



Elephants in Bwindi are selective concerning where, how and on what they feed

By

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Summary

- Feeding damage by elephants appears to be increasing
- Review of elephant selectivity
- Fresh elephant trails were followed; tree damage documented systematically (20x4 m plots)
- Out of 897 trees, 542 (60.4%) were intact, 22 (2.5%) debarked, 274 (30.5%) toppled and 172 (19.2%) had broken branches
- Damage by elephants may be providing conducive habitats for other species





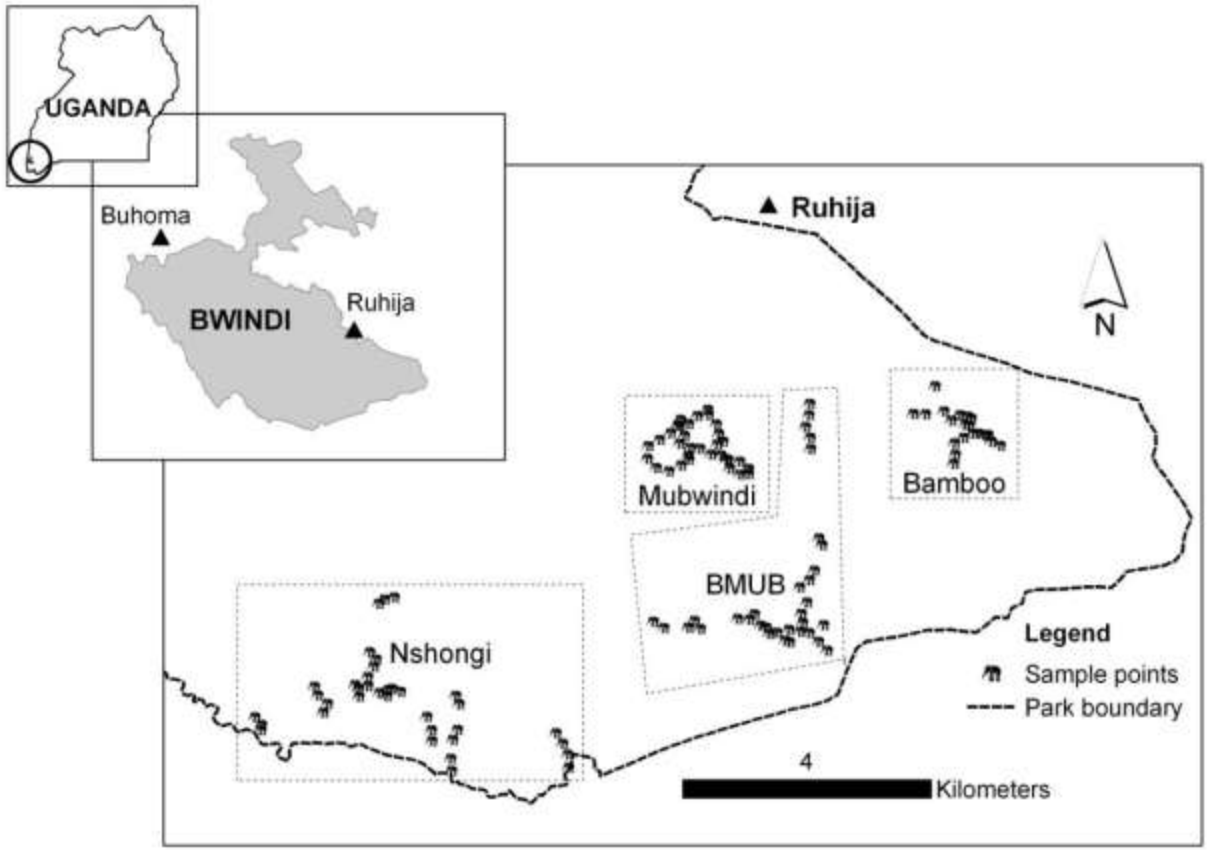
Background con't

- Human activities have forced elephants to alter their traditional ranges; now concentrated in PAs
- Elephants are important as agents of seed dispersal and habitat modification
- Nonetheless, elephant impacts are only partially understood especially for forests
- Some plant species appear selected by elephants in forests and woodlands
- Elephants in Bwindi are little studied (Butynski, 1986; Babaasa, 1994, 2000); their impacts remain poorly understood
- The population of elephants in Bwindi is increasing i.e. 20 (Butynski, 1984), 22 (Babaasa, 1994) and 40-50 (Plumptre *et al*., 2008)
- The study on feeding damage impacts by elephants can help in understanding plant community trends





Methods and Materials







Methods and analyses

- Field work was conducted between September and November 2009
- Feeding signs of elephants were recorded along fresh trails
- A series of 20x4 m were laid out at 200 m intervals; site characteristics were also recorded
- Plant identification was by the ITFC herbarium specialist
- Chi-square tests were used in initial evaluations
- Preference Ratio was calculated following Viljoen (1989) whereby

  Preference Ratio = Percent utilization/percent availability
- Generalised linear models (GLMs) were fitted using R version 2.6.0, with a logit link function to estimate the probability of a stem being damaged by elephants





Results

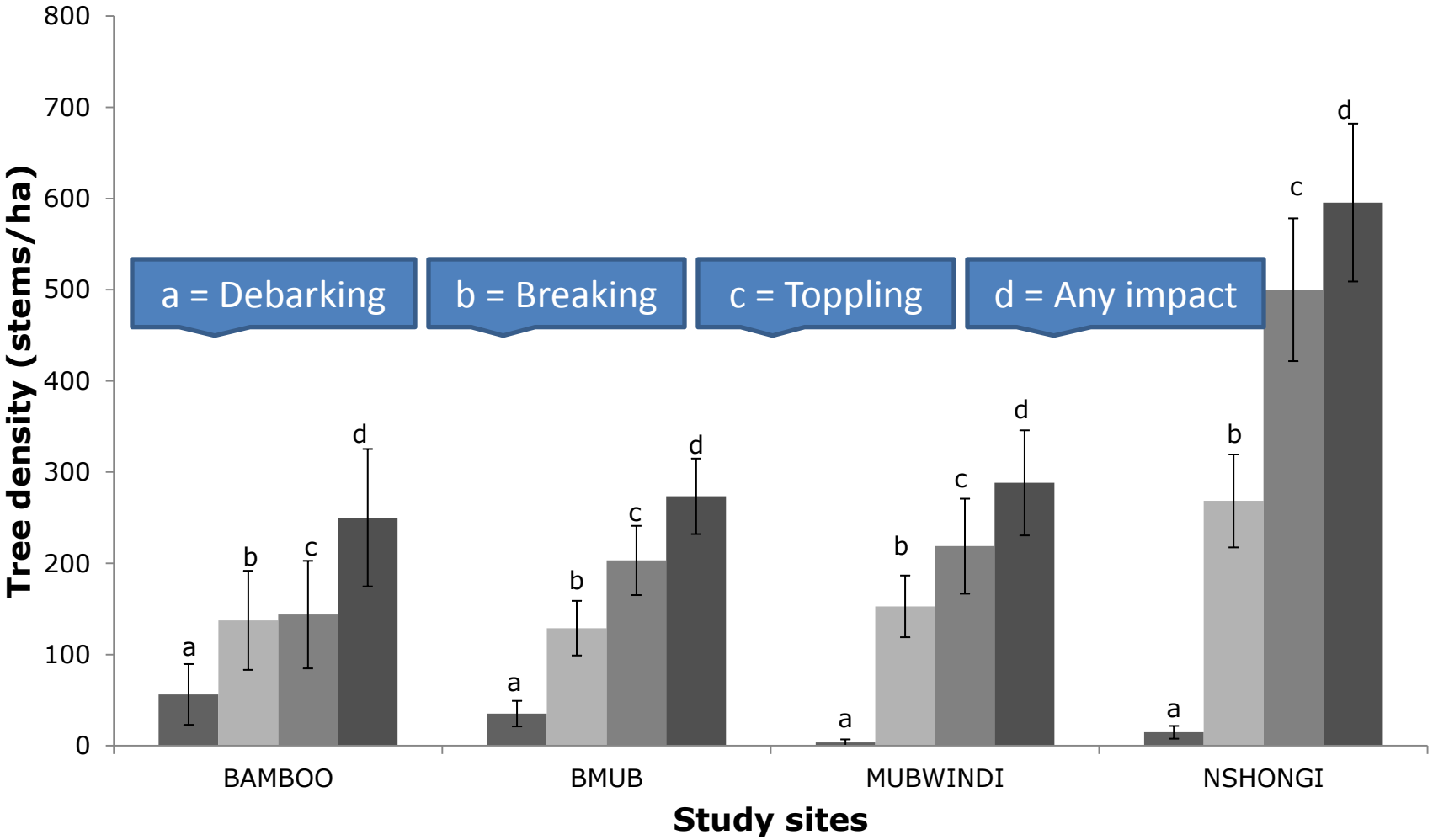
❖ General summary

- Total of 122 sample strips (sum=0.976 ha)
- 897 stems (dbh ≥ 2 cm) representing 55 species were recorded
- 623 stems were saplings (Dbh 2- 9.9 cm) representing 48 species
- 245 stems were big trees (Dbh ≥ 10 cm) representing 45 species
- The most abundant species (n=55) were *Neoboutonia macrocalyx*, *Galiniera saxifraga* and *Xymalos monospora*
- Overall, 542 (60.4%) intact, 22 (2.5%) debarked, 274 (30.5%) toppled and 172 broken stems (19.2%) were studied





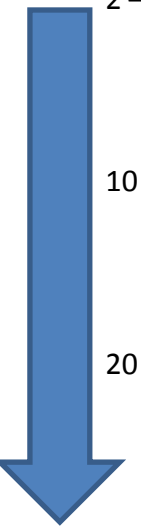
Sites favoured by elephants

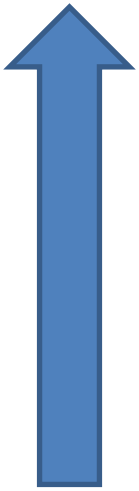


Preference ratios for any elephant impact across tree size classes

Size class	Available absolute	Utilized absolute	Available proportion	Utilized proportion	Preference ratio
2 – 9.9 cm*	623	304	0.705	0.856	1.22
10 – 19.9 cm	120	33	0.136	0.093	0.68
20 – 29.9 cm	50	9	0.057	0.025	0.45
≥ 30cm	91	9	0.103	0.025	0.25

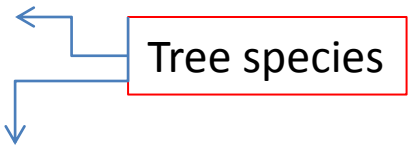
Selected





Seeds recovered from elephant dung across sites

Species	Number of dung piles	Number of seeds	Seeds per dung pile
Allophyllus griseotomentosus	2	19	9.5
Lagnaria sphaerica	28	110	3.9
Solanum anguivii	7	17	2.4
Ampelocissus africana	7	12	1.7
Myrianthus holstii	5	6	1.2
Galiniera saxifraga	3	3	1.0
Unidentified (damaged)	4	5	1.25



Saplings with their selection ratios from studies in Kibale and Bwindi forests

	Kibale author		**Bwindi author**	
Species	Kasenene (1980&1984)[a]	Lwanga (1994)[b]	Babaasa (1994)[c]	This study (2010)[d]
Newtonia buchananii	1.77	5.75	0.54	2.05
Chrysophyllum ssp	1.559	5.75	NS	1.91
Strombosia scheffleri	1.31	5.75	NS	1.45
Psychotria ssp	NS	0	NS	0.90
Teclea nobilis	0.36	0	0.66	0.41
Cassipourea ssp	1.363	0	NS	0.60
Myrianthus ssp	NS	0	NS	2.05
Symphonia globulifera	0.938	NS	NS	1.31
Macaranga kilimandscharica	NS	NS	0.95	1.75
Alangium chinense	NS	NS	1.69	2.09

Note: NS = none in sample, [a]0.5 m tall to ≤ 12.7 cm dbh, [b]≥ 1.0 - < 14 cm dbh, [c]≥ 2.0 cm dbh and [d]2.0 - < 10 cm dbh

Implications

- ❖ This study, and previous studies show that elephants preferentially damage small trees
- \- Implications: Elephants may selectively disadvantage or benefit certain species
- ❖ The preferred species were mid-successional species

  -Implications:As elephant numbers increase, mid-successional species may be depleted
- ❖ Babaasa (2000) found only 17.0% damage (71/417 principal food trees). This study found 61.4% damage (127/207 similar trees). Correcting for differences in strip width, our data would give 24.6% damage.

  - Implication: The intensity of elephant damage has increased.

Synthesis and recommendations

- Synthesis: The increase in damage can be attributed to the increasing population of elephants.
- Prediction: If population continues to grow, we predict that elephants will have an increasing influence on plants and animals including endemics
- Recommendations:

  - Monitoring of vegetation is needed to evaluate the effects of elephants.

  - Further clarification of how elephants contribute to or subtract from other conservation values