

Supplementary Information for

Widespread bone-based fluorescence in chameleons

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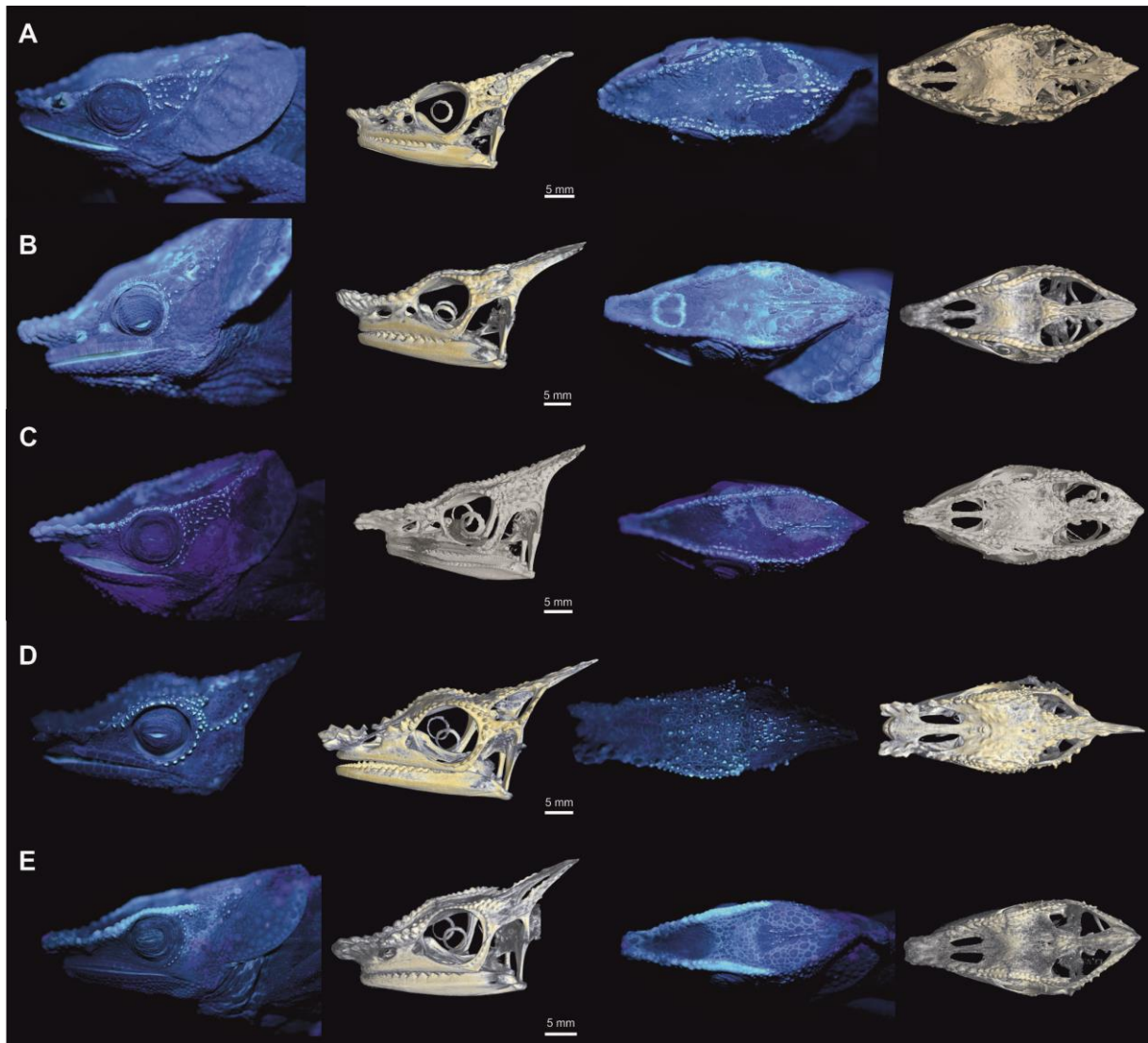


Figure S1. Fluorescence photographs and micro-CT scans of male specimens of the *Calumma brevicorne* group (A–C) and other species (D, E) in lateral and dorsal view. (A) *C. amber* ZSM 1041/2003. (B) *C. brevicorne* ZSM 549/2001. (C) *C. crypticum* ZSM 455/2010. (D) *C. cucullatum* ZSM 655/2014. (E) *C. malthe* ZSM 71/2005.

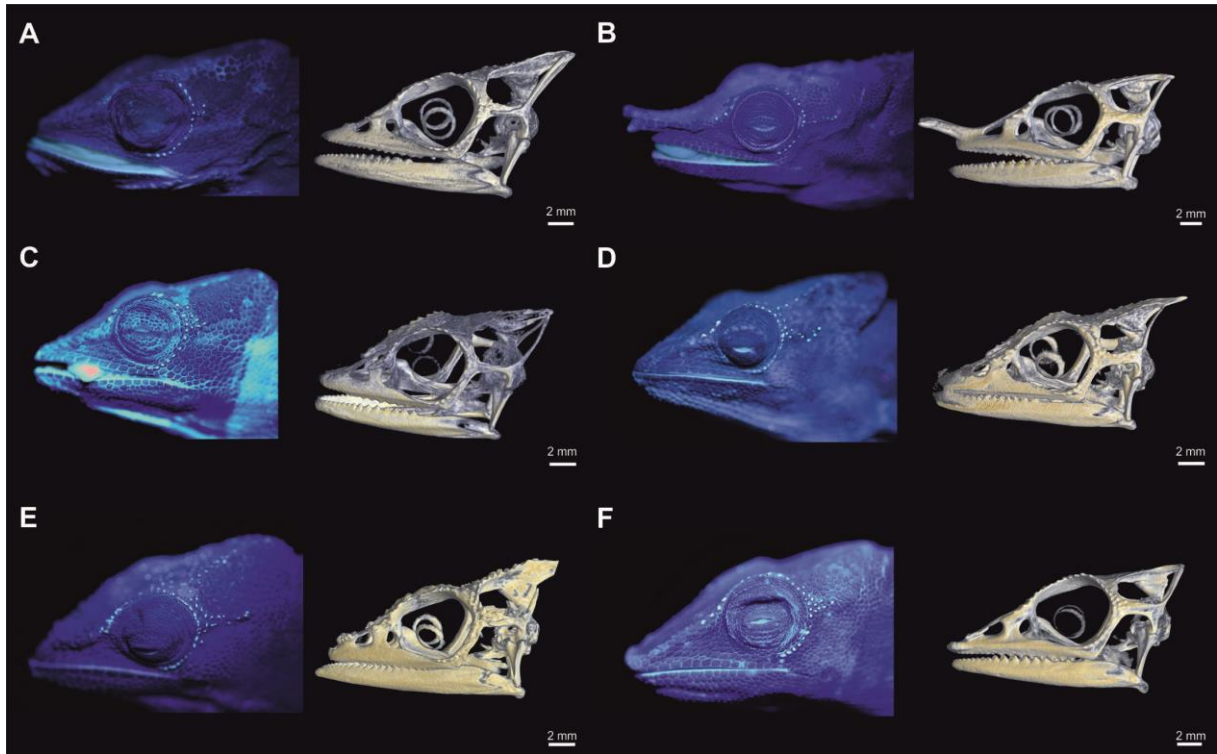


Figure S2. Fluorescence photographs and micro-CT scans of male specimens of the *Calumma furcifer* group in lateral view. (A) *C. andringitraense* ZSM 554/2001. (B) *C. furcifer* ZSM 225/2002. (C) *C. gastrontaenia* ZSM 226/2002. (D) *C. glawi* ZSM 2042/2008. (E) *C. guillaumeti* ZSM 440/2005. (F) *C. tarzan* ZSM 219/2010.

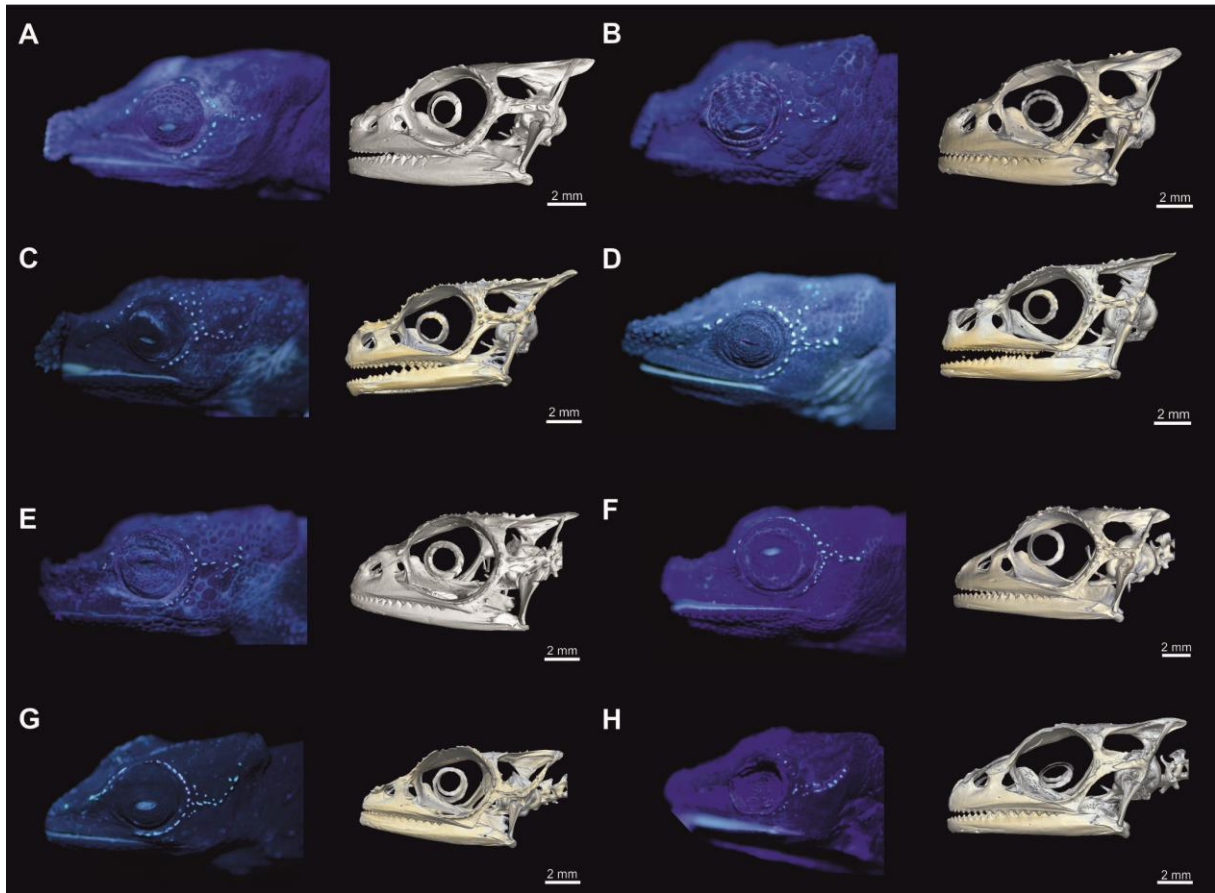


Figure S3. Fluorescence photographs and micro-CT scans of male specimens of *Calumma nasutum* group in lateral view. (A) *C. boettgeri* ZSM 440/2000. (B) *C. cf. fallax* ZSM 693/2009. (C) *C. gehringi* ZSM 2851/2010. (D) *C. linotum* ZSM 2072/2007. (E) *C. guibei* ZSM 2855/2010. (F) *C. nasutum* ZSM 618/2009. (G) *C. vatosoa* MRSN R1628. (H) *C. vohibola* ZSM 645/2009.

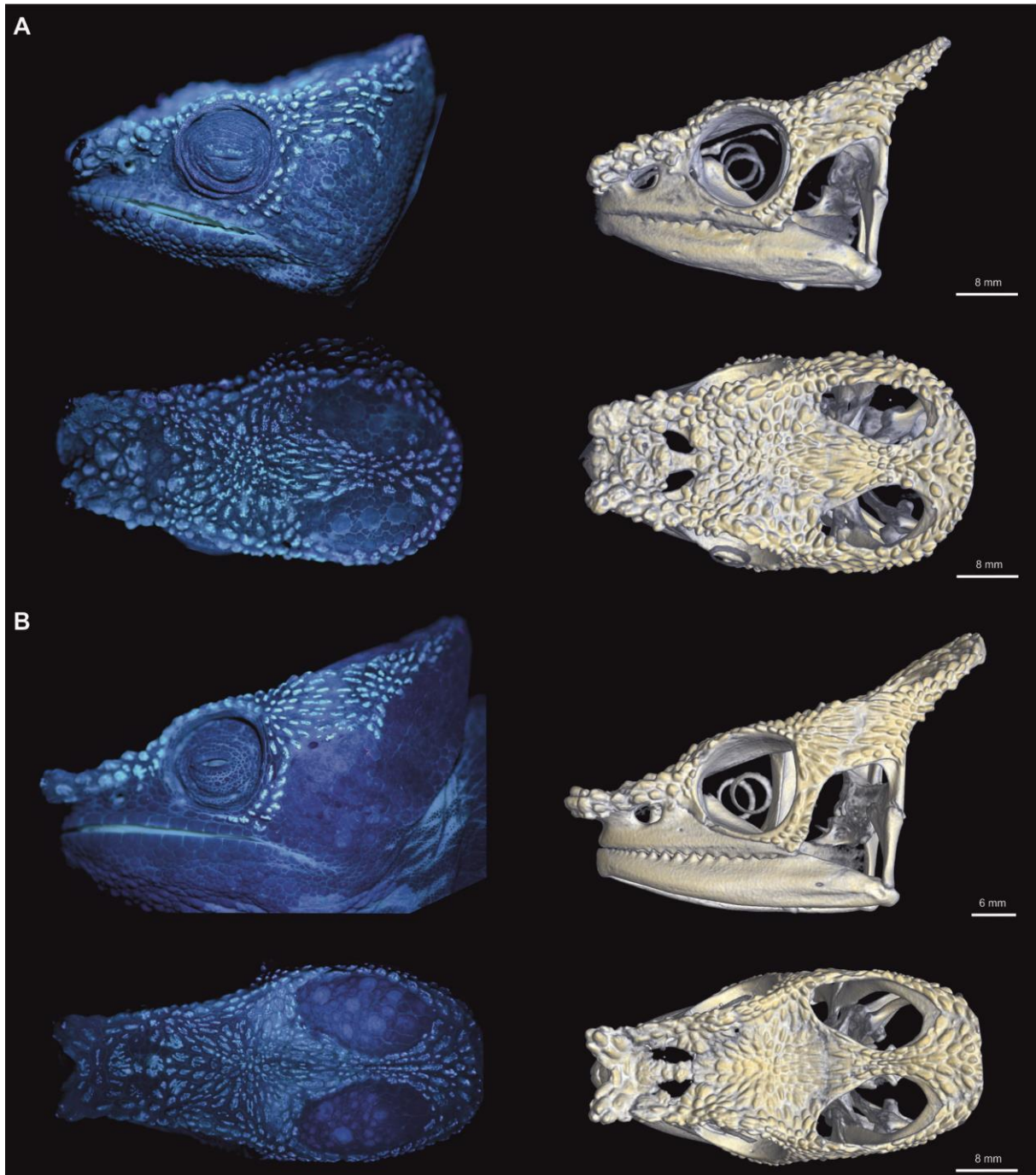


Figure S4. Fluorescent photographs and micro-CT scans of male specimens of *Calumma parsonii* group in lateral and dorsal view. (A) *C. ambreense* ZSM 1042/2003. (B) *C. oshaughnessyi* ZSM 1836/2010.

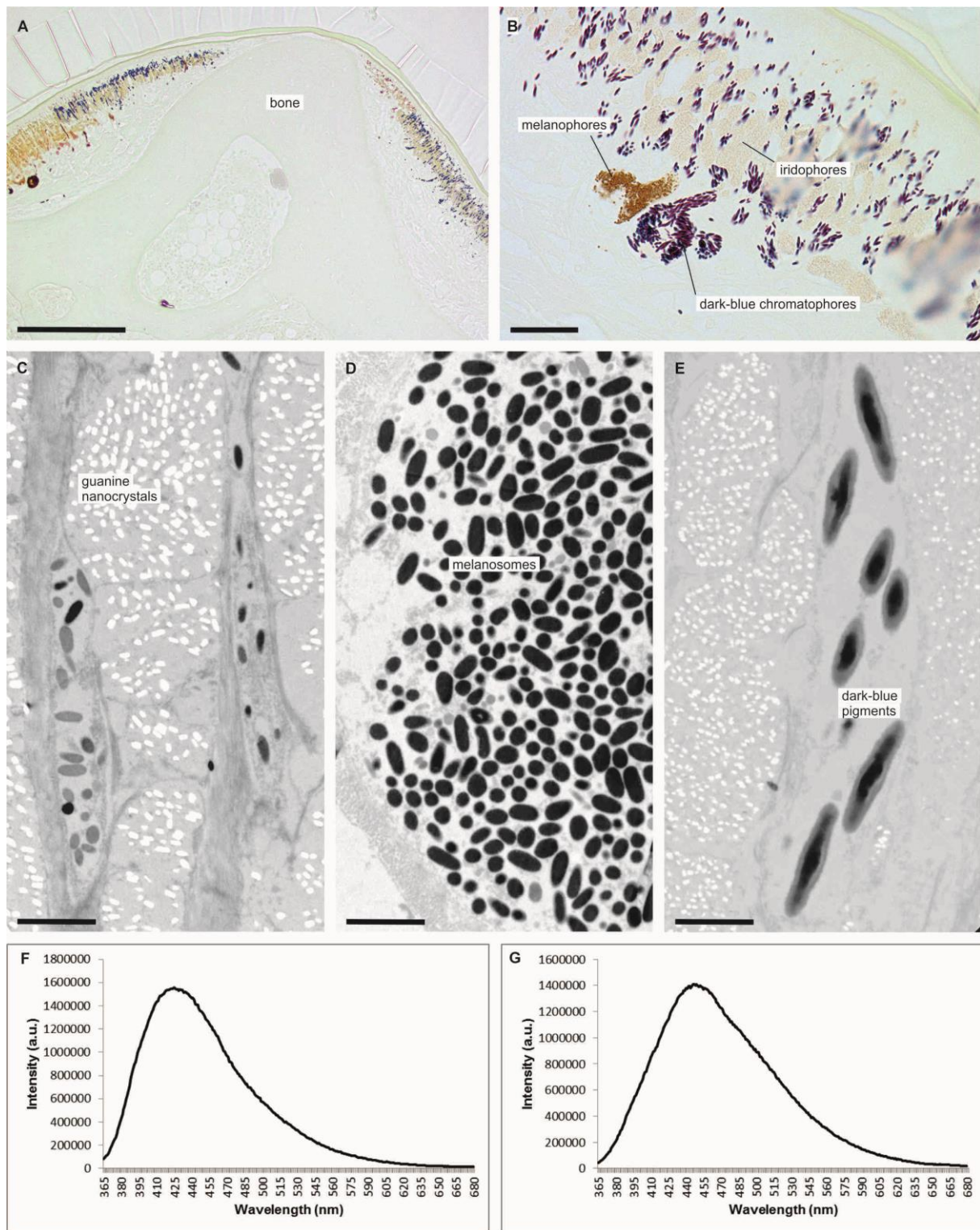


Figure S5. Chromatophores in the skin of a male *Calumma crypticum* (ZSM 503/2014) from the temporal region. (A) Semithin section (1.54 μm) of a FT, unstained, 10x. (B) Details of skin including 3 types of chromatophores in the dermis, unstained, 60x; (C–E) TEM photographs of the different chromatophores, shown in (B). (C) Guanine nanocrystals in iridophores. (D) Melanosomes in brown melanophores (up to 450 nm in diameter and 1 μm in length, homogenous material). (E) Unknown pigments in dark-blue chromatophores; up to 750 nm in diameter and 3.2 μm in length, electron dense core, less electron dense coat ca. 150 nm). (F) Fluorescence spectrum of FT on temporal region of *C. crypticum* (see above) with

emission peak at 425 nm. (G) Fluorescence spectrum of underlying bone on temporal region of the same specimen with emission peak at around 445 nm. Scale bars in (A) 200 μm , in (B) 20 μm , in (C–E) 2 μm .

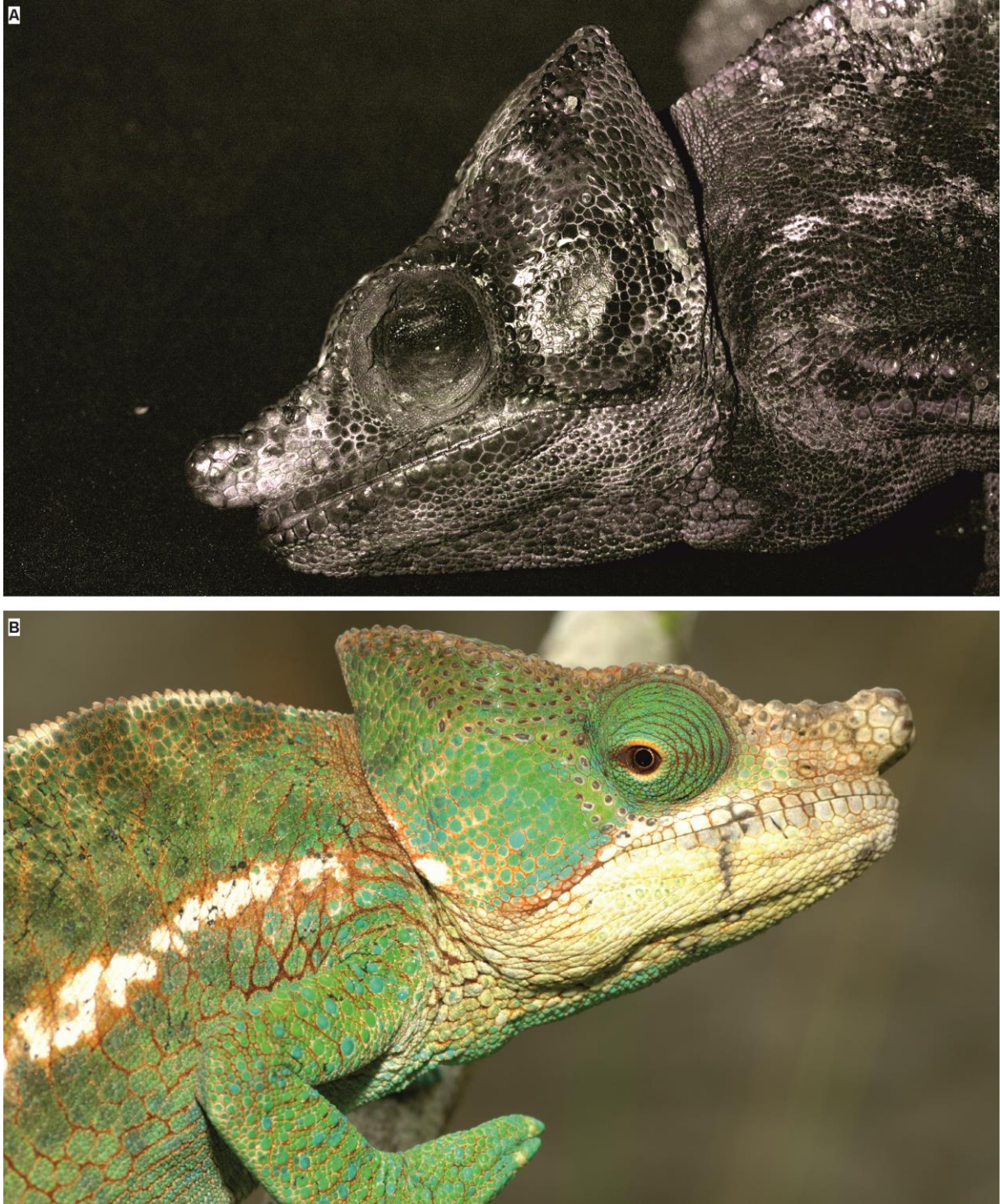


Figure S6. (A) UV photograph of *Calumma globifer*, male (ZSM 141/2016, only UV light at 365 nm, for details, see chapter UV photography; photograph taken by Roy Hessing). (B) Photograph of the same specimen under sunlight in the natural habitat.

Table S1. ANOVA results for species- and sex-specificity based on the total number of FTs per head side of 133 individuals/25 *Calumma* species assigned to four species groups. For graphical representation of the extent of sexual dimorphism see Fig. 3B. (Df, degrees of freedom; sq, square; *P*, Probability; Significance: ‘***’ < 0.01, ‘*’ < 0.05.

		Df	Sum Sq	Mean Sq	F value	P	Significance
<i>Calumma brevicorne</i> species group, response variable (n tubercles), ANOVA anova(lm(tub~spec + sex))	Species	5	3452.2	690.43	3.627	0.016036	*
	Sex	1	2758.3	2758.27	14.490	0.001031	**
	Residuals	21	3997.6	190.36			
<i>Calumma furcifer</i> species group, response variable (n tubercles), ANOVA anova(lm(tub~spec + sex))	Species	4	263.32	65.830	1.3737	0.2803	
	Sex	1	140.51	140.514	2.9321	0.1031	
	Residuals	19	910.53	47.922			
<i>Calumma nasutum</i> species group, response variable (n tubercles), ANOVA anova(lm(tub~spec + sex))	Species	7	1398.13	199.73	3.6115	0.002801	**
	Sex	1	529.94	529.94	9.5820	0.003066	**
	Residuals	56	3097.09	55.31			
<i>Calumma parsonii</i> species group, response variable (n tubercles), ANOVA anova(lm(tub~spec + sex))	Species	4	6462.3	1615.59	6.9377	0.0284	*
	Sex	1	0.9	0.94	0.0040	0.9518	
	Residuals	5	1164.4	232.87			

Table S2. Sex and species specific fluorescent pattern of adult individuals (140 individuals, 29 species). Factor loadings of PC 1 to PC 3 complementary to Fig. 3C.

	PC 1	PC 2	PC 3
RC	0.087203	0.19697	-0.017932
a	0.10219	0.29573	0.095006
b	0.058863	0.34484	0.27247
b-sr	-0.031373	0.11016	0.42523
c	0.036192	0.37266	0.54059
c-sr	0.095217	0.086056	0.0049441
d	0.00067786	-0.007235	-0.0031641
LC	-0.076625	0.24938	0.17161
LC-sr	-0.019371	0.065071	0.25557
TC	0.0021107	0.38367	-0.33088
CC	0.2678	0.57305	-0.47357
TR	0.94295	-0.23313	0.12168
Eigenvalue	208.589	10.575	5.7124
% variance	87.938	4.4583	2.4083

Table S3. Number of fluorescent tubercles per bone of 25 adult males of different *Calumma* species. Factor loadings of PC 1 to PC 3 complementary to Fig. 3D.

	PC 1	PC 2	PC 3
M	0.072493	-0.10216	0.41616
PRF	0.19456	0.26981	0.85568
Flat	-0.019186	-0.0059612	-0.07562
POF	0.60942	0.71193	-0.29435
JU	0.12935	0.025077	0.036106
SQ	7.54E-01	-6.40E-01	-3.10E-02
Eigenvalue	315.87	18.7527	6.11386
% variance	90.758	5.3881	1.7567

Table S4. FTs per head side based on 12 characters of 140 individuals/29 *Calumma* species. See ‘Methods’ for abbreviations.

species	collection number	sex	head side	RC	CO					LC	LC-sr	TC	CC	TR	PC	DH	
					a	b	b-sr	c	c-sr								d
<i>Calumma brevicorne</i> group																	
<i>Calumma amber</i>	ZSM 1040/2003	m	left side	5	4	6	0	12	7	0	4	0	5	10	8	8	20
			right side	5	4	7	0	7	3	0	5	0	6	8	7	0	0
<i>Calumma amber</i>	ZSM 1041/2003	m	left side	2	3	5	0	4	0	0	4	0	5	7	9	5	15
			right side	3	3	4	0	5	0	0	4	0	4	7	5	0	0
<i>Calumma amber</i>	ZSM 261/2004	f	left side	0	0	2	0	3	0	0	3	0	0	0	0	0	0
			right side	0	0	-	0	-	0	0	-	0	0	0	0	0	0
<i>Calumma amber</i>	ZSM 260/2004	f	left side	0	0	4	0	3	0	0	4	0	3	0	0	0	0
			right side	0	0	4	0	3	0	0	2	0	2	0	0	0	0
<i>Calumma brevicorne</i>	ZSM 30/2016	m	left side	2	4	6	0	6	0	0	5	0	4	10	7	6	20
			right side	2	4	7	0	8	0	0	4	0	5	10	8	0	0
<i>Calumma brevicorne</i>	ZSM 549/2001	m	left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calumma brevicorne</i>	ZSM 1043/2003	m	left side	2	3	7	0	7	0	0	4	0	5	11	15	10	20
			right side	2	4	6	0	8	0	0	4	0	5	12	15	0	0
<i>Calumma brevicorne</i>	ZSM 549/2001	m	left side	1	3	6	0	5	0	0	4	0	6	4	5	7	10
			right side	1	3	6	0	9	0	0	5	0	4	4	6	0	0
<i>Calumma brevicorne</i>	ZSM 31/2016	f	left side	2	1	8	0	5	0	0	4	0	6	5	8	6	10
			right side	2	3	8	0	5	0	0	4	0	5	7	11	0	0
<i>Calumma brevicorne</i>	ZSM 802/2003	f	left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calumma brevicorne</i>	ZSM 1684/2012	f	left side	2	2	6	0	7	0	0	4	0	6	7	10	5	15
			right side	2	2	6	0	8	0	0	4	0	5	5	10	0	0
<i>Calumma crypticum</i>	ZSM 32/2016	m	left side	4	5	8	0	7	0	0	3	0	5	7	5	7	15
			right side	3	5	11	0	7	0	0	4	0	4	8	10	0	0
<i>Calumma crypticum</i>	ZSM 135/2016	m	left side	8	6	6	0	7	6	0	5	0	4	11	10	10	30
			right side	6	5	7	0	9	7	0	4	0	4	14	9	0	0

<i>Calumma crypticum</i>	ZSM 1022/2003 1044?	m	left side	1	3	6	0	5	0	0	5	0	6	8	13	7	15
			right side	0	5	5	0	7	0	0	5	0	7	10	14	0	0
<i>Calumma crypticum</i>	ZSM 68/2005	m	left side	0	0	3	0	2	0	0	3	0	2	0	0	3	4
			right side	0	0	3	0	2	0	0	3	0	2	0	0	0	0
<i>Calumma crypticum</i>	ZSM 455/2010	m	left side	3	6	6	0	6	5	0	3	0	5	12	15	5	20
			right side	3	5	7	0	8	0	0	5	0	7	12	17	0	0
<i>Calumma crypticum</i>	ZSM 1711/2010	m	left side	1	6	6	0	7	2	0	5	0	5	9	8	4	30
			right side	2	5	7	0	4	0	0	5	0	4	10	7	0	0
<i>Calumma crypticum</i>	ZSM 1712/2010	m	left side	2	5	7	0	7	4	0	5	0	4	11	10	9	40
			right side	3	3	5	0	7	3	0	6	0	5	10	8	0	0
<i>Calumma crypticum</i>	ZSM 1713/2010	m	left side	3	4	6	0	6	3	0	6	0	5	10	12	7	40
			right side	3	5	8	0	8	2	0	7	0	4	12	11	0	0
<i>Calumma crypticum</i>	ZSM 503/2014	m	left side	2	3	8	0	7	0	0	5	0	6	2	0	5	20
			right side	2	3	7	0	8	0	0	4	0	6	4	0	0	0
<i>Calumma crypticum</i>	ZSM 502/2014	jm	left side	0	0	3	0	6	0	0	5	0	4	0	7	4	4
			right side	0	0	4	0	6	0	0	4	0	5	0	1	0	0
<i>Calumma crypticum</i>	ZSM 1723/2010	jm	left side	0	0	3	0	4	0	0	4	0	3	0	0	6	10
			right side	0	0	3	0	5	0	0	4	0	3	0	3	0	0
<i>Calumma crypticum</i>	ZSM 67/2005	f	left side	0	5	0	0	0	0	0	3	0	1	0	0	0	4
			right side	0	5	0	0	0	0	0	1	0	0	0	0	0	0
<i>Calumma crypticum</i>	ZSM 133/2005	f	left side	0	0	4	0	3	0	0	0	0	0	0	0	0	0
			right side	0	0	3	0	4	0	0	3	0	1	0	0	0	0
<i>Calumma crypticum</i>	ZSM 504/2014	jf	left side	2	5	7	0	8	0	0	5	0	6	7	5	7	15
			right side	3	4	7	0	7	0	0	5	0	5	7	3	0	0
<i>Calumma crypticum</i>	ZSM 617/2009	m	left side	3	6	7	0	3	0	0	4	0	4	13	4	8	15
			right side	3	5	8	0	8	1	0	5	0	4	11	3	0	0
<i>Calumma hafahafa</i>	ZSM 511/2014	f	left side	0	6	6	0	7	0	0	4	0	7	3	7	8	20
			right side	0	7	7	0	7	0	0	3	0	5	3	6	0	0
<i>Calumma hilleniusi</i>	ZSM 315/2006	m	left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calumma hilleniusi</i>	ZSM 380/2000	m	left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calumma hilleniusi</i>	ZSM 593/1998	f	left side	0	4	6	0	4	0	0	5	0	4	8	6	7	30
			right side	0	3	8	0	4	0	0	4	0	3	9	8	0	0
<i>Calumma hilleniusi</i>	ZSM 594/1998	f	left side	0	5	6	0	6	0	0	5	0	3	7	8	0	0
			right side	0	3	8	0	4	0	0	4	0	3	9	9	0	0
<i>Calumma hilleniusi</i>	ZSM 545/2001	f	left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calumma peltierorum</i>	ZSM 1725/2010	m	left side	4	5	4	0	7	0	0	3	0	7	6	8	7	50
			right side	4	6	6	0	6	3	0	4	0	7	7	12	0	0
<i>Calumma peltierorum</i>	ZSM 518/2014	m	left side	6	3	4	0	9	7	0	7	1	5	4	13	8	50
			right side	6	3	5	0	7	4	0	6	2	3	7	12	0	0
<i>Calumma peltierorum</i>	ZSM 519/2014	f	left side	2	0	5	0	5	1	0	4	0	5	3	8	7	50
			right side	2	0	3	0	7	1	0	4	2	4	3	10	0	0
<i>Calumma peltierorum</i>	ZSM 520/2014	f	left side	3	0	7	0	7	1	0	6	0	4	6	9	9	15

			right side	2	0	7	0	7	2	0	5	0	4	5	8	0	0
<i>Calumma peltierorum</i>	ZSM 521/2014	f	left side	0	2	4	0	5	4	0	5	0	6	4	8	8	40
			right side	0	2	4	0	9	3	0	7	0	6	3	12	0	0
<i>Calumma peyrierasi</i>	ZSM 522/2014	m	left side	0	0	4	0	5	0	0	4	0	0	0	0	0	0
			right side	0	0	4	1	3	0	0	4	0	0	0	0	0	0
<i>Calumma peyrierasi</i>	ZSM 1726/2010	jm	left side	0	1	3	0	1	0	0	5	0	0	0	0	0	0
			right side	0	1	2	0	4	0	0	4	0	1	0	0	0	0
<i>Calumma peyrierasi</i>	ZSM 1727/2010	f	left side	0	0	4	0	7	0	0	6	0	1	0	0	0	0
			right side	0	1	3	0	7	0	0	6	0	1	0	0	0	0
<i>Calumma peyrierasi</i>	ZSM 523/2014	f	left side	0	0	3	0	7	0	0	2	0	0	0	0	0	0
			right side	0	0	3	0	7	0	0	4	0	0	0	0	0	0
<i>Calumma tsaratananaense</i>	ZSM 524/2014	m	left side	0	0	1	0	0	0	0	2	0	0	0	0	0	0
			right side	0	0	1	0	0	0	0	2	0	0	0	0	0	0
<i>Calumma tsaratananaense</i>	ZSM 1728/2010	f	left side	0	0	0	0	0	0	0	1	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>Calumma furcifer</i>																	
group																	
<i>Calumma andringitraense</i>	ZSM 554/2001	m	left side	0	0	2	0	1	0	0	2	0	0	0	0	0	0
			right side	0	0	4	1	5	1	0	3	0	0	0	0	0	0
<i>Calumma andringitraense</i>	ZSM 128/2005	m	left side	0	3	5	3	10	1	0	4	0	0	0	0	0	7
			right side	0	3	6	2	7	1	0	4	0	0	0	0	0	0
<i>Calumma andringitraense</i>	ZSM 129/2005	m	left side	0	2	6	1	10	0	0	3	0	0	0	0	0	11
			right side	0	2	8	1	12	1	0	3	0	0	0	0	0	0
<i>Calumma andringitraense</i>	ZSM 130/2005	m	left side	0	1	5	5	9	1	0	3	0	0	0	0	0	0
			right side	0	1	6	1	10	0	0	3	0	0	0	0	0	9
<i>Calumma andringitraense</i>	ZSM 131/2005	f	left side	0	0	4	1	1	0	0	2	0	0	0	0	0	0
			right side	0	0	2	1	2	1	0	2	0	0	0	0	0	0
<i>Calumma furcifer</i>	ZSM 656/2014	m	left side	1	2	6	2	9	0	0	6	3	1	0	0	0	>30
			right side	1	3	7	3	9	0	0	7	3	1	0	0	0	0
<i>Calumma furcifer</i>	ZSM 225/2002	m	left side	1	1	6	0	7	0	0	6	0	0	0	0	0	0
			right side	1	1	5	0	5	0	0	6	0	0	0	0	0	0
<i>Calumma furcifer</i>	ZSM 657/2014	f	left side	0	2	4	1	4	0	0	5	3	1	0	0	0	7
			right side	0	2	6	1	5	0	0	5	2	1	0	0	0	0
<i>Calumma furcifer</i>	ZSM 136/2016	f	left side	0	1	4	0	7	0	0	6	1	0	0	0	0	>20
			right side	0	1	5	1	7	0	0	7	2	0	0	0	0	0
<i>Calumma gastrotaenia</i>	ZSM 140/2016	m	left side	0	1	5	0	6	0	0	5	0	0	0	0	0	0
			right side	0	1	4	0	4	0	0	4	0	0	0	0	0	0
<i>Calumma gastrotaenia</i>	ZSM 226/2002	m	left side	0	2	6	3	6	0	0	4	2	0	0	0	0	0
			right side	0	1	7	2	7	0	0	3	1	0	0	0	0	0
<i>Calumma gastrotaenia</i>	ZSM 506/2014	m	left side	1	2	7	5	9	0	0	4	0	0	0	0	0	1
			right side	1	2	6	4	8	0	0	3	0	0	0	0	0	0
<i>Calumma gastrotaenia</i>	ZSM 659/2014	m	left side	1	3	5	5	8	0	0	7	4	1	0	0	0	>40
			right side	1	3	6	5	8	0	0	8	4	2	0	0	0	0
<i>Calumma gastrotaenia</i>	ZSM 508/2014	m	left side	3	7	7	5	4	0	0	3	2	0	2	0	0	10

			right side	2	3	8	6	6	0	0	5	2	0	3	0	0	0
<i>Calumma</i>			left side	0	2	6	0	8	0	0	4	2	0	0	0	0	0
<i>gastrotaenia</i>	ZSM 507/2014	f															
			right side	0	2	6	1	6	0	0	4	2	0	0	0	0	0
<i>Calumma</i>			left side	0	2	5	0	9	0	0	3	0	0	0	0	0	0
<i>gastrotaenia</i>	ZSM 509/2014	f															
			right side	0	2	8	0	7	0	0	4	2	0	0	0	0	0
<i>Calumma</i>			left side	0	3	7	3	8	0	0	7	2	1	0	0	0	0
<i>gastrotaenia</i>	ZSM 658/2014	f															
			right side	0	3	6	6	9	0	0	8	3	1	0	0	0	0
<i>Calumma glawi</i>	ZSM 2042/2008	m	left side	1	2	7	4	7	0	0	5	2	2	3	0	0	10
			right side	1	2	5	2	9	0	0	5	3	1	4	0	0	0
<i>Calumma guillaumeti</i>	ZSM 440/2005	m	left side	0	5	6	4	8	2	0	5	3	0	5	0	0	>20
			right side	0	5	5	4	11	1	0	8	2	0	3	0	0	0
<i>Calumma guillaumeti</i>	ZSM 1701/2012	m	left side	0	2	5	4	7	0	0	5	2	0	0	0	0	0
			right side	0	2	6	3	8	0	0	3	2	0	0	0	0	0
<i>Calumma guillaumeti</i>	ZSM 34/2016	m	left side	1	3	6	2	11	0	0	4	3	0	0	0	0	0
			right side	1	4	5	2	10	0	0	5	1	0	0	0	0	0
<i>Calumma guillaumeti</i>	ZSM 1703/2012	m	left side	0	0	4	4	6	0	0	4	1	0	0	0	0	0
			right side	0	0	4	4	6	0	0	5	1	0	0	0	0	0
<i>Calumma guillaumeti</i>	ZSM 1702/2012	f	left side	0	2	4	2	8	0	0	4	2	0	0	0	0	0
			right side	0	2	4	2	8	0	0	4	2	0	0	0	0	0
<i>Calumma guillaumeti</i>	ZSM 33/2016	f	left side	0	2	5	1	9	0	0	3	2	0	0	0	0	0
			right side	0	2	7	3	9	0	0	4	3	0	0	0	0	0
<i>Calumma tarzan</i>	ZSM 219/2010	m	left side	2	2	8	4	8	0	0	4	2	0	0	0	0	8
			right side	2	2	7	2	8	0	0	4	2	0	0	0	0	0
<i>Calumma tarzan</i>	ZSM 222/2010	f	left side	0	3	3	1	8	0	0	3	0	0	0	0	0	0
			right side	0	2	4	0	8	0	0	3	1	0	0	0	0	0
<i>Calumma vencesi</i>	ZSM 50/2011	m	left side	2	4	6	3	7	0	0	7	2	2	0	0	0	>40
			right side	3	3	7	4	8	0	0	8	4	2	0	0	0	0
<i>Calumma vencesi</i>	ZSM 462/2010	m	left side	0	0	4	3	7	0	0	5	1	0	0	0	0	>30
			right side	0	0	5	2	4	0	0	5	1	0	0	0	0	0
<i>Calumma vencesi</i>	ZSM 620/2009	m	left side	1	3	7	7	9	0	0	6	6	0	7	0	0	>50
			right side	1	4	7	5	9	0	0	8	5	0	8	0	0	0
Calumm nasutum group																	
<i>Calumma boettgeri</i>	ZSM 440/2000	m	left side	0	2	5	0	7	0	0	6	0	0	0	0	0	0
			right side	0	3	5	0	5	0	0	5	0	0	0	0	0	0
<i>Calumma boettgeri</i>	ZSM 444/2000	m	left side	0	1	4	0	6	0	0	6	0	0	0	0	0	0
			right side	0	2	6	0	6	0	0	7	0	0	0	0	0	0
<i>Calumma boettgeri</i>	ZSM 227/2002	f	left side	0	0	3	0	2	0	0	2	0	0	0	0	0	0
			right side	0	0	5	0	4	0	0	3	0	0	0	0	0	0
<i>Calumma fallax</i>	ZSM 691/2009	f	left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			right side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calumma gallus</i>	ZSM 137/2016	m	left side	2	3	8	1	5	0	0	6	0	0	2	0	0	10
			right side	2	4	7	1	6	0	0	5	1	1	2	0	0	0
<i>Calumma gallus</i>	ZSM 139/2018	m	left side	1	4	6	0	7	0	0	7	0	0	0	0	0	0
			right side	2	5	9	0	7	0	0	6	0	0	0	0	0	0

<i>Calumma gallus</i>	ZSM 321/2000	m	left side	0	0	3	0	2	0	0	7	2	1	0	0	0	0
			right side	0	1	8	0	5	0	0	5	0	1	0	0	0	0
<i>Calumma gallus</i>	ZSM 792/2003	m	left side	3	2	7	0	6	0	0	6	0	3	0	0	0	0
			right side	3	3	6	0	6	0	0	5	0	3	0	0	0	0
<i>Calumma gallus</i>	ZSM 138/2016	f	left side	0	2	7	1	7	0	0	6	1	0	0	0	0	4
			right side	0	2	8	0	7	0	0	6	0	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2840/2010	m	left side	0	2	8	3	3	0	0	5	3	3	0	0	4	>20
			right side	0	4	8	0	5	0	0	5	4	2	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2841/2010	m	left side	0	1	7	0	3	0	0	4	0	0	0	0	0	15
			right side	0	2	6	1	5	0	0	4	0	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2851/2010	m	left side	0	4	5	5	6	0	0	6	2	2	0	0	0	0
			right side	0	5	5	4	7	0	0	5	2	2	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2842/2010	m	left side	0	3	7	1	3	0	0	3	0	1	3	0	0	15
			right side	0	3	4	0	4	1	0	4	0	2	4	0	0	0
<i>Calumma gehringi</i>	ZSM 1835/2010	m	left side	0	3	5	0	2	0	0	4	0	0	5	0	0	20
			right side	1	3	6	0	3	0	0	5	0	2	2	0	0	0
<i>Calumma gehringi</i>	ZSM 1834/2010	m	left side	0	1	5	2	2	0	0	4	0	0	0	0	0	0
			right side	1	2	7	2	3	0	0	5	2	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2843/2010	m	left side	2	3	7	4	5	2	0	5	0	3	4	0	4	>30
			right side	3	4	7	4	7	0	0	7	0	3	2	0	0	0
<i>Calumma gehringi</i>	ZSM 42/2016	m	left side	0	2	5	3	6	0	0	4	0	0	0	0	4	10
			right side	0	3	6	4	3	0	0	5	0	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 39/2016	m	left side	3	3	4	4	7	0	0	6	2	4	0	0	0	15
			right side	3	3	6	6	7	0	0	5	3	4	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2844/2010	f	left side	0	2	4	4	5	0	0	5	2	0	0	0	4	20
			right side	0	3	7	5	5	0	0	6	2	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2847/2010	f	left side	0	0	6	4	4	0	0	5	3	0	3	0	0	0
			right side	0	0	6	3	4	0	0	5	2	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 2852/2010	f	left side	0	2	5	3	5	0	0	2	0	1	0	0	0	0
			right side	0	3	4	4	5	0	0	5	3	2	4	0	0	0
<i>Calumma gehringi</i>	ZSM 2845/2010	f	left side	0	2	6	3	5	0	0	5	0	0	5	0	4	20
			right side	0	1	6	4	5	0	0	6	0	1	5	0	0	0
<i>Calumma gehringi</i>	ZSM 2848/2010	jf	left side	0	0	6	2	4	0	0	5	0	0	0	0	0	0
			right side	0	0	4	2	5	0	0	5	0	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 38/2016	f	left side	0	2	7	0	5	0	0	4	0	0	2	0	4	0
			right side	0	2	5	0	4	0	0	6	2	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 40/2016	f	left side	0	0	6	1	3	0	0	4	0	0	0	0	0	0
			right side	0	0	7	1	2	0	0	4	0	0	0	0	0	0
<i>Calumma gehringi</i>	ZSM 41/2016	f	left side	0	2	6	3	5	0	0	4	0	1	0	0	4	0
			right side	0	2	6	3	4	0	0	4	0	1	0	0	0	0
<i>Calumma guibei</i>	ZSM 2853/2010	m	left side	2	3	6	4	6	2	0	5	0	2	4	0	0	15
			right side	2	3	6	3	6	0	0	5	0	0	4	0	0	0
<i>Calumma guibei</i>	ZSM 2854/2010	m	left side	2	2	7	5	5	3	0	5	0	2	0	0	5	15
			right side	2	2	8	4	5	3	0	6	0	0	0	0	0	0
<i>Calumma guibei</i>	ZSM 2857/2010	f	left side	0	2	4	3	4	0	0	5	0	0	3	0	2	0

			right side	0	0	6	4	3	0	0	5	0	1	0	0	0	0
<i>Calumma guibei</i>	ZSM 2856/2010	f	left side	0	0	7	3	4	1	0	5	2	1	3	0	4	0
			right side	0	0	6	4	5	0	0	6	1	0	2	0	0	0
<i>Calumma guibei</i>	ZSM 2855/2010	m	left side	0	4	5	4	5	0	0	5	3	2	0	0	4	10
			right side	0	3	5	3	6	0	0	5	3	2	0	0	0	0
<i>Calumma guibei</i> (cf.)	ZSM 1688/2012	m	left side	4	3	7	4	5	0	0	6	4	3	5	5	4	>30
			right side	4	3	8	4	7	4	0	8	5	3	5	4	0	0
<i>Calumma guibei</i> (cf.)	ZSM 1686/2012	jm	left side	0	0	3	0	5	0	0	6	3	1	0	0	0	0
			right side	0	0	4	0	3	0	0	6	2	1	0	0	0	0
<i>Calumma guibei</i> (cf.)	ZSM 1685/2012	j	left side	0	0	4	0	5	0	0	6	1	0	0	0	1	0
			right side	0	0	4	0	5	0	0	7	0	0	0	0	0	0
<i>Calumma guibei</i> (cf.)	ZSM 1687/2012	f	left side	0	0	4	0	4	0	0	7	1	0	0	0	0	0
			right side	0	0	5	0	5	0	0	7	1	0	0	0	0	0
<i>Calumma guibei</i> (cf.)	ZSM 2948/2010	m	left side	5	2	5	4	4	2	0	7	0	1	5	0	4	>40
			right side	5	2	5	4	9	2	0	7	0	1	5	0	0	0
<i>Calumma linotum</i>	ZSM 1683/2012	m	left side	0	2	4	0	0	0	0	6	4	0	0	0	0	0
			right side	0	2	4	0	2	0	0	4	2	0	0	0	3	10
<i>Calumma linotum</i>	ZSM 2072/2007	m	left side	0	2	3	0	7	0	0	5	3	3	0	0	4	8
			right side	0	2	4	1	8	0	0	5	3	2	0	0	0	0
<i>Calumma linotum</i>	ZSM 551/2001	f	left side	0	1	4	1	4	0	0	4	0	0	0	0	0	0
			right side	0	1	4	1	4	0	0	5	0	0	0	0	0	0
<i>Calumma linotum</i> cf.	ZSM 43/2016	m	left side	0	3	8	3	4	0	0	7	0	0	0	0	0	20
			right side	1	5	7	4	7	0	0	5	0	0	0	0	0	0
<i>Calumma linotum</i> cf.	ZSM 142/2016	f	left side	0	0	2	0	2	0	0	4	0	1	0	0	0	0
			right side	0	0	3	0	1	0	0	2	0	0	0	0	0	0
<i>Calumma linotum</i> cf.	ZSM 143/2016	f	left side	0	0	2	0	4	0	0	3	0	0	0	0	0	0
			right side	0	0	2	0	5	0	0	5	0	0	0	0	0	0
<i>Calumma nasutum</i>	ZSM 663/2014	m	left side	0	3	7	3	6	0	0	7	3	3	3	0	0	10
			right side	0	3	7	5	5	2	0	6	2	3	2	0	0	0
<i>Calumma nasutum</i>	ZSM 618/ 2009	m	left side	0	2	7	1	5	0	0	5	2	1	0	0	0	0
			right side	0	5	7	2	7	0	0	6	2	1	0	0	0	0
<i>Calumma nasutum</i>	ZSM 661/2014	f	left side	0	0	4	0	6	0	0	5	3	3	0	0	0	0
			right side	0	0	4	0	5	0	0	5	3	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 662/2014	f	left side	0	0	4	1	5	0	0	4	0	0	0	0	0	0
			right side	0	0	4	1	4	0	0	6	1	1	0	0	0	0
<i>Calumma nasutum</i>	ZSM 553/2001	f	left side	0	0	5	0	7	0	0	6	0	3	0	0	0	0
			right side	0	1	5	0	6	0	0	5	0	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 693/2009	m	left side	0	0	3	0	6	0	0	5	0	0	0	0	0	0
			right side	0	0	3	0	6	0	0	5	1	1	0	0	0	0
<i>Calumma nasutum</i>	ZSM 694/2003	m	left side	0	1	2	0	5	0	0	5	0	2	0	0	0	0
			right side	0	1	1	0	6	0	0	5	1	2	0	0	0	0
<i>Calumma nasutum</i>	ZSM 134/2005	m	left side	0	0	2	0	5	0	0	5	0	3	0	0	0	0
			right side	0	0	2	0	6	0	0	5	0	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 924/2003	m	left side	0	2	5	0	6	0	0	4	0	3	0	0	2	0
			right side	0	1	6	0	9	0	0	6	0	2	3	0	0	0

<i>Calumma nasutum</i>	ZSM 441/2005	m	left side	0	2	5	2	4	0	0	5	0	2	4	0	1	0
			right side	0	2	6	3	3	0	0	7	4	3	4	0	0	0
<i>Calumma nasutum</i>	ZSM 443/2005	f	left side	0	2	5	1	4	0	0	5	1	3	5	0	0	0
			right side	0	2	6	0	3	0	0	5	3	0	4	0	0	0
<i>Calumma nasutum</i>	ZSM 619/2009	m	left side	0	0	7	4	6	2	0	6	0	3	0	0	0	0
			right side	0	0	5	2	6	2	0	6	0	2	0	0	0	0
<i>Calumma nasutum</i>	ZSM 146/2016	f	left side	0	0	5	0	4	0	0	4	0	3	0	0	0	0
			right side	0	0	5	0	5	0	0	5	0	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 147/2016	f	left side	0	0	3	0	8	0	0	7	0	4	0	0	0	0
			right side	0	0	3	0	10	0	0	6	0	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 148/2016	f	left side	0	2	1	0	6	0	0	4	2	3	0	0	0	0
			right side	0	0	5	2	6	0	0	5	0	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 149/2016	f	left side	0	0	3	0	4	0	0	5	0	0	0	0	0	0
			right side	0	0	4	0	5	0	0	5	0	0	0	0	0	0
<i>Calumma nasutum</i>	ZSM 145/2016	m	left side	0	0	3	0	5	0	0	5	0	3	0	0	0	0
			right side	0	0	3	0	7	0	0	5	0	2	0	0	0	0
<i>Calumma nasutum</i>	ZSM 645/2009	m	left side	0	0	4	0	4	0	0	5	3	2	0	0	0	0
			right side	0	0	4	0	5	1	0	4	4	3	0	0	0	0
<i>Calumma nasutum</i>	ZSM 144/2016	f	left side	0	0	7	0	5	0	0	5	0	0	0	0	0	0
			right side	0	0	6	0	5	0	0	4	0	0	0	0	0	0
<i>Calumma vatosoa</i>	MRSN R1628	m	left side	1	4	10	3	7	3	0	6	3	6	0	0	0	5
			right side	1	5	6	3	9	2	0	3	2	5	0	0	0	0
<i>Calumma vohibola</i>	ZSM 644/2009	m	left side	0	0	4	1	7	0	0	5	4	1	0	0	0	0
			right side	0	2	4	0	7	0	0	5	5	1	0	0	0	0
<i>Calumma vohibola</i>	ZSM 643/2009	f	left side	0	0	4	0	5	0	0	5	3	0	0	0	0	0
			right side	0	0	3	0	4	0	0	5	3	0	0	0	0	0
<i>Calumma vohibola</i>	ZSM 152/2016	f	left side	0	0	2	0	3	0	0	5	0	0	0	0	0	0
			right side	0	0	3	0	2	0	0	4	0	1	0	0	0	0
<i>Calumma parsonii</i> group																	
<i>Calumma ambreense</i>	ZSM 1042/2003	m	left side	5	6	7	0	8	6	0	0	0	0	15	39	0	100
			right side	3	7	7	0	6	5	0	0	0	0	12	45	0	0
<i>Calumma ambreense</i>	ZSM 1682/2012	f	left side	3	5	7	0	8	6	0	0	0	0	14	39	0	100
			right side	2	4	9	0	7	6	0	0	0	0	15	46	0	0
<i>Calumma capuroni</i>	ZSM 132/2005	m	left side	4	4	6	0	6	4	0	0	0	0	5	19	4	40
			right side	2	4	7	0	7	1	0	0	0	0	7	20	0	0
<i>Calumma capuroni</i>	ZSM 5104/2005	f	left side	4	6	7	0	5	4	0	0	0	0	9	27	5	60
			right side	4	5	8	0	6	5	0	0	0	0	7	25	0	0
<i>Calumma globifer</i>	ZSM 141/2016	m	left side	4	10	8	0	10	7	0	0	0	0	20	81	10	100
			right side	8	8	8	0	8	6	0	0	0	0	21	85	0	0
<i>Calumma globifer</i>	ZSM 683/2003	m	left side	4	11	8	0	7	5	0	0	0	0	15	51	8	100
			right side	5	11	8	0	7	7	0	0	0	0	15	58	0	0
<i>Calumma globifer</i>	ZSM 221/2002	f	left side	4	7	7	0	5	5	0	0	0	0	14	72	9	60
			right side	4	7	8	0	7	6	0	0	0	0	15	65	0	0
<i>Calumma oshaughnessyi</i>	ZSM 1043/2003	f	left side	6	5	9	0	6	4	0	0	0	0	13	48	0	100
			right side	5	4	9	0	7	6	0	0	0	0	14	46	0	0

<i>Calumma oshaughnessyi</i>	ZSM 1047/2003	f	left side	7	8	8	0	7	6	0	0	0	0	14	53	0	0
			right side	7	6	8	0	7	8	0	0	0	0	0	13	56	0
<i>Calumma p. parsoni</i>	ZSM 151/2016	m	left side	9	8	7	0	7	1	0	0	0	0	12	39	0	70
			right side	8	2	6	0	6	1	0	0	0	0	5	33	0	0
<i>Calumma parsonii cristifer</i>	ZSM 664/2014	f	left side	4	6	11	0	8	5	0	0	0	0	15	41	0	76
			right side	3	8	8	0	7	5	0	0	0	0	17	42	0	0
others																	
<i>Calumma cucullatum</i>	ZSM 655/2014	m	left side	6	9	9	11	6	0	0	7	2	5	0	0	0	60
			right side	5	10	8	8	8	0	0	5	2	5	0	0	0	0
<i>Calumma cucullatum</i>	ZSM 653/2014	f	left side	2	5	8	4	7	0	0	4	1	4	4	0	0	25
			right side	3	4	8	3	7	0	0	4	1	3	4	0	0	0
<i>Calumma cucullatum</i>	ZSM 654/2014	f	left side	2	4	7	4	6	0	0	3	1	3	5	0	0	30
			right side	2	4	7	3	7	0	0	6	1	4	4	0	0	0
<i>Calumma malthe</i>	ZSM 71/2005	m	left side	0	1	6	0	7	0	0	0	0	0	4	8	4	10
			right side	0	0	7	0	7	0	0	0	0	0	3	6	0	0
<i>Calumma malthe</i>	ZSM 512/2014	m	left side	7	5	13	0	7	0	0	0	0	0	5	36	5	24
			right side	8	6	9	0	7	0	0	0	0	0	5	35	0	0
<i>Calumma malthe</i>	ZSM 513/2014	m	left side	4	6	9	0	7	0	0	0	0	0	5	23	5	14
			right side	7	4	8	0	4	0	0	0	0	0	4	19	0	0
<i>Calumma malthe</i>	ZSM 515/2014	m	left side	13	7	9	0	7	0	0	0	0	0	9	16	8	13
			right side	15	9	12	0	6	0	0	0	0	0	16	18	0	0
<i>Calumma malthe</i>	ZSM 516/2014	m	left side	7	7	8	0	7	2	0	0	0	0	13	24	7	25
			right side	5	6	8	0	5	1	0	0	0	0	8	21	0	0
<i>Calumma malthe</i>	ZSM 1704/2012	m	left side	14	7	11	0	9	4	0	0	0	0	15	39	8	40
			right side	13	10	12	0	9	2	0	0	0	0	16	40	0	0
<i>Calumma malthe</i>	ZSM 1705/2012	f	left side	6	6	12	0	9	4	0	0	0	0	14	58	8	50
			right side	7	8	9	0	7	3	0	0	0	0	12	40	0	0
<i>Calumma malthe</i>	ZSM 1833/2010	f	left side	2	6	9	0	6	0	0	0	0	0	7	16	3	0
			right side	2	6	9	0	4	0	0	0	0	0	3	12	0	0
<i>Calumma malthe</i>	ZSM 514/2014	f	left side	0	0	4	0	6	0	0	0	0	0	6	4	5	7
			right side	0	0	4	0	7	0	0	0	0	0	6	5	0	0

Table S5. Number of FTs per cranial bone from lateral view of 25 adult males of different *Calumma* species. See ‘Methods’ for abbreviations.

species	collection number	sex	M	PRF	Flat	POF	JU	SQ	Summe lat.	Pdors	Fdors
<i>Calumma brevicorne</i> group											
<i>Calumma amber</i>	ZSM 1041/2003	m	0	3	0	16	5	15	39	20	0
<i>Calumma brevicorne</i>	ZSM 549/2001	m	0	4	0	15	4	11	34	17	0
<i>Calumma crypticum</i>	ZSM 455/2010	m	0	8	0	27	11	15	61	25	0
<i>Calumma hafahafa</i>	ZSM 617/2009	m	0	6	0	17	6	15	44	15	8
<i>Calumma peltierorum</i>	ZSM 1725/2010	m	3	7	0	11	9	14	44	23	34
<i>Calumma furcifer</i> group											
<i>Calumma andringitraense</i>	ZSM 129/2005	m	0	2	0	11	9	0	22	0	0
<i>Calumma furcifer</i>	ZSM 225/2002	m	0	2	0	9	5	5	21	0	0
<i>Calumma gastrotaenia</i>	ZSM 226/2002	m	0	2	2	13	6	0	23	0	0
<i>Calumma glawi</i>	ZSM 2042/2008	m	0	3	3	15	6	6	33	10	0
<i>Calumma guillaumeti</i>	ZSM 440/2005	m	0	6	0	21	7	4	38	20	20
<i>Calumma tarzan</i>	ZSM 219/2010	m	0	4	0	20	6	0	30	8	0
<i>Calumma vencesi</i>	ZSM 50/2011	m	0	4	4	12	7	6	33	30	30
<i>Calumma nasutum</i> group											
<i>Calumma boettgeri</i>	ZSM 440/2000	m	0	2	1	7	7	3	20	0	0
<i>Calumma linotum</i>	ZSM 2072/2007	m	0	2	0	8	6	7	23	8	4
<i>Calumma guibei</i>	ZSM 2855/2010	m	0	2	4	12	4	6	28	14	0
<i>Calumma gehringi</i>	ZSM 2851/2010	m	0	6	1	12	5	6	30	0	0
<i>Calumma fallax</i>	ZSM 693/2009	m	0	0	0	6	5	3	14	0	0
<i>Calumma nasutum</i>	ZSM 618/ 2009	m	0	2	2	11	4	4	23	0	0
<i>Calumma vohibola</i>	ZSM 645/2009	m	0	0	0	9	4	5	18	0	0
<i>Calumma vatosoa</i>	MRSN R1628	m	1	4	0	17	9	12	43	0	0
<i>Calumma parsonii</i> group											
<i>Calumma ambreense</i>	ZSM 1042/2003	m	5	8	0	36	12	25	86	40	60
<i>Calumma oshaughnessyi</i>	1836/2010	m	10	13	0	38	14	47	122	40	60
<i>Calumma globifer</i>	ZSM 141/2016	m	0	15	0	55	13	57	140	40	70
others											
<i>Calumma cucullatum</i>	ZSM 655/2014	m	2	16	0	23	5	9	55	20	40
<i>Calumma malthe</i>	ZSM 71/2005	m	0	3	0	13	6	4	26	14	0

Table S6. Presence (+) or absence (–) of fluorescence in chameleon genera checked with exemplarily specimens.

genus	species	collection number	sex	fluorescence
Archaius				+
	<i>Archaius tigris</i>	ZSM 600/2009	male	+
Bradypodion				+
	<i>Bradypodion thamnobates</i>	ZSM 4742/2012	male	+
	<i>Bradypodion damaranum</i>	ZSM 791/2000	male	+
	<i>Bradypodion thamnobates</i>	ZSM 795/2000	male	
Brookesia				+
	<i>Brookesia ambreensis</i>	ZSM 2090/2007	male	+
	<i>Brookesia antakarana</i>	ZSM 1661/2012	male	+
	<i>Brookesia betschi</i>	ZSM 435/2016	male	+
	<i>Brookesia brunoi</i>	ZSM 888/2010	male	+
	<i>Brookesia brygooi</i>	ZSM 80/2006	-	+
	<i>Brookesia decaryi</i>	ZSM 911/2006	-	+
	<i>Brookesia desperata</i>	ZSM 3276/2012	-	-
	<i>Brookesia ebenau</i>	ZSM 87/2015	-	+
	<i>Brookesia exarmata</i>	ZSM 72/2006	female	-
	<i>Brookesia griveaudi</i>	ZSM 1677/2012	male	+
	<i>Brookesia karchei</i>	ZSM 1659/2012	female	+
	<i>Brookesia lineata</i>	ZSM 27/2016	male	+
	<i>Brookesia minima</i>	ZSM 990/2003	male	-
	<i>Brookesia perarmata</i>	ZSM 17/2006	male	-
	<i>Brookesia peyrierasi</i>	ZSM 252/2016	female	-
	<i>Brookesia ramanantsoai</i>	ZSM 132/2016	male	-
	<i>Brookesia stumpffi</i>	ZSM 1681/2012	male	+
	<i>Brookesia superciliaris</i>	ZSM 253/2016	male	+
	<i>Brookesia thieli</i>	ZSM 1674/2012	female	+
	<i>Brookesia tuberculata</i>	ZSM 792/2009	male	-
	<i>Brookesia vadoni</i>	ZSM 440/2016	male	+
Chamaeleo				-
	<i>Chamaeleo calytratus</i>	ZSM 464/1998	male	-
	<i>Chamaeleo chamaeleon</i>	ZSM 935/2014	male	-
	<i>Chamaeleo dilepis</i>	ZSM 4347/2012	-	-
	<i>Chamaeleo laevigatus</i>	ZSM 56/1978	-	-
	<i>Chamaeleo monachus</i>	ZSM 13/1920	-	-
	<i>Chamaeleo namaquensis</i>	ZSM 96/1989/2	-	-
	<i>Chamaeleo senegalensis</i>	ZSM 4712/2012	-	-
Furcifer				+
	<i>Furcifer angeli</i>	ZSM 1057/2003	male	+
	<i>Furcifer antimena</i>	ZSM 624/2000	female	-
	<i>Furcifer antimena</i>	ZSM 625/2000	male	-
	<i>Furcifer antimena</i>	ZSM 780/2000	male	-
	<i>Furcifer antimena</i>	ZSM 4381/2012	female	-
	<i>Furcifer antimena</i>	ZSM 4382/2012	female	-
	<i>Furcifer balteatus</i>	ZSM 682/2003	male	-
	<i>Furcifer balteatus</i>	ZSM 795/2003	-	-
	<i>Furcifer bifidus</i>	ZSM 157/2016	female	-
	<i>Furcifer campani</i>	ZSM 537/2001	male	-
	<i>Furcifer campani</i>	ZSM 538/2001	-	-
	<i>Furcifer campani</i>	ZSM 539/2001	-	-
	<i>Furcifer campani</i>	ZSM 1058/2003	female	-
	<i>Furcifer campani</i>	ZSM 1059/2003	male	+
	<i>Furcifer campani</i>	ZSM 72/2005	male	-
	<i>Furcifer campani</i>	ZSM 316/2006	male	+
	<i>Furcifer campani</i>	ZSM 317/2006	male	-

<i>Furcifer campani</i>	ZSM 723/2014	female	+
<i>Furcifer campani</i>	ZSM 724/2014	female	+
<i>Furcifer campani</i>	ZSM 725/2014	female	-
<i>Furcifer campani</i>	ZSM 630/2003	-	-
<i>Furcifer cephalolepis</i>	ZSM 1686/2008	male	-
<i>Furcifer cephalolepis</i>	ZSM 701/2000	male	-
<i>Furcifer cephalolepis</i>	ZSM 702/2000	female	-
<i>Furcifer cephalolepis</i>	ZSM 324/2002	female	+
<i>Furcifer cephalolepis</i>	ZSM 325/2002	female	+
<i>Furcifer cephalolepis</i>	ZSM 326/2002	male	+
<i>Furcifer cephalolepis</i>	ZSM 327/2002	male	+
<i>Furcifer cephalolepis</i>	ZSM 328/2002	female	+
<i>Furcifer labordi</i>	ZSM 875/2000	male	-
<i>Furcifer labordi</i>	ZSM 782/2000	male	-
<i>Furcifer lateralis</i>	ZSM 28/2004	female	-
<i>Furcifer lateralis</i>	ZSM 185/2004	male	-
<i>Furcifer lateralis</i>	ZSM 2043/2008	-	-
<i>Furcifer lateralis</i>	ZSM 836/2014	male	-
<i>Furcifer lateralis</i>	ZSM 649/2000	female	-
<i>Furcifer lateralis</i>	ZSM 541/2001	-	-
<i>Furcifer lateralis</i>	ZSM 542/2001	-	-
<i>Furcifer lateralis</i>	ZSM 543/2001	male	-
<i>Furcifer lateralis</i>	ZSM 636/2003	male	-
<i>Furcifer lateralis</i>	ZSM 785/2003	male	-
<i>Furcifer lateralis</i>	ZSM 786/2003	female	-
<i>Furcifer lateralis</i>	ZSM 783/2006	male	-
<i>Furcifer lateralis</i>	ZSM 916/2006	male	-
<i>Furcifer lateralis</i>	ZSM 917/2006	female	-
<i>Furcifer lateralis</i>	ZSM 68/2009	-	-
<i>Furcifer lateralis</i>	ZSM 69/2009	-	-
<i>Furcifer lateralis</i>	ZSM 726/2014	male	-
<i>Furcifer major</i>	ZSM 224/2002	female	-
<i>Furcifer major</i>	ZSM 936/2003	male	-
<i>Furcifer major</i>	ZSM 937/2003	male	-
<i>Furcifer major</i>	ZSM 938/2003	male	-
<i>Furcifer major</i>	ZSM 41/2004	male	-
<i>Furcifer major</i>	ZSM 175/2004	male	-
<i>Furcifer major</i>	ZSM 195/2004	male	-
<i>Furcifer major</i>	ZSM 73/2005	-	-
<i>Furcifer major</i>	ZSM 194/2004	male	-
<i>Furcifer major</i>	ZSM 783/2000	male	-
<i>Furcifer minor</i>	ZSM 784/2000	male	-
<i>Furcifer minor</i>	ZSM 786/2000	male	-
<i>Furcifer minor</i>	ZSM 787/2000	female	-
<i>Furcifer minor</i>	ZSM 536/2001	male	-
<i>Furcifer minor</i>	ZSM 918/2006	male	-
<i>Furcifer minor</i>	ZSM 919/2006	female	-
<i>Furcifer minor</i>	ZSM 920/2006	female	-
<i>Furcifer nicosiai</i>	ZSM 20/2006	female	-
<i>Furcifer nicosiai</i>	ZSM 51/2006	female	-
<i>Furcifer nicosiai</i>	ZSM 84/2006	male	-
<i>Furcifer oustaleti</i>	ZSM 243/2004	-	-
<i>Furcifer oustaleti</i>	ZSM 1/2006	male	-
<i>Furcifer oustaleti</i>	ZSM 105/2006	female	-
<i>Furcifer oustaleti</i>	ZSM 58/2009	female	-
<i>Furcifer oustaleti</i>	ZSM 59/2009	female	-
<i>Furcifer oustaleti</i>	ZSM 60/2009	female	-
<i>Furcifer oustaleti</i>	ZSM 61/2009	male	-
<i>Furcifer oustaleti</i>	ZSM 665/2014	male	-
<i>Furcifer oustaleti</i>	ZSM 774/2000	female	-
<i>Furcifer pardalis</i>	ZSM 775/2000	female	-
<i>Furcifer pardalis</i>	ZSM 776/2000	female	-
<i>Furcifer pardalis</i>	ZSM 777/2000	female	-

<i>Furcifer pardalis</i>	ZSM 778/2000	female	-
<i>Furcifer pardalis</i>	ZSM 1060/2003	female	-
<i>Furcifer pardalis</i>	ZSM 1061/2003	female	-
<i>Furcifer pardalis</i>	ZSM 2210/2007	female	-
<i>Furcifer pardalis</i>	ZSM 62/2009	-	-
<i>Furcifer pardalis</i>	ZSM 63/2009	male	-
<i>Furcifer pardalis</i>	ZSM 64/2009	-	+
<i>Furcifer pardalis</i>	ZSM 65/2009	-	-
<i>Furcifer pardalis</i>	ZSM 1730/2010	male	-
<i>Furcifer pardalis</i>	ZSM 4379/2012	male	+
<i>Furcifer pardalis</i>	ZSM 4380/2012	-	+
<i>Furcifer pardalis</i>	ZSM 4680/2012	male	+
<i>Furcifer pardalis</i>	ZSM 316/2014	-	-
<i>Furcifer pardalis</i>	ZSM 317/2014	-	-
<i>Furcifer pardalis</i>	ZSM 318/2014	-	-
<i>Furcifer pardalis</i>	ZSM 319/2014	-	-
<i>Furcifer pardalis</i>	ZSM 320/2014	-	-
<i>Furcifer pardalis</i>	ZSM 321/2014	-	-
<i>Furcifer pardalis</i>	ZSM 322/2014	male	-
<i>Furcifer pardalis</i>	ZSM 323/2014	-	-
<i>Furcifer pardalis</i>	ZSM 324/2014	-	-
<i>Furcifer pardalis</i>	ZSM 527/2014	male	+
<i>Furcifer pardalis</i>	ZSM 1016/2000	-	-
<i>Furcifer pardalis</i>	ZSM 1017/2000	-	-
<i>Furcifer petteri</i>	ZSM 1001/2003	female	-
<i>Furcifer petteri</i>	ZSM 1002/2003	male	-
<i>Furcifer petteri</i>	ZSM 254/2004	male	-
<i>Furcifer petteri</i>	ZSM 258/2004	female	-
<i>Furcifer petteri</i>	ZSM 272/2004	male	-
<i>Furcifer petteri</i>	ZSM 274/2004	male	-
<i>Furcifer petteri</i>	ZSM 315/2004	female	-
<i>Furcifer petteri</i>	ZSM 2136/2007	female	-
<i>Furcifer petteri</i>	ZSM 2137/2007	male	-
<i>Furcifer petteri</i>	ZSM 2141/2007	male	-
<i>Furcifer petteri</i>	ZSM 2142/2007	male	-
<i>Furcifer petteri</i>	ZSM 2160/2007	female	-
<i>Furcifer petteri</i>	ZSM 2161/2007	male	-
<i>Furcifer petteri</i>	ZSM 2022/2008	male	-
<i>Furcifer petteri</i>	ZSM 1706/2012	male	-
<i>Furcifer petteri</i>	ZSM 521/2000	female	-
<i>Furcifer petteri</i>	ZSM 785/2000	female	-
<i>Furcifer petteri</i>	ZSM 789/2000	male	-
<i>Furcifer petteri</i>	ZSM 790/2000	female	-
<i>Furcifer petteri</i>	ZSM 767/2003	female	-
<i>Furcifer petteri</i>	ZSM 859/2003	male	-
<i>Furcifer petteri</i>	ZSM 727/2014	male	-
<i>Furcifer polleni</i>	ZSM 37/2010	male	+
<i>Furcifer polleni</i>	ZSM 666/2000	male	+
<i>Furcifer polleni</i>	ZSM 667/2000	female	+
<i>Furcifer rhinocerotus</i>	ZSM 329/2014	-	-
<i>Furcifer rhinocerotus</i>	ZSM 532/2001	male	-
<i>Furcifer rhinocerotus</i>	ZSM 533/2001	male	-
<i>Furcifer rhinocerotus</i>	ZSM 534/2001	female	-
<i>Furcifer rhinocerotus</i>	ZSM 535/2001	-	-
<i>Furcifer rhinocerotus</i>	ZSM 787/2001	-	-
<i>Furcifer timoni</i>	ZSM 255/2004	female	-
<i>Furcifer timoni</i>	ZSM 256/2004	female	-
<i>Furcifer timoni</i>	ZSM 2103/2007	male	+
<i>Furcifer timoni</i>	ZSM 2023/2008	female	-
<i>Furcifer verrucosus</i>	ZSM 1063/2003	female	-
<i>Furcifer verrucosus</i>	ZSM 1064/2003	male	-
<i>Furcifer verrucosus</i>	ZSM 1065/2003	male	-
<i>Furcifer verrucosus</i>	ZSM 1066/2003	male	-

<i>Furcifer verrucosus</i>	ZSM 1067/2003	male	-
<i>Furcifer verrucosus</i>	ZSM 40/2004	female	-
<i>Furcifer verrucosus</i>	ZSM 60/2004	male	-
<i>Furcifer verrucosus</i>	ZSM 61/2004	male	-
<i>Furcifer verrucosus</i>	ZSM 66/2009	male	-
<i>Furcifer verrucosus</i>	ZSM 67/2009	female	-
<i>Furcifer verrucosus</i>	ZSM 328/2014	male	-
<i>Furcifer verrucosus</i>	ZSM 623/2000	male	-
<i>Furcifer verrucosus</i>	ZSM 779/2000	-	-
<i>Furcifer verrucosus</i>	ZSM 959/2003	male	-
<i>Furcifer viridis</i>	ZSM 540/2001	-	-
<i>Furcifer viridis</i>	ZSM 79/2006	male	-
<i>Furcifer viridis</i>	ZSM 1729/2010	female	-
<i>Furcifer viridis</i>	ZSM 1838/2010	male	-
<i>Furcifer viridis</i>	ZSM 525/2014	female	-
<i>Furcifer viridis</i>	ZSM 526/2014	male	-
<i>Furcifer viridis</i>	ZSM 44/2016	male	-
<i>Furcifer willsii</i>	ZSM 193/2004	male	-
<i>Furcifer willsii</i>	ZSM 446/2005	male	-
<i>Furcifer willsii</i>	ZSM 463/2010	female	-
<i>Furcifer willsii</i>	ZSM 835/2014	male	-
<i>Furcifer willsii</i>	ZSM 45/2016	female	-

Palleon			+
<i>Palleon lolontany</i>	ZSM 1679/2012	female	+

Kinyongia			
<i>Kinyongia excubitor</i>	ZSM 893/2000	male	+
<i>Kinyongia matschiei</i>	ZSM 4746/2012	-	-
<i>Kinyongia multituberculata</i>	ZSM 1/1920/1	male	+
<i>Kinyongia tavetana</i>	ZSM 4747/2012	-	+
<i>Kinyongia tenue</i>	ZSM 22/1915	-	+
<i>Kinyongia vosseleri</i>	ZSM 2871/2007	male	+
<i>Kinyongia xenorhina</i>	ZSM 4751/2012	male	+

Nadzikambia	no specimens available		
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Rhampholeon			-
<i>Rhampholeon boulengeri</i>	ZSM 4373/2012	male	-
<i>Rhampholeon platyceps</i>	ZSM 16/1932/1	-	-
<i>Rhampholeon spectrum</i>	ZSM 858/2000	female	-

Rieppeleon			-
<i>Rieppeleon brevicaudatus</i>	ZSM 859/2000	-	-
<i>Rieppeleon kerstenii</i>	ZSM 826/2000	-	-

Trioceros			
<i>Trioceros cristatus</i>	ZSM 808/2000	male	-
<i>Trioceros deremensis</i>	ZSM 671/1911	male	+
<i>Trioceros ellioti</i>	ZSM 911/2000	-	-
<i>Trioceros fuelleborni</i>	ZSM 4706/2012	-	-
<i>Trioceros hoehnelii</i>	ZSM 907/2000	-	+
<i>Trioceros ituriensis</i>	ZSM 893/2014	-	-
<i>Trioceros jacksonii</i>	ZSM 839/2000	female	+
<i>Trioceros melleri</i>	ZSM 814/2000	male	-
<i>Trioceros montium</i>	ZSM 827/2000	male	-
<i>Trioceros oweni</i>	ZSM 4719/2012	male	-
<i>Trioceros quadricornis</i>	ZSM 933/2014	-	-
<i>Trioceros sternfeldi</i>	ZSM 1766/2006	-	-
<i>Trioceros wiedersheimi</i>	ZSM 855/2000	-	+

Table S7. Settings for micro-CT scans. Abbreviations: Diam, diamond target; Stand, standard (tungsten) target.

specimen	description	kV	mA	target	duration
<i>C. amber</i> ZSM 1041/2003	complete body	130	60	Diam	18 min
<i>C. ambreense</i> ZSM 1042/2003	complete body	130	50	Diam	18 min
<i>C. andrigitraense</i> ZSM 544/2001	complete body	130	60	Diam	18 min
<i>C. andringitraense</i> ZSM 554/2001	complete body	130	60	Diam	18 min
<i>C. boettgeri</i> ZSM 227/2002	chameleon head	130	80	Stand	30 min
<i>C. boettgeri</i> ZSM 272/2007	chameleon head	130	80	Stand	30 min
<i>C. boettgeri</i> ZSM 273/2007	chameleon head	130	80	Stand	30 min
<i>C. boettgeri</i> ZSM 36/1913	complete body	130	60	Diam	18 min
<i>C. boettgeri</i> ZSM 440/2000	chameleon head	130	80	Stand	30 min
<i>C. boettgeri</i> ZSM 441/2000	chameleon head	130	80	Stand	30 min
<i>C. boettgeri</i> ZSM 444/2000	chameleon head	130	80	Stand	30 min
<i>C. boettgeri</i> ZSM 551/2001	chameleon head	130	80	Stand	30 min
<i>C. brevicorne</i> ZSM 549/2001	complete body	130	50	Diam	18 min
<i>C. cf. fallax</i> ZSM 693/2009	chameleon head	130	80	Stand	30 min
<i>C. cf. gallus</i> ZSM 691/2009	chameleon head	130	80	Stand	30 min
<i>C. cf. linotum</i> ZSM 143/2016	chameleon head	130	80	Diam	30 min
<i>C. cf. vencesi</i> ZSM 620/2009	complete body	130	50	Diam	18 min
<i>C. cf.andringitraense</i> ZSM 0129/2005	complete body	130	60	Diam	18 min
<i>C. cf.marojenze</i> ZSM 462/2010	complete body	130	50	Diam	18 min
<i>C. crypticum</i> ZSM 455/2010	complete body	120	70	Diam	18 min
<i>C. cuculatum</i> ZSM 655/2014	complete body	130	50	Diam	18 min
<i>C. fallax</i> MNHN 1899.317	chameleon head	131	80	Diam	30 min
<i>C. fallax</i> ZSM 268/2010	complete body	130	60	Diam	18 min
<i>C. fallax</i> ZSM 685/2003	complete body	130	60	Diam	18 min
<i>C. furcifer</i> ZSM 225/2002	complete body	130	60	Diam	18 min
<i>C. gallus</i> ZSM 321/2000	complete body	130	60	Diam	18 min
<i>C. gastrotaenia</i> ZSM 226/2002	complete body	130	60	Diam	18 min
<i>C. gehringi</i> ZSM 2851/2010	complete body	130	80	Stand	30 min
<i>C. glawi</i> ZSM 2042/2008	complete body	131	60	Diam	18 min
<i>C. globifer</i> ZSM 141/2016	chameleon head	130	80	Diam	30 min
<i>C. globifer</i> ZSM 221/2002	complete body	130	50	Diam	18 min
<i>C. globifer</i> ZSM 221/2002	chameleon head	130	60	Diam	18 min
<i>C. guibei</i> 2842/2010	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ht SMF 50.354	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ZSM 1686/2012	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ZSM 1688/2012	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ZSM 2840/2010	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ZSM 2841/2010n	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ZSM 2849/2010	chameleon head	130	80	Stand	30 min
<i>C. guibei</i> ZSM 2855/2010	chameleon head	130	80	Stand	30 min
<i>C. guillaumeti</i> ZSM 440/2005	complete body	130	50	Diam	18 min
<i>C. hafahafa</i> DRV 06282	complete body	130	50	Diam	18 min
<i>C. hafahafa</i> ZSM 617/2009	complete body	130	50	Diam	18 min

<i>C. hilleniusi</i> ZSM 380/200	complete body	130	60	Diam	12 min
<i>C. linotum</i> ZSM 21/1923	complete body	120	80	Stand	30 min
<i>C. malthe</i> ZSM 71/2005	complete body	130	50	Diam	18 min
<i>C. nasutum</i> ZSM 134/2005	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 135/2005	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 35/2016	chameleon head	130	80	Diam	30 min
<i>C. nasutum</i> ZSM 441/2005	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 443/2005	complete body	130	50	Diam	18 min
<i>C. nasutum</i> ZSM 553/2009	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 618/2009	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 619/2009	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 735/2003	chameleon head	130	80	Stand	30 min
<i>C. nasutum</i> ZSM 924/2003	chameleon head	130	80	Stand	30 min
<i>C. oshaughnessyi</i> ZSM 1836/2010	complete body	130	50	Diam	18 min
<i>C. parsoni</i> ZSM 47/1990	complete body	130	60	Diam	36 min
<i>C. peltierorum</i> ZSM 1725/2010	complete body	130	50	Diam	18 min
<i>C. peyrieasi</i> ZSM 1727/2010	complete body	130	50	Diam	18 min
<i>C. radamanus</i> SMF 26394	complete body	130	80	Stand	30 min
<i>C. tarzan</i> ZSM 219/2010	complete body	120	80	Diam	18 min
<i>C. tsaratanaense</i> ZSM 1728/2010	complete body	130	50	Diam	18 min
<i>C. vatosoa</i> MRSN R1628	chameleon head	130	80	Stand	30 min
<i>C. vatosoa</i> SMF 26357	chameleon head	130	80	Stand	30 min
<i>C. vencesi</i> ZSM 50/2011	complete body	120	80	Diam	21 min
<i>C. vencisi</i> ZSM 50/2011	complete body	130	50	Diam	51 min
<i>C. vohibola</i> ZSM 645/2009	chameleon head	130	80	Stand	30 min
<i>C. vohibola</i> ZSM 645/2009	complete body	130	60	Diam	18 min
<i>C. capuroni</i> ZSM 5104/2005	complete body	130	60	Diam	18 min

Table S8. Equipment and settings of microscopy photography

Figs 2A,B	Volume renderings based on light micrographs (see corresponding section in material and methods): original 8 bit grayscale, jpg, 1390 x 1065 px @ 1.28 $\mu\text{m}/\text{px}$. Processed with Adobe® Photoshop® CS6: edge length downsampled to 96% \rightarrow 1051 x 1045 px @ 1.33 $\mu\text{m}/\text{px}$, converted to TIFF, 300 dpi.
Figs 2C,D	Light micrographs (10x): original 24 bit RGB, jpg, 2560 x 1920 px @ 342 nm/px. Processed with Adobe® Photoshop® CS6: edge length downsampled to 41%, height cropped from 788 to 710 px \rightarrow 1051 x 710 px @ 834 nm/px, slight color correction (reduction of magenta), unsharp masked (radius 4px, strength 80%), converted to TIFF, 300 dpi.
Figs 2E,F	Light micrographs (40x): original 24 bit RGB, jpg, 1920 x 2560 px @ 85.2 nm/px. Processed with Adobe® Photoshop® CS6: edge length downsampled to 54.7%, height cropped from 1400 to 710 px \rightarrow 1051 x 710 px @ 156 nm/px, slight color correction (reduction of magenta), unsharp masked (radius 4px, strength 80%), converted to TIFF, 300 dpi.
Supplementary Fig. S1A	Light micrographs (10x): original 24 bit RGB, jpg, 2560 x 1920 px @ 342 nm/px. Processed with Adobe® Photoshop® CS6: edge length downsampled to 41%, height cropped from 788 to 728 px \rightarrow 1051 x 728 px @ 834 nm/px, slight color correction (reduction of magenta), unsharp masked (radius 4px, strength 80%), converted to TIFF, 300 dpi.
Supplementary Fig. S1B	Light micrographs (60x): original 24 bit RGB, jpg, 2560 x 1920 px @ 56.6 nm/px. Processed with Adobe® Photoshop® CS6: edge length downsampled to 41%, height cropped from 788 to 728 px \rightarrow 1051 x 728 px @ 138 nm/px, slight color correction (reduction of magenta), unsharp masked (radius 4px, strength 80%), converted to TIFF, 300 dpi.
Supplementary Figs S1C–E	TEM photographs (4400x): original 1376 x 1032 @ 15.8 nm/px, 8 bit grayscale, TIFF. Processed with Adobe® Photoshop® CS6: region of interest 515 x 942 px cropped (after rotation if necessary), upscaled to 692 x 1266 px (i.e. 134.369%) to match print area, final resolution 11.76 nm/px, brightness and contrast adjusted, 300 dpi.