

An assessment of the terrestrial mammal diversity in a FSC-certified forest in east Gabon

Impact of camera trap placement strategy on the detected species

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Authors' affiliation



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Background

Central Africa

- 53 millions ha allocated to timber production
- 4,4 millions FSC certified

Gabon

- 14 millions ha allocated to timber production
- 1,7 millions FSC certified



 **Logging concessions**

 **Protected areas**

 **Dense humid forest cover** (Mayaux et al. (2004))



Background



Diversified protocols



Placement strategy

Game-Trail VS

TEAM protocol

- Monitoring changes in the ground-dwelling vertebrates community in 17 tropical sites
- Game-trail oriented camera traps



Background



Diversified protocols



Placement strategy

Game-Trail

VS

Systematic

Density estimation



Methods in Ecology and Evolution



Methods in Ecology and Evolution 2017

doi: 10.1111/2041-210X.12790

Distance sampling with camera traps

Eric J. Howe^{*1}, Stephen T. Buckland¹, Marie-Lyne Després-Einspenner² and Hjalmar S. Kühl^{2,3}

Journal of Applied Ecology



Journal of Applied Ecology 2008, 45, 1228–1236

doi: 10.1111/j.1365-2664.2008.01473.x

Estimating animal density using camera traps without the need for individual recognition

J. Marcus Rowcliffe^{1*}, Juliet Field², Samuel T. Turvey¹ and Chris Carbone¹



Objectives

Terrestrial mammal diversity assessment of sustainably logged forests in east Gabon

Impact of placement strategy on the detected diversity

Game-trail

Systematic

1

Species richness

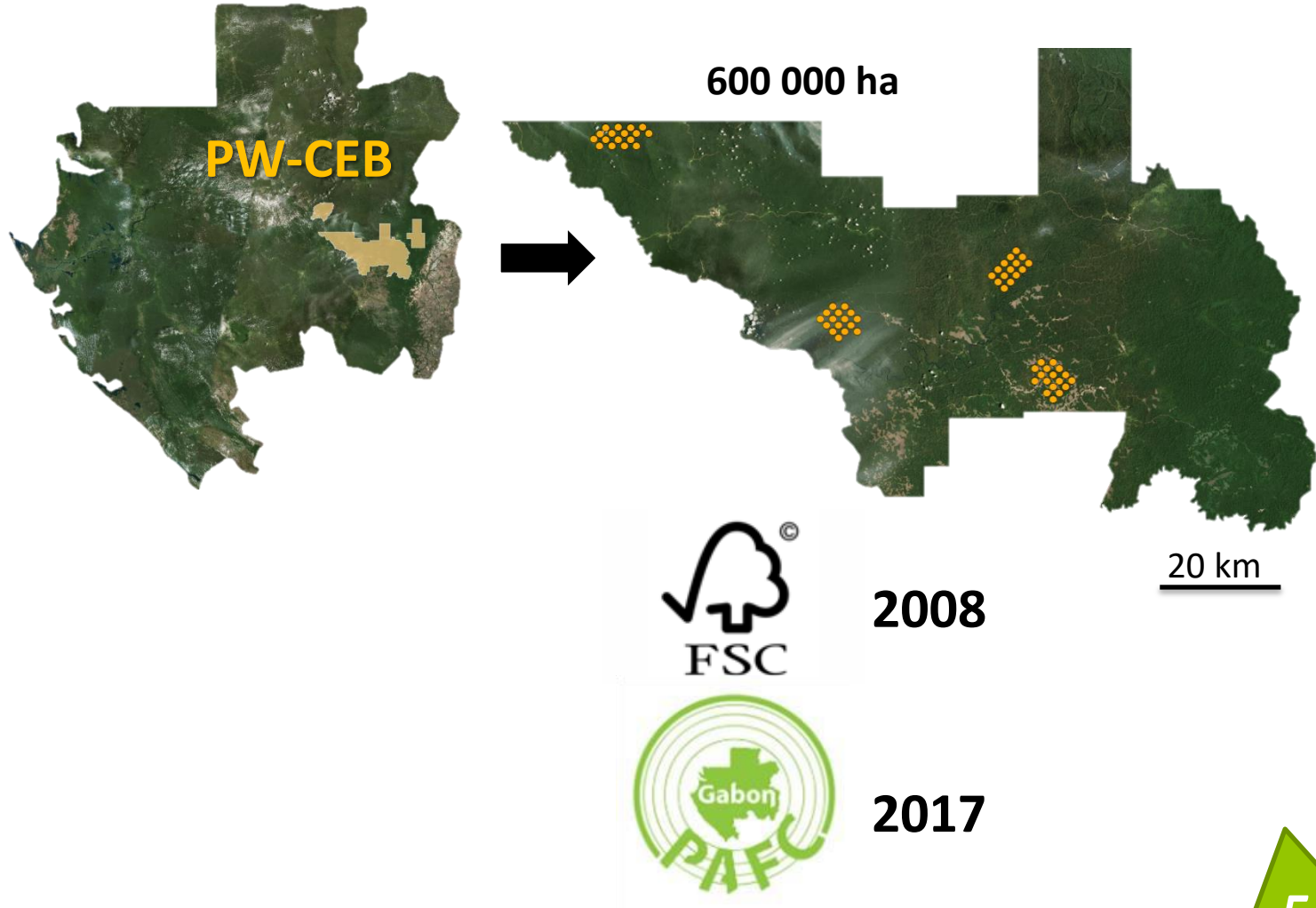
2

Species occupancy and abundance

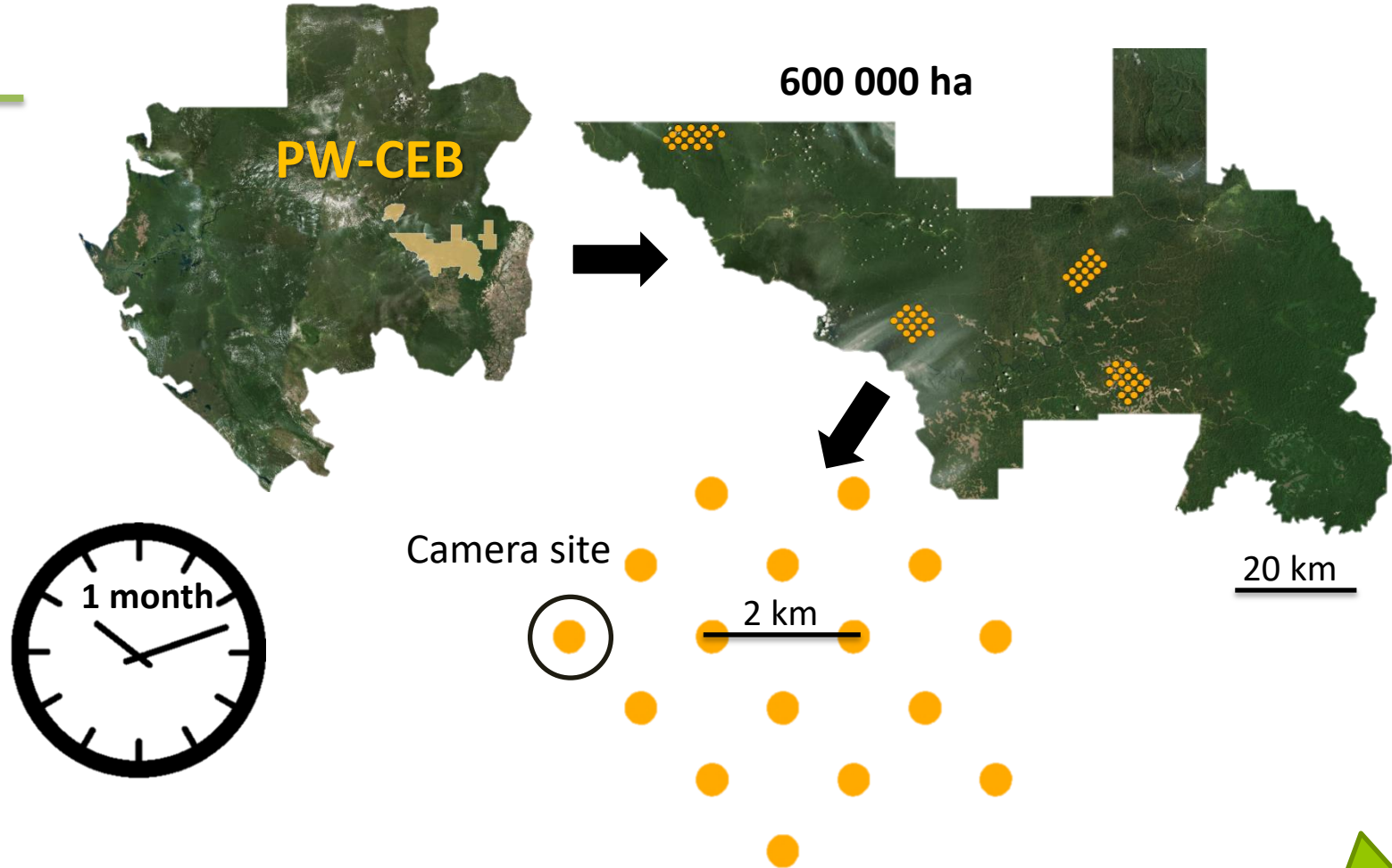
3

Community composition

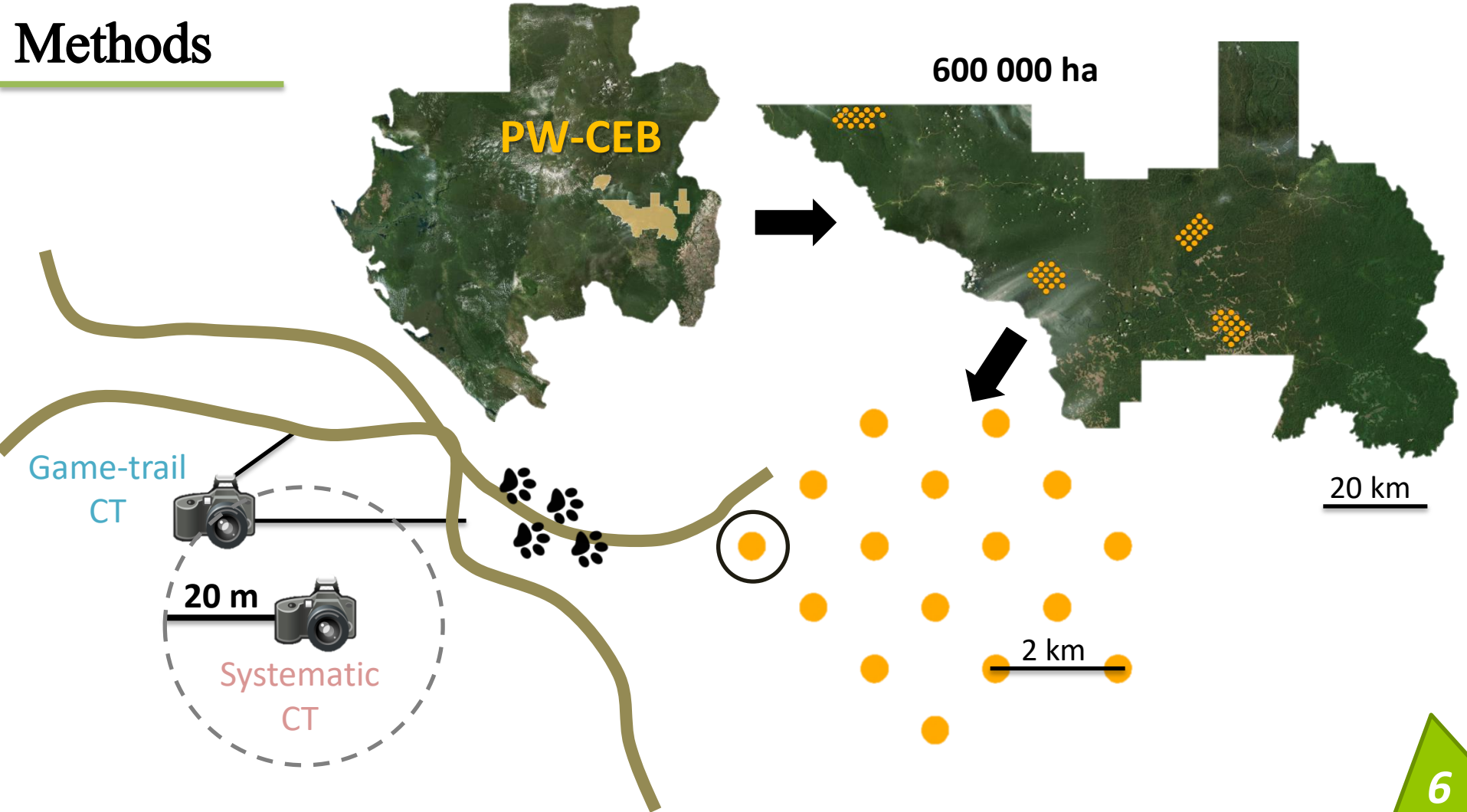
Study area



Methods



Methods



Results

A diverse wildlife in the logging concession

but more species detected with the game-trail orientation

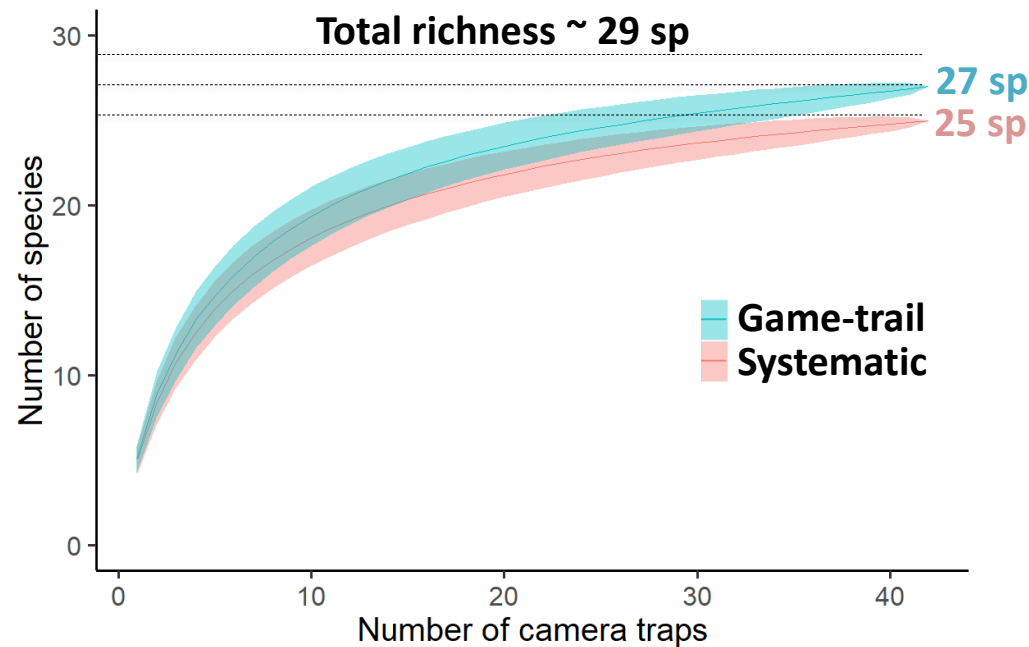
1

Species richness

Rarefied curve of species richness

(N = 84 CT = 42 pairs of CT)

Total richness ~ 29 sp



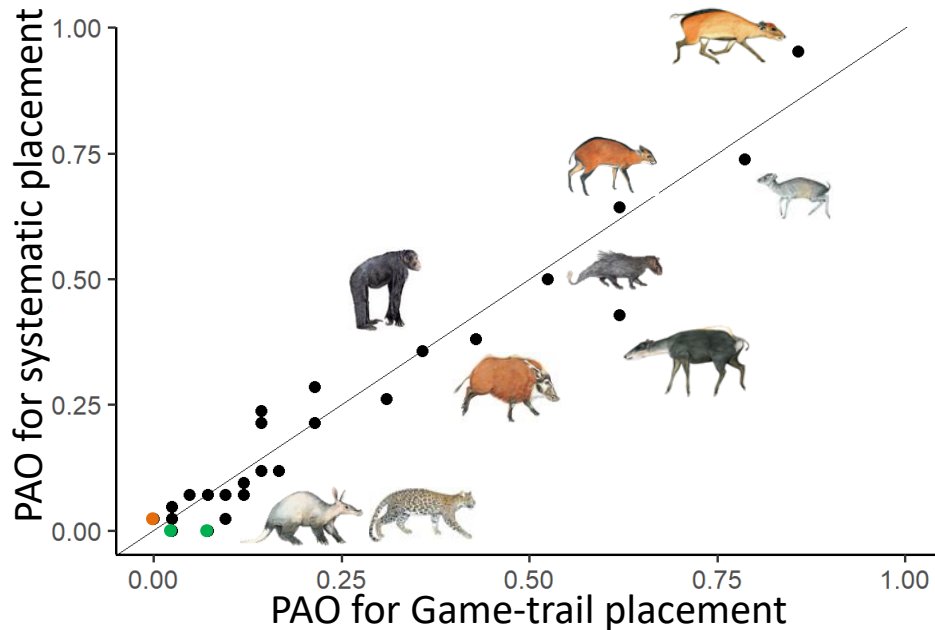
Results

Similar species occupation patterns but.....

2

Species occupancy and abundance

$$\text{PAO} = \frac{\# \text{ CTs where species detected}}{\text{total \# CTs surveyed}}$$



- Similar spatial occupation for most species
- The **leopard** and the **aardvark** were only detected through the game-trail orientation
- The **grey-cheeked mangabey** and the **Bates's pygmy antelope** were only detected through the systematic orientation

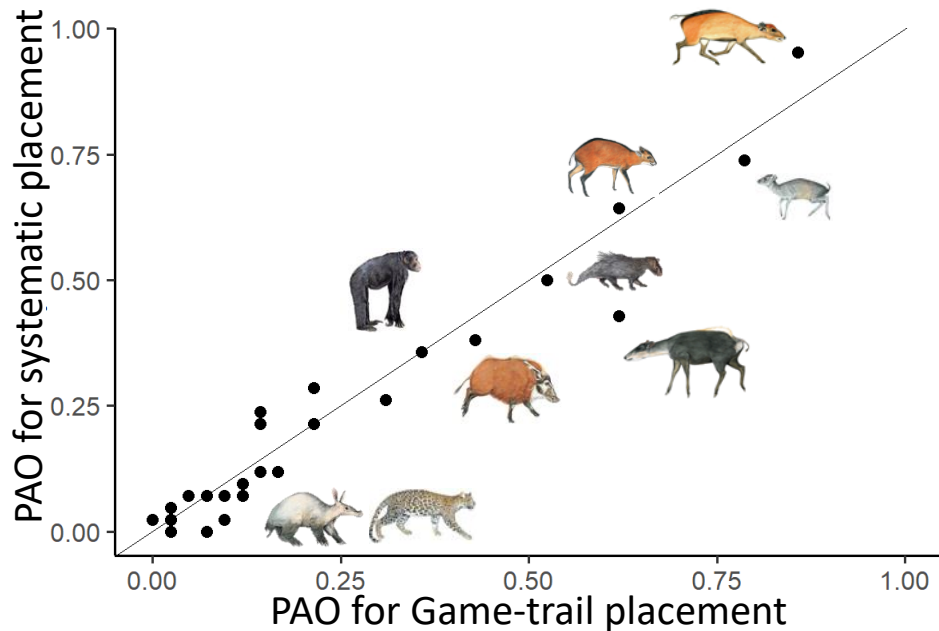
Results

Similar species occupation patterns but.....

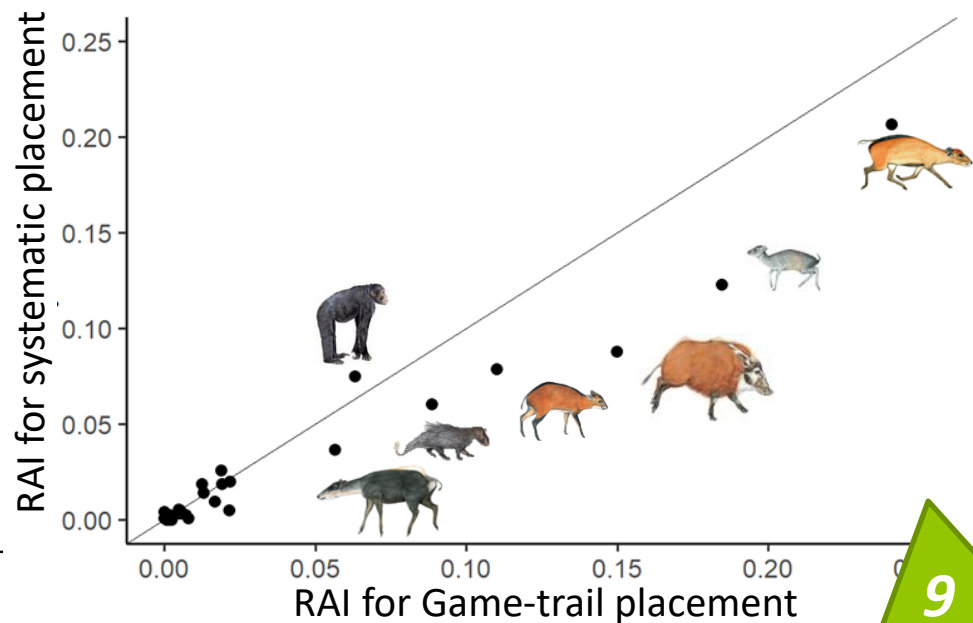
2

Species occupancy and abundance

$$\text{PAO} = \frac{\# \text{ CTs where species detected}}{\text{total \# CTs surveyed}}$$



$$\text{RAI} = \frac{\# \text{ independent events}}{\text{number of camera.days of the CT}}$$

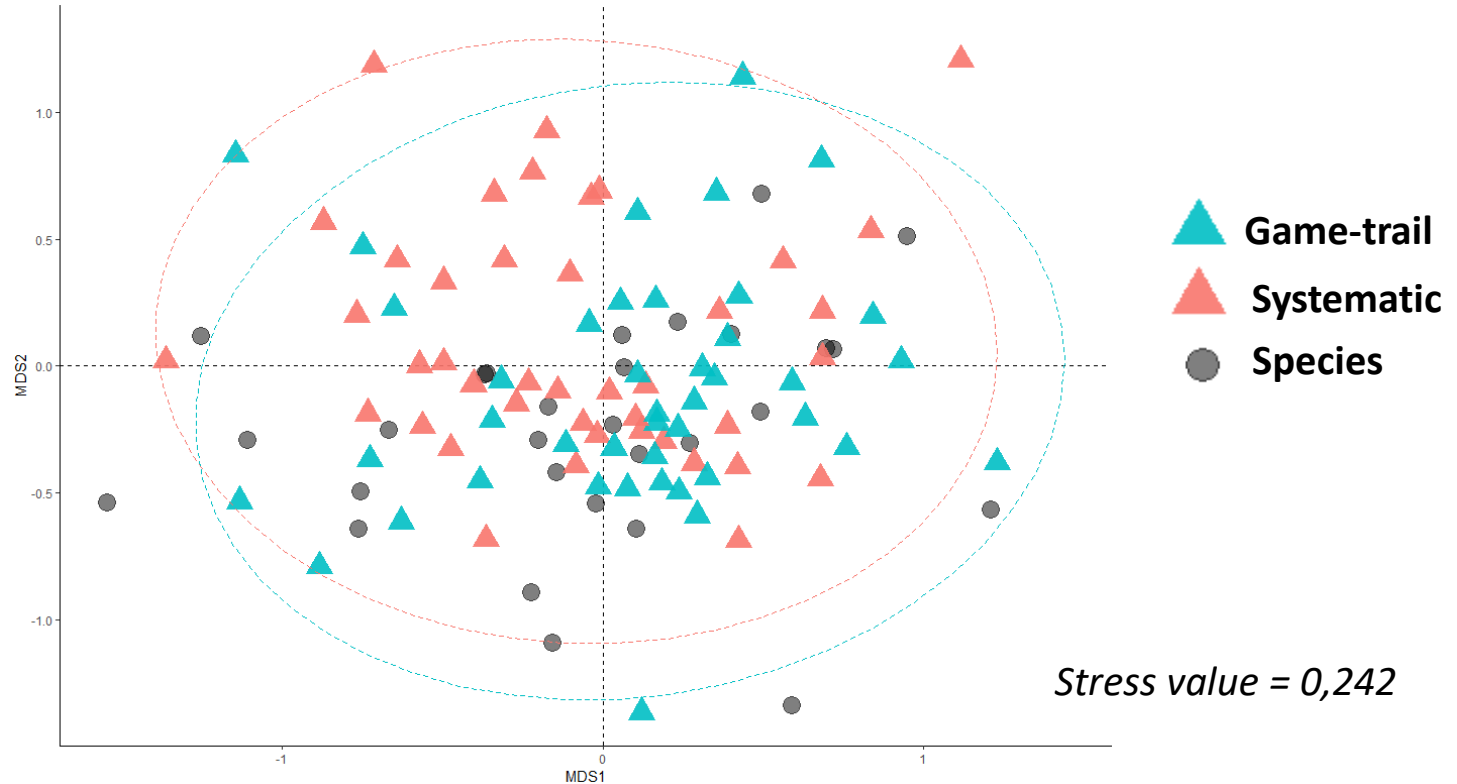


Results

Same community detected at the grid scale

3

Community composition

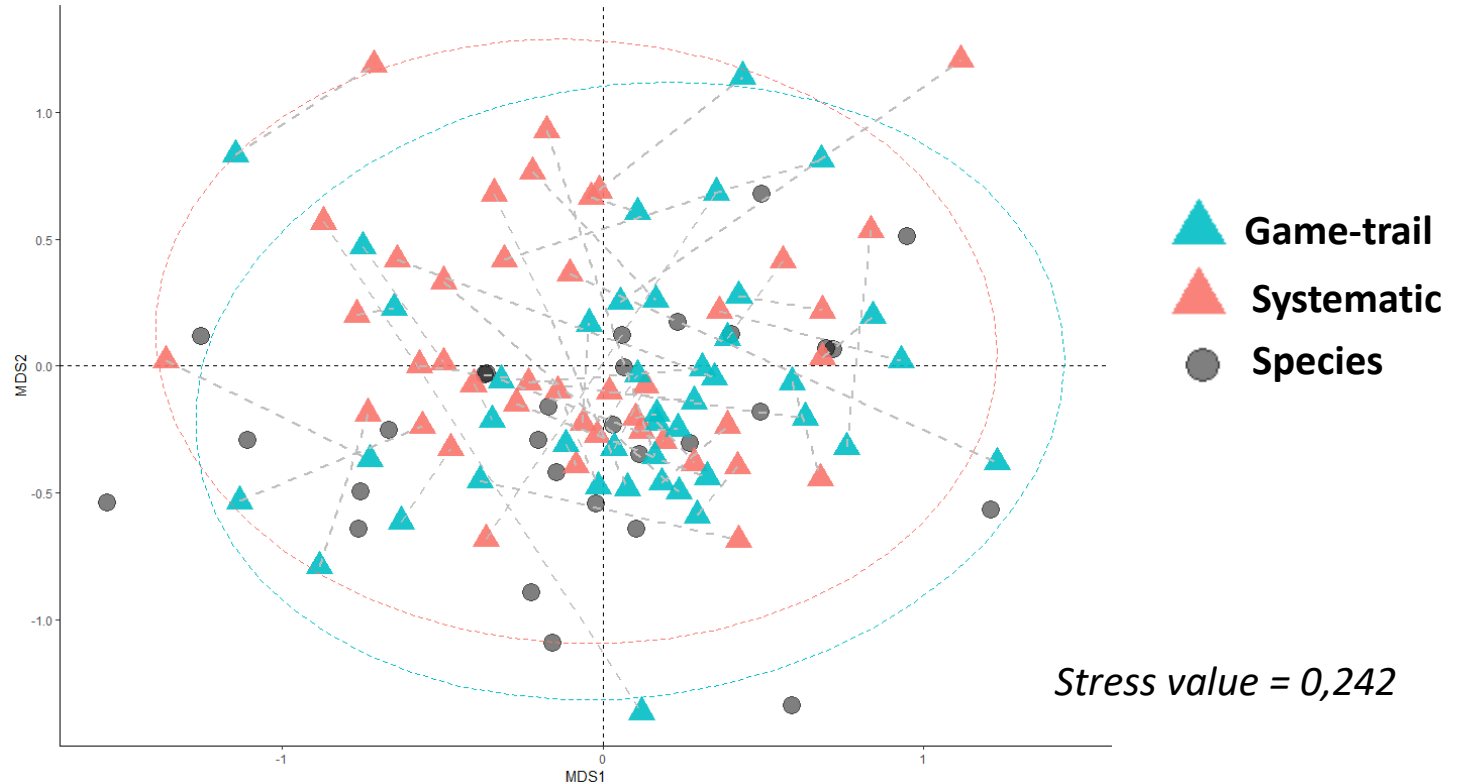


Results

Same community detected at the grid scale
but local differences between pairs

3

Community composition

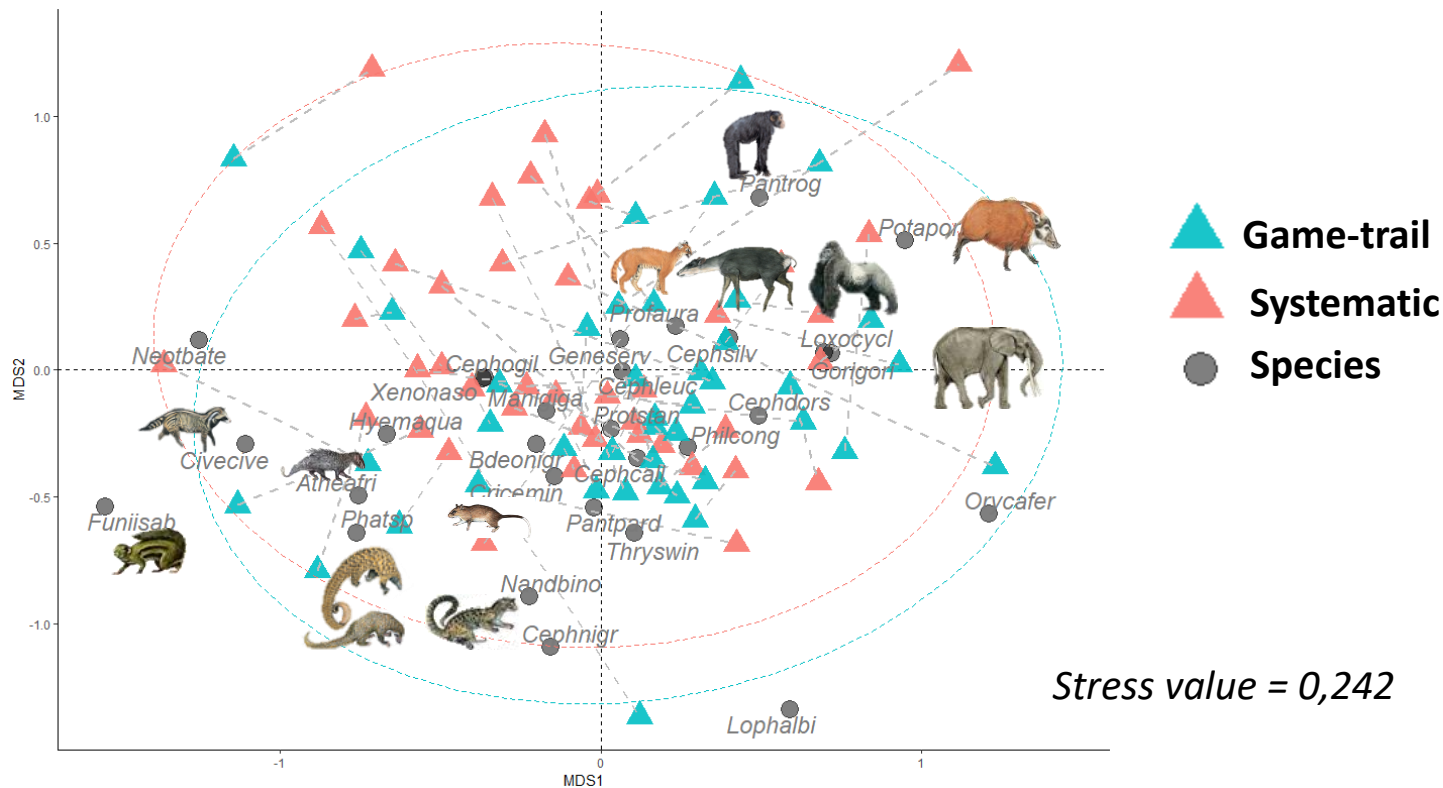


Results

Species gradient revealed by the ordination Explained by spatial variables

3

Community composition

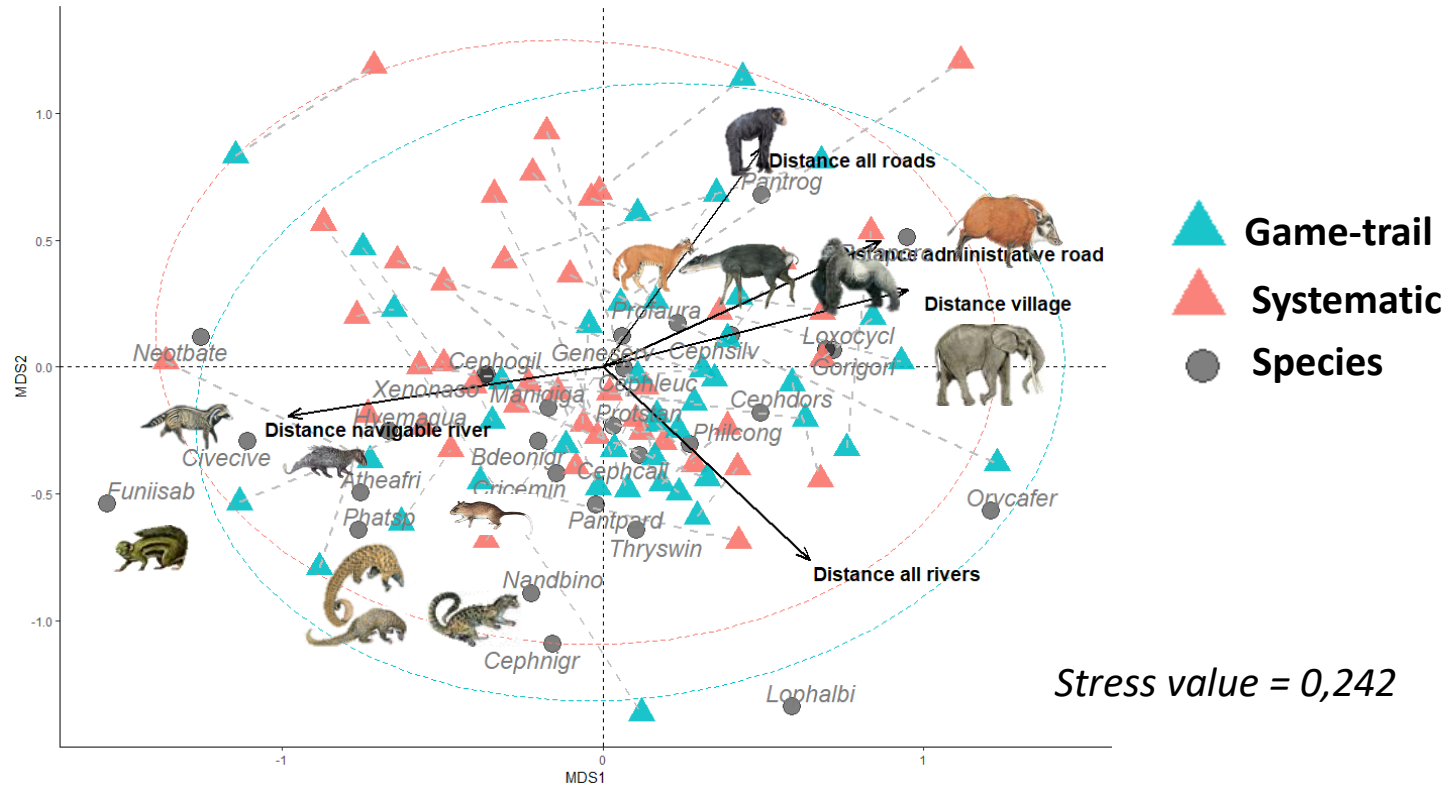


Results

Species gradient revealed by the ordination

3

Community composition



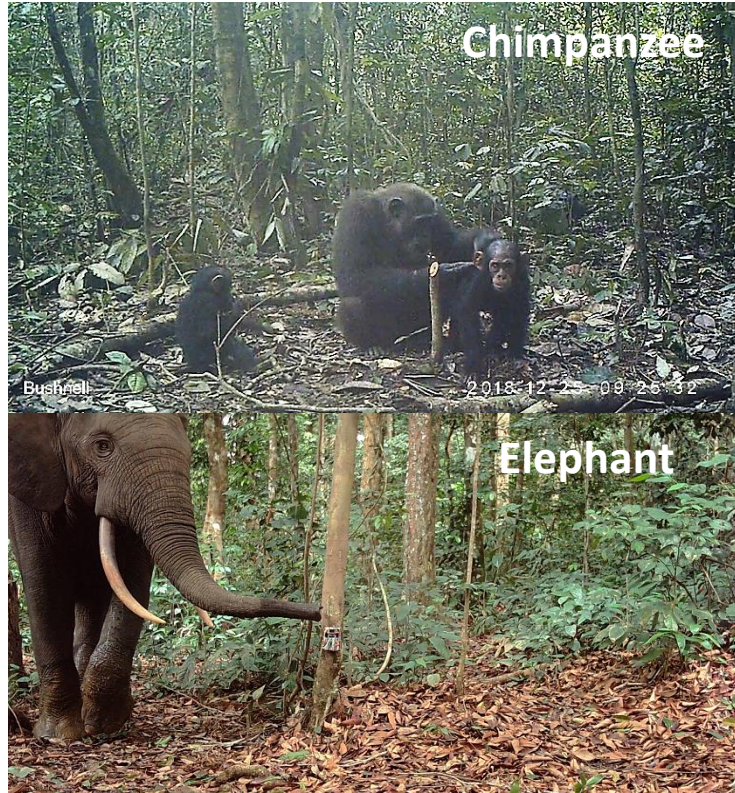
Take home message (1)

Terrestrial mammal diversity assessment of certified forests in east Gabon

→ Emblematic megafauna still present thanks to low hunting pressure and wildlife conservation measures implemented by the company

29 species in **4** months and **84** camera traps

Similar species richness compared to adjacent areas



Take home message (2)

Impact of placement strategy on the detected diversity

	Game-trail strategy		Systematic strategy
1	Species richness	>	25 sp
2	Species composition	=	Spatial occupancy
		>	Relative abundance
3	Community composition	≠	CT scale
		=	Grid scale

Thank you for your attention !



Authors' affiliation



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Feel free to ask questions or contact me...



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Take home message (2)

Impact of placement strategy on the detected diversity

	Game-trail strategy		Systematic strategy
1 Species richness	27 sp	>	25 sp
2 Species composition	Spatial occupancy Relative abundance	= >	Spatial occupancy Relative abundance
3 Community composition	CT scale Grid scale	≠ =	CT scale Grid scale

*We recommend maintaining **game-trail strategy** for large-scale camera trapping inventories conducted at species or community level*

Results

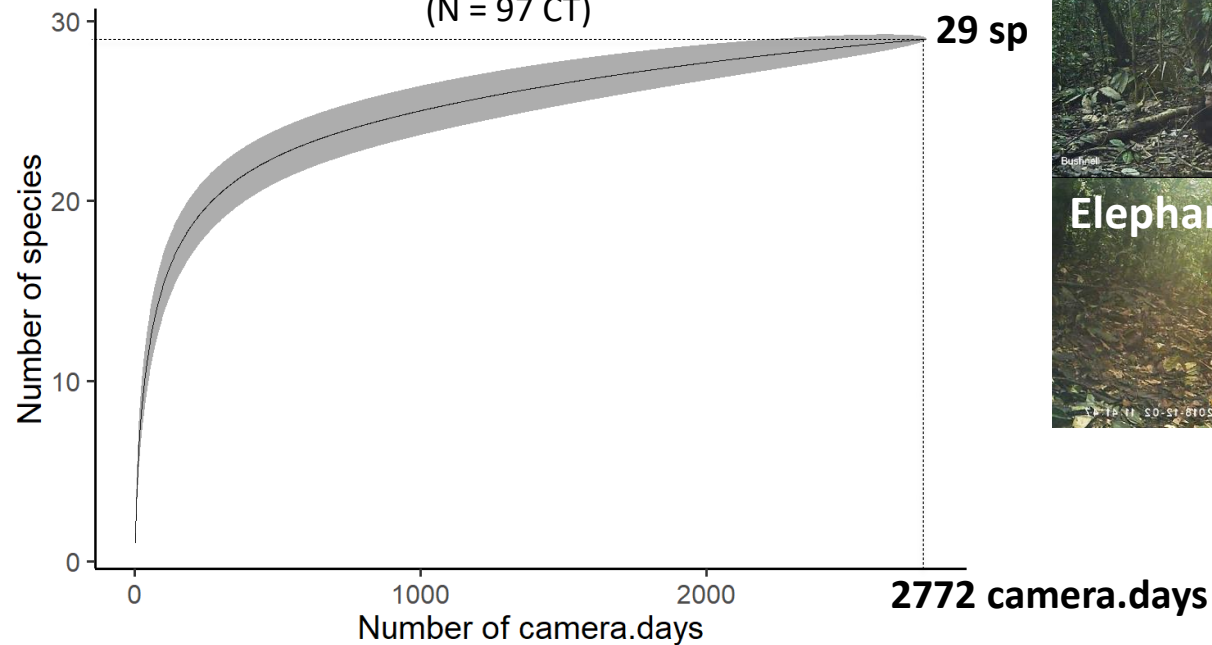
A diverse wildlife in the logging concession

1

Richness

Rarefied curve of species richness

(N = 97 CT)



Results

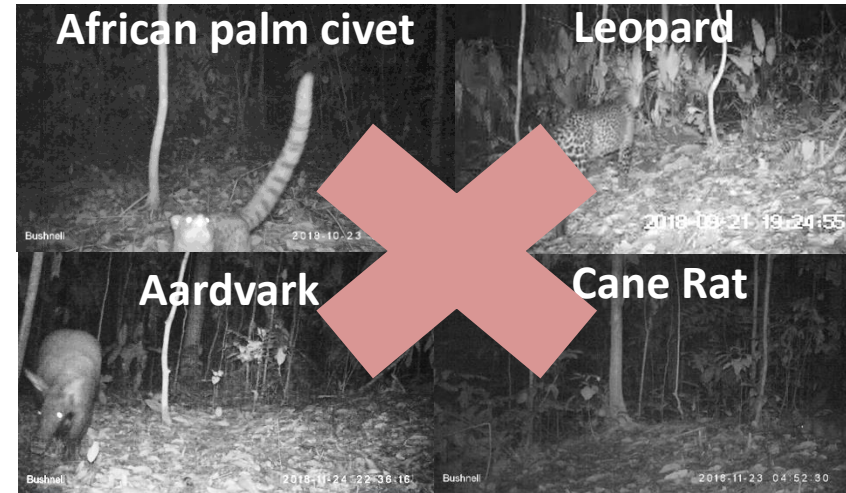
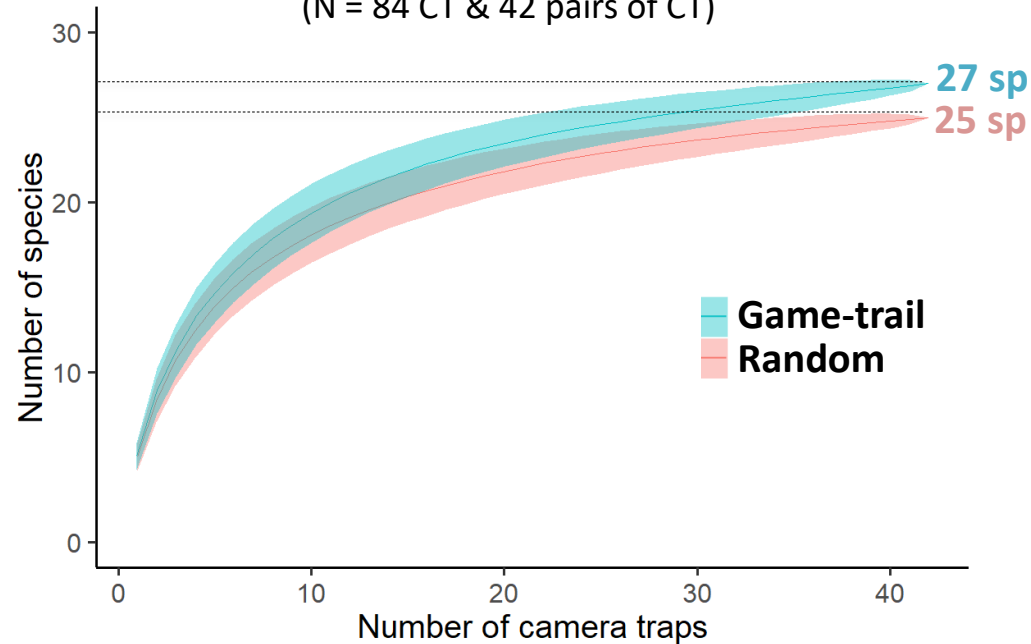
More species detected with a game trail orientation

1

Richness

Rarefied curve of species richness

(N = 84 CT & 42 pairs of CT)



Results

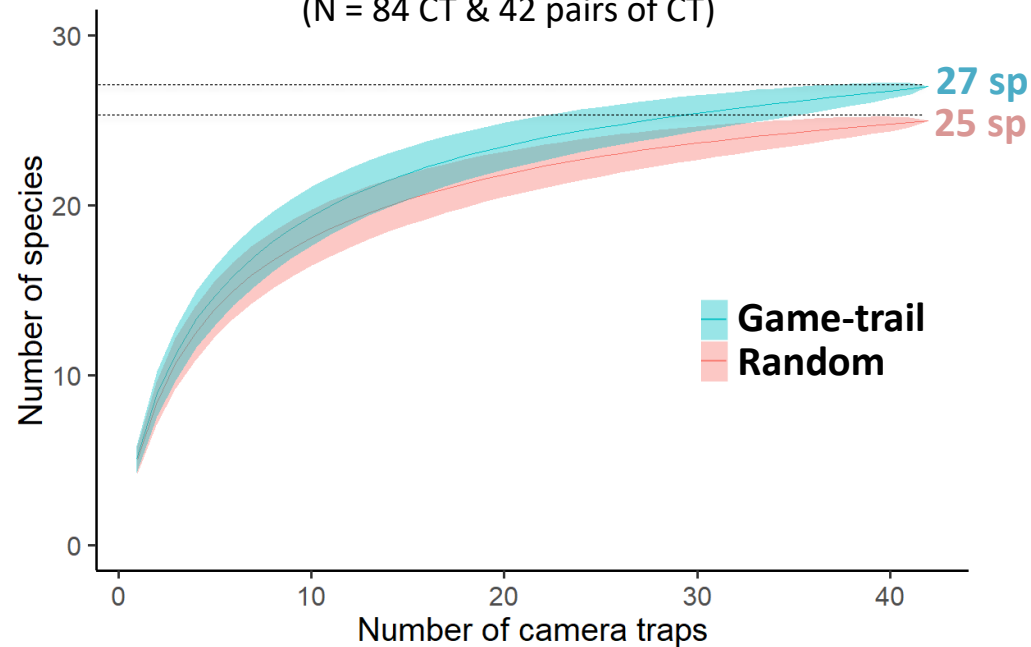
More species detected with a game trail orientation

1

Richness

Rarefied curve of species richness

(N = 84 CT & 42 pairs of CT)



Atherurus africanus	Loxondonta cyclotis
Bdeogale nigripes	Manis gigantea
Cephalophus callipygus	Nandinia binotata
Cephalophus dorsalis	Neotragus batesi
Cephalophus ogilbyi	Pan troglodytes
Cephalophus silvicultor	Orycteropus afer
Cephalophus leucogaster	Panthera pardus
Cephalophus nigrifrons	Phataginus sp.
Civettictis civetta	Philantomba congica
Cricetomys emini	Potamochoeurs porcus
Funisciurus isabella	Profelis aurata
Genetta servalina	Protoxerus stangeri
Gorilla gorilla	Thryonomys swinderianus
Funisciurus isabella	Xenogale naso
Lophocebus albigena	

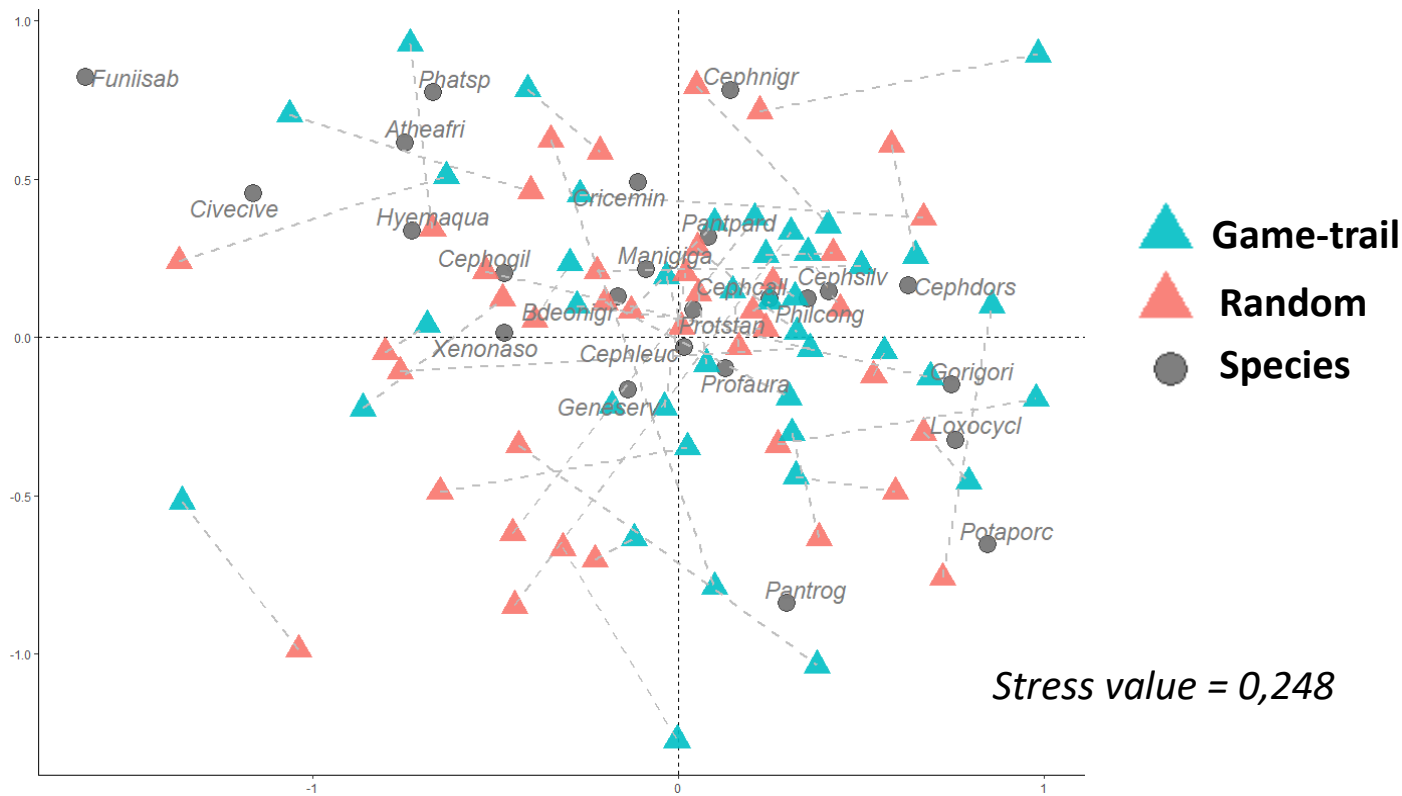
Results

Same community detected at the grid scale but ...

3

Community composition

> 1 sp on CT & >1 CT for sp



Same community detected at the grid scale but ...

Community composition



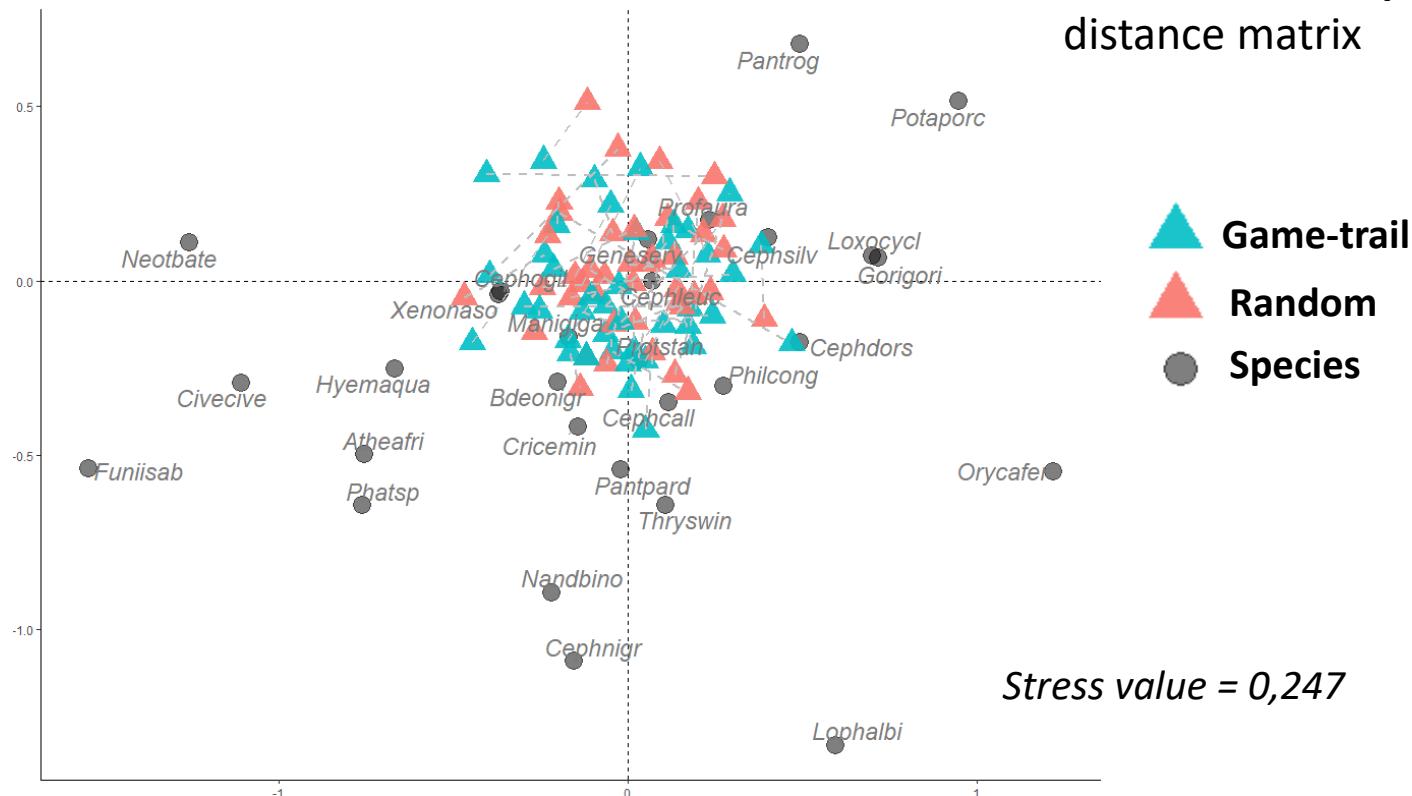
Results

3

Community composition

Same community detected at the grid scale but ...

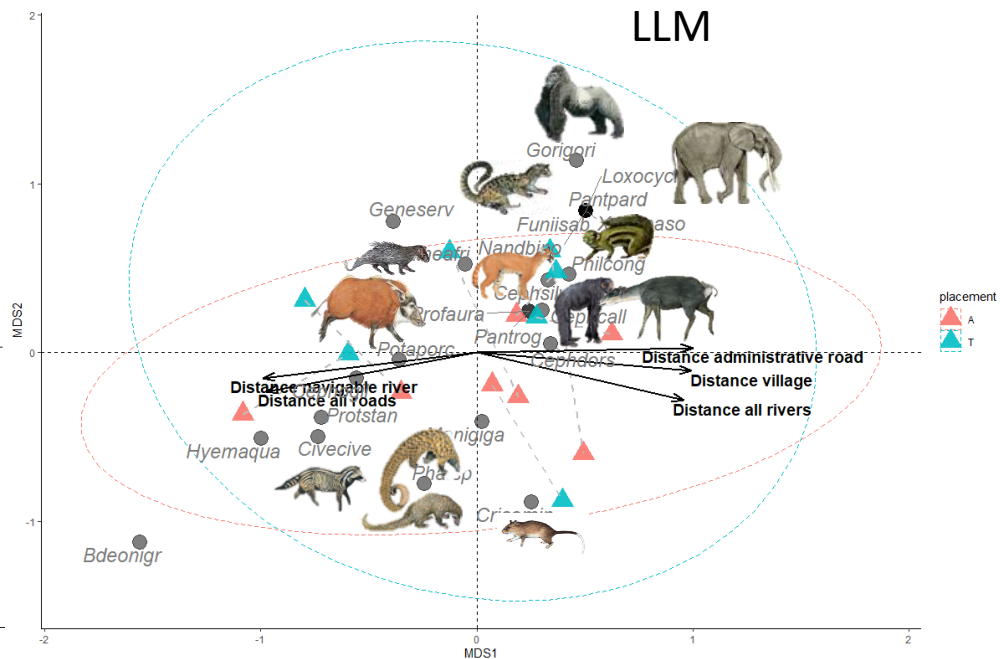
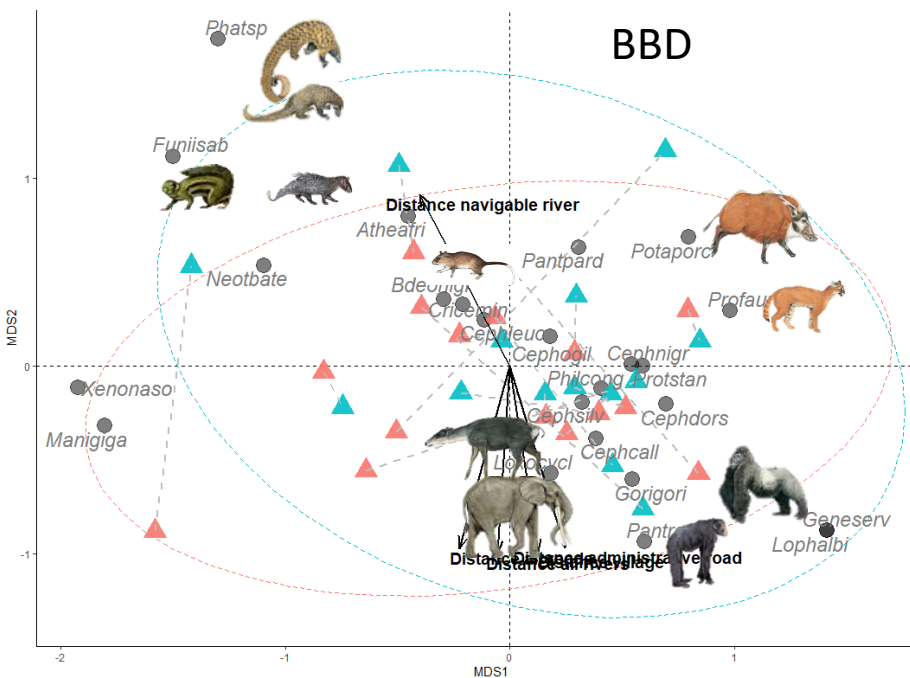
nMDS based on β_{sim} distance matrix



Results

3

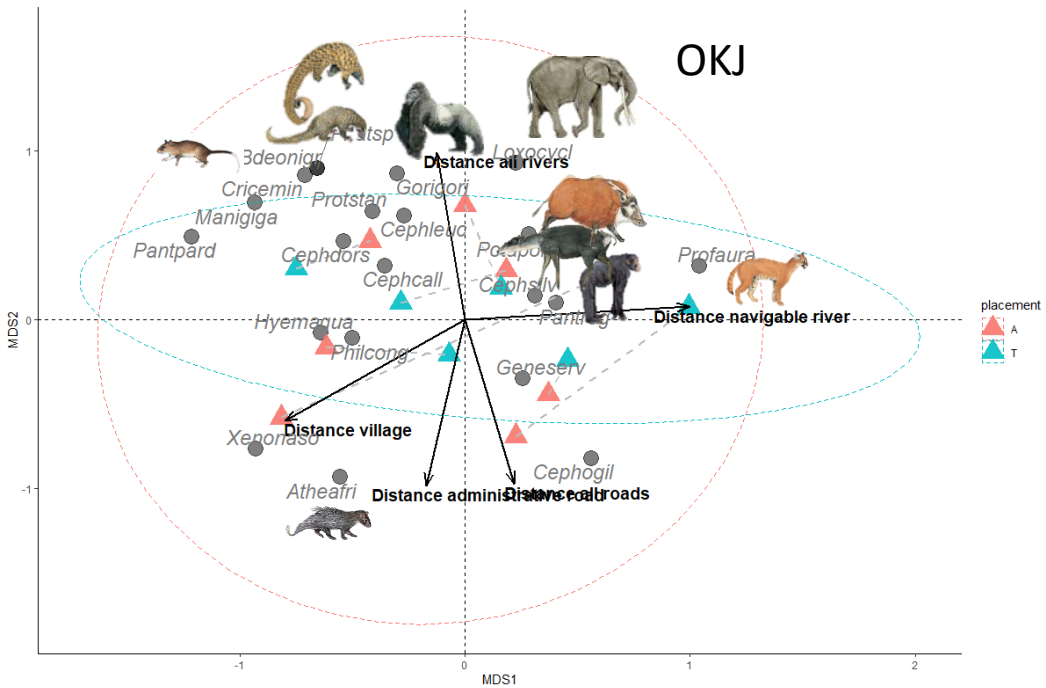
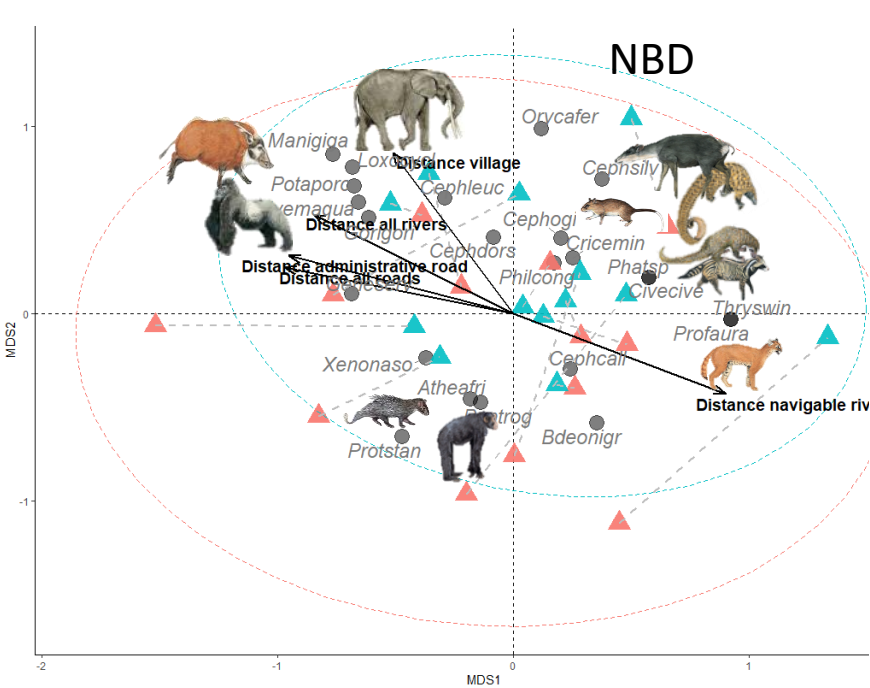
Community composition



Results

3

Community composition



Results

3

Community composition

