

**Factors affecting nest height and ground nesting behaviour in
Eastern chimpanzees (*Pan troglodytes schweinfurthii*) of the northern
Democratic Republic of the Congo**

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Supplementary material

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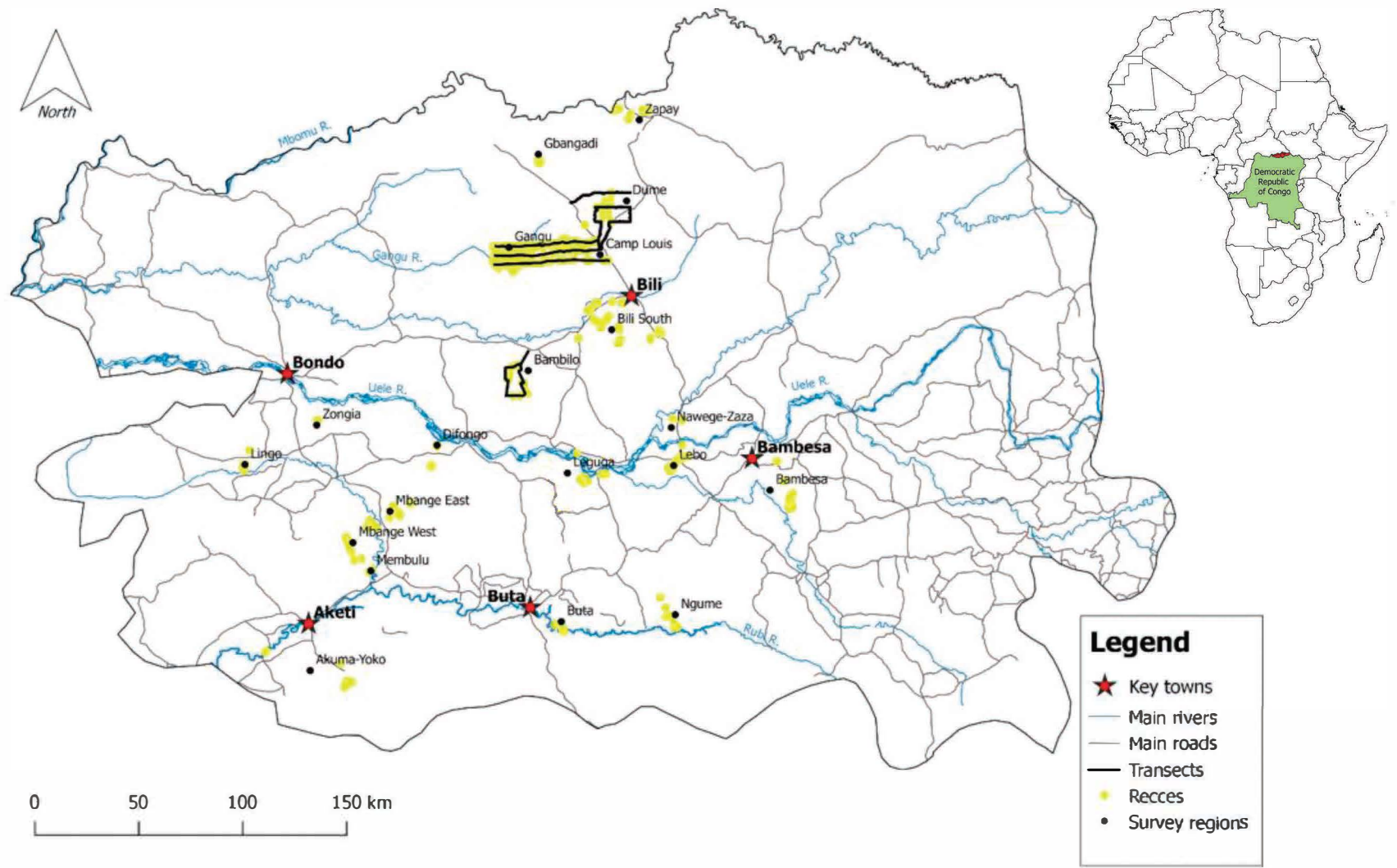


Figure 1. Location of the surveyed areas within the Bili-Uere landscape. See supplementary table S2, Hicks *et al.* (2014, 2019a, and 2020) for further details.

Table S2. Numbers and ratios of ground nest groups and ground nests found out of total numbers of nest groups and nests in the Bili-Uéré Landscape, DRC.

Study area	Time period	Km walked per area	No. GN sites / total no. nest groups	Ratio GN sites / nest groups (%)	No. GN / total no. nests	Ratio GN / nests (%)
Camp Louis total	Aug 04–Jul 05, Aug 06–Feb 07, Jul 12–Mar 13	1,421.6	59 / 303	19.5	86 / 739	11.6
Camp Louis transects	March–July 05, Aug–Sept 12	114.5	24 / 146	16.4	37 / 317	11.7
Camp Louis recces	Aug 04–Jul 05, Aug 06–Feb 07, Jul 12–Mar 13	1,307.1	35 / 157	22.3	49 / 422	11.6
Gangu total	Mar 05–Jun 05, Aug 06–Feb 07, Jul 12–Mar 13	949.4	60 / 393	14.9	119 / 934	12.7
Gangu transects	March–July 05, Aug–Sept 12	71.5	23 / 144	16.0	41 / 390	10.5
Gangu recces	Mar 05–Jun 05, Aug 06–Feb 07, Jul 12–Mar 13	877.9	37 / 249	15.3	78 / 544	14.3
Bili South	Jul 06–Nov 06	205.0	4 / 58	6.9	6 / 115	5.2
Zapay	Dec 06	49.9	8 / 68	11.8	10 / 128	7.8
Gbangadi	Dec 06	31.7	3 / 32	9.4	3 / 98	3.1
Nawege-Zaza	Sept 06, Aug 08	21.7	0 / 11	0.0	0 / 32	0.0
Dume total	Aug–Sept 12	102.6	2 / 13	15.4	6 / 26	23.1
Dume transects	Aug–Sept 12	27.0	0 / 4	0.0	0 / 6	0.0
Dume recces	Aug–Sept 12	75.6	2 / 9	22.2	6 / 20	30.0
Bambilo total	Oct 12	76.2	1 / 23	4.3	1 / 55	1.8
Bambilo transects	Oct 12	18.0	0 / 6	0.0	0 / 11	0.0
Bambilo recces	Oct 12	58.2	1 / 17	5.9	1 / 44	2.3
N Uele Total	Aug 04–Mar 13	2,858.1	137 / 901	15.2	231 / 2,127	10.9
Leguga	Mar 08	48.5	19 / 48	39.6	33 / 115	28.7
Buta	Sept 08	25.6	0 / 15	0.0	0 / 27	0.0
Ngume	Sept–Oct 08	37.5	0 / 16	0.0	0 / 28	0.0
Akuma - Yoko	Jun 08, Nov 08	22.4	2 / 21	9.5	2 / 37	5.4
Mbange E	Jan 08	80.9	1 / 47	2.1	1 / 92	1.1
Mbange W	Jan 08–Feb 08	45.5	0 / 32	0.0	0 / 69	0.0
Lingo	Nov 07	38.5	0 / 24	0.0	0 / 40	0.0
Zongia	Nov 07	35.7	2 / 18	11.1	3 / 31	9.7
Difongo	Feb 09	33.8	3 / 5	60.0	3 / 23	13.0
Membulu	Feb 09	2.0	1 / 3	33.3	1 / 18	5.6
Lebo	Sept 06, Aug 08	41.3	3 / 69	4.4	3 / 166	1.8
Bambesa	April–May 08	65.0	11 / 78	14.1	34 / 218	15.6
S of Uele Total	Sept 06–Mar 13	476.7	42 / 376	11.2	80 / 864	9.3
Total	Aug 04–Mar 13	3,334.8	179 / 1,277	14.0	311 / 2,991	10.4

Km in Dume and Camp Louis are slightly different from Hicks *et al.* (2019a) as we have reclassified 9.03 km of the Nambala recces from Camp Louis to Dume. The number of nests differs from those in table 4 and other supplementary materials because here we omit nests which were found by locals and to which we were led (see supplementary table S7 for more details on number of nests per nest group).

TH was not present for the surveys of Bambilo, Dume, Membulu, and Difongo, but the teams were led by experienced researchers who had trained with TH, and thus we have used the nest encounter rates from these areas in the paper.

GN, ground nest.

Table S3. Numbers and encounter rates per km (in bold) of carnivores, large herbivores (elephant and buffalo), human (non-hunting) signs and human hunting evidence.

Site	Km walked fauna	Carnivore signs (No. & / km)	Lion signs (No. & / km)	Hyena signs (No. & / km)	Leopard signs (No. & / km)	Elephant signs (No. & / km)	Buffalo signs (No. & / km)	Km walked humans	Hunting evidence (No. & / km)	Other signs humans (No. & / km)
Camp Louis	1,421.6 ¹	41 0.03	1 0.001	18 0.01	22 0.02	236 0.17	34 0.16	1,120.2	16 0.01	116 0.10
Gangu	948.5 ¹	31 0.03	1 0.001	8 0.01	22 0.02	1,037 1.09	31 0.05	940.0	36 0.04	127 0.14
Bili South	205.0	6 0.03	0 0.00	1 0.005	5 0.02	23 0.11	20 0.10	87.6	29 0.33	104 1.19
Zapay	49.9	4 0.08	0 0.00	4 0.08	0 0.00	0 0.00	6 0.12	49.9	9 0.18	19 0.38
Gbangadi	31.7	4 0.13	0 0.00	0 0.00	4 0.13	2 0.06	0 0.00	31.7	0 0.00	19 0.60
Nawege-Zaza	21.7	0 0.00	0 0.00	0 0.00	0 0.00	2 0.09	1 0.05	21.7	1 0.05	6 0.28
Dume	102.6	2 0.02	0 0.00	1 0.01	1 0.01	16 0.16	4 0.04	102.6	32 0.31	56 0.55
Bambilo	76.2	2 0.03	0 0.00	0 0.00	2 0.03	29 0.38	3 0.04	77.7	29 0.37	42 0.54
N Uele total	2,990.0	90 0.03	2 0.001	32 0.01	56 0.02	1,345 0.45	99 0.03	2,440.6	151 0.06	464 0.19
Leguga	48.5	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	2 0.04	48.5	13 0.27	124 0.29
Buta	25.6	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	25.6	4 0.16	14 0.55
Ngume	39.4	4 0.10	0 0.00	0 0.00	4 0.10	1 0.03	0 0.00	39.4	6 0.79	28 0.71
Akuma-Yoko	24.5	0 0.00	0 0.00	0 0.00	0 0.00	1 0.04	0 0.00	23.5	29 1.23	17 0.72
Mbange East	80.9	2 0.03	0 0.00	0 0.00	2 0.03	42 0.52	0 0.00	80.9	10 0.12	8 0.10
Mbange West	45.5	0	0	0	0	7	1	45.5	38	128

0.00 0.00 0.00 0.00 0.15 0.02 0.84 2.81

Continued from table S3.

Site	Km walked fauna	Carnivore signs (No. & / km)	Lion signs (No. & / km)	Hyena signs (No. & / km)	Leopard signs (No. & / km)	Elephant signs (No. & / km)	Buffalo signs (No. & / km)	Km walked humans	Hunting evidence (No. & / km)	Other signs humans (No. & / km)
Lingo	38.5	0 0.00	0 0.00	0 0.00	0 0.00	2 0.05	0 0.00	38.5	106 2.75	72 1.87
Zongia	35.7	1 0.03	0 0.00	0 0.00	1 0.03	8 0.22	0 0.00	35.7	15 0.42	21 0.59
Lebo	41.3	2 0.05	0 0.00	0 0.00	2 0.05	1 0.02	1 0.02	31.0	31 1.00	92 2.97
Bambesa	65.0	5 0.08	0 0.00	0 0.00	5 0.08	26 0.40	0 0.00	65.0	11 0.17	25 0.39
S Uele total	444.4	14 0.03	0 0.00	0 0.00	14 0.03	88 0.20	4 0.01	433.6	263 0.61	529 1.22
Total	3,434.4	104 0.03	2 0.001	32 0.01	70 0.02	1,433 0.42	103 0.03	2,874.2	414 0.14	993 0.35

¹km used for the buffalo encounter rates in Camp Louis (208.5 km) and Gangu (612.6 km) differ because we include here only the 2012 data (see Hicks [2014] for details).

Note: Elephant recce encounter rates include one contact with an elephant in Camp Louis. Leopard (transect) and hyena (recce) data for Gangu also each include one contact. The buffalo sign at Mbange West was the carcass of an adult that had been killed by a Nile crocodile.

Reference

Hicks TC (2014). Faunal diversity and human impact in two protected areas of northern DR Congo: Bili-Uéré and Rubi-Télé. Lukuru Foundation, USFWS Final Report 169.

Table S4. Nest occurrence and percentages (in bold) in the different habitat types. See table 2 for definitions of the habitat types.

		Active field	Old field / Regenerating forest	Secondary forest	Mixed forest	Riparian forest	Swamp forest	<i>Gilbertiodendron</i> monodominant	Savanna forest	Total
North Uele	All nests	0	47	3	1094	512	247	117	10	2,030
		0	2.3	0.2	53.9	25.2	12.2	5.8	0.5	–
	TNs	0	47	2	972	466	247	115	8	1,857
		0	2.5	0.1	52.3	25.1	13.3	6.2	0.4	–
	GNs	0	0	1	122	46	0	2	2	173
		0	0	0.6	70.5	26.6	0	1.2	1.2	–
South Uele	All nests	11	0	0	355	52	52	419	0	889
		1.2	0	0	39.9	5.9	5.9	47.1	0	–
	TNs	11	0	0	293	51	19	396	0	770
		1.4	0	0	38.1	6.6	2.5	51.4	0	–
	GNs	0	0	0	62	1	33	23	0	119
		0	0	0	52.1	0.8	27.7	19.3	0	–
Total	All nests	11	47	3	1,449	564	299	536	10	2,919
		0.4	1.6	0.1	49.6	19.3	10.2	18.4	0.3	–
	TNs	11	47	2	1,265	517	266	511	8	2,627
		0.4	1.8	0.001	48.2	19.7	10.1	19.5	0.3	-
	GNs	0	0	1	184	47	33	25	2	292
		0	0	0.3	63.0	16.1	11.3	8.6	0.7	–

We included here only those nests for which we had collected information on habitat.

GNs, ground nests; TNs, tree nests.

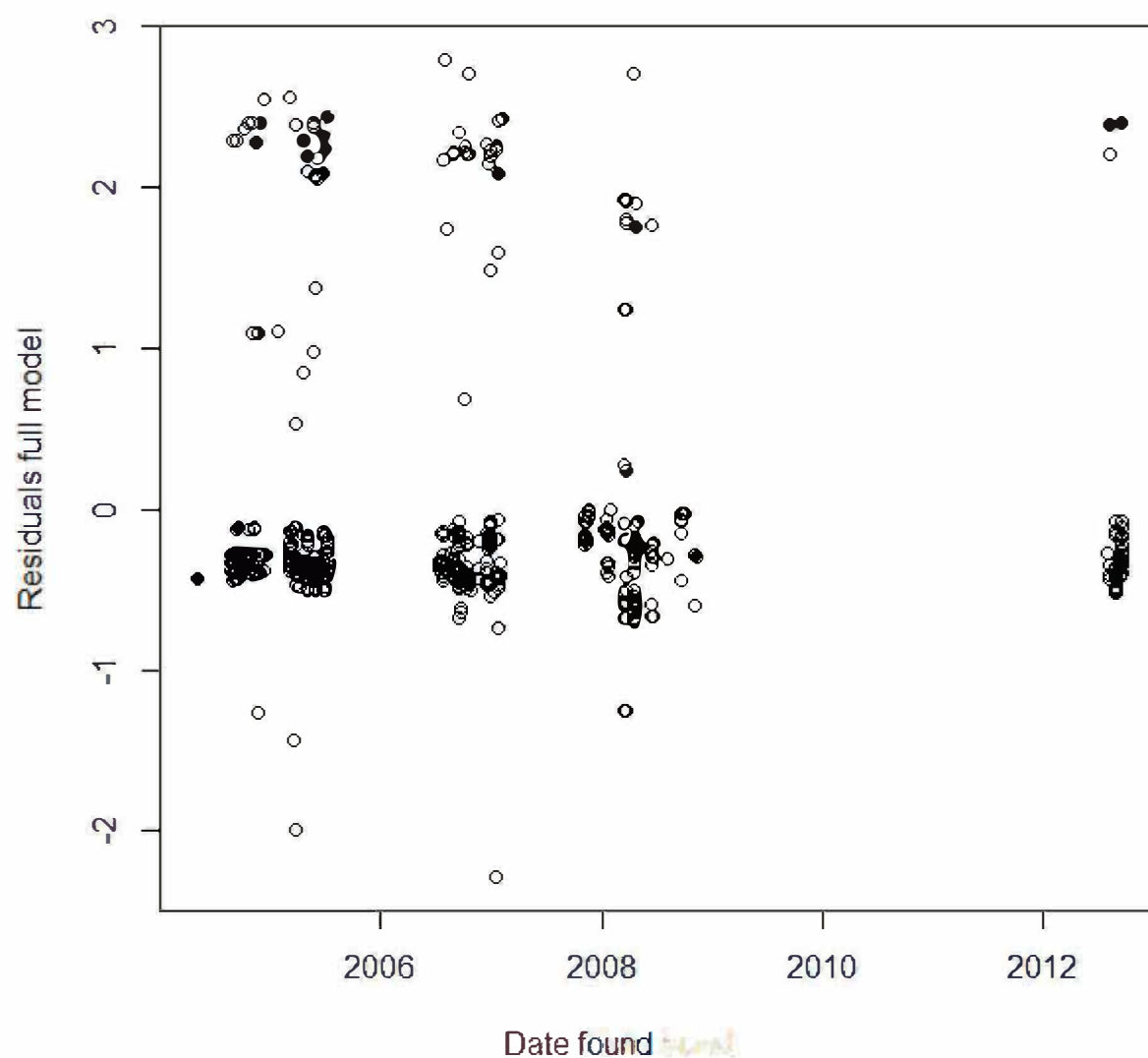


Figure S2. Model 1a: Residuals of the full model as a function of date. Note that there is no clustering in the residuals such that larger values concentrate in some periods and smaller values in others (as would be expected if ground nest building would be particularly common during some parts of the year).

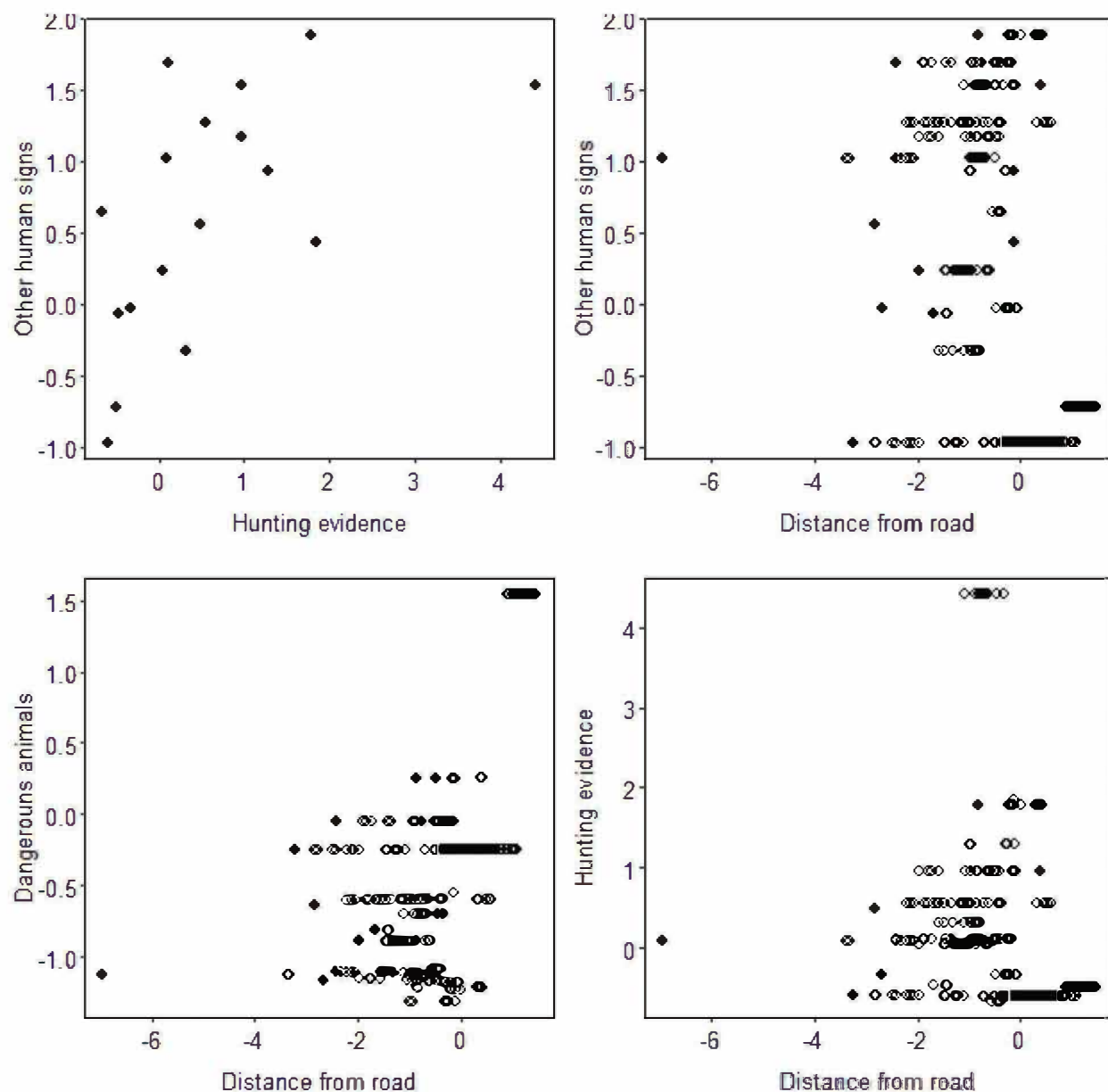


Figure S3. Scatterplots used in Model 1a to check for collinearity between hunting evidence and other human signs, distance from road and dangerous animals and/ or hunting evidence and other human signs.

Table S6. Model 1: Results of the models excluding (a) hunting evidence and (b) other human signs and (c) with combination of, respectively, human (hunting signs and otherwise) and dangerous animals (predators and large herbivores) signs (Model 1b).

(a)

Term	est	SE	χ^2 ^a	P
(Intercept)	-2.938	0.166	—	—
Hillside	-1.143	1.025	-1.115	0.265
Herb patch	2.159	0.465	4.644	< 0.001
Light gap	2.619	0.583	4.491	< 0.001
Forest density	0.352	0.124	2.846	0.004
Distance from road	0.295	0.266	1.107	0.268
Other signs (humans)	-0.566	0.202	-2.796	0.005
Carnivores	-0.037	0.168	-0.218	0.827
Large herbivores	-0.081	0.222	-0.365	0.715

(b)

Term	est	SE	χ^2 ^a	P
(Intercept)	-3.146	0.207	—	—
Hillside	-1.045	1.027	-1.017	0.309
Herb patch	2.304	0.496	4.643	< 0.001
Light gap	2.561	0.598	4.287	< 0.001
Forest density	0.358	0.124	2.888	0.004
Distance from road	0.257	0.257	0.999	0.318
Hunting evidence	-1.248	0.376	-3.319	0.001
Carnivores	-0.216	0.163	-1.324	0.186
Large herbivores	-0.084	0.219	-0.385	0.700

(c)

Term	est	SE	χ^2 ^a	P
(Intercept)	-2.949	0.167	—	—
Hillside	-1.104	1.026	-1.076	0.282
Herb patch	2.218	0.464	4.783	< 0.001
Light gap	2.581	0.585	4.413	< 0.001
Forest density ¹	0.354	0.123	2.881	0.004
Distance from road ²	0.293	0.261	1.122	0.262
Humans ³	-0.594	0.193	-3.075	0.002
Dangerous animals ⁴	-0.082	0.215	-0.383	0.702

^a χ^2 values from a likelihood ratio test. df was 1 in all cases.

¹ z-transformed to a mean of 0 and a standard deviation of 1; mean and sd of the original variable were 2.01 and 0.59, respectively.

² Log and z-transformed to a mean of 0 and a standard deviation of 1; mean and sd of the logged variable were 2.28 and 0.99, respectively.

³ Log and z-transformed to a mean of 0 and a standard deviation of 1; mean and sd of the logged variable were -0.96 and 1.16, respectively.

⁴ Log and z-transformed to a mean of 0 and a standard deviation of 1; mean and sd of the logged variable were 0.38 and 0.26, respectively.

Table S7. Number of tree nests and ground nests per nest groups in the surveyed forest areas (see supplementary table S2 for more details on the surveys).

Survey area	No. nest groups	No. nests	No. GNs	No. nest groups w GNs	No. lone GNs	No. lone TNs	No. GN groups w at least 1 TN	No. nest groups w ≥ 1 GN, no TNs	No. nest groups w ≥ 5 GN
Camp Louis	303	739	86	59	20	126	29	27	1
Gangu	393	934	119	60	19	194	26	15	4
Bili South	58	115	6	4	1	28	1	2	0
Zapay	68	128	10	8	3	33	4	4	0
Gbangadi	32	98	3	3	1	12	2	1	0
Nawege-Zaza	11	32	0	0	0	7	0	0	0
Dume	13	26	6	2	1	7	0	2	1
Bambilo	23	55	1	1	0	13	1	0	0
Tot N Uele	901	2,127	231	137	45	420	63	51	6
Leguga	48	115	33	19	6	17	6	13	0
Buta	15	27	0	0	0	11	0	0	0
Ngume	16	28	0	0	0	10	0	0	0
Akuma-Yoko	21	37	2	2	1	11	1	1	0
Mbange East	47	92	1	1	0	27	1	0	0
Mbange West	32	69	0	0	0	13	0	0	0
Lingo	24	40	0	0	0	17	0	0	0
Zongia	18	31	3	2	0	11	2	0	0
Difongo	5	23	3	3	2	0	1	0	0
Membulu	3	18	1	1	0	0	1	0	0
Lebo	69	166	3	3	1	35	2	1	0
Bambesa	78	218	34	11	2	41	9	1	2
Tot S Uele	376	864	80	42	12	193	23	16	2
Total	1,277	2,991	311	179	57	613	86	67	8

GNs, ground nests; TNs, tree nests

Table S8. Numbers of ground nests per nest group.

	Number	%
Total nest groups	1,277	–
GN groups	179	14
GN groups without TNs	93	52
GN groups with only 1 GN	114	64
GN groups with 2 or more GNs	65	36
GN groups with 3 or more GNs	24	13
GN groups with 4 or more GNs	13	7
GN groups with 5 or more GNs	8	5
GN groups with 8 or more GNs	4	2
GN groups with 9 or more GNs	3	2
GN groups with 12 or more GNs	2	1
GN, ground nest; TNs, tree nests.		

Table S9. Average nest height above the ground in the different survey areas including and excluding ground nests.

Survey area	No. total nests	No. TNs	mean (m) [GNs excluded]	SE	min (m)	max (m)	median (m)	No. GNs	mean (m) [GNs included]	SE	min (m)	max (m)	median (m)
Camp Louis	719	631	9.6	6.8	0.6	35.0	7.0	88	8.4	7.1	0.0	35.0	6.5
Gangu	750	631	10.2	5.5	0.6	40.0	8.5	119	8.6	6.3	0.0	40.0	8.0
Bili South	102	95	11.9	5.1	1.7	28.0	11.0	7	11.1	5.8	0.0	28.0	11.0
Zapay	124	114	11.1	6.1	2.5	28.0	8.0	10	10.2	6.6	0.0	28.0	8.0
Gbangadi	85	82	10.9	5.5	1.9	28.0	10.0	3	10.5	5.8	0.0	28.0	10.0
Nawege-Zaza	31	31	8.1	3.8	2.5	18.0	8.0	0	8.1	3.8	2.5	18.0	8.0
Dume	18	12	11.2	9.4	2.0	30.0	7.5	6	7.5	9.3	0.0	30.0	5.0
Bambilo	—	—	—	—	—	—	—	—	—	—	—	—	—
N Uele total	1,829	1,596	10.4	1.7	0.6	40.0	8.0	233	9.2	1.7	0.0	40.0	8.0
Leguga	116	83	10.5	6.0	4.5	30.0	8.0	33	7.5	6.9	0.0	30.0	7.0
Buta	39	39	15.9	5.5	6.5	28.0	15.0	0	15.9	5.5	6.5	28.0	15.0
Ngume	30	30	9.9	2.5	4.0	15.0	10.0	0	9.9	2.5	4.0	15.0	10.0
Akuma -Yoko	37	35	13.9	7.3	6.5	27.0	10.0	2	13.2	7.8	0.0	27.0	10.0
Mbange East	91	90	9.5	3.8	2.1	23.0	8.8	0	9.4	3.9	0.0	23.0	8.5
Mbange West	67	67	11.3	5.5	5.0	30.0	9.5	0	11.3	5.5	5.0	30.0	9.5
Lingo	36	36	13.6	6.7	6.0	30.0	11.0	0	13.6	6.7	6.0	30.0	11.0
Zongia	27	24	7.9	3.1	3.0	15.0	7.0	3	7.0	3.8	0.0	15.0	7.0
Difongo	—	—	—	—	—	—	—	—	—	—	—	—	—
Membulu	—	—	—	—	—	—	—	—	—	—	—	—	—
Lebo	162	158	10.3	5.0	0.6	34.0	9.0	4	10.0	5.2	0.0	34.0	9.0
Bambesa	215	183	8.0	3.5	0.6	25.0	7.0	32	6.8	4.3	0.0	25.0	7.0
S Uele total	820	745	11.1	1.6	0.6	34.0	9.3	74	10.5	1.6	0.0	34.0	9.3
Total	2,649	2,341	10.8	0.1	0.6	40.0	8.6	307	9.8	0.1	0.0	40.0	8.6

The number of nests differ from other tables and other SMs because we included a subset of nests that had information on nest height.

GNs, ground nests; TNs, tree nests; "—", data not available.

Table S10. Number and percentages (in bold) of complex ground nests, flimsy ground nests, and leaf cushions associated with feeding remains, dung, and hair when considering all ages or limited to fresh and recent only.

Associated chimpanzee evidence	All TNs	Fresh and recent TNs	All CGNs	Fresh and recent CGNs	All FGNs	Fresh and recent FGNs	All LCs	Fresh and recent LCs
Feeding remains, dung, hair	0	0	4	4	0	0	3	3
	0	0	1.5	2.8	0	0	13.6	18.8
Feeding remains, dung	1	1	1	1	1	1	2	2
	0.1	0.1	0.4	0.7	9.1	16.7	9.1	12.5
Feeding remains only	33	22	18	9	3	2	2	2
	2.5	2.7	6.9	6.4	27.3	33.3	9.1	12.5
Hair only	5	4	50	27	1	0	2	2
	0.4	0.5	19.2	19.2	9.1	0	9.1	12.5
Dung only	82	30	31	8	1	0	0	0
	10.0	2.2	11.9	5.7	9.1	0	0	0
Hair and dung	6	6	19	18	0	0	0	0
	0.4	0.7	7.3	12.8	0	0	0	0
Total feeding remains	34	23	23	14	4	3	7	7
	2.5	2.8	8.8	9.9	36.4	50.0	31.8	43.8
Total hair	11	10	73	49	1	0	5	5
	0.8	1.2	28.0	34.8	9.1	0	22.7	31.2
Total dung	89	37	55	31	2	1	5	5
	6.6	4.5	21.1	22.0	18.2	16.7	22.7	31.2
None	1,273	712	157	92	5	3	13	7
	95.3	86.7	60.2	65.3	45.5	50.0	59.1	43.8
Total	1,342	821	261	141	11	6	22	16

50% (11/22) of LCs were associated with chimpanzee nests, 9% (2/22) with TNs and 41% (9/22) with GNs. 6.3% of the fresh and recent LCs were associated with TNs, 43.8% with GNs and 50% with both GNs and TNs.

CGNs, complex ground nests; FGNs, flimsy ground nests; LCs, leaf cushions; TNs, tree nests.

Table S11. Proportions of ground nests out of total nests in different age categories. Data includes all nests found in our Bili-Uéré surveys in which we categorized their nest age.

Nest age category	GNs	TNs	Total nests	% GNs
1 (fresh)	35	347	382	9
2 (recent)	68	542	610	11
3 (retains form)	117	603	720	16
Retains form (1–3)	220	1492	1712	13
4 (rotted)	66	1018	1084	6
5 (skeleton)	21	117	138	15
Old (4–5)	87	1135	1222	7
Total nests	307	2627	2934	11
GN, ground nests; TNs, tree nests.				

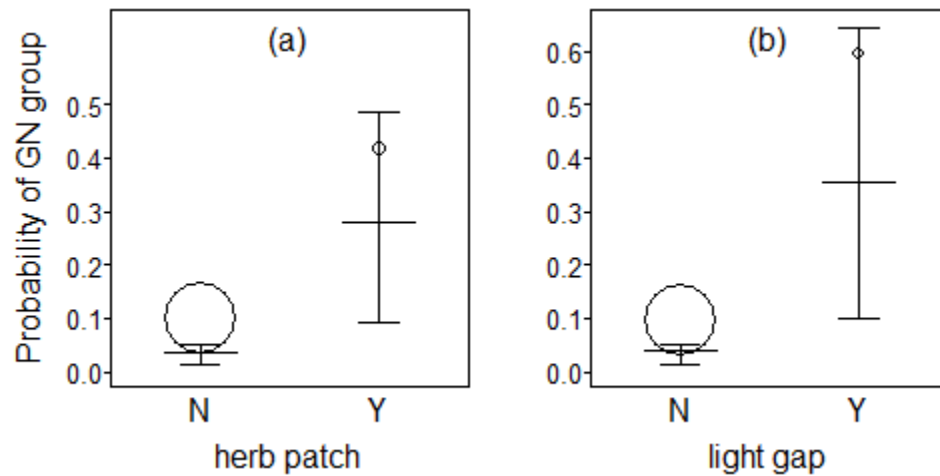


Figure S4. Model 1a: Probability of a nest group consisting of ground nests as a function of herb patch (A, p-value < 0.001) and light gap (B, p-value < 0.001). They were both significant. The bars represent the fitted model and its lower and upper confidence limits, with all other predictors being centered. The area of the dots corresponds to the total sample size (herb patch: No = 2,496 - Yes = 93; light gap: No = 2,520 - Yes = 69).

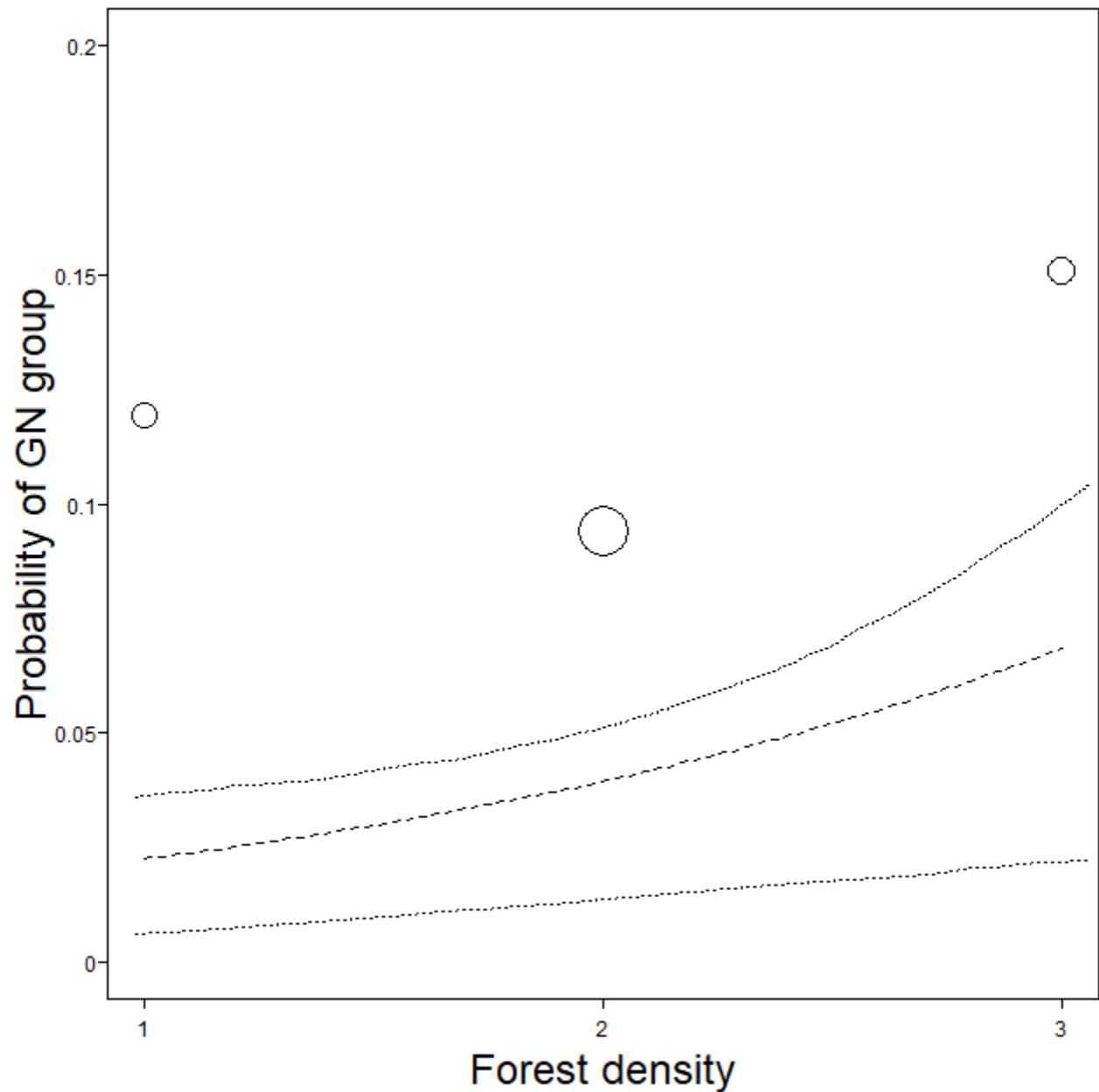


Figure S5. Model 1a: Probability of a nest group consisting of ground nests as a function of forest density (significant: p -value = 0.004). The dashed lines depict the fitted model and the dotted lines its 95% confidence intervals. The area of the dots depicts the sample size (min = 452 and max = 1,619). GN, ground nest.

Table S12. Impact of habitat in Models 1a and 2a. See tables 3 and 4 for description of habitat types, and supplementary table S4 for details on the number of nests found in each.

Habitat type	BLUPs Model 1a	BLUPs Model 2a
Active field	0.0	-2.434
Old field / regenerating forest	0.0	10.529
Secondary forest	0.0	-1.858
Mixed forest	0.0	-1.480
Riparian forest	0.0	5.309
Swamp forest	0.0	-1.389
<i>Gilbertiodendron</i> monodominant forest	0.0	1.368
Savanna	0.0	-2.761

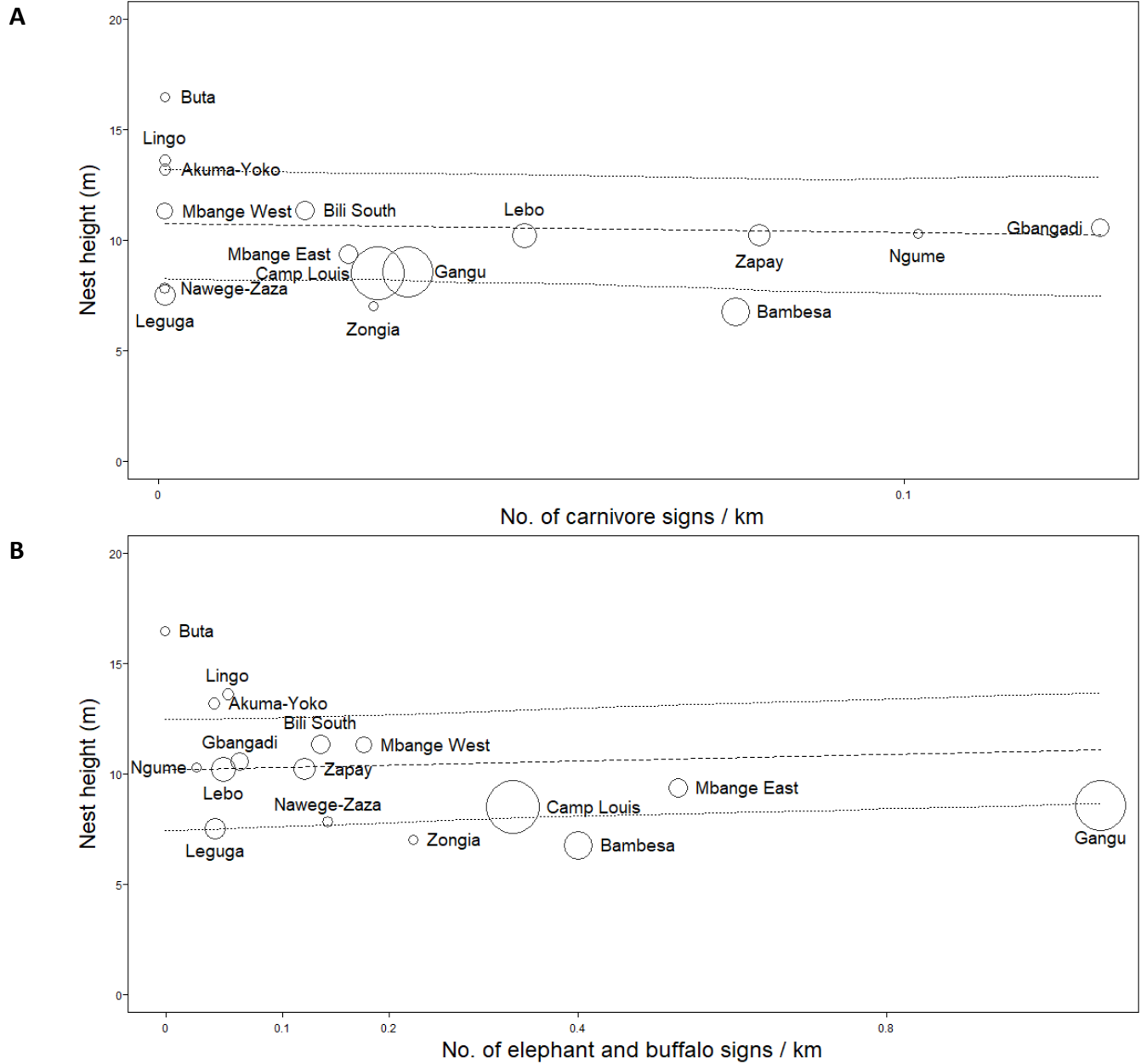


Figure S6. Nest height as a function of encounter rates of carnivores (A; not significant: p -value = 0.686), and elephants and buffalos (B; significant: p -value = 0.023). The area of the circles represents the number of nests in the 16 survey areas (min = 5, max = 710), and nest height refers to the average nest height per survey area. The dashed lines depict the fitted model (Model 2a) and the dotted lines its upper and lower confidence limits for all other predictors centered to a mean of zero.

Table S13. Distance of nests from the nearest road.

Survey area	GNs						TNs					
	No. GNs	mean (km)	SE	Min	Max	Median	No. TNs	mean (km)	SE	Min	Max	Median
Camp Louis	91	13.07	5.16	3.00	26.00	11.50	656	12.27	6.80	0.40	28.90	11.58
Gangu	121	34.68	3.83	27.20	41.40	33.50	826	33.57	3.68	24.00	41.80	33.58
Bili South	7	4.56	2.12	2.50	7.00	3.40	109	5.96	5.43	1.10	17.80	3.65
Zapay	10	4.53	1.12	2.70	5.50	5.05	118	3.66	1.16	1.40	5.50	3.50
Gbangadi	3	6.87	0.40	6.50	7.30	6.80	95	6.51	0.50	5.70	7.30	6.50
Nawege-Zaza	0	NA	NA	NA	NA	NA	33	2.00	0.59	1.20	2.50	2.15
Bambilo	1	2.26	0.00	2.26	2.26	2.26	33	12.65	4.52	6.67	21.29	12.96
Dume	6	2.64	2.88	0.60	4.68	2.64	20	4.62	3.87	0.31	11.22	3.35
N Uele total	239	9.80	–	0.60	41.40	–	1,890	11.10	–	0.31	41.80	–
Leguga	33	7.80	0.91	6.20	9.00	7.95	85	6.94	2.70	0.70	9.50	7.90
Buta	0	NA	NA	NA	NA	NA	39	7.11	1.95	3.70	8.90	7.70
Ngume	0	NA	NA	NA	NA	NA	32	10.02	4.36	1.30	15.10	9.35
Akuma -Yoko	2	5.15	1.34	4.20	6.10	5.15	35	4.17	1.91	1.40	6.70	4.40
Mbange East	1	9.00	0.00	9.00	9.00	9.00	91	9.13	3.45	4.20	14.80	8.70
Mbange West	0	NA	NA	NA	NA	NA	70	5.03	0.97	3.30	7.10	4.90
Lingo	0	NA	NA	NA	NA	NA	40	3.57	0.91	2.10	4.50	3.95
Zongia	3	8.70	0.00	8.70	8.70	8.70	28	8.70	0.00	8.70	8.70	8.70
Lebo	4	4.55	0.58	3.70	5.00	4.75	165	3.02	1.98	0.01	6.00	3.90
Bambesa	34	7.70	0.72	6.40	8.50	7.95	190	5.58	2.58	0.90	8.60	6.40
S Uele total	77	7.15	–	3.70	9.00	–	775	6.26	–	0.01	15.10	–
Total	316	9.45	–	0.60	41.40	–	2,765	8.68	–	0.01	41.80	–

The number of nests differ from other tables and SMs because we included a subset of nests that had information on distance from road.

GNs, ground nests; TNs, tree nests; “NA”, not applicable due to absence of ground nests.

Text S1. Were all of the ground nests night nests?

Usually, the nest sites we found were not fresh and therefore it was difficult to be sure whether or not ground nests had been slept in overnight. Fortunately, there were enough exceptions to allow us to be certain that at least some of the ground nests were night nests. The following are 5 cases where we could be reasonably sure that the ground nests had been slept in overnight and vacated the following morning (excerpted from TH's data books). More information on each nest site can be found in the online data.

NOVEMBER 13, 2004, GANGU FOREST (NEST SITE 100)

On 13 November, 2004, leaving camp before first light, we followed chimpanzee vocalizations to their nest site in the Nambala Swamp. There, at 7:45 am we made contact with several individuals, including an adult male, as they were feeding in a fig tree. Following the contact, we backtracked to their nest site and found four fresh tree nests with dung on the ground beneath them and a large, elaborately-constructed ground nest made of interwoven *Marantochloa congenisa* herbs. The herbs had been bent into a central body (fig. text S1), and the nest was full of hairs. A large amount of dung, weighing 1285 g, was found at the nest. As can be seen in the figure, one dung pile (weighing 869 g) was clearly fresh and had been deposited in the morning. The crisp edges of the hostra rings were visible, and the color was light. Another 416 g of dung present at the site was decayed and reddish-colored, with no discernable hostra rings. This second mass of older dung had probably been deposited the night before, and had already decayed into mush, probably due to the action of dung beetles.

NOVEMBER 16, GANGU FOREST (NEST SITE 102)

We wait until about 11 am, then move north into the Nambala riverbed to look for more nests, where we find another fresh ground nest, not 50 m NW of the one we found 3 days ago. Is this the same male come back to nest in a favorite spot? The nest is a big one, 130 cm × 90 cm, made of *dukpe* leaves. *Dukpe* is another kind of swamp herb, resembling *Megaphrynium* and *gole* (*Megaphrynium* is also growing near the nest). There is lots of dung from this morning or last evening (291 g) and it has been rained on, thus eliminating any shape or hostra rings. That it was

rained on shows that it most likely predated the morning contact and thus was unlikely to be a day nest. We save several long black hairs with roots present for DNA analysis (one hair measured 5.8 cm). We also find feeding remains in the nest: the red shells of *dukpe* fruits. There is also a full, rather rotten fig on the ground beside the nest. We are far enough from the fig tree that the fruit must have been transported by hand. Did the chimp bring the fruit here in the evening and then decide against eating it?

OCTOBER 12, 2006, GANGU FOREST (NEST SITE 279)

Turning off the transect just a few m, at 12:55 Ligada spots a beautiful GROUND NEST SITE (N178), in age cat 2 forest, from TODAY! Vacated this morning! Which means we just missed these chimps when we passed by the night before!). Nest A is the ground nest, 73 cm × 93 cm, quite beautiful and complex. There are 4 piles of dung around the south rim of the ground nest, all rained on, so the dung is all from the morning or last evening before the rain. The dung is full of *gelo* seeds. Several hairs are collected from this nest. 1.5 m north northeast from the edge of the ground nest is a tree nest from the same day (today), with dung beneath, also full of *gelo*. Its estimated elevation is 6 m. The next day, we will collect hair samples from the tree nest as well.

DECEMBER 30, 2006, ZAPAY FOREST (NEST SITE 366)

After listening to chimpanzees pant-hoot and tree-drum all night at close range (at least one adult male was in the sleeping party), we left camp before dawn at 5:40 hours. We arrived at the chimpanzees' freshly-vacated nest site at 6:45 hours, having last heard the chimpanzees pant-hoot from there prior to sunrise at 5:59 hours. We found two fresh elaborate bowl-shaped ground nests next to the stream, full of shed hairs and constructed from *Marantaceae* and saplings (see fig. 1B). We also found three fresh tree nests across the stream within 50 m, along with older tree and ground nests. Beside one of the two fresh ground nests was dung from the previous evening, only slightly decayed. Beside the second nest was fresh dung from that morning with crisp hostra rings. Clearly this site had been slept in at night and vacated minutes before. While controlling

the nest site we heard an adult male chimpanzee pant-hoot and tree-drum three times from within 100 m of the nest site. He had not moved off far.

MARCH 17, 2008, LEGUGA FOREST (NEST SITE 555)

Following chimpanzee vocalizations heard from camp at 7:29, we encounter chimpanzees: 3 feeding in a fig tree and others on the ground at a large termite pounding 'workshop' on the ground. Following our contact, we backtrack to the nest site, passing many fresh pounded termite mounds, dung, and fruit feeding remains. <100 m along the trail we find a fresh nest site of 6 tree nests and 2 complex ground nests; the fresh dung means the nest was vacated this morning. One fresh ground nest has a large *akamba* (*Desplatsia dewevrai*) fruit eaten by the chimpanzee touching the northwest corner of the nest). The nest is in a cat 3 vine tangle. The other ground nest has dung from yesterday 25 cm N of the nest, with what look like hostra rings. The dung is still crisp. Several of the associated tree nests also have fresh dung beneath them. The chimpanzees clearly slept at this site the night before and then visited the fruit tree (<100 m away) where we had contacted them.



Figure text S1. Nest site with clear signs of having been slept in overnight. The arrows indicate an old (to the right) and fresh dung (to the left).

Video S1. Online video clips showing uninjured Bili-Gangu chimpanzees.

https://www.youtube.com/watch?v=_Zi-1oeGhh4&t=1s

<https://www.youtube.com/watch?v=X2H5s7vNgms&t=9s>

<https://www.youtube.com/watch?v=z8A30gacZSg&t=3s>

<https://www.youtube.com/watch?v=kyp2P4ywHF0>