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Long-term high densities of African elephants clear the understorey and promote a new stable savanna woodland community

Nicolas Ferry, Stéphane Dray, Hervé Fritz, Audrey Ipavec, Benjamin Wigley, Tristan Charles-dominique, Mathieu Bourgarel, Lovelater Sebele, Marion Valeix

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Supporting information to the paper

Ferry N., et al. Long-term high densities of African elephants clear the understorey and promote a new stable savanna woodland community. *Journal of Vegetation Science*

Appendix S1. GPS location of the twelve vegetation plots monitored (Zone UTM 35S) with distance to the closest waterhole.

Vegetation Type	Plot	GPS.X	GPS.Y	Distance waterhole (m)
Baikiaea plurijuga	B1	483462	7928751	920
Baikiaea plurijuga	B2	483394	7928869	820
Baikiaea plurijuga	B3	483192	7928902	940
Colophospermum mopane	M1	456407	7914882	720
Colophospermum mopane	M2	456132	7914909	840
Colophospermum mopane	M3	456548	7915001	980
Combretum hereroense	C1	490193	7927926	1800
Combretum hereroense	C2	490428	7927842	1700
Combretum hereroense	C3	490554	7927844	1650
Terminalia sericea	T1	514499	7914603	1500
Terminalia sericea	T2	514400	7914627	1640
Terminalia sericea	T3	514308	7914820	1750

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Appendix S2. List of the 26 species contributing to the 90% standing abundance in the plots for which functional traits were gathered.

Species name
Acacia ataxacantha
Acacia erioloba
Acacia fleckii
Acacia luederitzii
Baikiaea plurijuga
Baphia massaiensis
Burkea africana
Colophospermum mopane
Combretum celastroides
Combretum hereroense
Combretum imberbe
Combretum zeyheri
Croton gratissimus
Dalbergia melanoxylon
Dichrostachys cinerea
Diospyros lycioides
Erythrophleum africanum
Grewia flavescens
Grewia monticola
Gymnosporia buxifolia
Gymnosporia senegalensis
Markhamia zanzibarica
Ochna pulchra
Rhus tenuinervis
Terminalia brachystemma
Terminalia sericea

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Appendix S3. Distribution of the different elephant impact types.

Percentage (%) represents the percentage of woody plants suffering of the specified impact among all the plants being used by elephants. As uprooted plants and plants with root utilization were very seldom recorded, we indicate here only the number of individuals recorded with such impacts.

	Number of woody plants	Number of used woody plants	Broken trunk (%)	Browsed (%)	Bark utilization (%)	Uprooted (number of individuals)	Root utilization (number of individuals)
2001	6101	2068	87	21	1	12	1
2008	2456	868	85	37	2.6	2	0
2015	6104	3186	88	58	2.7	5	1

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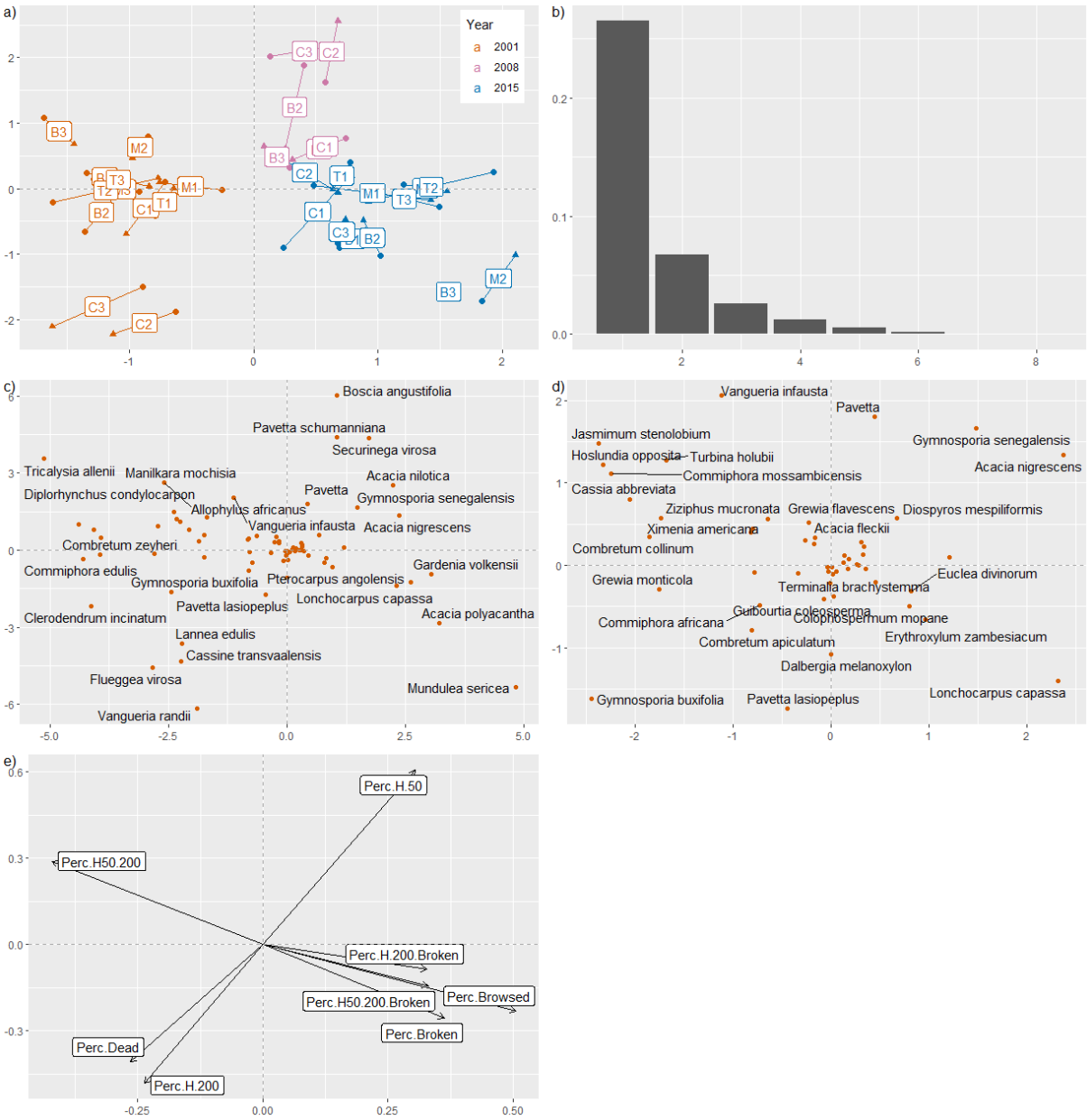
Appendix S4. Outputs of co-inertia analysis for the first two axes.

a) Scores computed as linear combination of plant species. Each plot in each year (e.g. Baikiaea 1 in 2001) is represented by a pair of points linked together. This pair of points represents the two normalized scores calculated from the elephant impact table (round point) and from the vegetation species abundance table (triangle). The first axis mainly highlights a temporal variation in species abundances. b) Eigenvalue barplot, showing that the first axis captures the largest part of the inertia. c) and d) represent the loadings of vegetation species with d) focusing on species experiencing the lower abundance changes (i.e., around the plot origin (0,0)) and which were not displayed in c) for graphical convenience. For visual convenience, these loadings were not represented as arrows but as points. e) Loading of each elephant impact variable used to compute the linear combination. Perc.Broken represents the percentage of tree broken in each plot*year for all height layers, with specific consideration for height layer under 50 cm (Perc.Broken.H50), between 50 and 200 cm (Perc.Broken.H50-200), and higher than 200 cm, (Perc.Broken.H200). Perc.Dead represents the percentage of dead trees, and Perc. H50, Perc. H50-200 and Perc.H200 the percentage of tree in the height layer under 50 cm, between 50 and 200 cm, and higher than 200 cm respectively.


a)
Year
2001
2008
2015
b)
c)
Boscia angustifolia
Pavetta schumanniana
Securinega virosa
Tricalysia allenii
Manilkara mochisia
Acacia nilotica
Diplorhynchus condylocarpon
Pavetta
Gymnosporia senegalensis
Allophylus africanus
Vangueria infausta
Acacia nigrescens
Combretum zeyheri
Commiphora edulis
Gymnosporia buxifolia
Pterocarpus angolensis
Gardenia volkensii
Lonchocarpus capassa
Pavetta lasiopeplus
Acacia polyacantha
Clerodendrum incinatum
Lannea edulis
Cassine transvaalensis
Flueggea virosa
Mundulea sericea
Vangueria randii
d)
Vangueria infausta
Pavetta
Jasmimum stenolobium
Gymnosporia senegalensis
Hoslundia opposita
Turbina holubii
Acacia nigrescens
Commiphora mossambicensis
Cassia abbreviata
Ziziphus mucronata
Grewia flavescens
Diospyros mespiliformis
Ximenia americana
Acacia fleckii
Combretum collinum
Euclea divinorum
Grewia monticola
Terminalia brachystemma
Gurbourtia coleosperma
Commiphora africana
Colophospermum mopane
Combretum apiculatum
Erythroxylum zambesiacum
Dalbergia melanoxylon
Gymnosporia buxifolia
Pavetta lasiopeplus
Lonchocarpus capassa
e)
Perc.H.50
Perc.H50.200
Perc.H.200.Broken
Perc.Browsed
Perc.H50.200.Broken
Perc.Broken
Perc.Dead
Perc.H.200

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Appendix S5. Total number of woody plants per plot per year a) lower than 50cm height, b) between 50cm and 200cm height and c) higher than 200cm height.

a)

	B1	B2	B3	C1	C2	C3	M1	M2	M3	T1	T2	T3
2001	64	35	11	19	5	6	280	46	50	10	20	10
2015	65	57	11	81	37	35	366	84	159	101	72	32

b)

	B1	B2	B3	C1	C2	C3	M1	M2	M3	T1	T2	T3
2001	499	197	167	241	162	182	812	383	405	222	278	213
2015	520	181	121	248	346	264	787	347	346	152	159	264

c)

	B1	B2	B3	C1	C2	C3	M1	M2	M3	T1	T2	T3
2001	247	100	98	132	239	133	47	115	111	183	281	255
2015	183	93	108	107	138	98	58	110	70	113	146	139

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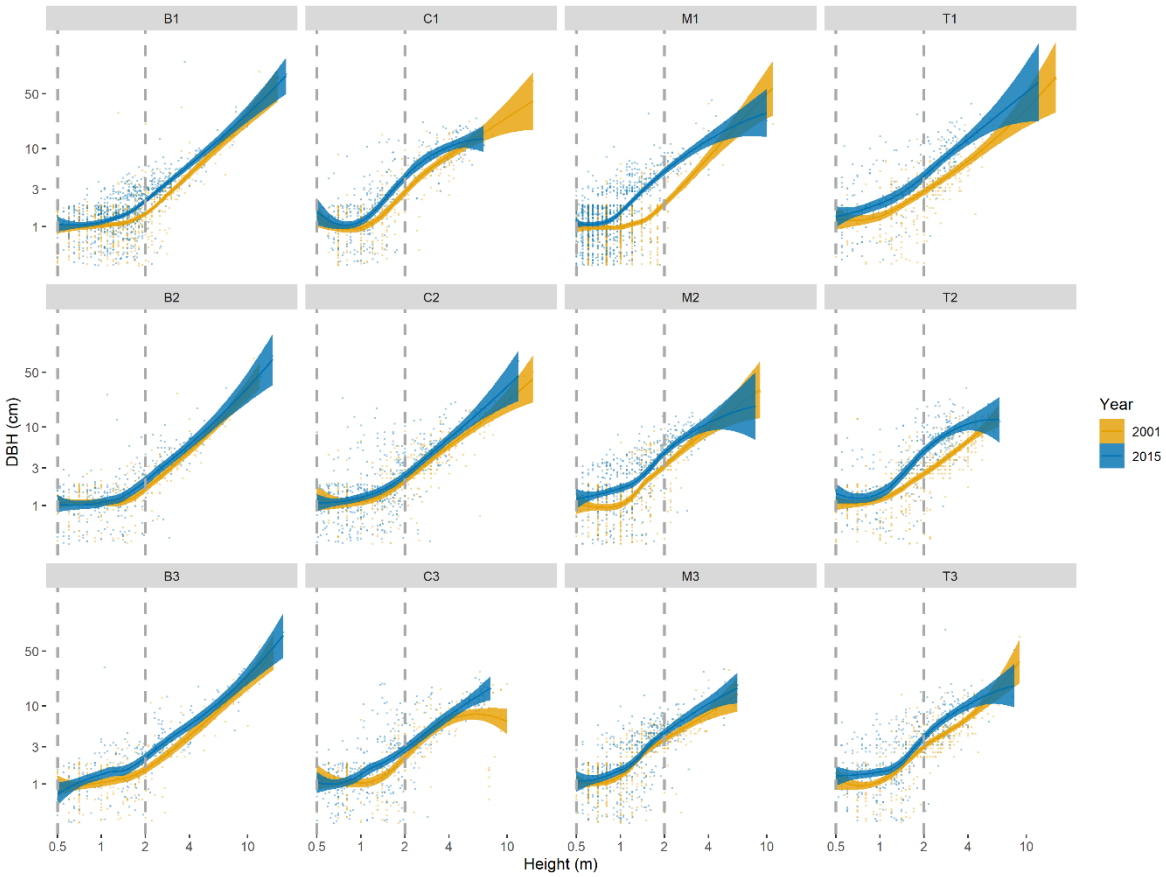
Appendix S6. Graph of log-transformed DBH in function of log-transformed height of all woody plants.

Representation of the log-transformed DBH in function of log-transformed height of all plants for the three plots monitored for each of the four vegetation types (B = *Baikiaea plurijuga* woodland, C = *Combretum* bushed-woodland, M = *Colophospermum mopane* bushland and T = *Acacia/Terminalia* bushed-woodland). Predicted values with confidence interval (using local polynomial regression fitting "loess" smoothing method) are represented in orange for 2001 and in blue for 2015. Vertical lines indicate the heights of 50 cm and 200 cm respectively.