope to hear from you soon and will happily respond to any questions you have.

Yours Sincerely,

Daniella Rabaiotti, on behalf of all authors

# Significance statement

This is novel and interesting work, which we believe would be of great interest to readers of *Oikos* for the following reasons:

* This paper looks at species interactions across a number of spatiotemporal scales.
* The study uses detailed data on species behaviour to explore the mechanism behind climate change threats previously identified by a number of the authors, that is, the fall in recruitment and survival observed in African wild dogs at high temperatures.
* The findings of this study contrast with previous assumptions about the response of endothermic predators and prey to rising temperatures.
* The observed prey switching behaviour has ecosystem level implications, and highlights the potential for rising temperatures to alter prey composition and browsing pressure through the influence of temperature on predator behaviour.
* The study has implications for conservation of not only African wild dogs under climate change, but of predator species more generally, which may use prey switching to cope with higher temperatures, and also of herbivore species, which may face increased predation risk under shifting climatic regimes.

This work not only extends the authors’ previous work on climate change impacts on African wild dogs and predator-prey interactions within this study system, but adds to a growing body of work linking behavioural shifts in response to climatic conditions to population and ecosystem level impacts of climate change. The findings of this work challenge the assumption built into a number of global scale models, including the Madingley model, that predation rates will increase under climate change across taxa. This has implications for any work using these models to predict climate change impacts on ecosystems.

# Acknowledgements

We thank Mpala Research Centre for hosting our research, Kenya Wildlife Service for collaboration, and the Kenya National Council for Science and Technology for research permission. We also thank funders and research assistants too numerous to list individually.

# Funding statement

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# Ethics statement

Research permissions were given by Kenya National Council for Science and Technology (permits NACOSTI/P/14/9920/1659 and NCST/RRI/12/1/MAS86). Animal handling was approved by the Ethics Committee of the Zoological Society of London and the Animal Care Committee of the University of British Columbia.

# Author Contributions

D. Rabaiotti, Rosie Woodroffe and Adam Ford, designed the research questions. D. Rabaiotti organised the datasets, designed and carried out the final analyses and wrote the paper. Rosie Woodroffe oversaw data collection on wild dogs and contributed to the writing of the paper. Adam Ford and Jacob Goheen collected the dik-diks and impala data and contributed to the writing of the paper. Andrea Fuller provided insight into large mammal physiology and climate impacts and contributed to the writing of the paper. Ben Chapple helped create the prey datasets and designed and carried out the initial analyses on the impala and dik-diks data and African wild dog habitat use. Sophie Morrill assisted in designing and carrying out the analyses on wild dog hunt times.

# Conflict of interest statement

None of the authors have any conflict of interest to declare

# Data Archiving Statement

Impala and dikdik data are available at https://doi.org/10.1002/ecm.1344. Should the article be accepted, the African wild dog data will be deposited on Dryad and the DOI included at the end of the article

# 2-3 sentence abstract

Species often change their behaviour in response to environmental conditions, which can impact predator-prey dynamics. We investigated behavioural changes at high temperatures in one predator species, the African wild dog, and two prey species, impala and dik-dik, alongside corresponding changes in wild dog diet. We found greater overlap in habitat use in African wild dogs and impala at high temperatures, however African wild dogs also hunted for shorter periods in hot weather and had a greater proportion of impala compared to dik-dik in their diet.

# Tweetable abstract

New paper from @DaniRabaiotti @adamTford @goheen\_jacob @bnchapple @soph\_morrill & @AndreaFuller06 looks at changes predator-prey dynamics in hot weather in an African savanna ecosystem