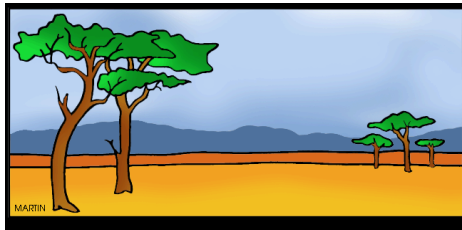


Rewilding Europe with large herbivores: insights from Africa

Associate Prof. Joris Cromsigt

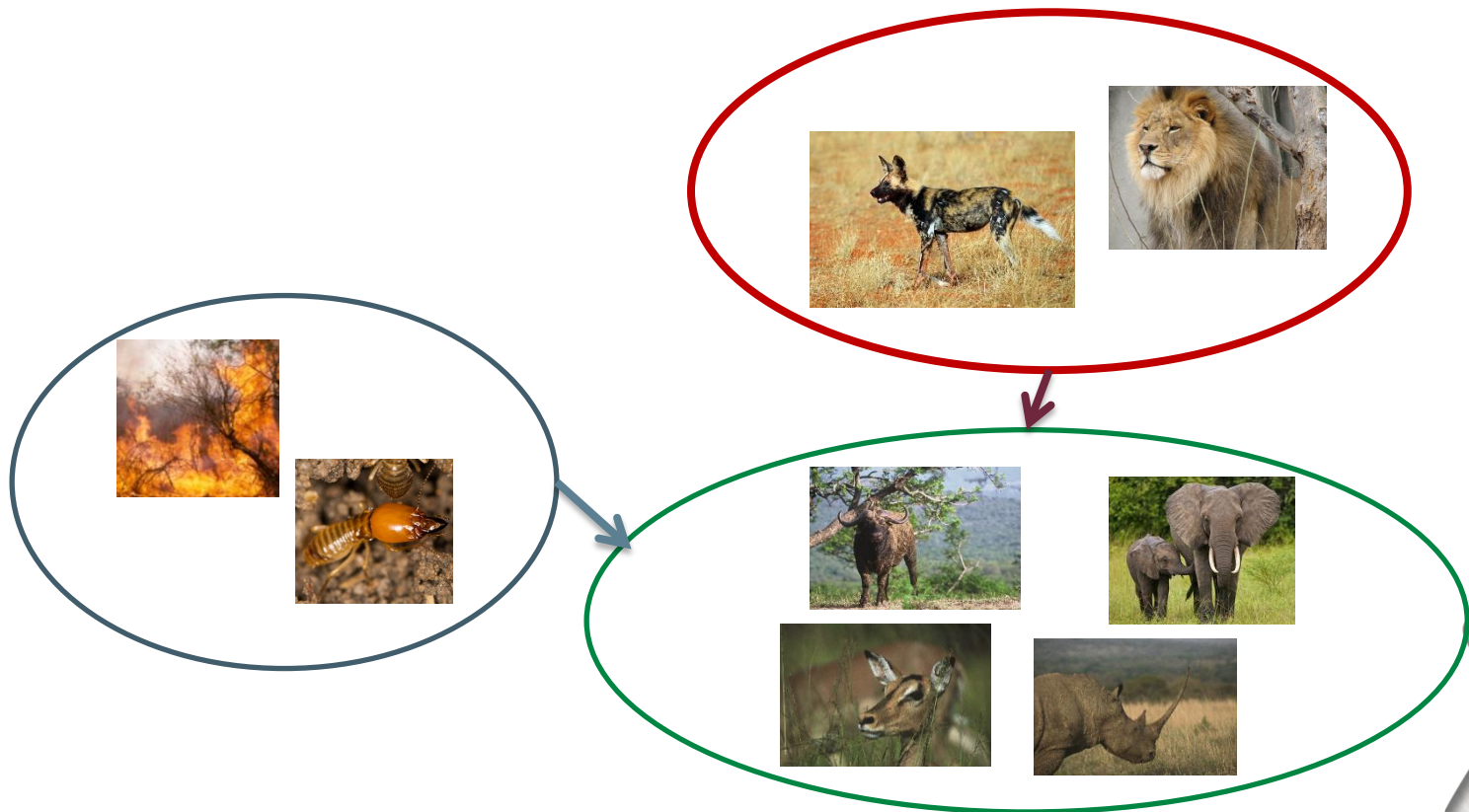
Dept. of Wildlife, Fish & Environmental studies, SLU, Umeå, Sweden

My research: large mammals and ecosystem functioning

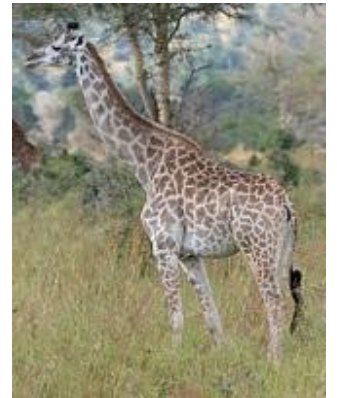


Rewilding Europe – insights from Africa

1. Not all herbivores are equal
2. Carnivores control herbivory
3. Large herbivores interact with other plant consumers



1. Not all herbivores are equal



Not all herbivores are equal – functional diversity

PROCEEDINGS
— OF —
THE ROYAL
SOCIETY **B**

rspb.royalsocietypublishing.org

Research



Low functional redundancy among mammalian browsers in regulating an encroaching shrub (*Solanum campylacanthum*) in African savannah

Robert M. Pringle^{1,5}, Jacob R. Goheen^{2,5}, Todd M. Palmer^{3,5},
Grace K. Charles^{4,5}, Elyse DeFranco⁵, Rhianna Hohbein⁵, Adam T. Ford^{5,6}
and Corina E. Tarnita^{1,5}

Journal of Ecology

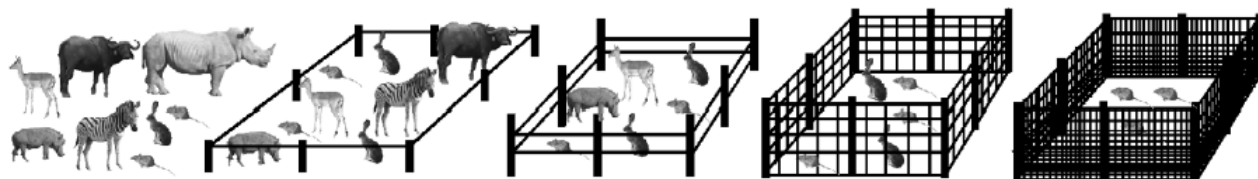


Journal of Ecology 2016, **104**, 864–875

doi: 10.1111/1365-2745.12549

Different-sized grazers have distinctive effects on plant functional composition of an African savannah

Fons van der Plas^{1,2*†}, Ruth A. Howison¹, Nokukhanya Mpanza^{1†},
Joris P. G. M. Cromsigt^{3,4} and Han Olff¹



Rewilding Europe – functional diversity in Europe's large herbivore community?

- We don't know our European species very well!
- We lack novel, exciting, experiments
- What we know is their ecology as it has been shaped by humans for many, many centuries

European Bison as king of the forest?



**NAJLEPSZY EFEKT DAJE
WYCHYLENIE ŻUBRA**



Replacement of open steppe by forest and increasing human pressure forced bison into forests as refuge habitat



Ecography 35: 519–529, 2012

doi: 10.1111/j.1600-0587.2011.07146.x

© 2011 The Authors. Ecography © 2011 Nordic Society Oikos

Subject Editor: Jens-Christian Svenning. Accepted 1 July 2011

Conservation implications of the refugee species concept and the European bison: king of the forest or refugee in a marginal habitat?

G. I. H. Kerley, R. Kowalczyk and J. P. G. M. Cromsigt



Need to (re) discover and rewild bison

- Not as a forest specialist but a species of more open habitat
- Kraansvlak pilot: bison in a non-fed and heterogenous landscape

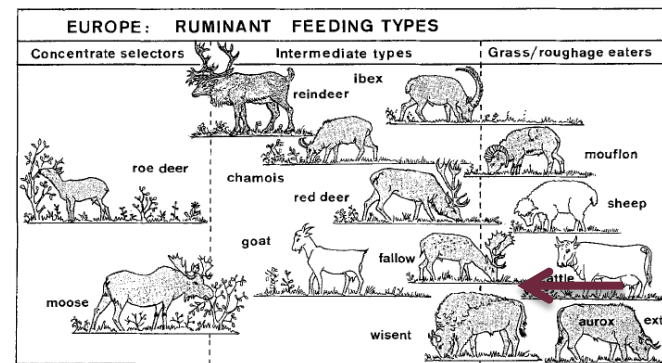


Photo by Leo Linnartz



Europe's three largest herbivores have very similar diets!

- > 5 years of monitoring diets (Cromsigt et al. In prep)



But if we dive deeper..

- Bison debarks while cattle browses

Rewilding with large herbivores = rewilding species

- We have to (re)discover the ecology of Europe's large herbivores
- Allow species to display their 'ecological potential'
 - Remove the anthropogenic filters that shape their ecology

This may be more common than we think

Journal of Applied Ecology



Journal of Applied Ecology 2010, **47**, 920–925

doi: 10.1111/j.1365-2664.2010.01836.x

FORUM

Still walking on the wild side? Management actions as steps towards 'semi-domestication' of hunted ungulates

Atle Mysterud*

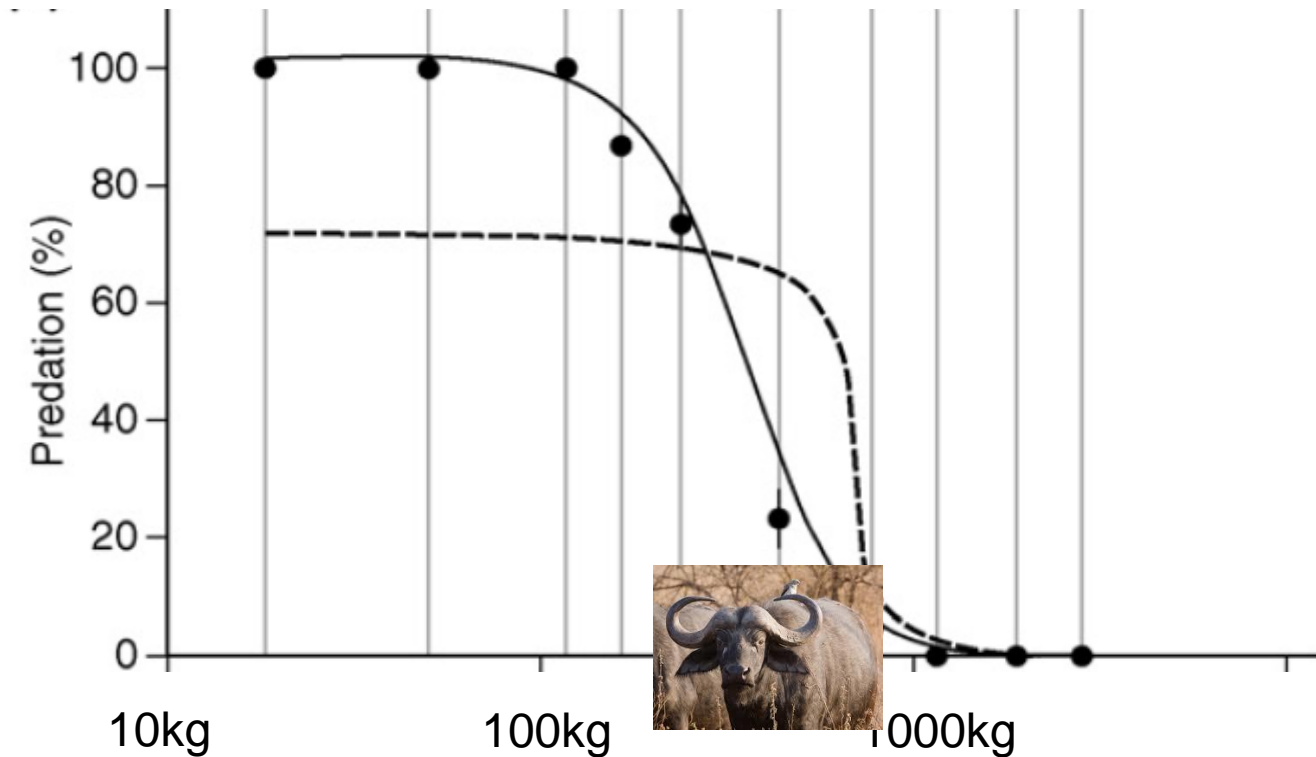
- Loss of wild traits in human-modified landscapes
- Rewilding = de-domesticating 'wild' species

Is Red deer really the prince of the forest?



2. Carnivores control herbivory

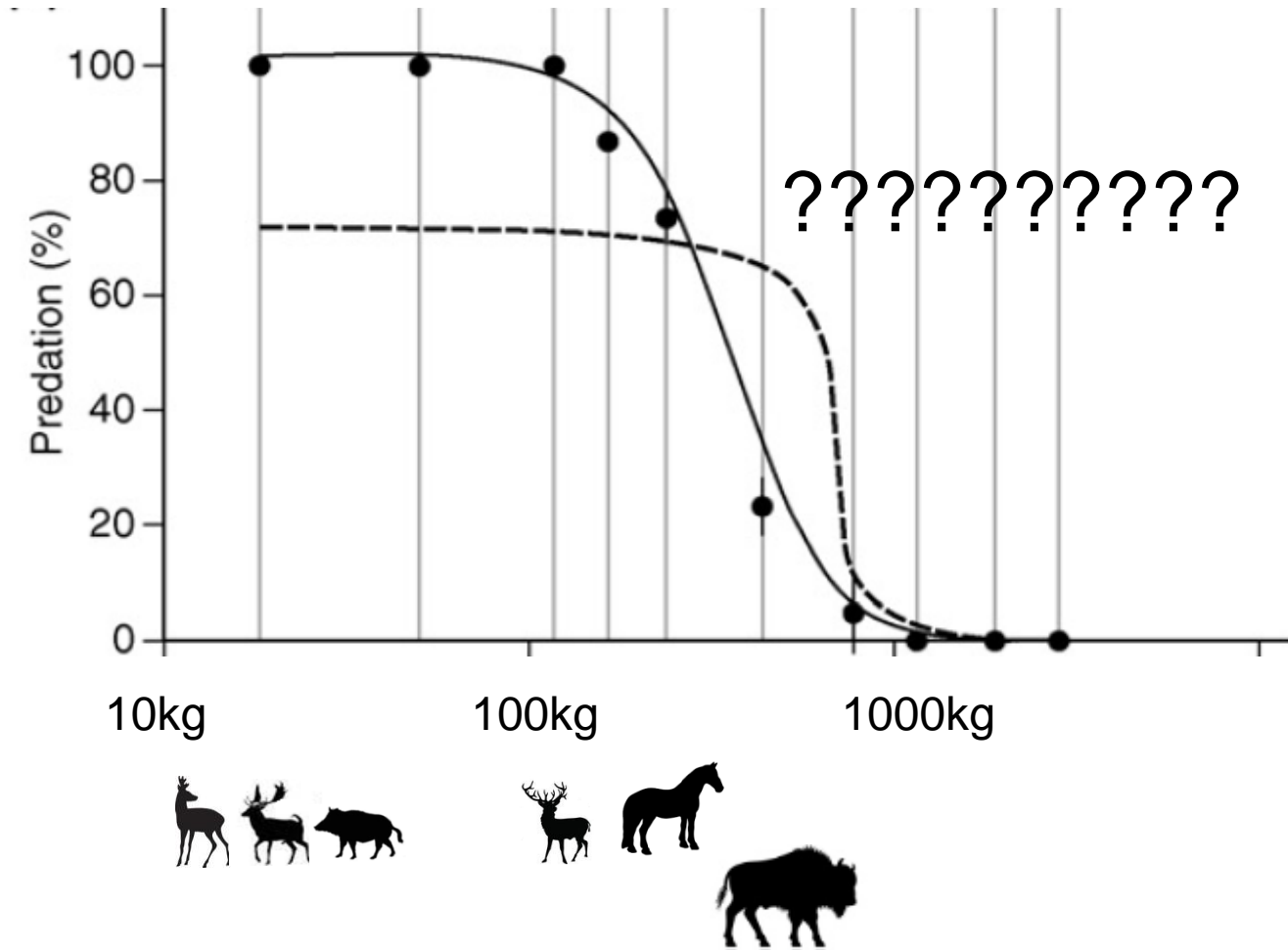
Role of predation in mortality & population density



Hopcraft JGC et al. 2010. TREE 25:119-128.

- Serengeti: large carnivores eat large and small prey
- - - Kruger: large carnivores large prey, small carnivores small prey

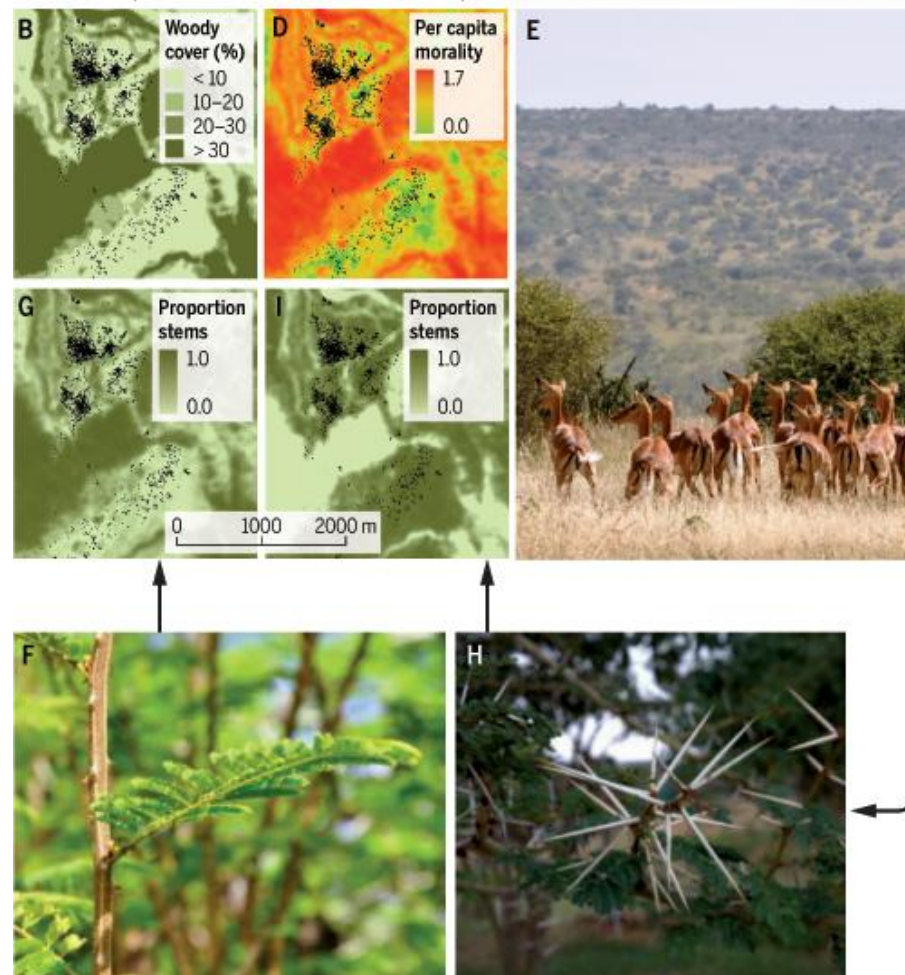
Rewilding Europe with predation if we lack carnivores?



Predation – effects on prey behavior



Ecology of Fear – African example



Adapted from Ford. 2015. Science 350:1175-1176

Rewilding Europe and ecology of fear

- If carnivores are lacking at ecologically relevant densities
- (How) Should rewilding restore ecology of fear?
- Hunting does not simulate ecology of fear
 - It focuses on reducing densities, while minimizing behavioral responses (and stress)

Hunting that steers behavior



Journal of Applied Ecology



Journal of Applied Ecology 2013

doi: 10.1111/1365-2664.12076

FORUM

Hunting for fear: innovating management of human–wildlife conflicts

Joris P.G.M. Cromsigt^{1,2,3*,†}, Dries P.J. Kuijper^{4†}, Marius Adam⁵, Robert L. Beschta⁶, Marcin Churski⁴, Amy Eycott^{4,7}, Graham I.H. Kerley^{4,3}, Atle Mysterud², Krzysztof Schmidt⁴ and Kate West⁸

Recipe hunting for fear or 'rewilding the hunt'

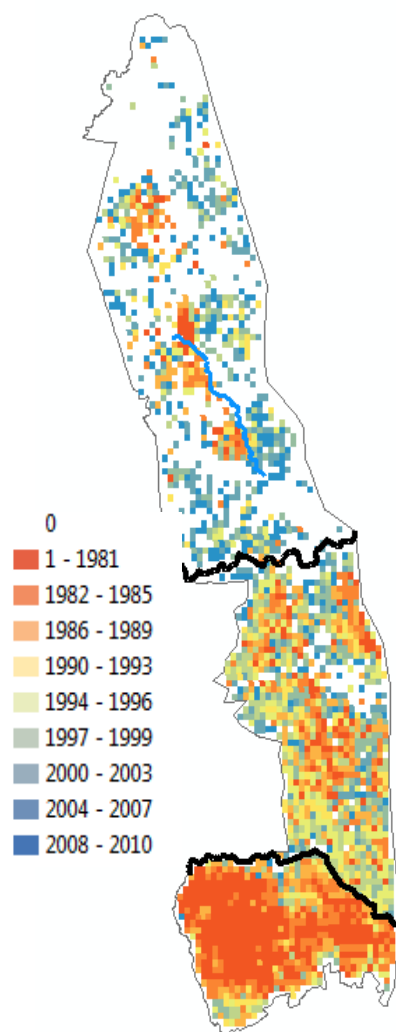
1. Variation in hunting pressure in space and time
 - a. Develop a 'hunting landscape of fear'
2. Year-round, instead of seasonal, hunting
3. More 'ambush-style' forms of hunting
4. Hunting during the growing season
5. Use of dogs
6. Hunting calves/juveniles and females

3. Large herbivores interact with other consumers

White rhino as ecosystem engineers



Is this true and can their effects be easily restored?



100 YEARS Journal of Ecology

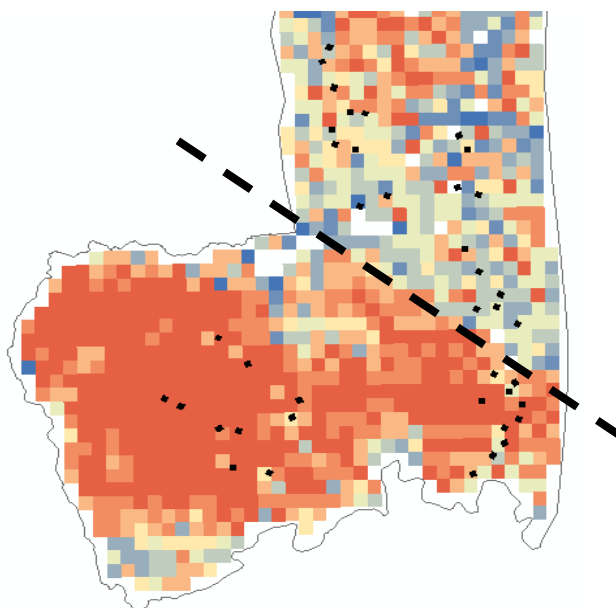


Journal of Ecology

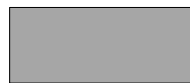
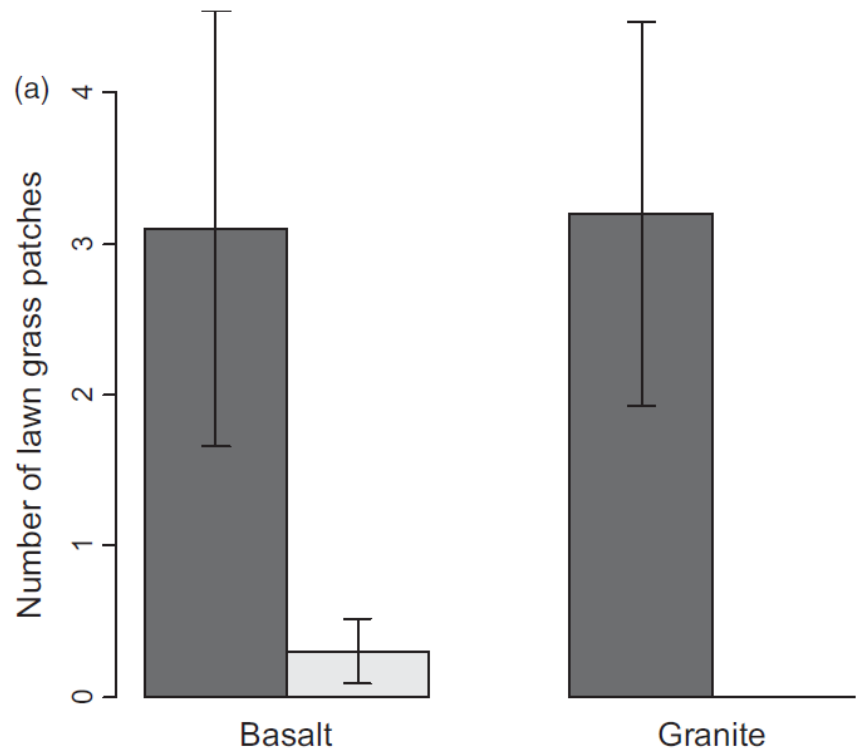
doi: 10.1111/1365-2745.12218

Restoration of a megaherbivore: landscape-level impacts of white rhinoceros in Kruger National Park, South Africa

Joris P. G. M. Cromsigt^{1,2,3*} and Mariska te Beest⁴



Yes, restoring rhino restores grassland heterogeneity



30 + years after recolonization



10-20 years after recolonization

But with the help of termites...



Rewilding Europe with large herbivores and insects?

- Which ones?
- Do they need to be restored before we introduce large grazers?



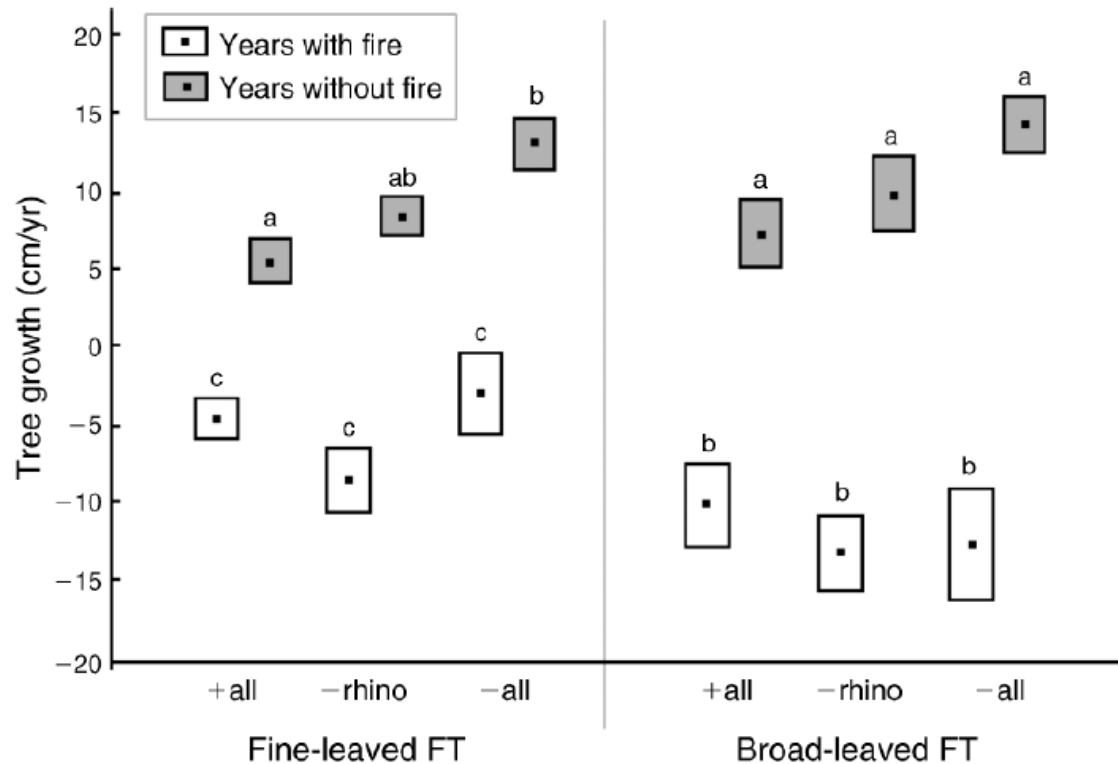
Photo by Aniek Ivens

Fire is a major consumer of plant biomass in Africa



Browsing and fire interact to suppress tree density in an African savanna

A. CARLA STAVER,¹ WILLIAM J. BOND,¹ WILLIAM D. STOCK,² SUE J. VAN RENSBURG,³ AND MATTHEW S. WALDRAM⁴



Rewilding Europe with herbivores AND fire?

- We have excluded fire from the landscape



Concluding

Rewilding with herbivores – insights from Africa:

1. Not all herbivores are equal
 - a) But need to (re)discover functional ecology of European species
 - b) Need to 'rewild' some of these species
2. Carnivores control herbivory
 - a) But which herbivores to control and to what extent?
 - b) And how to simulate fear-mediated effects? (hunting for fear)
3. Herbivores interact with other consumers
 - a) You may need to restore these other consumers before large herbivores can show their effects

Thanks!