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Craniometric study of *Felis silvestris* (Mammalia: Carnivora) in Germany – are there differences between populations or in time?

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Abstract. A craniometric study of European wildcats (*Felis silvestris silvestris* Schreber, 1777) in Germany was conducted to determine whether there are differences between regional populations in Germany and provide data on variability in cranial morphometry. 232 wildcats were studied, mainly from the Harz region, Thuringia, Eifel, Rhineland and Hessia. For the analyses they were assigned either to a West or East German sample and compared with a few wildcats from Romania and domestic cats from Germany. Wildcat populations from East and West Germany could only be separated using discriminant analyses when domestic cats were included in the analyses, and separation is only clearly visible if cat groups are not separated according to sex. Sexual dimorphism predominates over regional differences as sexes and not regional groups are separated. The craniometric regional differences therefore are likely to be subtle and not suggestive of well separated wildcat groups in Germany. Also possible changes in morphometry over time in all German wild and domestic cats were studied comparing different time periods. Slight morphometric changes have occurred over time and indicate a stronger similarity between 'old' (1891–1930) and 'most modern' (1971–2010) wildcats than of 'old' and 'modern' (1931–1970) wildcats.

Key words. Wildcat, domestic cat, *Felis*, Felidae, linear measurements, skull morphology, discriminant analysis, Germany, Carpathians.

INTRODUCTION

Formerly the European wildcat (*Felis silvestris* Schreber, 1777) was distributed from the Iberian Peninsula to the Black Sea and from Scotland to the Mediterranean (Hemmer 1993, Heptner & Sludskij 1980). Due to near extirpation, particularly in the 19th century, they are now more patchily distributed (Stahl & Leger 1992, Mitchell-Jones et al. 1999, Piechocki 1999, Aulagnier et al. 2009). Populations probably only survived persecution in North-East and East France, South Belgium and Luxembourg, West and South-West Germany and areas in the Harz Mountains and East Europe, mainly in the Carpathian Mountains (Hemmer 1993: 1100). Within Germany it has been assumed that wildcats survived in the Eifel, Hunsrück, Harz (De Leuw 1976) and probably Thuringia, Taunus, Black forest, Pfälzer Wald and some areas in Hessia ('Kaufunger and Meißner Wald') (Petzsch 1968, Röben 1974, Stefen & Görner 2009). So for at least some time populations have been isolated; particularly the one in the Harz is assumed to be small and isolated

Increasing dispersion is indicated for Scotland (Easterbee 1988), Spain and also for Germany (Röben 1974), more recently for Thuringia (Görner 2000, Stefen et al. 2009), Hessia (Denk & Jung 2004) and in the North like the northern area adjacent to the Harz (Hakel) (Stubbe & Stubbe 2001) and Solling since 1960 (Dieckert 1982). In a reintroduction program in Bavaria 580 wildcats were released from 1984 to 2008 (Worel 2009). The distribution of wildcats in Germany as summarized from published maps since 1957 is illustrated in Fig. 1. Two main areas of occurrence are visible, one in the East in and around the Harz and one in the West, including Eifel, Hunsrück and Pfälzer Wald. The western population is continuous with the one in France and Belgium (Mitchell-Jones

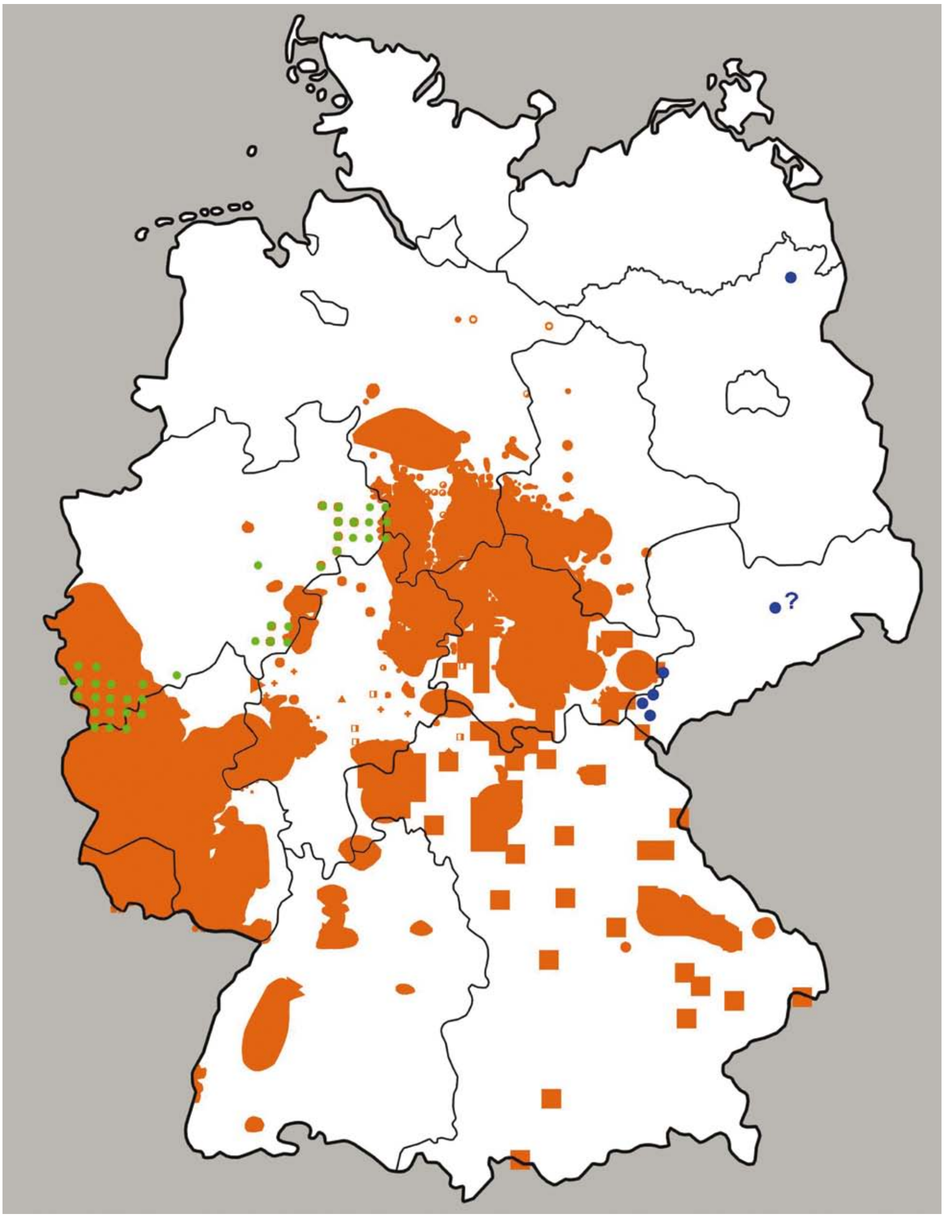

Fig. 1. Distribution of wild cats in Germany from Stefen (2011). It is based on 28 published maps scaled to the same size and overlayed from 1957 to 2009 adapted after Stefen & Görner (2009) and additional information from Hucht-Ciorga (2011). Included are maps from: Haltenorth (1957), Röben (1974), Jost (1978), Vogt (1985), Pflüger (1987), Piechocki (1987, 1989, 1990), Büttner & Worel (1990), Herrmann (1991), Piechocki & Möller (1991), Hossfeld et al. (1993), Raimer (1994), Stubbe & Stubbe (1994), Kock & Altmann (1999), Görner (2000), Raimer (2001), Knapp et al. (2002), Mölich & Klaus (2003), BUND (2004a), Denk et al. (2004), Frobel & Thein (2006), NABU (2007), MUNLV NRW (2007), Pott--Dörfer & Dörfer (2007), Simon & Raimer (2007), Götz & Roth (2007), Stefen et al. (2009).

1999). The domestic cat is considered to be the result of domestication of the African wildcat about 9000 years ago in villages in the Fertile Cresent in the Near East (Driscoll et al. 2007, 2009). It was probably widely distributed by the Romans about 2,000 years ago (Daniels et al. 1998, Driscoll et al. 2009). Hamilton (1869), however, assumes that Egyptian cats were previously introduced into Europe about 300–400 years before Christ.

Many papers deal with wildcats and often attempt to distinguish between wild and domestic cats (e.g. Schauenberg 1969, 1971, 1977, Beaumont et al. 2001, Kitchener et al. 2005, Daniels et al. 1998, Reig et al. 2001, Krüger et al. 2009, Platz et al. 2011). Several studies deal with the craniometric morphology of wildcats (e.g. Sládek et al. 1971, 1972, Kratochvíl & Kratochvíl 1970, Kratochvíl 1973, French et al. 1988, Yamaguchi et al. 2004, Krüger et al. 2009). There are very few studies describing the variability in detail and giving craniometric data on wildcats from different populations in Germany (Krüger et al. 2009 for Thuringia, Stefen & Heidecke 2011 for the Harz region).

There are three main aims of this study. First the craniometric variability of samples of wildcats from Germany is described and compared with those of other samples. They are also compared with domestic cats. Secondly, as molecular studies indicate differences between West and East German wildcats (Hertwick et al. 2009, Eckert et al. 2010) it is determined whether there are craniometric differences between these populations. The answer to this question will establish whether there are distinct groups or populations in need of separate conservation. And thirdly the question, whether there have been morphometric changes in wildcats over time is addressed. This is done by determining whether morphometric changes have occurred in German wildcats over the last 160 years. This also raises the question whether wildcats and domestic cats have always been distinct from one another or have been closer in some periods of time, which would indicate that the rate of hybridization between them has also differed.

MATERIAL AND METHODS

Material

Altogether 232 cat skulls, 148 wildcat skulls (45 females (f), 75 male (m) and 28 of unknown sex) from Germany, 12 from Rumania, Transsylvania, 6 from Spain, Treuel and the area around Salamanca and 84 (23 f, 31 m, 30 of unknown sex) domestic cats from Germany were studied in the following German institutions: Institut für Biologie, Bereich Zoologie of the Martin-Luther-Universität Halle-Wittenberg, Naturkundemuseum im Ottoneum Kassel, **NOK**, Senckenberg Forschungsinstitut und Naturmuseum Frankfurt, **SMF**, Senckenberg Naturhistorsiche Sammlungen Dresden, Museum für Tierkunde, **MTD**, Zoologische Staatsammlung München, **ZSM**, Zoologisches Forschungsmuseum Alexander König, **ZFMK**, Zoologisches Museum Berlin, **ZMB**.

Determination of cats was based on cranial volume, cranial index and, when available, intestine length from the museum records (mainly in Halle). According to Piechocki (1990) the cranial volume of wildcats (WC) ranges from 32.5–50 cm^3 and of domestic cats (DC) from 20–35 cm^3, thus a cranial volume of > 35 cm^3 can be used to identify wildcats. For cats with a cranial volume of 32–35 cm^3 the cranial index (= greatest total skull length : cranial volume) can be used to identify them. Schauenberg (1969) used the cranial index to differentiate wild and domestic cats: A cranial index <2.75 is indicative of wildcats, one >2.75 is indicative of domestic cats (for skulls with fully developed adult dentition). In cases where neither cranial volume nor intestine length were available a combination of glabella, location of palatine foramen, nasal length and angular process were used for determination. Individuals that were not clearly determinable were not included in the analyses.

In this study only cats with permanent dentition, thus older than seven months, were included (based on tooth replacement see Condé & Schauenberg 1978). Only domestic cats from Germany, predominantly around Halle, were included. Material that was clearly of special cat breeds, e.g., Persian cats, was excluded.

The wildcats studied came from different regions in Germany: Eifel (17), Rhineland (20), Sauerland and North Rhine Westphalia (3), Taunus (4), other localities in Hessia (8), Harz region (78), Thuringia (13), Solling (4) and lower Saxony (1). These were lumped into three regional groups: Eifel/Rhineland (37), Hessen/Taunus (12) and Harz/Thuringia (90).

On an even coarser geographic level the cats were assigned to the following groups: Wildcats from western Germany, WC West, 58, 14 w, 21 m, 23 undetermined sex, wildcats from eastern Germany, WC East 90, 31 w, 54 m, 5 undetermined sex and domestic cats from Germany, DC De 84, 23 w, 31 m, 30 undetermined sex. The small samples from Romania and Spain were only used in some analyses.

The cats studied were also grouped into samples according to four time periods. The time periods were chosen to be of suitable length so that samples were not too small in each group. In the earliest time period a few individuals from earlier times were also included and, therefore, not used in all analyses. The samples were as follows: 1850–1890 (WC n=7, DC n=6), 1891–1930 (WC n=21, DC n=12), 1931–1970 (WC n=33, DC n=32), 1971–2010 (WC n=70, DC n=23).

Measurements

The linear measurements taken and the parameters derived from these are listed and explained in Table 1 and illustrated in Fig. 2. Measurements were chosen mainly in accordance with French et al. (1988) and partial in accordance with Kratochvíl (1973), Yamaguchi et al. (2004) and Krüger et al. (2009). Kratochvíl (1973) lists numerous qualitative characters and discusses how they differ in wild and domestic cats. Here, the few qualitative characters recorded that partially accord with Kratochvíl (1973) and Yamaguchi et al. (2004) are listed along with their coding in Table 1.

Skulls were measured to the nearest 0.01 mm using digital callipers and cranial volume was determined using glass beads of 1 mm diameter and a graduated cylinder, and volume recorded rounded to the nearest 0.5 cm^3.

Extreme outliers in the data, i.e., those that were outside the theoretical distribution (– 3s and > x + 3s, s – standard deviation), were not included in the analyses.

Statistical analyses

Besides classical descriptive statistics the coefficient of variance of the samples and the coefficient of difference between wildcat samples and between wild and domestic cats were calculated. The coefficient of variance in percentage, CV% = (sd : mean) × 100, indicates the amount of statistical spread in different samples. The coefficient of difference (CD) was calculated after Krüger et al. (2009) who followed Mayr et al. (1953) so that CD = $|mean_1 - mean_2| : sd_2 + sd_1$ (with 1 and 2 being the samples to be compared, and sd the standard deviation).

To test for statistically significant differences between samples Student's t tests, using a 0.05 significance level, were performed.

Principal component analyses (PCA) were performed including different variables mainly in accordance with French et al. (1988): a) with all variables, b) with all variables listed in French et al. (1988), henceforth called 'french variables', c) with 27, 18 and 12 'french variables' (as indicated in appendix 1) and d) with variables with a coefficient of difference of >0.5 for domestic cats, excluding CranV and schind as they were used to identify the cats. PCAs were used with varmix rotation so that the first factor explains most of the variance. The first three resulting factors were saved and used in discriminant analyses and the first two factors were also used as axes for comparing mean scores of factor one and two.

Discriminant analyses (DAs) were used to see if a set of variables is able to separate different samples. DAs were performed using Wilk's lambda statistics, entering all the variables at once, not stepwise, with equal prior probabilities for the groups and covariance within the groups. As in the PCAs different sets of variables were included in the analyses.

All statistical analyses were performed using SPSS 16.

RESULTS

Craniometric variability – descriptive statistics

Descriptive statistics for different groups are given in appendix 1, the Coefficients of difference between wildcat samples and wild and domestic cats in appendix 2 and the frequencies of the non metric traits in appendix 3. Wildcats and domestic cats show some variability in all non metric traits. In most of them, as expected, wild and domestic cats differ markedly. Particularly clear is the difference in palfor, pariet, nasl_max and angular, and less so in the presence of a glabella. The three non metric traits, the development of the sagital crest, nuchal crest and fusion of basoccipital and basisphenoid, are indicative of the age structure of the samples. Domestic cats appear to be slightly older in fusbas but not in anucr and asagcr.

Student's t tests were performed to see if differences between the samples from the Eifel and Rhineland areas existed before combining them (appendix 4). Statistical differences between the groups were found based on 12 variables for all individuals and only one variable for males. Student's t tests revealed statistically significant differences in a few metric variables of wildcats from West and East Germany; six for males, five for females and only two if all are included irrespective of sex (Table 2).

The ranges of the parameters for the different wildcat samples are very similar (appendix 1), but in CranV the range for wildcats from the Carpathians is much larger and clearly there are higher values although the mean is only slightly larger.

Statistically significant differences between males and females in the different samples are given in Table 3. The sexual dimorphism is strong and statistically significant in 54 variables in East German wildcats, in 42 variables in West German wildcats and in 52 variables in domestic cats.

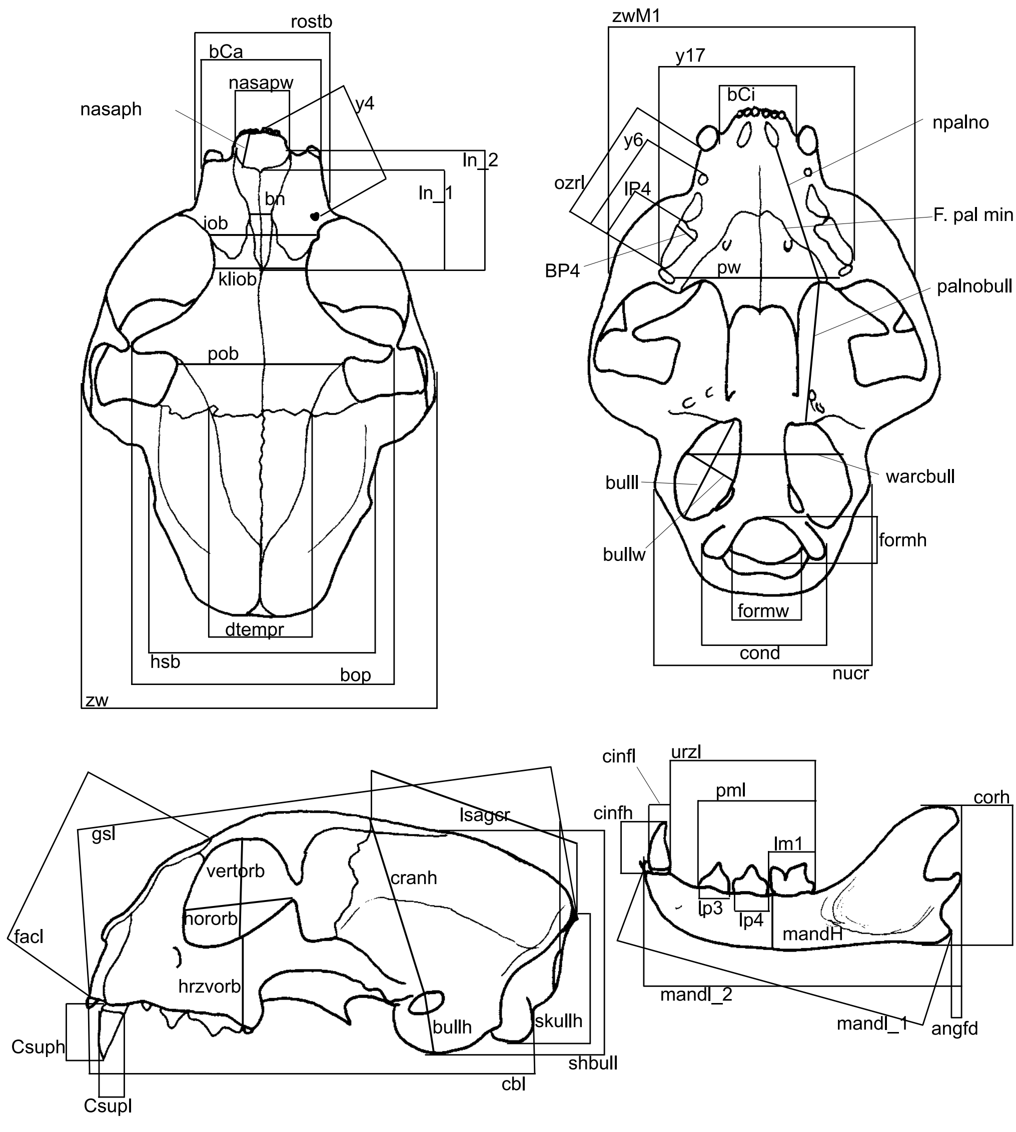

Fig. 2. Schematic illustration of most measurements taken. Abbreviations and explanations are given in Table 1.

Table 1. List and explanations of the qualitative cranial variables measured. The first column lists the number of the variable in French et al. (1988) and x indicates those included in PCAs or DAs, with 12 (xxx), 18 (xx) or 27 (x) of these variables

gsl	greatest skull length, from inion (point where the two superior nuchal crest meet in sagittal plane) to prosthion (maxillary bone at alveoles of incisors in sagittal plane), nearest way
cbl	condylobasal length (condylion, furthest extension of condyles to inion)
zw	zygomatic width, maximum
zwM1	zygomatic width at M1, measured from ventral
nucr	maximum width across nuchal crest
hsb	maximum cranial width (maximum across squamosum)
dtempr	distance between frontoparietal ridges at their intersection with frontoparietal sutures
iob	interorbital width measured between grooves of angularis occuli veins
bn	width of nasal bones at premaxilla/maxilla/nasal sutures
nasapw	maximum internal width of nasal aperture
nasaph	maximum internal height of nasal aperture (might be oblique)
cranh	cranial height from porion (dorsal most point of auditory meatus) to bergma (intersection of frontoparietal sutures at sagittal plane)
lsagcr	potential length of sagittal crest, from intersection of frontoparietal sutures to inion
bop	width across orbital processes
pob	width across postorbital constriction
skullh	skull height from condyles to inion
ln_1	length of nasal bones at midline
ln_2	maximal length of nasal bones
facl	facial length, from prosthion to nasion (caudal end of nasals)
vertorb	maximal vertical diameter of orbit
hororb	horizontal diameter across orbit
hzvorb	vertical distance from orbital to maxillary bone between P4 and M1
bCa	width of maxillary bone at canines
bCi	distance between canines
rostb	rostral breadth, maximal width of snout
pw	palate width measured between M1 (tips of callipers tugged in between palate and M1 from distal in ventral view)
acbull	width across bullae from porion to porion
formw	maximal width of foramen magnum
formh	height of foramen magnum (occasionally occurring high notches of the foramen are not included in the measurement)
cond	maximal width across occipital condyles
npalno	distance from internal nares to anterior palatal notch
palnobull	distance from anterior palatal notch to depression of the tympanic bulla at base of styloid process
bulll	length of tympanic bulla
bullw	width of tympanic bulla
bullh	height of tympanic bulla, from top of auditory meatus to maximal ventral extension of bulla
ozrl	length of maxillary tooth row from distal of canine to distal end of P4
lP4	length of P4 crown
bP4	width of P4 crown
Ch	height of crown of maxillar caninus from alveole to tip
Cl	length of crown of maxillar caninus
afor	distance between foramen lacerum and foramen ovale
shbull	height of skull measured vertically above bullae tympanica
cranV	cranium volume, measured to the nearest 0.5 cm^3 using glass beads of 1 mm diameter
mandls	length of mandible measured from the alveoles of the incisors at sagittal plane (pogonion) to the caudal end of angular process
mandl	length of mandible measured from pogonion to condyle parallel to ventral rim of mandible
corh	height of mandibular ramus at coronoid process
angfd	from angular process to an imaginary line extended from condyle and coronoid process; positive values indicate an angular process not extending as far caudally as this line, negative values indicate coronoid process extending not as far caudally as angular process

mand	height of mandibular ramus between p4 and m1
uzrl	length of mandibular tooth row from distal end of caninus to distal end of m1
pm1	length of p-m1 (at alveoles)
lp3	length of p3 at alveole
lp4	length of p4 at alveole
lm1	length of crown of m1 (measured from above)
cl	length of mandibular caninus
ch	height of mandibular caninus from alveole to tip
y4	distance from prosthion to middle of infraorbital foramen
y17	greatest width across both P4
y6	length of tooth row from P2-P4
kliob	interorbital breadth measured at shortest distance between orbits
derived variables	
schind	cranial index, CranV : gsl
sagind	sagittal index, lsagcr : cranh
nasvol	nasal volume, naspw × nasaph × facl
bullvol	volume of bulla, bulll × bullw × bullh
mandsh	mandible shearing power, pml : mandl
orbar	area of orbit, vertorb × hororb
cheekb	slope of cheekbone, zwM1 : zw
formagar	area of foramen magnum, formw × formh
qualitative characters and coding	
alisph	contact between alisphenoid and squamosal bone; 1 – no contact on both sides of skull, 2 – contact on one side and none on the other, 3 – contact on both sides of skull, 0 – not determinable
palfor	position of palatine foramen; 1 – in palatinum, 2 – both in maxillar-palatine suture, 3 – one foramen in palatinum and one in suture, 0 – not determinable
glab	presence of glabella, the depression at the nasal-frontal suture; 1 – glabella clearly present, 2 – no glabella, 3 – faint depression, 0 – not determinable
frontopar	intersection of frontoparietal sutures at midline; 1 – straight, 2 – nearly straight, 3 – displaced, 0 – not determinable
pariet	course of parietal suture at midline, 1 – straight, 2 – slightly undulating, 3 – partially straight, partially straight, 4 – serrated, 0 – not determinable
nas_max	caudal extension of nasals in relation to maxillary; 1 – nasals clearly extending more caudally than maxillary bone, 2 – caudal ending about in line with maximal extension of maxillary, 3 – nasals not extending as far caudally as maxillary, 0 – not determinable
angular	extension of angular process in relation to coronoid process; 1 – angular process extending further caudally, 2 – angular and coronoid process caudally in line, 3 – angular process not extending as far caudally as coronoid process, 0 – not determinable
UKstand	does mandible stand on caudal end, on coronoid, condyle and angular process?; 1 – yes, 2 – no, 0 – not determinable
asagcr	development of sagittal crest; 1 – clearly well developed, 2 – weak, 3 – none, 0 – not determinable
anucr	development of nuchal crest; 1 – clearly well developed, 2 – weak, 3 – none, 0 – not determinable
fusbas	fusion of basioccipital and basisphenoid; 1 – fusion complete, 2 – fusion but suture still visible, 3 – not yet fused, 0 – not determinable
dcalc	presence of dental calculus; 1 – strong, 2 – little, 3 – none, 0 – not determinable

Differences between locations

PCAs of only wildcat samples and different sets of variables resulted in varying factors, the first two only explaining 44% of total variance at most. PCAs with all wildcat and the domestic cat samples and different sets of variables also resulted in varying factors, the first two again only explaining about 54–65% of total variance and the first three about 71%.

Overall separation of samples from different locations or time periods in scatter plots using PCA factors as axes is poor with wildcats alone and with domestic cats included (not illustrated).

Table 2. Result of Student's t-tests of the differences in the measurements of wildcats from West and East Germany, for all and both sexes separately. For abbreviations of variables see Table 1; var unequ – variances unequal

variable	all	females	males
nucr			0.004 (21 / 33)
hsb	0.029 (52 / 55)	var unequ (14 / 18)	
hororb	var unequ (56 / 57)	0.041 (15 / 17)	var unequ
nasapw			0.043 (22 / 33)
bop			0.011 (22 / 31)
shbull	var unequ (52 / 55)		var unequ
wacrbull			0.011 (20 / 31)
formw	var unequ (49 / 55)	0.011 (15 / 19)	
shbull	var unequ (52 / 55)	0.004 (14 / 19)	var unequ (22 / 33)
schind	0.004 (40 / 43)	0.034 (13 / 14)	
corh			0.014 (21 / 34)
pml			0.033 (21 / 34)
nasvol			0.033 (21 / 32)
kliob		0.033 (10 / 17)	

Discriminant analyses of wild and domestic cats from different localities

DAs of samples from Eifel/Rhineland, Hessia, Harz/Thuringia, performed using different sets of variables, did not result in a separation of the groups and there was a very high number of ungrouped cases. In DAs with West and East German wildcats and domestic cats, with all the french variables, wild and domestic cats are separated along function one, mainly based on hsb, pml,

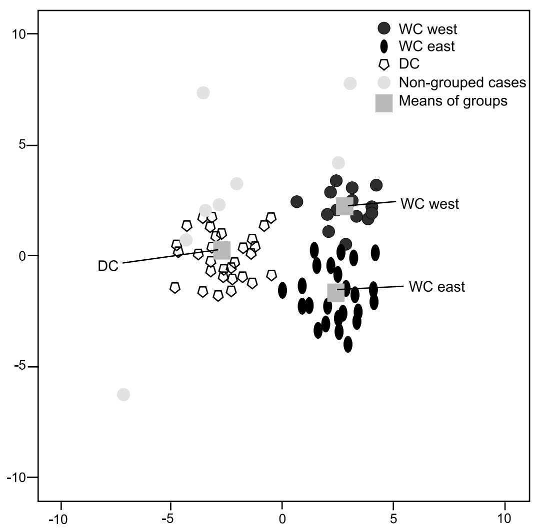

Fig. 3. DAs with West and East German wild cats (WC) and domestic cats (DC). Using all french variables resulted in 2 functions. Function 1 has an Eigen value of 7.233, explains 77.3% of variance and is mainly influenced by hsb, pml, lp3, formh and formagw. Function 2 has an Eigen value of 2.130, explains 22.77% of variance and is mainly influenced by corh, wacrbul, hororb, dtempr and cl.

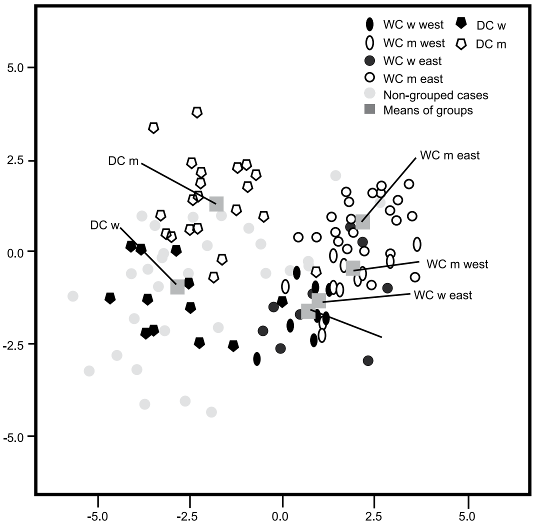

Fig. 4. Discriminant analysis with West and East German wild cats (WC) and domestic cats (DC) separated according to sex with variables with a high C.D. (>0.5) to domestic cats and three non metric variables. The DA yielded 5 functions; the first two explain 85.9% of variance. Function 1 with an Eigen value of 4.260 explains 65.7% and is mainly influenced by hsb, pml, cl, afor, formh, lp3. Function 2 with an Eigen value of 1.320 explains 20.2% of variance and is mainly influenced by bCA, hzavorb and naslcode.

lp3 and formh, wildcats from the East and West are separated along function two, mainly based on corh, wacrbull, hororb and dtempr (Fig. 3). Using the variables with high CD for domestic cats, wildcats and domestic cats are well separated along function one, mainly based on hsb, pml, formh, and western and eastern wildcats are slightly separated along function two, mainly based on Csupl, LP4, bCA and pml.

DAs of western and eastern wildcats and domestic cats, all separated according to sex, give a weaker separation. Using the variables with a high CD for wild and domestic cats and some non metric ones, the separation between wild and domestic cats is good mainly along function one, particularly based on hsb, pml and Csupl, but a few domestic cats are grouped along with the wildcats. For wildcats rather the sexes are separated along factor two, mainly based on bCa, hzavorb and naslcode than western and eastern ones, but there are a number of non-grouped cases (Fig. 4). Again wild and domestic cats are separated along function one, mainly based on hsb, pml, Csupl, and sexes of both wild and domestic cats along function two, mainly based on bCam, nucr, Csupl and hzvorb.

Including the small samples from Spain and Romania in the DAs of only wildcats does not result in a clear separation of the groups. Only when domestic cats are included are wildcat groups separated (Fig. 5). The Spanish sample falls within the range of domestic cats when a random set of variables is used in the DA.

Differences between samples from different time periods

Data for wildcats from West and East Germany were combined and tested for differences over time using four time periods from 1850–2010.

Table 3. Sexual dimorphism of German wildcats (WC) and domestic cats (DC) indicated by the result of Student's t--tests of the differences in the measurements of males and females. For abbreviations of variables see Table 1; var unequ – variances unequal

variable	WK East	WK West	HK De
gsl	0.000 (18 / 35)	0.000 (15 / 21)	0.000 (21 / 31)
cbl	0.000 (19 / 36)	0.000 (15 / 20)	0.000 (21 / 31)
zw	0.000 (19 / 32)	0.010 (15 / 22)	0.000 (22 / 31)
zwM1	0.000 (18 / 33)	0.021 (15 / 21)	0.000 (21 / 30)
nucr	0.000 (18 / 33)		0.000 (23 / 31)
hsb	0.000 (18 / 33)	var unequ (14 / 21)	var unequ (3 / 31)
dtmpr	0.000 (19 / 33)	0.000 (15 / 21)	0.015 (19 / 31)
iob	0.000 (19 / 34)		0.001 (23 / 31)
nasapw	0.000 (19 / 33)		0.000 (23 / 30)
nasaph	0.001 (17 / 33)	0.015 (15 / 21)	0.004 (21 / 29)
cranh	0.000 (19 / 34)	0.005 (14 / 21)	0.017 (23 / 31)
lsagcr	0.000 (18 / 33)	0.010 (15 / 22)	0.001 (23 / 31)
bop	0.001 (16 / 31)		0.006 (22 / 30)
skullh	0.000 (17 / 33)	0.025 (15 / 20)	0.002 (22 / 31)
ln_1	0.020 (18 / 35)	0.006 (15 / 21)	0.012 (22 / 29)
ln_2	0.000 (16 / 35)	0.022 (15 / 22)	0.004 (22 / 29)
facl	0.000 (18 / 35)	0.022 (15 / 22)	var unequ (21 / 28)
vertorb	0.004 (19 / 36)		
hororb	0.009 (17 / 36)	0.024 (15 / 22)	0.011 (22 / 31)
hzavorb	0.006 (19 / 36)	0.004 (15 / 22)	0.044 (23 / 30)
bCa	0.000 (16 / 30)	0.002 (15 / 22)	0.001 (23 / 30)
bCi	0.011 (18 / 34)		0.005 (23 / 30)
rostb	0.001 (19 / 34)	0.001 (15 / 22)	0.000 (23 / 31)
pw	0.000 (17 / 32)	0.030 (13 / 21)	0.032 (20 / 27)
wacrbull	0.000 (19 / 31)	0.007 (15 / 20)	0.032 (23 / 31)
formw	0.023 (19 / 34)		0.020 (23 / 31)
cond	0.000 (19 / 34)	0.007 (15 / 20)	0.006 (23 / 30)
npalno	0.000 (18 / 35)	0.002 (14 / 21)	0.002 (23 / 30)
palnobull	0.000 (19 / 34)	0.000 (14 / 21)	0.001 (23 / 31)
bulll	0.000 (19 / 34)	0.017 (15 / 21)	0.001 (23 / 31)
bullw	0.000 (19 / 35)		0.003 (23 / 31)
ozrl	0.000 (19 / 36)	0.003 (15 / 22)	0.032 (21 / 28)
LP4	0.000 (18 / 36)	0.002 (15 / 22)	0.005 (21 / 29)
BP4	0.007 (18 / 36)	0.007 (13 / 21)	0.001 (21 / 28)
Csuph	0.000 (17 / 33)	0.001 (14 / 21)	0.001 (21 / 30)
Csupl	0.000 (19 / 36)	0.000 (15 / 21)	0.000 (22 / 30)
shbull	0.000 (19 / 33)	0.015 (14 / 22)	var unequ (22 / 31)
CranV	0.004 (14 / 29)	var unequ (13 / 17)	0.007 (23 / 30)
mandl	0.000 (18 / 34)	0.002 (15 / 21)	0.001 (22 / 31)
mandl_2	0.000 (16 / 31)	0.003 (13 / 19)	0.000 (21 / 28)
corh	0.000 (18 / 34)	0.003 (15 / 19)	0.001 (22 / 31)
mandH	0.000 (18 / 33)	0.004 (15 / 21)	0.001 (20 / 30)
uzrl	0.000 (18 / 34)	0.011 (15 / 21)	0.007 (19 / 30)
pm1	0.000 (18 / 34)	0.018 (15 / 21)	0.002 (19 / 31)
lp3	0.003 (18 / 34)	0.043 (15 / 20)	0.048 (19 / 31)
lm1	0.012 (17 / 34)		0.010 (19 / 29)
cinfh	0.012 (14 / 33)	0.001 (15 / 21)	0.000 (20 / 29)
cinfl			0.000 (20 / 30)
nasvol	var unequ (17 / 32)	0.022 (14 / 21)	0.000 (21 / 28)
bullvol	0.006 (19 / 34)	0.043 (14 / 21)	0.003 (23 / 31)
mandsh	0.016 (16 / 31)		
orbar	0.001 (17 / 36)	0.026 (15 / 22)	0.007 (22 / 31)

variable	WK East	WK West	HK De
formagar	0.048 (18 / 32)		0.041 (23 / 31)
y4	0.000 (18 / 32)	0.002 (15 / 22)	0.000 (21 / 30)
y17	0.000 (18 / 31)	0.002 (15 / 22)	0.014 (20 / 29)
y6	0.000 (17 / 32)	0.001 (15 / 22)	0.001 (16 / 27)
kliob			0.001 (21/ 30)

DAs with different sets of variables did not reveal a clear separation between the time periods for wild or domestic cats. Separation in DAs was achieved only by including both wildcats and domestic cats in the analyses. Using all the french variables wildcats and domestic cats from 1850–1890 are more separated from the others, but the samples are smaller. Excluding the oldest specimens leaves the wildcats from 1891–1930 closer to the 'most recent' ones from 1971–2001 and those from 1931–1970 more separated, along function two, mainly based on formw, bullh and lp4 (Fig. 6). Domestic cats show a clearer separation of those from 1891–1930 from the other two samples, which are nearly indistinguishable. Wild and domestic cats are fairly well separated along function one, mainly based on hsb, formh, pml and lp3.

Using fewer french variables in the analysis or random ones the separation between samples becomes much weaker or insignificant.

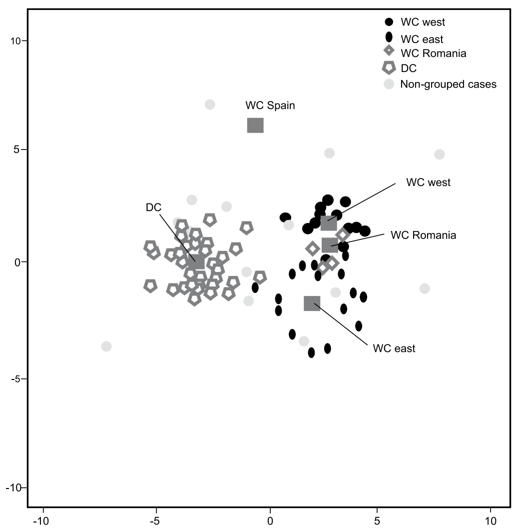

Fig. 5. Discriminant analysis with wild cats (WC) from West and East Germany, Romania and Spain as well as domestic cats (DC) from Germany. A) Using all french linear measurements in the DA results in 4 functions, the first with an Eigen value of 8.002 explains 62.3% of variance, the second with an Eigen value of 2.259 explains 17.6% of variance. The first is mainly influenced b hsb, pml, formh, lp3 and formw, the second by wacrbull and lP4.

DISCUSSION

Craniometric variability – descriptive statistics

Overall the variability (ranges and CV%) in the linear measurements is very similar in the wildcat samples studied (appendix 1, Fig 3). The sample from Romania is small, thus the status of these cats is uncertain and the Spanish sample is not considered to be representative of Spanish wildcats as it occurs within the range of domestic cats in a DA (Fig. 5B) and is also very small.

The CV% can be seen as an indicator of homogeneity of the sample and varies usually between four and 10 in mammals (Krüger et al. 2009) or between 2–5% on average, according to Kratochvíl (1973). For most of the wildcat samples studied the CV% is within the range of one to 10, but is much larger for angfd, dtempr, afor, bn, Csuph, Csupl, cinfl, cinfh, nasvol, bulvol and formagar in most samples, and for corh and orbar in a few samples (appendix 1). The values of CV% for the domestic cats studied are > 10 for many variables.

Overall the values of CV% for domestic cats are often slightly larger than for wildcats, indicating a generally larger variability, which is also indicated by the PCA factors. Kratochvíl (1973) also records a greater variability in all parameters of the domestic cats he studied, with CV% for skull parameters between 2.4–17% and for the mandible between 4.3–10.8% in wildcats and 37.7 to 17.1% and 5.5–12.8%, respectively, for domestic cats. Krüger et al. (2009: Table 1) record a similar high level of variation in domestic cats. Herein, particularly the sample of female domestic cats is more heterogeneous than that of males. The homogeneity of the domestic cat sample might be influenced by the fact that not all are from one small region.

Comparing the ranges of some variables of the wildcat samples studied with each other and some of those reported in the literature a few aspects seem noteworthy:

The ranges of samples from the Harz are slightly greater than those for the Harz given by Stefen & Heidecke (2011) based on material only from Halle (also included in this study), which is

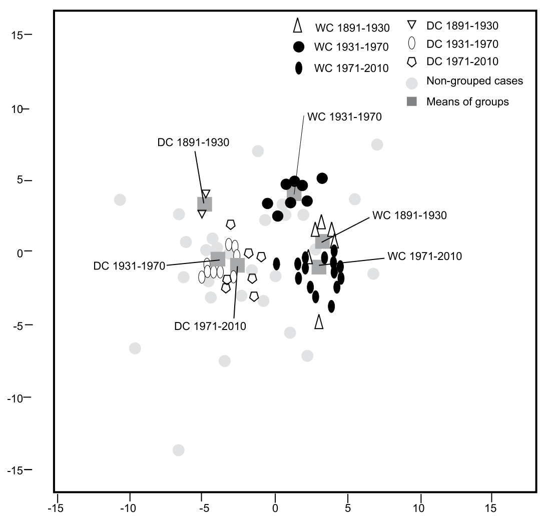

Fig. 6. Discriminant analyses with all french variables of wild cats (WC) and domestic cats (DC) from Germany grouped in three time periods from 1891 to 2010. The DA resulted in 5 functions. The first with an Eigen value of 10.386 explains 54.7% of total variance and the second one with an Eigenvalue of 3.424 explains 18% of variance. Function 1 is mainly influenced by hsb, formh, pml and function 2 is mainly influenced by hzavorb, sagind and bull.

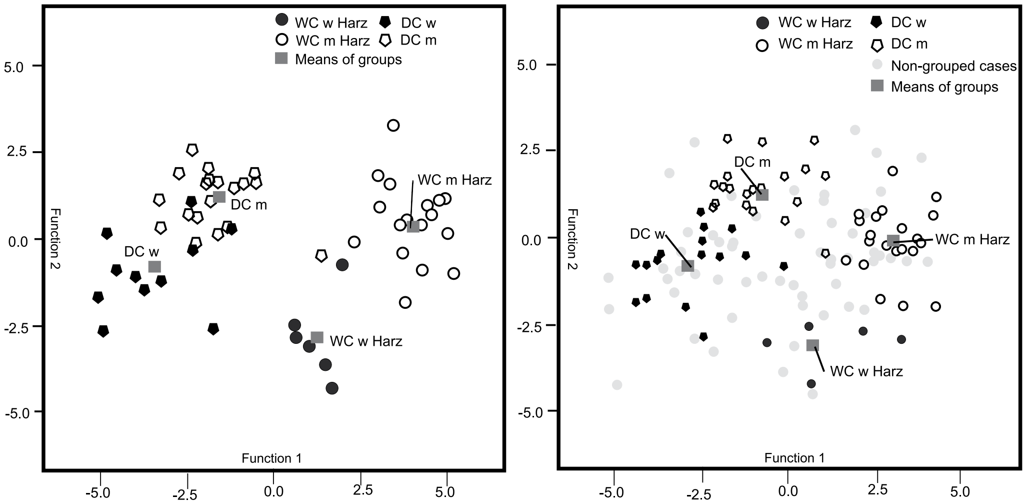

Fig. 7. Discriminant analyses with wild cats (WC) from the Harz region and domestic cats (DC). A) with material from the collection in Halle only, B) with all studied WK from the Harz region and all domestic cats.

probably due to the size (Harz Halle only n=35, not for all measurements, for Harz in this study n=53; not for all variables) and age structure of the samples. At least some specimens in the ZMB appeared to be fairly old individuals.

The range of some variables (gsl, nuchr, ln_1, bulll, pml) of the wildcats from West Germany is slightly greater than that of those from Harz and Thuringia (n=30 not for all variables and including some specimens younger than 7 months, Krüger et al. 2009), but smaller in wildcats from the Harz, based on dtempr, bop, formw and kliob. Otherwise the ranges of both groups are similar.

The ranges of some variables of wildcats from the western Carpathians are greater for gsl, hsb, mandl and most markedly for CranV (see also Krüger et al. 2009, Stefen & Heidecke 2011, Platz et al. 2011). Especially, the latter are clearly greater for samples from Germany (the means also differ: WC Carpathians: 41.8 cm^3, n=130 after Sládek et al. (1971), Romania: 40.9 cm^3, n=9, WC West 37.8 cm^3, n=40, WC East 38.1 cm^3, n=44 irrespective of sex, and WC Scotland males 42.9 cm^3, n=32, females 41.06 cm^3, n=21 after Yamaguchi et al. (2004)). As the sample from the West Carpathians is more than three times the size of the others it is possible that the samples from West and East Germany are not large enough to include the full range.

But as the wildcats from East and West Germany can be assumed to represent random samples and in terms of other variables are similar to those from the Carpathians it is unlikely that the difference in CranV is a consequence of only small sample size. Platz et al. (2011) indicate that characters used to differentiate between wildcats and domestic cats may differ in different regions of this taxa's distribution. This would also imply regional differences in craniometry of wildcats.

It is likely that the variability and range of a variable is greater in a large than a small population. The wildcat population in the Harz region is probably smaller than that in the Carpathians. But the population in West Germany is part of a population that includes the one in France and Belgium and therefore may not be smaller than the one in the Carpathians and the latter might also be heterogeneous.

Thus, it is likely that German and Carpathian wildcats differ. This should be reflected in some other cranial variables that are related to the size of the cranium, which are known for both populations, like hsb, skullh and shbull. Hsb has a slightly greater range in Carpathians wildcats, but the two other variables cannot be compared.

A factor that might influence cranial volume in wildcats is hybridization with domestic cats, which is possible and has occurred to different degrees in Europe (Suminski 1962, Pierpaoli et al. 2003). Most of the recent molecular studies indicate that the incidence of hybridization in Germany is fairly low (Eckert et al. 2010: 171) or about 18.4% (Hertwig et al. 2009).

If the difference in CranV of Carpathian and German wildcats is attributed to hybridization then why is hybridization more likely to have occurred in Germany than the Carpathians? Population size and availability of mates are the most probable causes of wildcats and domestic cats mating, but again in this respect the populations in western Germany and the Carpathians should be very similar.

Another aspect to note is that the CDs of comparable measurements of wild and domestic cats are clearly greater for the Carpathian and (Moravian) (as cited by Sládek et al. 1971, Kratochvíl 1973) than German poulations (appendix 3, Stefen & Heidecke 2011, Krüger et al. 2009), which at least indicate a somewhat greater similarity of wildcats and domestic cats in Germany.

Wild and domestic cats differ quite clearly in several nonparametric traits, particularly palforcode, naslcode, angularcode and parietcode, and less so in frontopar, UKstand, dcalc and alisph (appendix 3). These differences are in accordance with those cited by Kratochvíl (1973) and are discussed in Stefen & Heidecke (2011).

Comparion of wild and domestic cats

Student's t tests of measurements made on samples of West and East German wildcats revealed some statistically significant differences (Table 3), but not in the same variables in males and females, which renders interpretation difficult. The sexual differences in the samples from each of these regions are much stronger than the differences between western and eastern wildcats (Tab. 4). Thus, it is likely that the differences between the western and eastern samples is fairly small and does not clearly indicate two separate groups. This is supported by the generally low CDs, which are in the range of about 0.01 to 0.2 (appendix 2). This is in accordance to the fact that wildcats from different regions, even those from Romania, could not be separated in the DAs using different sets of variables.

The sexual dimorphism of wildcats is well known (e.g. Sládek et al. 1972). In the material studied fewer variables differ between sexes in the West than the East German sample (Table 3). For males differences in the ages of the specimens studied, might influence this; several of the wildcats in the collection in Berlin appeared to be very old individuals and thus would have fairly large values for several parameters (e. g. nucr, bop). But as dtmpr, the variable probably mostly influenced by age, shows a clear sexual dimorphism in both groups, age cannot be the main influencing factor in this respect.

West and East German wildcats and domestic cats can be separated in DAs using some sets of variables (Fig. 3, 6, 7). The separation of wildcats and domestic cats is quite clear and has been shown previously using several statistical methods (e.g. Sládek et al. 1972, Kratochvíl & Kratochvíl 1970, Krüger et al. 2009, Stefen & Heidecke 2011). Variables mainly influencing the function separating wildcats and domestic cats include hsb, pml, lp3, formh – all with a CD>0.5 in comparison to domestic cats. The separation of West and East German wildcats is much weaker and the function is influenced mainly by corh, wacrbull, hororb, dtempr, bCa, lp4, Csupl, mostly with a CD≤0.5 in comparison to domestic cats. Only a few of them have relatively high CDs between the wildcat samples of 0.17 (corh, wacrbull, hororb) or are significantly different in the student's t test (Table 2). Thus there are few subtle differences between West and East German wildcats, which are too small to be clearly distinctive if only wildcats are compared.

The small samples of wildcats from Spain and Romania were included in the analysis to see if that might help to separate the German wildcat samples, but the level of separation remained similar (Fig. 5).

The subtleness of the separation of West and East German wildcats is supported by the DAs with all cats separated according to sex, which separates wild and domestic cats along the function mainly influenced by the variables discussed, but wildcats according to sex and less according to region (Fig. 4). This indicates that sexual dimorphism is fairly strong and obscures any regional differences in German wildcats.

The ungrouped cases and the domestic cats at the edge of the range of wildcats might indicate undetected hybrids (Fig. 3B, 6). These specimens might be hybrids of the second or subsequent generations as they could not be clearly identified as such on the basis of individual traits. Molecular studies might help to identify hybrids (Krüger et al. 2009), but as only a small number of genetic markers is often used the possibility of detecting hybrids after the first generation of backcrossing is very unlikely (Randi 2008). The problem to identify hybrids based only on morphological traits remains (Suminski 1962, Kratochvíl & Kratochvíl 1970, Kratochvíl 1973, Piechocki 1990, Fernández et al. 1992, Krüger et al. 2009), but is not considered further here.

In the scatter plots of different wildcat samples with PCA factors as axes no clear separation of regional or chronological samples was obtained. This is in contrast to Krüger et al. (2009) who showed clear separation of samples with PCA factors used as axes, but using other variables and including postcranial measurements. Sample size might influence the outcome as large samples are more likely to include a greater range of the variability in each group and might show more overlap of the overall very similar cat groups.

Only wild and domestic cats separated according to sex from the collection in Halle are well differentiated in DAs (Stefen & Heidecke 2011), but less so when all wildcats studied from the Harz and all domestic cats from different collections are included (Fig. 7).

Molecular studies indicate a difference between western and eastern wildcats in Germany (Hertwig et al. 2009, Eckert et al. 2010). As molecular studies of mtDNA and micro satellites look at non coding genes and skulls are the result of coding genes and are a very complex structure subject to several constraints, the molecular and craniometrical data are not directly comparable. Nevertheless, there is a weak differentiation between western and eastern wildcats. But it does not appear robust enough, using the different sets of variables measures, to consider western and eastern wildcats craniometrically clearly distinct groups. However, it might indicate that the Harz population was isolated for a long period from the West German population.

Changes in skull morphometry of wildcats over time

French et al. (1988) used PCA factors to distinguish between cat groups in Scotland and indicate that changes have occurred in wildcats over time. The present study also addressed the question whether wildcats changed over time using the same set of variables. The sample of wildcats used was larger and from a larger area (all of Germany versus several areas in Scotland), and were for different and longer periods of time. The analysis indicated a separation according to period of time in the sample studied between 'most modern' wildcats from 1971–2010 and those from 1931–1970. 'Old wildcats' from 1891–1930 are closer to the most modern ones (Fig. 6).

French et al. (1988) report that their analyses indicate that 'recent' [n=14 from 1953–1963] and 'modern' [n=13 from 1975–1978] wildcats differ from those collected earlier ['old wildcats' n=25 from 1901–1941]. Their domestic cat sample (n=24) was for the time period 1976–1978. They argue that this implies changes in the hybridization rate with domestic cats. The structure of the modern cats could indicate a trend towards re-establishment of the earlier wildcat type or that no 'pure' wildcats remain in Scotland (French et al. 1988).

The results presented here are comparable to those of French et al. (1988) in respect to the strong similarity between 'old' and 'most modern' wildcats (although different time periods are used: 1891–1930 in Germany, 1901–1941 in Scotland) and the slightly greater similarity of wildcats and domestic cats in the 'recent' time period (1931–1970 in Germany and 1953–1963 in Scotland). As in the present study however, the separation of the groups is not supported when different sets of variables are used and therefore the separation is to be considered weak and should not be overrated. Also the great overlap in PCA factors indicates a similarity in the chronology of the groups of wildcats.

Conclusion

The different samples of wildcats from Germany were similar in their craniometric variability and comparable to wildcats in the Carpathians. Both West and East German wildcats differ markedly from Carpathian wildcats in CranV. The coefficient of difference between wild and domestic cats for comparable parameters is smaller in Germany than in the Carpathians.

The CD and DAs of the material studied indicatea clear distinction between wild and domestic cats based on several cranial variables other than the cranial volume and cranial index used to identify the cats. Wildcat samples from Eifel/Rhineland, Hessia, Harz/Thuringia are not clearly separated from each other. DAs separate wildcats from western and eastern Germany based on cranial variables only if domestic cats are included in the analyses. This separation accords with molecular data, which indicates a difference between western and eastern wildcats and might indicate that Harz wildcats were more isolated from other populations. However, the overall similarity in the ranges in cranial variables (but not in CranV) and the CV% for both groups indicate that the probably formerly more isolated Harz population cannot be considered to be a clearly distinct group and should therefore not be considered a separate unit for conservation. It is possible that any regional craniometric differences are obscured by sexual differences.

The DAs that included domestic cats indicate slight morphometric changes in wildcats over time and a close similarity between 'old' (1891–1930) and 'most modern' (1971–2010) wildcats. It is unlikely that these changes are a consequence of changes in the rate of hybridization as hypothesised for Scotland by French et al. (1988) as none of the groups studied were clearly more similar to domestic cats, which might indicate the changes are due to natural fluctuations in cranial morphology.

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APPENDIX 1

Descriptive statistics of the different samples of wildcats from East Germany (WC east), Eifel/Rhineland (WC Eifel/Rh), West Germany (WC west), Romania (WC Rom) and domestic cats from Germany (DC De) separated according to sex, f – female, m – male. N – sample size, min – minimum, max – maximum, st. err – standard error of the mean, st. dev. – standard deviation, CV% – percentage coefficient of variation.

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
gsl	WK Harz	all	52	22.00	85.59	107.59	5049.22	97.1004	0.7601	5.4814	30.045	5.645
	WK east G	f	18	15.15	85.59	100.74	1647.86	91.5478	0.9470	4.0176	16.141	4.389
		m	35	19.89	87.70	107.59	3484.37	99.5534	0.6449	3.8151	14.555	3.832
		all	57	22.00	85.59	107.59	5526.23	96.9514	0.7300	5.5110	30.371	5.684
	WK Eifel/Rh	f	10	12.83	85.53	98.36	899.16	89.9160	1.1101	3.5103	12.323	3.904
		m	13	22.94	82.77	105.71	1265.37	97.3362	1.6369	5.9019	34.832	6.063
		all	32	22.94	82.77	105.71	3045.56	95.1738	1.0565	5.9762	35.715	6.279
	WK West G	f	15	12.83	85.53	98.36	1371.79	91.4527	0.9716	3.7631	14.161	4.115
		m	21	22.94	82.77	105.71	2044.97	97.3795	1.0822	4.9592	24.594	5.093
		all	53	25.16	82.77	107.93	5104.68	96.3147	0.7469	5.4377	29.568	5.646
	WK Rom	all	9	19.12	87.69	106.81	877.30	97.4778	2.0869	6.2607	39.196	6.423
	HK	w	21	21.28	80.25	101.53	1893.23	90.1538	1.0383	4.7579	22.637	5.418
	HK	m	31	21.57	84.11	105.68	2963.47	95.5958	0.7622	4.2439	18.011	5.278
	HK	all	81	28.22	77.46	105.68	7473.06	92.2600	0.6286	5.6573	32.004	4.439
cbl	WK Harz	all	53	20.34	78.70	99.04	4742.00	89.4717	0.6796	4.9477	24.479	6.132
	WK east G	f	19	13.84	78.70	92.54	1602.29	84.3311	0.8069	3.5173	12.371	4.171
		m	36	18.29	80.75	99.04	3304.28	91.7856	0.5641	3.3846	11.456	3.688
			58	20.34	78.70	99.04	5181.05	89.3284	0.6389	4.8653	23.671	5.445
	WK Eifel/Rh	f	10	11.20	79.57	90.77	825.17	82.5170	1.0198	3.2249	10.400	3.908
		m	12	17.73	77.46	95.19	1077.53	89.7942	1.4555	5.0421	25.423	5.615
		all	31	21.17	77.46	98.63	2718.66	87.6987	1.0086	5.6153	31.532	6.403
	WK West G	f	15	11.20	79.57	90.77	1263.15	84.2100	0.9654	3.7391	13.981	4.444
		m	20	18.50	77.46	95.96	1799.04	89.9520	0.9804	4.3845	19.224	4.874
		all	50	21.17	77.46	98.63	4434.08	88.6816	0.7147	5.0537	25.540	5.699
	WK Karp R	all	10	17.33	80.82	98.15	903.86	90.3860	1.9288	6.0994	37.203	6.748
	HK	w	21	18.32	74.50	92.82	1742.60	82.9810	0.9478	4.3435	18.866	5.234
	HK	m	31	17.33	78.96	96.29	2732.88	88.1574	0.6779	3.7743	14.245	4.281
	HK	all	81	24.55	71.74	96.29	6885.30	85.0037	0.5720	5.1479	26.500	6.056
zw	WK Harz	all	48	18.93	58.47	77.40	3320.53	69.1777	0.6531	4.5247	20.473	6.541
	WK east G	f	19	15.24	58.47	73.71	1237.28	65.1200	0.7908	3.4468	11.880	5.293
		m	32	16.69	60.71	77.40	2280.35	71.2609	0.6034	3.4133	11.650	4.790
			53	18.93	58.47	77.40	3657.59	69.0111	0.6174	4.4949	20.204	6.513
	WK Eifel/Rh	f	10	11.54	60.34	71.88	645.94	64.5940	0.9630	3.0452	9.273	4.714
		m	14	19.60	56.79	76.39	968.90	69.2071	1.3278	4.9683	24.684	7.179
		all	36	20.71	56.79	77.50	2441.5	67.8194	0.8348	5.0089	25.089	7.386
	WK West G	f	15	11.54	60.34	71.88	985.57	65.7047	0.8478	3.2807	10.763	4.993
		m	22	19.60	56.79	76.39	1525.93	69.3605	0.9441	4.4287	19.613	6.385
		all	55	20.71	56.79	77.50	3763.34	68.4244	0.6062	4.4958	20.212	6.571
	WK Rom	all	10	12.69	62.57	75.26	685.31	68.5310	1.4242	4.5036	20.282	6.571
	HK	w	22	31.55	39.67	71.22	1352.14	61.4609	1.2654	5.9352	35.227	9.657
	HK	m	32	16.62	58.32	74.94	2151.16	67.2238	0.5572	3.1521	9.936	4.689
	HK	all	82	35.27	39.67	74.94	5280.00	64.3902	0.5529	5.0067	25.067	7.776

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
zwM1	WK Harz	all	51	16.17	50.95	67.12	3115.13	61.0810	0.4834	3.4523	11.918	5.652
	WK east G	f	18	11.34	50.95	62.29	1043.96	57.9978	0.6359	2.6979	7.279	4.651
		m	33	12.30	54.82	67.12	2067.46	62.6503	0.4793	2.7535	7.582	4.395
			54	16.17	50.95	67.12	3294.35	61.0065	0.4667	3.4296	11.762	5.621
	WK Eifel/Rh	f	10	8.18	55.18	63.36	580.46	58.0460	0.7519	2.3778	5.654	4.096
		m	14	12.64	53.64	66.28	850.61	60.7579	0.8784	3.2868	10.803	5.410
		all	35	12.64	53.64	66.28	2095.55	59.8729	0.5366	3.1745	10.077	5.302
	WK West G	f	15	8.18	55.18	63.36	883.64	58.9093	0.6529	2.5286	6.394	4.292
		m	21	12.64	53.64	66.28	1286.32	61.2533	0.6719	3.0791	9.481	5.027
		all	55	13.79	53.64	67.43	3344.79	60.8144	0.4273	3.1690	10.042	5.211
	WK Rom	all	11	14.55	51.21	65.76	655.61	59.6009	1.2589	4.1752	17.432	7.005
	HK	w	21	11.24	51.85	63.09	1210.31	57.6338	0.5872	2.6908	7.241	4.669
	HK	m	30	14.16	56.34	70.50	1868.50	62.2833	0.5496	3.0102	9.061	4.833
	HK	all	79	20.64	49.86	70.50	4733.85	59.9222	0.4250	3.7775	14.27	6.304
nucr	WK Harz	all	50	7.30	39.40	46.70	2170.20	43.4030	0.2853	2.0176	4.071	4.641
	WK east G	f	18	5.80	39.40	45.20	744.00	41.3360	0.3584	1.5207	2.312	3.679
		m	33	6.40	40.30	46.70	1463.70	44.3560	0.2508	1.4407	2.076	3.248
		all	55	7.30	39.40	46.70	2380.00	43.2730	0.2758	2.0451	4.183	4.726
	WK Eifel/Rh	f	10	5.10	39.80	44.80	411.00	41.0970	0.4535	1.4341	2.057	3.490
		m	13	4.50	40.80	45.20	562.40	43.2610	0.3720	1.3413	1.799	3.101
		all	32	5.90	39.80	45.60	1362.30	42.5710	0.3182	1.7998	3.239	4.228
	WK West G	f	15	11.50	39.80	51.30	634.20	42.2770	0.7484	2.8985	8.401	6.856
		m	21	4.50	40.80	45.20	907.00	43.1890	0.2917	1.3367	1.787	3.095
		all	53	11.50	39.80	51.30	2287.10	43.1530	0.2855	2.0788	4.322	4.817
	WK Rom	all	10	5.20	41.00	46.20	435.00	43.4970	0.5740	1.8150	3.294	
	HK	w	23	11.50	31.30	42.80	906.20	39.4000	0.5031	2.4126	5.820	6.120
	HK	m	31	5.80	38.90	44.70	1295.50	41.7900	0.2516	1.4008	1.962	3.352
	HK	all	84	13.30	31.30	44.70	3394.30	40.4090	0.2290	2.0987	4.404	5.194
hsb	WK Harz	all	50	5.57	41.84	47.41	2265.76	45.3152	0.1939	1.3707	1.879	3.025
	WK east G	f	18	4.64	41.84	46.48	798.58	44.3656	0.3056	1.2967	1.681	2.922
		m	33	4.62	42.79	47.41	1509.02	45.7279	0.1912	1.0985	1.207	2.402
		all	55	5.57	41.84	47.41	2490.94	45.2898	0.1797	1.3328	1.776	2.943
	WK Eifel/Rh	f	9	2.55	44.73	47.28	412.21	45.8011	0.2647	0.7941	0.631	1.734
		m	13	4.73	43.55	48.28	598.52	46.0400	0.4155	1.4982	2.245	3.254
		all	31	4.73	43.55	48.28	1424.45	45.9500	0.2116	1.1756	1.382	2.559
	WK West G	f	14	2.86	44.42	47.28	636.27	45.4479	0.2222	0.8313	0.691	1.829
		m	21	4.73	43.55	48.28	964.19	45.9138	0.3039	1.3926	1.939	3.033
		all	52	5.33	43.55	48.88	2383.40	45.8346	0.1675	1.2081	1.460	2.636
	WK Rom	all	11	3.06	44.18	47.24	501.18	45.5618	0.2750	0.9121	0.832	2.002
	HK	w	23	10.01	35.60	45.61	970.30	42.1870	0.4597	2.2048	4.861	5.226
	HK	m	31	5.21	40.02	45.23	1343.38	43.3348	0.1996	1.1114	1.235	2.565
	HK	all	84	10.01	35.6	45.61	3578.41	42.6001	0.1860	1.7044	2.905	4.001
dtempr	WK Harz	all	51	25.44	2.00	27.44	812.25	15.9265	0.7770	5.5509	30.812	34.853
	WK east G	f	19	12.70	14.74	27.44	398.05	20.9500	0.7970	3.4733	12.064	16.579
		m	33	22.79	2.00	24.79	452.88	13.7236	0.8052	4.6257	21.397	33.707
		all	56	25.44	2.00	27.44	901.87	16.1048	0.7296	5.4601	29.812	33.903
	WK Eifel/Rh	f	10	11.83	16.46	28.29	219.76	21.9760	1.1755	3.7173	13.818	16.915
		m	13	12.78	6.60	19.38	180.27	13.8669	1.1341	4.0890	16.720	29.488
		all	34	23.24	5.29	28.53	576.41	16.9532	0.9877	5.7592	33.168	33.971
	WK West G	f	15	16.58	14.34	30.92	320.76	21.3840	1.2134	4.6995	22.085	21.977
		m	21	13.72	6.60	20.32	302.10	14.3857	1.0070	4.6148	21.296	32.079
		all	55	25.63	5.29	30.92	897.62	16.3204	0.7773	5.7643	33.228	35.320
	WK Rom	all	11	22.38	4.43	26.81	191.35	17.3955	1.9241	6.3815	40.724	36.685
	HK	w	19	14.70	6.21	20.91	295.33	15.5437	1.0755	4.6881	21.978	30.161
	HK	m	31	18.79	4.09	22.88	371.93	11.9977	0.8839	4.9212	24.218	41.017
	HK	all	76	21.94	0.94	22.88	996.23	13.1083	0.5410	4.7161	22.241	35.978
iob	WK Harz	all	52	9.08	16.97	26.05	1100.39	21.1613	0.2524	1.8198	3.312	8.560
	WK east G	f	19	7.52	16.97	24.49	375.01	19.7374	0.3896	1.6982	2.884	8.604
		m	34	7.48	18.57	26.05	744.63	21.9009	0.2596	1.5136	2.291	6.911
		all	57	9.08	16.97	26.05	1207.72	21.1881	0.2426	1.8312	3.353	8.643
	WK Eifel/Rh	f	10	2.97	18.86	21.83	202.67	20.2670	0.2867	0.9065	0.822	4.473
		m	14	5.82	18.86	24.68	300.07	21.4336	0.5045	1.8875	3.563	8.806
		all	35	5.82	18.86	24.68	734.53	20.9866	0.2571	1.5210	2.313	7.247
	WK West G	f	15	4.12	18.86	22.98	309.38	20.6253	0.3103	1.2018	1.444	5.827
		m	22	6.70	17.98	24.68	468.50	21.2955	0.3674	1.7231	2.969	8.091
		all	56	6.70	17.98	24.68	1183.48	21.1336	0.1971	1.4752	2.176	6.980
	WK Rom	all	11	5.07	18.30	23.37	232.55	21.1409	0.3868	1.2830	1.646	6.069

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	HK	w	23	9.89	11.83	21.72	436.04	18.9583	0.4237	2.0319	4.129	10.718
	HK	m	31	6.36	17.15	23.51	638.75	20.6048	0.2572	1.4320	2.051	6.950
	HK	all	84	11.68	11.83	23.51	1644.96	19.5829	0.1979	1.8136	3.289	9.261
bn	WK Harz	all	50	40.00	4.20	8.20	294.30	5.8860	0.1269	0.8971	0.805	15.241
	WK east G	f	18	2.70	4.60	7.39	105.51	5.8617	0.1866	0.7918	0.627	13.508
		m	33	4.00	4.20	8.20	192.63	5.8373	0.1645	0.9450	0.893	16.091
		all	55	4.00	4.20	8.20	322.15	5.8573	0.1172	0.8690	0.755	14.836
	WK Eifel/Rh	f	10	2.40	4.22	6.62	55.46	5.5460	0.2593	0.8201	0.673	14.787
		m	14	2.70	4.40	7.10	80.09	5.7207	0.2231	0.8346	0.697	14.589
		all	35	3.85	3.59	7.44	196.64	5.6183	0.1470	0.8698	0.757	15.482
	WK West G	f	15	2.62	4.22	6.84	87.23	5.8153	0.2087	0.8083	0.653	13.899
		m	22	2.70	4.40	7.10	126.28	5.7400	0.1652	0.7748	0.600	13.498
		all	55	3.85	3.59	7.44	317.42	5.7713	0.1113	0.8253	0.681	14.300
	WK Rom	all	11	2.74	4.32	7.06	61.66	5.6055	0.2668	0.8849	0.783	15.787
	HK	w	22	4.00	3.70	7.70	123.45	5.6114	0.2315	1.0860	1.179	19.353
	HK	m	30	4.85	4.00	8.85	173.07	5.7690	0.2030	1.1120	1.237	19.276
	HK	all	80	5.20	3.65	8.85	448.95	5.6119	0.1188	1.0624	1.129	18.932
nasapw	WK Harz	all	51	5.19	8.97	14.16	604.17	11.8465	0.1526	1.0897	1.188	9.199
	WK east G	f	19	3.43	8.97	12.40	210.71	11.0900	0.1873	0.8164	0.667	7.362
		m	33	4.86	9.30	14.16	403.42	12.2248	0.1697	0.9748	0.950	7.974
		all	56	5.19	8.97	14.16	661.99	11.8212	0.1410	1.0551	1.113	8.926
	WK Eifel/Rh	f	9	2.27	10.18	12.45	99.16	11.0178	0.2217	0.6651	0.442	6.036
		m	14	4.21	9.13	13.34	162.84	11.6314	0.3457	1.2933	1.673	11.112
		all	34	4.21	9.13	13.34	389.69	11.4615	0.1806	1.0529	1.109	9.186
	WK West G	f	14	2.78	10.18	12.96	156.44	11.1743	0.2074	0.7762	0.602	6.946
		m	22	4.21	9.13	13.34	256.16	11.6436	0.2310	1.0833	1.174	9.304
		all	55	4.22	9.13	13.35	637.32	11.5876	0.1351	1.0018	1.004	8.645
	WK Rom	all	11	3.32	9.72	13.04	124.08	11.2800	0.3254	1.0792	1.165	9.568
	HK	w	23	6.67	6.39	13.06	245.92	10.6922	0.2688	1.2891	1.662	12.057
	HK	m	30	4.42	9.52	13.94	361.45	12.0483	0.1720	0.9422	0.888	7.820
	HK	all	82	8.77	6.39	15.16	930.23	11.3443	0.1375	1.2455	1.551	10.979
nasaph	WK Harz	all	49	4.08	9.57	13.65	569.11	11.6145	0.1424	0.9969	0.994	8.583
	WK east G	f	17	2.18	9.88	12.06	186.67	10.9806	0.1691	0.6970	0.486	6.348
		m	33	4.08	9.57	13.65	394.47	11.9536	0.1770	1.0093	1.019	8.444
		all	54	4.08	9.57	13.65	627.50	11.6204	0.1351	0.9925	0.985	8.541
	WK Eifel/Rh	f	10	3.14	8.88	12.02	105.86	10.5860	0.2741	0.8668	0.751	8.188
		m	14	3.36	9.53	12.89	162.47	11.6050	0.2580	0.9654	0.932	5.633
		all	34	4.32	8.88	13.20	383.42	11.2771	0.1839	1.0725	1.150	9.511
	WK West G	f	15	3.52	8.88	12.40	163.2	10.8800	0.2308	0.8938	0.799	8.215
		m	21	3.59	9.53	13.12	244.54	11.6448	0.1910	0.8752	0.766	7.516
		all	53	5.34	8.88	14.22	611.10	11.5302	0.1469	1.0693	1.143	9.274
	WK Rom	all	10	3.42	9.03	12.45	108.43	10.8430	0.3580	1.1321	1.282	10.441
	HK	w	21	3.05	9.03	12.08	227.79	10.8471	0.1953	0.8951	0.801	8.252
	HK	m	29	3.58	10.18	13.76	337.16	11.6262	0.1639	0.8824	0.779	7.590
	HK	all	76	4.89	8.87	13.76	846.54	11.1387	0.1145	0.9985	0.997	8.965
cranh	WK Harz	all	52	6.68	36.73	43.41	2098.79	40.3613	0.1976	1.4252	2.031	3.531
	WK east G	f	19	5.21	36.73	41.94	746.33	39.2805	0.3414	1.4881	2.214	3.788
		m	34	5.15	38.26	43.41	1386.01	40.7650	0.1984	1.1570	1.339	2.838
		all	56	6.68	36.73	43.41	2255.00	40.2679	0.1957	1.4642	2.144	3.636
	WK Eifel/Rh	f	9	2.78	38.39	41.17	359.62	39.9578	0.3280	0.9840	0.968	2.463
		m	13	4.37	39.27	43.64	533.72	41.0554	0.3604	1.2994	1.688	3.165
		all	32	7.77	35.87	43.64	1291.58	40.3619	0.2751	1.5564	2.422	3.856
	WK West G	f	14	3.13	38.04	41.17	557.48	39.8200	0.2607	0.9753	0.951	2.449
		m	21	4.37	39.27	43.64	860.04	40.9543	0.2521	1.1553	1.335	2.821
		all	53	7.91	35.87	43.78	2148.54	40.5385	0.1982	1.4430	2.082	3.559
	WK Rom	all	11	4.34	38.67	43.01	451.13	41.0118	0.4090	1.3564	1.840	3.307
	HK	w	23	9.8	32.27	42.07	890.46	38.7157	0.4379	2.1002	4.411	5.425
	HK	m	31	7.73	35.16	42.89	1237.02	39.9039	0.2580	1.4367	2.064	3.600
	HK	all	84	10.62	32.27	42.89	3275.13	38.9896	0.2095	1.9197	3.685	4.924
lsagcr	WK Harz	all	50	9.15	38.51	47.66	2195.82	43.9164	0.2937	2.0767	4.313	4.787
	WK east G	f	18	7.45	38.51	45.96	755.83	41.9906	0.4436	1.8821	3.542	4.482
		m	33	6.97	40.69	47.66	1473.68	44.6570	0.2653	1.5240	2.322	3.413
		all	54	9.15	38.51	47.66	2363.80	43.7741	0.2823	2.0745	4.304	4.739
	WK Eifel/Rh	f	10	6.61	38.87	45.48	427.99	42.7990	0.6065	1.9178	3.678	4.481
		m	14	10.81	39.66	50.47	625.83	44.7021	0.7681	2.8738	8.259	6.429
		all	34	11.60	38.87	50.47	1490.68	43.8435	0.4127	2.4062	5.790	5.488

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK West G	f	15	6.61	38.87	45.48	641.94	42.7960	0.4519	1.7500	3.063	4.089
		m	22	10.81	39.66	50.47	985.76	44.8073	0.5273	2.4731	6.116	5.520
		all	55	11.60	38.87	50.47	2436.65	44.3027	0.3203	2.3754	5.642	5.362
	WK Rom	all	10	391.10	41.85	432.95	833.48	83.3480	38.8494	122.8525	15092.700	147.397
	HK	w	23	13.77	33.39	47.16	967.85	42.0804	0.6567	3.1493	9.918	7.484
	HK	m	31	12.73	37.44	50.17	1390.39	44.8513	0.4765	2.6529	7.038	5.929
	HK	all	84	16.78	33.39	50.17	3627.91	43.1894	0.3376	3.0937	9.571	7.163
bop	WK Harz	all	47	11.29	44.35	55.64	2404.61	51.1619	0.4058	2.7819	7.739	5.438
	WK east G	f	16	9.20	44.91	54.11	787.01	49.1881	0.6996	2.7984	7.831	5.690
		m	31	11.29	44.35	55.64	1608.53	51.8881	0.4605	2.5638	6.573	4.941
		all	50	11.29	44.35	55.64	2552.42	51.0484	0.4045			
	WK Eifel/Rh	f	10	7.76	44.48	52.24	482.50	48.2500	0.8409	2.6591	7.071	5.511
		m	14	9.61	45.20	54.81	697.25	49.8036	0.7275	2.7221	7.410	5.466
		all	34	10.33	44.48	54.81	1678.37	49.3638	0.4777	2.7857	7.760	5.643
	WK West G	f	15	8.48	44.48	52.96	737.41	49.1607	0.6731	2.6070	6.797	5.303
		m	22	10.63	45.20	55.83	1097.41	49.8823	0.6237	2.9252	8.557	5.864
		all	55	14.62	44.48	59.10	2754.03	50.0733	0.4180	3.1001	9.611	6.193
	WK Rom	all	10	9.61	44.34	53.95	485.85	48.5850	1.0404	3.2901	10.825	6.772
	HK	w	22	22.16	32.34	54.50	1032.36	46.9255	1.0037	4.7078	22.164	10.033
	HK	m	30	12.00	44.20	56.20	1497.82	49.9273	0.5084	2.7847	7.755	5.578
	HK	all	82	23.86	32.34	56.20	3964.22	48.3441	0.4335	3.9257	15.411	8.120
pob	WK Harz	all	52	6.54	29.36	35.90	1742.77	33.5148	0.1973	1.4228	2.024	4.245
	WK east G	f	19	4.41	32.10	36.51	644.23	33.9068	0.3263	1.4222	2.023	4.195
		m	34	6.03	29.36	35.39	1134.16	33.3576	0.2671	1.5572	2.425	4.668
		all	58	7.15	29.36	36.51	1944.80	33.5310	0.1932	1.4711	2.164	4.390
	WK Eifel/Rh	f	10	3.56	33.14	36.70	344.83	34.4830	0.3722	1.1771	1.386	3.414
		m	14	6.88	30.52	37.40	474.76	33.9114	0.5132	1.9203	3.688	6.000
		all	35	6.88	30.52	37.40	1190.65	34.0186	0.2570	1.5201	2.311	4.469
	WK West G	f	15	4.19	32.51	36.70	509.55	33.9700	0.3327	1.2885	1.660	3.793
		m	22	6.88	30.52	37.40	738.45	33.5659	0.3785	1.7752	3.151	5.289
		all	56	7.04	30.36	37.40	1886.34	33.6846	0.2124	1.5894	2.526	4.719
	WK Rom	all	11	3.91	32.51	36.42	379.79	34.5264	0.4525	1.5007	2.252	4.347
	HK	w	23	8.72	27.39	36.11	738.12	32.0922	0.4391	2.1058	4.434	6.562
	HK	m	31	5.92	29.26	35.18	995.60	32.1161	0.3234	1.8007	3.242	5.607
	HK	all	84	8.72	27.39	36.11	2690.37	32.0282	0.1949	1.7864	3.191	5.578
skullh	WK Harz	all	47	6.44	24.10	30.54	1327.06	28.2353	0.2417	1.6573	2.747	5.870
	WK east G	f	17	5.77	24.10	29.87	455.55	26.7971	0.3414	1.4076	1.981	5.250
		m	33	5.86	24.68	30.54	951.69	28.8391	0.2214	1.2721	1.618	4.411
		all	52	6.44	24.10	30.54	1465.79	28.1883	0.2237	1.6132	2.602	5.723
	WK Eifel/Rh	f	10	3.93	25.67	29.60	274.40	27.4400	0.4282	1.3540	1.833	4.934
		m	12	5.75	24.90	30.65	343.99	28.6658	0.4867	1.6858	2.842	5.881
		all	31	5.75	24.90	30.65	876.00	28.2581	0.2784	1.5499	2.402	5.485
	WK West G	f	15	3.93	25.67	29.60	412.38	27.4920	0.3113	1.2057	1.454	4.386
		m	20	5.75	24.90	30.65	571.66	28.5830	0.3255	1.4557	2.119	5.093
		all	50	5.75	24.90	30.65	1414.57	28.2914	0.2031	1.4362	2.063	5.076
	WK Rom	all	10	5.08	27.15	32.23	291.60	29.1600	0.4889	1.5461	2.390	5.302
	HK	w	22	5.51	23.39	28.90	564.98	25.6809	0.2870	1.3463	1.812	5.242
	HK	m	31	5.41	24.16	29.57	831.16	26.8116	0.2043	1.1376	1.294	4.243
	HK	all	83	10.86	18.71	29.57	2155.88	25.9745	0.1854	1.6893	2.854	6.504
ln_1	WK Harz	all	52	7.32	18.27	25.59	1152.24	22.1585	0.2336	1.6847	2.838	7.603
	WK east G	f	18	6.28	18.27	24.55	383.90	21.3278	0.3870	1.6402	2.690	7.690
		m	35	6.54	19.05	25.59	785.88	22.4537	0.2699	1.5968	2.550	7.112
		all	57	7.32	18.27	25.59	1260.50	22.1140	0.2185	1.6493	2.720	7.458
	WK Eifel/Rh	f	10	4.74	18.22	22.96	207.24	20.7240	0.4089	1.2930	1.672	6.239
		m	14	4.71	20.02	24.73	317.15	22.6536	0.3944	1.4758	2.178	6.515
		all	34	6.51	18.22	24.73	749.32	22.0388	0.2753	1.6050	2.576	7.282
	WK West G	f	15	7.15	16.37	23.52	314.01	20.9340	0.4820	1.8667	3.484	8.917
		m	21	4.78	19.95	24.73	473.21	22.5338	0.3052	1.3987	1.956	6.207
		all	53	8.92	16.37	25.29	1173.81	22.1474	0.2334	1.6993	2.887	7.673
	WK Rom	all	10	6.10	20.88	26.98	237.51	23.7510	0.5653	1.7877	3.196	7.537
	HK	w	22	9.55	15.67	25.22	446.03	20.2741	0.5243	2.4590	6.047	12.128
	HK	m	29	7.92	17.39	25.31	636.11	21.9348	0.3868	2.0831	4.339	9.497
	HK	all	77	9.64	15.67	25.31	1608.91	20.8949	0.2550	2.2373	5.006	10.706
ln_2	WK Harz	all	50	7.38	22.46	29.84	1331.30	26.6260	0.2365	1.6723	2.797	6.281
	WK east G	f	16	5.17	22.46	27.63	404.44	25.2775	0.3828	1.5311	2.344	6.057
		m	35	5.87	23.97	29.84	951.80	27.1943	0.2551	1.5089	2.277	5.549
		all	55	7.38	22.46	29.84	1462.20	26.5855	0.2279	1.6900	2.856	6.357

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK Eifel/Rh	f	10	3.99	22.50	26.49	247.55	24.7550	0.4495	1.4216	2.021	5.743
		m	14	7.26	21.65	28.91	374.46	26.7471	0.5788	2.1657	4.690	8.097
		all	33	7.43	21.65	29.08	859.71	26.0518	0.3630	2.0851	4.348	8.004
	WK West G	f	15	8.38	19.74	28.12	374.12	24.9413	0.5468	2.1176	4.484	8.490
		m	21	7.26	21.65	28.91	558.30	26.5857	0.4306	1.9731	3.893	7.423
		all	51	9.34	19.74	29.08	1329.34	26.0655	0.2848	2.0335	4.135	7.802
	WK Rom	all	10	6.08	24.45	30.53	275.37	27.5370	0.6134	1.9398	3.763	7.044
	HK	w	22	9.16	19.43	28.59	524.06	23.8209	0.5537	2.5970	6.745	10.902
	HK	m	29	7.97	21.38	29.35	747.89	25.7893	0.3888	2.0940	4.385	7.912
	HK	all	77	9.94	19.41	29.35	1885.74	24.4901	0.2836	2.4881	6.191	10.160
facl	WK Harz	all	52	13.55	28.15	41.70	1927.34	37.0642	0.3618	2.6091	6.807	7.040
	WK east G	f	18	7.12	31.12	38.24	631.03	35.0572	0.4346	1.8440	3.400	5.260
		m	35	13.55	28.15	41.70	1322.35	37.7814	0.4092	2.4208	5.860	6.407
		all	57	13.55	28.15	41.70	2109.14	37.0025	0.3398	2.5655	6.582	6.933
	WK Eifel/Rh	f	10	4.77	32.31	37.08	345.66	34.5660	0.4597	1.4538	2.113	4.206
		m	14	12.81	27.85	40.66	517.79	36.9850	0.8991	3.3642	11.318	9.096
		all	35	12.81	27.85	40.66	1269.76	36.2789	0.4643	2.7470	7.546	7.572
	WK West G	f	15	7.57	31.45	39.02	525.38	35.0253	0.5179	2.0057	4.023	5.726
		m	22	12.81	27.85	40.66	815.88	37.0855	0.6132	2.8764	8.273	7.756
		all	56	14.51	27.85	42.36	2058.41	36.7573	0.3604	2.6972	7.275	7.338
	WK Rom	all	11	8.85	33.78	42.63	415.92	37.8109	0.7656	2.5392	6.448	6.756
	HK	w	21	11.29	27.78	39.07	693.44	33.021	0.6786	3.1097	9.670	9.417
	HK	m	28	9.50	30.61	40.11	1003.63	35.8439	0.3778	1.9992	3.997	5.578
	HK	all	75	12.33	27.78	40.11	2556.47	34.0863	0.3358	2.9077	8.455	8.530
vertorb	WK Harz	all	54	8.60	18.10	26.80	1279.80	23.7000	0.2212	1.6252	2.641	6.857
	WK east G	f	19	7.10	18.10	25.20	433.60	22.8180	0.3843	1.6752	2.806	7.342
		m	36	6.10	20.70	26.80	867.40	24.0960	0.2351	1.4105	1.989	5.854
		all	59	8.60	18.10	26.80	1398.00	23.6950	0.2040	1.5669	2.455	6.613
	WK Eifel/Rh	f	10	4.10	21.20	25.30	234.00	23.3960	0.4553	1.4398	2.073	6.154
		m	14	5.50	20.10	25.60	339.70	24.2640	0.4232	1.5833	2.507	6.525
		all	34	6.20	20.10	26.30	814.70	23.9620	0.2693	1.5702	2.465	6.553
	WK West G	f	15	5.00	21.20	26.10	358.40	23.8930	0.3727	1.4436	2.084	6.042
		m	22	5.80	20.10	25.90	534.50	24.2950	0.3270	1.5338	2.352	6.313
		all	55	7.40	20.10	27.50	1333.50	24.2460	0.2201	1.6320	2.663	6.731
	WK Rom	all	10	3.70	22.00	25.80	242.40	24.2380	0.4083	1.2910	1.667	5.326
	HK	w	23	12.50	12.60	25.10	485.90	21.1260	0.5211	2.4989	6.245	11.829
	HK	m	31	6.50	19.70	26.20	689.80	22.2520	0.3007	1.6741	2.803	4.490
	HK	all	83	13.50	12.60	26.20	1789.60	21.5610	0.2430	2.2157	4.909	10.276
hororb	WK Harz	all	53	5.69	22.88	28.57	1366.10	25.7755	0.1483	1.0797	1.166	4.189
	WK east G	f	17	4.75	22.88	27.63	427.53	25.1488	0.3071	1.2663	1.603	5.035
		m	36	4.42	24.15	28.57	935.67	25.9908	0.1574	0.9447	0.892	3.635
		all	57	5.69	22.88	28.57	1467.99	25.7542	0.1467	1.1072	1.226	4.300
	WK Eifel/Rh	f	10	5.14	22.51	27.65	241.96	24.1960	0.5242	1.6576	2.748	6.851
		m	14	4.97	22.47	27.44	354.07	25.2907	0.4000	1.4965	2.239	5.792
		all	35	5.18	22.47	27.65	866.85	24.7671	0.2584	1.5285	2.336	6.172
	WK West G	f	15	5.14	22.51	27.65	361.98	24.1320	0.3674	1.4228	2.024	5.896
		m	22	4.97	22.47	27.44	554.92	25.2236	0.2891	1.3559	1.839	5.376
		all	56	5.18	22.47	27.65	1390.78	24.8354	0.1849	1.3836	1.914	5.571
	WK Rom	all	11	3.36	24.67	28.03	292.56	26.5964	0.3300	1.0944	1.198	4.115
	HK	w	22	11.04	15.88	26.92	537.05	24.4114	0.4720	2.2138	4.901	9.069
	HK	m	31	4.38	23.61	27.99	795.24	25.6529	0.2121	1.1807	1.394	4.603
	HK	all	82	12.11	15.88	27.99	2068.41	25.2245	0.1806	1.6356	2.675	6.484
hzvorb	WK Harz	all	54	7.54	15.76	23.30	1009.32	18.6911	0.2251	1.6545	2.737	8.852
	WK east G	f	19	6.08	15.76	21.84	340.44	17.9179	0.3603	1.5705	2.467	8.765
		m	36	6.86	16.45	23.31	690.96	19.1933	0.2651	1.5904	2.529	8.286
		all	59	7.55	15.76	23.31	1106.43	18.7531	0.2215	1.7013	2.895	9.072
	WK Eifel/Rh	f	10	2.74	15.68	18.42	172.11	17.2110	0.3342	1.0569	1.117	6.141
		m	14	5.67	16.43	22.10	258.82	18.4871	0.4063	1.5203	2.311	8.129
		all	35	6.72	15.68	22.40	638.53	18.2437	0.2627	1.5544	2.416	8.520
	WK West G	f	15	3.38	15.19	18.57	258.28	17.2186	0.2795	1.0824	1.172	6.286
		m	22	5.67	16.43	22.10	410.17	18.6441	0.3295	1.5456	2.389	8.290
		all	56	11.18	15.19	26.37	1040.43	18.5791	0.2580	1.9305	3.727	10.390
	WK Rom	all	11	5.22	17.32	22.54	212.85	19.3500	0.5233	1.7356	3.012	8.970
	HK	w	23	14.69	9.03	23.72	434.93	18.9100	0.6322	3.0317	9.191	16.032
	HK	m	31	10.35	17.23	27.58	638.40	20.5935	0.4664	2.5968	6.743	12.610
	HK	all	30	10.35	17.23	27.58	615.10	20.5033	0.4731	2.5913	6.715	12.639
bCa	WK Harz	all	47	7.63	19.30	26.93	1130.81	24.0598	0.2476	1.6972	2.881	7.054

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK east G	f	16	5.31	19.30	24.61	357.01	22.3131	0.3078	1.2310	1.515	5.517
		m	30	5.41	21.52	26.93	742.93	24.7643	0.2264	1.2402	1.538	5.008
		all	50	7.63	19.30	26.93	1199.35	23.9870	0.2371	1.6768	2.812	6.991
	WK Eifel/Rh	f	10	4.74	20.84	25.58	224.52	22.4520	0.4341	1.3727	1.884	6.114
		m	13	5.06	21.62	26.68	316.80	24.3692	0.4649	1.6763	2.810	6.879
		all	34	5.86	20.84	26.70	804.89	23.6732	0.2961	1.7268	2.982	7.294
	WK West G	f	15	4.74	20.84	25.58	340.02	22.6680	0.3215	1.2451	1.550	5.493
		m	21	5.06	21.62	26.68	508.85	24.2310	0.3110	1.4250	2.030	5.881
		all	55	6.54	20.84	27.38	1310.40	23.8255	0.2122	1.5736	2.476	6.605
	WK Rom	all	11	5.78	21.53	27.31	263.56	23.9600	0.5924	1.9649	3.861	8.201
	HK	w	23	14.32	14.17	28.49	515.17	22.3987	0.5580	2.6760	7.161	11.436
	HK	m	30	5.81	20.95	26.76	734.77	24.4923	0.2692	1.4742	2.173	6.019
	HK	all	83	14.32	14.17	28.49	1930.61	23.2604	0.2494	2.2719	5.161	9.767
bCi	WK Harz	all	51	6.33	10.27	16.60	713.52	13.9906	0.1680	1.1997	1.439	8.575
	WK east G	f	18	6.36	10.27	16.63	241.21	13.4006	0.2984	1.2661	1.603	9.448
		m	34	5.68	10.87	16.55	485.31	14.2738	0.1804	1.0519	1.106	7.369
		all	56	6.36	10.27	16.63	787.20	14.0571	0.1624	1.2150	1.476	8.643
	WK Eifel/Rh	f	9	3.72	12.29	16.01	119.83	13.3144	0.3996	1.1987	1.437	9.003
		m	14	3.76	11.98	15.74	198.11	14.1507	0.2828	1.0581	1.120	7.477
		all	34	4.03	11.98	16.01	469.82	13.8182	0.1918	1.1182	1.250	8.092
	WK West G	f	14	3.72	12.29	16.01	188.94	13.4957	0.2620	0.9802	0.961	7.263
		m	22	3.76	11.98	15.74	309.49	14.0677	0.2004	0.9399	0.883	6.681
		all	55	4.03	11.98	16.01	764.74	13.9044	0.1289	0.9558	0.914	6.874
	WK Rom	all	11	4.69	11.53	16.22	149.85	13.6227	0.3798	1.2595	1.586	9.246
	HK	w	23	6.15	9.34	15.49	308.71	13.4222	0.2770	1.3283	1.764	9.896
	HK	m	30	3.63	12.28	15.91	429.79	14.3263	0.1708	0.9357	0.875	6.531
	HK	all	83	7.45	9.34	16.79	1147.41	13.8242	0.1328	1.2097	1.463	8.751
rostb	WK Harz	all	52	13.78	17.14	30.92	1350.91	25.9790	0.3173	2.2882	5.236	8.808
	WK east G	f	19	5.66	21.97	27.63	468.28	24.6463	0.3646	1.5891	2.525	6.448
		m	34	13.78	17.14	30.92	911.02	26.7947	0.3960	2.3090	5.331	8.617
		all	57	13.78	17.14	30.92	1486.55	26.0798	0.2971	2.2427	5.030	8.600
	WK Eifel/Rh	f	10	5.07	22.74	27.81	251.10	25.1100	0.4028	1.2737	1.622	5.073
		m	14	6.53	23.24	29.77	376.46	26.8900	0.4775	1.7866	3.192	6.644
		all	35	7.03	22.74	29.77	920.98	26.3137	0.2915	1.7245	2.974	6.554
	WK West G	f	15	5.36	22.45	27.81	376.59	25.1060	0.3428	1.3278	1.763	5.289
		m	22	6.53	23.24	29.77	593.82	26.9918	0.3392	1.5910	2.531	5.894
		all	56	7.43	22.45	29.88	1481.51	26.4555	0.2355	1.7625	3.106	6.662
	WK Rom	all	11	5.89	22.93	28.82	283.24	25.7491	0.5443	1.8051	3.258	
	HK	w	23	13.16	15.22	28.38	568.28	24.7078	0.5170	2.4794	6.147	10.035
	HK	m	31	6.44	23.44	29.88	830.22	26.7813	0.2532	1.4097	1.987	5.264
	HK	all	84	14.66	15.22	29.88	2153.19	25.6332	0.2298	2.1061	4.436	8.217
pw	WK Harz	all	48	10.11	28.18	38.29	1611.21	33.5669	0.3119	2.1613	4.671	6.439
	WK east G	f	17	5.68	28.18	33.86	536.42	31.5541	0.3616	1.4909	2.223	4.725
		m	32	8.39	29.90	38.29	1098.57	34.3303	0.3076	1.7398	3.027	5.068
		all	53	10.11	28.18	38.29	1773.80	33.4679	0.2908	2.1167	4.480	6.324
	WK Eifel/Rh	f	8	1.85	30.74	32.59	252.71	31.5888	0.2474	0.6996	0.489	2.215
		m	13	8.13	28.61	36.74	431.63	33.2023	0.6037	2.1768	4.738	6.556
		all	31	8.13	28.61	36.74	1005.81	32.4455	0.3278	1.8250	3.331	5.639
	WK West G	f	13	5.66	28.96	34.62	415.92	31.9938	0.4065	1.4656	2.148	4.581
		m	21	8.15	28.61	36.76	701.68	33.4133	0.4216	1.9323	3.734	5.783
		all	52	9.94	28.61	38.55	1714.79	32.9767	0.2790	2.0112	4.045	6.099
	WK Rom	all	11	5.01	30.58	35.59	361.19	32.8355	0.5318	1.7639	3.111	5.372
	HK	w	20	7.94	27.81	35.75	633.80	31.6900	0.4336	1.9390	3.760	6.119
	HK	m	27	5.29	30.27	35.56	883.69	32.7293	0.2448	1.2719	1.618	3.886
	HK	all	77	10.09	26.38	36.47	2460.66	31.9566	0.2176	1.9095	3.646	5.975
wacrbull	WK Harz	all	48	7.08	31.62	38.70	1692.74	35.2654	0.2700	1.8703	3.498	5.304
	WK east G	f	19	5.88	31.62	37.50	640.25	33.6974	0.3714	1.6190	2.621	4.804
		m	31	5.97	32.73	38.70	1119.19	36.1029	0.2485	1.3837	1.915	3.833
		all	53	7.08	31.62	38.70	1865.94	35.2064	0.2508	1.8261	3.335	5.187
	WK Eifel/Rh	f	10	3.91	31.94	35.85	334.60	33.4600	0.4390	1.3882	1.927	4.149
		m	12	5.36	32.35	37.71	422.71	35.2258	0.4079	1.4130	1.997	4.011
		all	29	7.00	30.71	37.71	996.15	34.3500	0.3186	1.7157	2.943	4.995
	WK West G	f	15	3.91	31.94	35.85	507.15	33.8100	0.3631	1.4062	1.977	4.159
		m	20	5.36	32.35	37.71	701.95	35.0975	0.2784	1.2448	1.550	3.547
		all	48	7.14	30.71	37.85	1661.80	34.6208	0.2288	1.5853	2.513	4.579
	WK Rom	all	10	7.97	31.28	39.25	350.33	35.0330	0.6794	2.1484	4.616	6.132
	HK	w	23	11.75	24.19	35.94	772.21	33.5743	0.5142	2.4661	6.082	7.345

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	HK	m	31.00	8.46	29.87	38.33	1080.1100	34.8423	0.3171	1.765	3.116	
formw	WK Harz	all	50	3.64	12.56	16.20	719.10	14.3820	0.1097	0.7759	0.602	
	WK east G	f	19	3.14	12.31	15.45	265.94	13.9968	0.1806	0.7874	0.620	5.626
		m	34	3.64	12.56	16.20	493.65	14.5191	0.1321	0.7704	0.593	5.306
		all	55	3.89	12.31	16.20	789.65	14.3573	0.1088	0.8066	0.651	5.618
	WK Eifel/Rh	f	10	1.80	13.54	15.34	146.00	14.6001	0.1798	0.5685	0.323	3.893
		m	12	2.49	13.69	16.18	179.11	14.9258	0.1804	0.6249	0.390	4.187
		all	31	2.64	13.54	16.18	458.81	14.8004	0.1082	0.6025	0.363	4.071
	WK West G	f	15	1.80	13.54	15.34	219.55	14.6367	0.1367	0.5292	0.280	3.610
		m	20	2.49	13.69	16.18	296.68	14.8340	0.1209	0.5405	0.292	3.644
		all	49	2.67	13.54	16.21	726.54	14.8274	0.0815	0.5706	0.326	3.849
	WK Rom	all	10	2.61	13.58	16.19	150.19	15.0190	0.2738	0.8659	0.750	
	HK	w	23	4.05	10.92	14.97	300.56	13.0678	0.1828	0.8766	0.768	6.708
	HK	m	31	2.95	11.91	14.86	421.18	13.5865	0.1278	0.7116	0.506	5.237
	HK	all	84	4.05	10.92	14.97	1113.03	13.2504	0.0878	0.8050	0.648	6.075
formh	WK Harz	all	51	3.78	10.30	14.08	633.98	12.4310	0.1319	0.9422	0.888	
	WK east G	f	18	3.68	10.30	13.98	220.09	12.2272	0.2610	1.1073	1.226	9.056
		m	36	3.36	10.72	14.08	453.72	12.6033	0.1447	0.8681	0.754	6.888
		all	56	3.78	10.30	14.08	697.54	12.4561	0.1275	0.9542	0.911	7.661
	WK Eifel/Rh	f	10	3.14	10.75	13.89	124.72	12.4720	0.3393	1.0729	1.151	8.603
		m	12	3.78	10.18	13.96	144.94	12.0783	0.2623	0.9084	0.825	7.521
		all	31	4.04	10.18	14.22	384.03	12.3881	0.1772	0.9864	0.973	7.963
	WK West G	f	15	3.14	10.75	13.89	186.34	12.4227	0.2336	0.9046	0.818	7.282
		m	20	3.82	10.18	14.00	247.77	12.3885	0.2047	0.915	0.838	7.388
		all	48	4.04	10.18	14.22	595.41	12.4044	0.1300	0.9007	0.811	7.261
	WK Rom	all	10	3.90	11.43	15.33	130.09	13.0090	0.4236	1.3395	1.794	
	HK	w	23	3.98	9.15	13.13	247.48	10.7600	0.2116	1.0148	1.030	9.431
	HK	m	31	4.30	9.22	13.52	343.76	11.0890	0.1729	0.9626	0.927	8.681
	HK	all	84	4.69	8.83	13.52	908.77	10.8187	0.1001	0.9175	0.842	8.480
cond	WK Harz	all	50	6.05	20.20	26.25	1156.19	23.1238	0.1657	1.1714	1.372	
	WK east G	f	19	3.89	20.92	24.81	424.15	22.3237	0.2081	0.9072	0.823	4.064
		m	34	6.05	20.20	26.25	799.52	23.5153	0.1826	1.0648	1.134	4.528
		all	55	6.05	20.20	26.25	1271.42	23.1167	0.1556	1.1539	1.331	4.992
	WK Eifel/Rh	f	10	2.77	21.33	24.10	224.59	22.4590	0.2676	0.8463	0.716	5.083
		m	12	3.37	21.66	25.03	284.95	23.7458	0.2562	0.8876	0.788	3.738
		all	31	4.72	21.33	26.05	721.28	23.2671	0.1976	1.1002	1.210	4.729
	WK West G	f	15	2.77	21.33	24.10	341.99	22.7993	0.2207	0.8549	0.731	3.750
		m	20	3.37	21.66	25.03	472.67	23.6335	0.1887	0.8438	0.712	3.570
		all	49	4.72	21.33	26.05	1151.10	23.4918	0.1532	1.0723	1.150	4.565
	WK Rom	all	10	4.03	22.21	26.24	239.09	23.9090	0.3803	1.2026	1.446	
	HK	w	23	8.35	16.47	24.82	488.82	21.2530	0.3361	1.6119	2.598	7.584
	HK	m	30	4.02	20.02	24.04	668.59	22.2863	0.1874	1.0265	1.054	4.606
	HK	all	83	8.35	16.47	24.82	1793.53	21.6088	0.1456	1.3260	1.758	6.136
npalno	WK Harz	all	52	9.15	21.36	30.51	1388.27	26.6975	0.2787	2.0097	4.038	
	WK east G	f	18	4.19	23.05	27.24	447.47	24.8594	0.2728	1.1572	1.339	4.655
		m	35	8.78	21.36	30.14	957.53	27.3580	0.3067	1.8142	3.291	6.631
		all	57	9.15	21.36	30.51	1516.21	26.6002	0.2660	2.0085	4.034	7.551
	WK Eifel/Rh	f	9	3.56	23.09	26.65	221.05	24.5611	0.4103	1.2310	1.515	5.012
		m	13	7.94	22.77	30.71	349.89	26.9146	0.5914	2.1322	4.546	7.922
		all	32	7.94	22.77	30.71	832.49	26.0153	0.3242	1.8338	3.363	7.049
	WK West G	f	14	4.97	22.41	27.38	347.77	24.8407	0.4004	1.4981	2.244	6.031
		m	21	7.94	22.77	30.71	563.63	26.8395	0.4015	1.8399	3.385	6.855
		all	53	8.30	22.41	30.71	1389.58	26.2185	0.2439	1.7759	3.154	6.774
	WK Rom	all	11	4.97	23.54	28.51	290.25	26.3864	0.4646	1.5408	2.374	
	HK	w	23	14.54	14.44	28.98	545.00	23.6957	0.5529	2.6515	7.031	11.190
	HK	m	30	6.46	22.21	28.67	767.39	25.5797	0.2576	1.4110	1.991	5.516
	HK	all	81	14.54	14.44	28.98	1977.70	24.4160	0.2299	2.0689	4.281	8.474
palnobull	WK Harz	all	51	13.20	22.60	35.80	1524.30	29.8890	0.3945	2.8173	7.937	
	WK east G	f	19	9.90	22.60	32.60	529.20	27.8530	0.5043	2.1983	4.833	7.893
		m	34	11.20	24.60	35.80	1045.30	30.7440	0.4203	2.4507	6.006	7.971
		all	56	13.20	22.60	35.80	1671.90	29.8560	0.3659	2.7384	7.499	9.172
	WK Eifel/Rh	f	9	2.90	26.00	28.90	244.80	27.2060	0.2961	0.8884	0.789	3.249
		m	13	8.30	24.60	32.90	394.90	30.3770	0.6146	2.2160	4.911	7.295
		all	30	10.00	24.60	34.60	882.20	29.4060	0.4312	2.3616	5.577	8.031
	WK West G	f	14	4.90	26.00	31.00	391.80	27.9820	0.3768	1.4098	1.987	5.038
		m	21	9.20	24.60	33.80	641.60	30.5530	0.4424	2.0272	4.11	6.635
		all	50	10.00	24.60	34.60	1501.50	30.0300	0.3236	2.2883	5.236	7.620

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK Rom	all	10	6.70	27.20	33.90	302.00	30.1960	0.7006	2.2156	4.909	
	HK	w	23	16.00	14.80	30.80	603.10	26.2210	0.7708	3.6965	13.664	14.097
	HK	m	31	9.00	24.20	33.20	895.80	28.8970	0.3694	2.0569	4.231	7.118
	HK	all	84	18.40	14.80	33.20	2311.40	27.5170	0.3129	2.8678	8.224	10.422
bull	WK Harz	all	51	4.93	17.24	22.17	1035.56	20.3051	0.1585	1.1320	1.281	
	WK east G	f	19	3.53	17.24	20.77	368.42	19.3905	0.2012	0.8770	0.769	4.523
		m	34	4.64	18.39	23.03	707.38	20.8053	0.1703	0.9933	0.987	4.774
		all	56	5.79	17.24	23.03	1138.02	20.3218	0.1542	1.1538	1.331	5.678
	WK Eifel/Rh	f	10	4.01	16.99	21.00	190.06	19.0060	0.3843	1.2153	1.477	6.394
		m	13	5.49	18.58	24.07	264.83	20.3715	0.3732	1.3457	1.811	6.610
		all	32	7.08	16.99	24.07	639.74	19.9919	0.2444	1.3826	1.911	6.916
	WK West G	f	15	4.01	16.99	21.00	289.09	19.2727	0.2851	1.1042	1.219	5.729
		m	21	5.59	18.48	24.07	425.43	20.2586	0.2609	1.1958	1.430	5.903
		all	51	7.08	16.99	24.07	1025.54	20.1086	0.1754	1.2526	1.569	6.229
	WK Rom	all	10	3.58	18.62	22.20	205.69	20.5690	0.4392	1.3888	1.929	
	HK	w	23	8.81	12.25	21.06	427.91	18.6048	0.3898	1.8693	3.494	10.047
	HK	m	31	4.84	17.89	22.73	622.60	20.0839	0.2121	1.1807	1.394	5.879
	HK	all	84	10.48	12.25	22.73	1599.06	19.0364	0.1766	1.6188	2.621	8.504
bullw	WK Harz	all	52	3.63	10.93	14.56	670.88	12.9015	0.0995	0.7172	0.514	
	WK east G	f	19	3.21	10.93	14.14	234.33	12.3332	0.1668	0.7272	0.529	5.900
		m	35	2.69	11.87	14.56	462.30	13.2086	0.0894	0.5287	0.280	4.003
		all	57	3.63	10.93	14.56	734.97	12.8942	0.0947	0.7148	0.511	5.543
	WK Eifel/Rh	f	10	1.91	11.49	13.40	125.71	12.5710	0.1895	0.5992	0.359	4.766
		m	13	2.61	12.12	14.73	170.25	13.0962	0.2098	0.7565	0.572	5.777
		all	32	3.24	11.49	14.73	416.48	13.0150	0.1439	0.8142	0.663	6.256
	WK West G	f	15	1.91	11.49	13.40	190.34	12.6893	0.1332	0.5158	0.266	4.065
		m	21	2.61	12.12	14.73	274.90	13.0905	0.1426	0.6536	0.427	3.263
		all	50	3.24	11.49	14.73	651.85	13.0370	0.0984	0.6959	0.484	5.338
	WK Rom	all	10	2.36	12.05	14.41	128.41	12.8410	0.2213	0.6997	0.490	
	HK	w	23	5.14	9.45	14.59	279.38	12.1470	0.2094	1.0043	1.009	8.268
	HK	m	31	2.23	11.93	14.16	398.23	12.8461	0.1207	0.6723	0.452	5.233
	HK	all	84	5.14	9.45	14.59	1043.93	12.4277	0.0915	0.8382	0.703	6.745
bullh	WK Harz	all	52	6.59	8.90	15.49	694.09	13.3479	0.1713	1.2355	1.527	
	WK east G	f	19	4.24	10.85	15.09	246.12	12.9537	0.2399	1.0458	1.094	8.074
		m	35	6.59	8.90	15.49	471.89	13.4826	0.2156	1.2754	1.627	9.460
		all	57	6.59	8.90	15.49	759.89	13.3314	0.1590	1.2002	1.441	9.003
	WK Eifel/Rh	f	9	2.39	11.88	14.27	118.12	13.1244	0.2752	0.8256	0.682	6.290
		m	13	2.45	12.28	14.73	172.67	13.2823	0.1944	0.7008	0.491	5.276
		all	31	2.85	11.88	14.73	414.30	13.3645	0.1432	0.7971	0.635	5.964
	WK West G	f	14	2.67	11.88	14.55	186.81	13.3436	0.2114	0.7911	0.626	5.929
		m	21	2.45	12.28	14.73	281.26	13.3933	0.1522	0.6976	0.487	5.209
		all	50	2.87	11.88	14.75	675.21	13.5042	0.1104	0.7805	0.609	5.780
	WK Rom	all	10	2.60	12.46	15.06	139.52	13.9520	0.2771	0.8763	0.768	
	HK	w	23	6.65	8.08	14.73	263.77	11.4683	0.3370	1.6162	2.612	14.093
	HK	m	31	4.54	9.58	14.12	375.85	12.1242	0.1819	1.0127	1.026	8.353
	HK	all	84	6.65	8.08	14.73	982.77	11.6996	0.1378	1.2629	1.595	10.794
f29ozrl	WK Harz	all	54	5.20	20.95	26.15	1282.75	23.7546	0.1527	1.1225	1.260	
	WK east G	f	19	4.27	20.95	25.22	435.19	22.9047	0.2268	0.9885	0.977	4.316
		m	36	4.00	21.97	25.97	866.09	24.0581	0.1549	0.9293	0.864	3.863
		all	59	5.20	20.95	26.15	1400.29	23.7337	0.1464	1.1249	1.265	4.740
	WK Eifel/Rh	f	10	1.69	22.10	23.79	228.39	22.8390	0.1845	0.5835	0.340	2.555
		m	14	3.78	21.87	25.65	336.94	24.0671	0.2612	0.9774	0.955	4.061
		all	35	3.93	21.84	25.77	824.02	23.5434	0.1808	1.0693	1.143	4.542
	WK West G	f	15	2.69	22.10	24.79	348.40	23.2267	0.2207	0.8547	0.730	3.680
		m	22	3.80	21.87	25.67	531.73	24.1695	0.1924	0.9026	0.815	3.735
		all	56	4.16	21.84	26.00	1338.80	23.9071	0.1475	1.1041	1.219	4.354
	WK Rom	all	11	4.35	21.98	26.33	264.24	24.0218	0.3598	1.1933	1.424	
	HK	w	21	14.87	11.34	26.21	464.90	22.1381	0.6012	2.7550	7.590	12.445
	HK	m	28	3.59	21.41	25.00	654.51	23.3754	0.1800	0.9523	0.907	4.075
	HK	all	79	14.87	11.34	26.21	1795.91	22.7330	0.2004	1.7815	3.174	27.836
LP4	WK Harz	all	54	2.43	10.17	12.60	613.56	11.3622	0.0741	0.5445	0.296	
	WK east G	f	18	1.82	10.24	12.06	198.18	11.0100	0.1164	0.4939	0.244	4.486
		m	36	1.96	10.64	12.60	414.41	11.5114	0.0722	0.4333	0.188	3.764
		all	58	2.43	10.17	12.60	658.80	11.3586	0.0706	0.5378	0.289	4.735
	WK Eifel/Rh	f	10	1.99	9.72	11.71	106.35	10.6350	0.1920	0.6071	0.369	4.694
		m	14	1.46	10.76	12.22	159.50	11.3929	0.1103	0.4126	0.170	3.621
		all	36	2.75	9.72	12.47	400.89	11.1358	0.1083	0.6500	0.422	5.837

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK West G	f	15	1.99	9.72	11.71	161.48	10.7653	0.1539	0.5960	0.355	5.536
		m	22	1.80	10.42	12.22	249.34	11.3336	0.0898	0.4212	0.177	5.717
		all	57	2.75	9.72	12.47	636.51	11.1668	0.0773	0.5838	0.341	5.228
	WK Rom	all	11	1.87	10.25	12.12	123.40	11.2182	0.1654	0.5485	0.301	
	HK	w	21	3.42	7.92	11.34	210.03	10.0014	0.1694	0.7763	0.603	7.762
	HK	m	29	3.21	8.72	11.93	308.30	10.6310	0.1332	0.7170	0.514	6.745
	HK	all	80	4.01	7.92	11.93	814.12	10.1765	0.0847	0.7577	0.574	7.446
BP4	WK Harz	all	53	1.70	4.69	6.39	282.30	5.3264	0.0489	0.3563	0.127	
	WK east G	f	18	1.33	4.69	6.02	92.57	5.1428	0.0879	0.3728	0.139	7.249
		m	36	1.56	4.83	6.39	195.06	5.4183	0.0537	0.3219	0.104	5.940
		all	58	1.70	4.69	6.39	309.21	5.3312	0.0480	0.3652	0.133	6.850
	WK Eifel/Rh	f	9	1.37	4.23	5.60	45.90	5.1000	0.13299	0.3990	0.159	7.823
		m	13	1.20	5.02	6.22	71.61	5.5085	0.08279	0.2985	0.089	5.172
		all	34	2.04	4.23	6.27	182.87	5.3785	0.07334	0.4276	0.183	7.951
	WK West G	f	13	1.44	4.23	5.67	66.87	5.1438	0.10537	0.3799	0.144	7.386
		m	21	1.24	4.98	6.22	115.17	5.4843	0.06614	0.3031	0.092	5.526
		all	54	2.04	4.23	6.27	293.87	5.4420	0.05655	0.4156	0.173	7.636
	WK Rom	all	11	1.17	4.89	6.06	60.60	5.5091	0.11341	0.3761	0.141	
	HK	w	21	3.34	2.40	5.74	101.74	4.8448	0.14478	0.6635	0.440	13.695
	HK	m	28	2.12	4.36	6.48	151.99	5.4282	0.09002	0.4763	0.227	8.775
	HK	all	79	4.08	2.40	6.48	405.25	5.1297	0.06179	0.5492	0.302	10.707
csuph	WK Harz	all	49	6.63	9.42	16.05	640.77	13.0769	0.22443	1.5710	2.468	
	WK east G	f	17	5.59	9.42	15.01	202.09	11.8876	0.31851	1.3132	1.725	11.047
		m	33	5.03	11.02	16.05	449.55	13.6227	0.22141	1.2719	1.618	9.337
		all	53	6.63	9.42	16.05	691.34	13.0442	0.20943	1.5247	2.325	11.688
	WK Eifel/Rh	f	9	4.94	9.61	14.55	104.22	11.5800	0.50605	1.5181	2.305	13.110
		m	13	5.41	10.45	15.86	179.43	13.8023	0.41664	1.5022	2.257	10.884
		all	30	6.25	9.61	15.86	386.07	12.8690	0.30231	1.6558	2.742	12.867
	WK West G	f	14	4.96	9.59	14.55	166.12	11.8657	0.43408	1.6242	2.638	13.688
		m	21	5.71	10.45	16.16	288.24	13.7257	0.32168	1.4741	2.173	10.740
		all	51	6.57	9.59	16.16	667.23	13.0829	0.23115	1.6508	2.725	12.618
	WK Rom	all	11	3.92	11.17	15.09	140.74	12.7945	0.42437	1.4075	1.981	
	HK	w	21	7.94	5.16	13.10	204.86	9.7552	0.39261	1.7992	3.237	18.443
	HK	m	30	9.60	5.44	15.04	351.30	11.7100	0.35065	1.9206	3.689	16.401
	HK	all	75	18.74	5.16	23.90	821.80	10.9573	0.28932	2.5056	6.278	22.867
Csupl	WK Harz	all	54	2.46	4.34	6.80	297.06	5.5011	0.08337	0.6127	0.375	
	WK east G	f	19	1.83	4.34	6.17	93.63	4.9279	0.1106	0.4821	0.232	9.783
		m	36	1.75	5.05	6.80	206.69	5.7414	0.06724	0.4035	0.163	7.027
		all	59	2.46	4.34	6.80	323.92	5.4902	0.07794	0.5987	0.358	10.904
	WK Eifel/Rh	f	10	1.45	4.00	5.45	45.51	4.5510	0.14859	0.4699	0.221	10.325
		m	13	2.16	4.53	6.69	71.52	5.5015	0.19401	0.6995	0.489	12.715
		all	32	2.69	4.00	6.69	164.54	5.1419	0.12348	0.6985	0.488	13.585
	WK West G	f	15	1.56	4.00	5.56	70.38	4.6920	0.13102	0.5075	0.258	10.815
		m	21	2.16	4.53	6.69	116.99	5.5710	0.13338	0.6112	0.374	10.972
		all	53	2.74	4.00	6.74	280.59	5.2942	0.09658	0.7032	0.494	13.282
	WK Rom	all	11	1.65	4.18	5.83	54.50	4.9545	0.17863	0.5925	0.351	
	HK	w	22	2.22	2.91	5.13	88.92	4.0418	0.11002	0.5160	0.266	12.768
	HK	m	30	4.37	3.35	7.72	148.59	4.9530	0.14034	0.7687	0.591	15.519
	HK	all	78	4.81	2.91	7.72	351.60	4.5077	0.08432	0.7447	0.555	16.521
afor	WK Harz	all	50	2.48	2.60	5.08	196.17	3.9234	0.09257	0.6545	0.428	
	WK east G	f	17	1.66	2.84	4.50	63.26	3.7212	0.12491	0.5150	0.265	13.840
		m	34	2.48	2.60	5.08	135.00	3.9706	0.11758	0.6856	0.470	17.267
		all	55	2.48	2.60	5.08	214.24	3.8953	0.08585	0.6367	0.405	16.345
	WK Eifel/Rh	f	10	1.86	2.27	4.13	32.66	3.2660	0.20179	0.6381	0.407	19.539
		m	13	3.63	2.37	6.00	50.85	3.9115	0.25096	0.9049	0.819	23.133
		all	34	3.73	2.27	6.00	122.85	3.6132	0.14551	0.8485	0.720	23.483
	WK West G	f	15	3.09	2.27	5.36	52.88	3.5253	0.20444	0.7910	0.627	22.460
		m	21	3.63	2.37	6.00	81.85	3.8976	0.18011	0.8254	0.681	21.176
		all	54	3.73	2.27	6.00	196.27	3.6346	0.11547	0.8485	0.720	23.346
	WK Rom	all	11	1.99	2.02	4.01	34.78	3.1618	0.20188	0.6696	0.448	
	HK	w	23	2.88	1.65	4.53	57.32	2.4922	0.15305	0.7340	0.539	29.452
	HK	m	29	3.95	0.51	4.46	70.91	2.4452	0.13865	0.7467	0.557	30.536
	HK	all	82	4.02	0.51	4.53	193.34	2.3578	0.07184	0.6505	0.423	27.591
shbull	WK Harz	all	51	5.85	40.15	46.00	2195.89	43.0566	0.19163	1.3685	1.873	
	WK east G	f	19	5.06	40.15	45.21	799.32	42.0695	0.28954	1.2621	1.593	30.000
		m	33	4.56	41.44	46.00	1435.68	43.5054	0.18731	1.0760	1.158	2.473
		all	55	5.85	40.15	46.00	2366.07	43.0194	0.18149	1.3460	1.812	3.129

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK Eifel/Rh	f	9	4.80	38.47	43.27	366.49	40.7211	0.66004	1.9801	3.921	4.863
		m	14	8.01	38.83	46.84	592.91	42.3507	0.55114	2.0622	4.253	4.869
		all	33	9.67	37.17	46.84	1377.70	41.7485	0.39654	2.2780	5.189	5.456
	WK West G	f	14	4.80	38.47	43.27	566.60	40.4714	0.46076	1.7240	2.972	4.260
		m	22	9.07	37.77	46.84	927.01	42.1368	0.42968	2.0154	4.062	4.783
		all	52	9.67	37.17	46.84	2170.56	41.7415	0.29706	2.1421	4.589	5.132
	WK Rom	all	10	5.39	38.81	44.20	412.76	41.2760	0.51279	1.6216	2.629	
	HK	w	22	10.25	33.44	43.69	881.83	40.0832	0.57055	2.6761	7.162	6.676
	HK	m	31	6.99	37.78	44.77	1306.40	42.1419	0.29238	1.6279	2.650	3.863
	HK	all	83	11.33	33.44	44.77	3395.29	40.9071	0.24883	2.2670	5.139	5.542
CranV	WK Harz	all	41	12.00	33.00	45.00	1564.00	38.1460	0.4531	2.9010	8.416	
	WK east G	f	14	9.00	33.00	42.00	508.50	36.3210	0.7803	2.9195	8.523	8.038
		m	29	11.00	34.00	45.00	1131.50	39.0170	0.4802	2.5860	6.687	6.628
		all	44	12.00	33.00	45.00	1676.00	38.0910	0.4429	2.9379	8.631	7.713
	WK Eifel/Rh	f	8	5.00	36.00	41.00	305.50	38.1880	0.6119	1.7308	2.996	4.532
		m	10	9.50	33.50	43.00	394.00	39.4000	0.9568	3.0258	9.156	7.680
		all	25	12.50	33.50	46.00	982.50	39.3000	0.5694	2.8468	8.104	7.244
	WK West G	f	13	5.00	36.00	41.00	492.00	37.8460	0.4363	1.5730	2.474	4.156
		m	17	10.50	33.50	44.00	669.50	39.3820	0.7039	2.9022	8.423	7.369
		all	40	12.50	33.50	46.00	1561.00	39.0250	0.4443	2.8101	7.897	7.201
	WK Rom	all	9	9.50	37.50	47.00	368.00	40.8890	0.8810	2.6431	6.986	
	HK	w	23	16.00	20.00	36.00	637.00	27.6960	0.7530	3.6110	13.040	13.038
	HK	m	30	14.50	21.50	36.00	910.00	30.3330	0.5913	3.2386	10.489	10.678
	HK	all	82	16.00	20.00	36.00	2327.50	28.3840	0.3837	3.4742	12.070	12.240
schind	WK Harz	all	40	0.52	2.23	2.74	101.86	2.5466	0.0214	0.1353	0.018	
	WK east G	f	14	0.52	2.21	2.74	35.79	2.5561	0.0453	0.1694	0.029	6.629
		m	28	0.52	2.23	2.74	70.98	2.5349	0.0248	0.1313	0.017	5.180
		all	43	0.53	2.21	2.74	109.47	2.5459	0.0220	0.1440	0.021	5.655
	WK Eifel/Rh	f	8	0.38	2.13	2.51	18.77	2.3463	0.0386	0.1091	0.012	4.652
		m	10	0.44	2.23	2.67	24.65	2.4650	0.0437	0.1383	0.019	5.609
		all	25	0.54	2.13	2.67	60.38	2.4152	0.0253	0.1266	0.016	5.243
	WK West G	f	13	0.49	2.13	2.62	31.45	2.4192	0.0404	0.1456	0.021	6.017
		m	17	0.46	2.23	2.69	42.04	2.4729	0.0322	0.1328	0.018	5.372
		all	40	0.59	2.13	2.72	98.14	2.4535	0.0218	0.1378	0.019	5.616
	WK Rom	all	8	0.34	2.23	2.56	19.13	2.3920	0.0410	0.1159	0.013	
	HK	w	22	1.40	2.77	4.17	71.12	3.2326	0.0669	0.3139	0.099	9.711
	HK	m	30	1.28	2.75	4.03	95.37	3.1789	0.0577	0.3162	0.100	9.948
	HK	all	80	1.42	2.75	4.17	260.86	3.2607	0.0344	0.3076	0.095	9.433
mandl_1	WK Harz	all	52	17.82	54.56	72.38	3339.87	64.2283	0.6339	4.5708	20.892	
	WK east G	f	18	14.75	54.56	69.31	1082.01	60.1117	0.8469	3.5929	12.909	5.977
		m	34	16.78	54.94	71.72	2240.03	65.8832	0.5835	3.4024	11.576	5.164
		all	56	17.82	54.56	72.38	3590.85	64.1223	0.5908	4.4212	19.547	6.895
	WK Eifel/Rh	f	10	10.75	54.32	65.07	583.30	58.3300	1.0307	3.2599	10.627	5.589
		m	14	14.44	54.14	68.58	897.84	64.1314	1.1179	4.1828	17.496	6.522
		all	35	18.30	54.14	72.44	2177.53	62.2151	0.8087	4.7843	22.889	7.687
	WK West G	f	15	10.85	54.32	65.17	896.72	59.7813	0.9165	3.5495	12.599	5.937
		m	21	15.20	54.14	69.34	1344.18	64.0086	0.8079	3.7025	13.708	5.784
		all	54	18.64	54.14	72.78	3399.64	62.9563	0.5930	4.3579	18.991	6.922
	WK Rom	all	11	14.58	55.98	70.56	694.17	63.1064	1.3895	4.6086	21.239	
	HK	w	22	36.65	33.43	70.08	1260.63	57.3014	1.4392	6.7503	45.567	11.780
	HK	m	31	14.69	54.99	69.68	1924.12	62.0684	0.5583	3.1086	9.663	5.008
	HK	all	78	36.65	33.43	70.08	4631.33	59.3760	0.5797	5.1195	26.209	8.622
mandl_2	WK Harz	all	47	17.84	55.06	72.90	3006.20	63.9617	0.6086	4.1723	17.408	
	WK east G	f	16	13.54	55.06	68.60	961.19	60.0744	0.7780	3.1121	9.685	5.180
		m	31	16.71	56.19	72.90	2030.32	65.4942	0.6059	3.3734	11.380	5.151
		all	51	17.84	55.06	72.90	3251.49	63.7547	0.5704	4.0732	16.591	6.389
	WK Eifel/Rh	f	8	5.87	55.40	61.27	465.54	58.1925	0.6634	1.8762	3.520	3.224
		m	12	12.24	55.91	68.15	766.63	63.8858	1.0448	3.6193	13.099	5.665
		all	31	14.77	55.40	70.17	1926.95	62.1597	0.7154	3.9833	15.866	6.408
	WK West G	f	13	9.55	55.40	64.95	777.98	59.8446	0.8212	2.9608	8.766	4.948
		m	19	13.36	55.91	69.27	1209.17	63.6405	0.7773	3.3880	11.479	5.324
		all	50	17.00	55.40	72.40	3142.52	62.8504	0.5347	3.7806	14.293	6.015
	WK Rom	all	8	12.83	57.76	70.59	511.16	63.8950	1.5091	4.2682	18.218	
	HK	w	21	33.31	34.66	67.97	1196.43	56.9729	1.4278	6.5430	42.810	11.484
	HK	m	28	12.14	56.95	69.09	1744.22	62.2936	0.5497	2.9085	8.459	4.669
	HK	all	72	34.43	34.66	69.09	4274.85	59.3729	0.6075	5.1549	26.573	8.682

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
corh	WK Harz	all	52	10.28	22.10	32.38	1458.91	28.0560	0.3926	2.8312	8.016	
	WK east G	f	18	9.67	22.10	31.77	455.82	25.3233	0.4895	2.0770	4.314	8.202
		m	34	8.54	23.66	32.20	998.03	29.3538	0.3490	2.0352	4.142	6.933
		all	56	10.28	22.10	32.38	1572.19	28.0748	0.3721	2.7846	7.754	9.919
	WK Eifel/Rh	f	10	8.03	22.22	30.25	249.44	24.9440	0.7051	2.2297	4.972	8.939
		m	14	12.11	20.05	32.16	387.34	27.6671	0.7803	2.9195	8.524	10.552
		all	35	12.11	20.05	32.16	940.02	26.8577	0.4884	2.8896	8.350	10.759
	WK West G	f	15	8.10	22.15	30.25	378.97	25.2647	0.5906	2.2873	5.232	9.053
		m	21	12.11	20.05	32.16	584.00	27.8095	0.5322	2.4389	5.948	8.770
		all	54	12.11	20.05	32.16	1467.96	27.1844	0.3574	2.6266	6.899	9.662
	WK Rom	all	11	9.11	22.48	31.59	296.54	26.9582	0.9270	3.0747	9.453	
	HK	w	22	16.42	13.18	29.60	533.60	24.2545	0.7041	3.3024	10.906	13.616
	HK	m	32	7.69	23.18	30.87	852.23	26.6322	0.3421	1.9353	3.745	7.267
	HK	all	78	17.69	13.18	30.87	1977.64	25.3544	0.2977	2.6295	6.914	10.371
angdf	WK Harz	all	45	7.65	–3.50	4.15	21.26	0.4724	0.2640	1.7710	3.136	
	WK east G	f	16	6.36	–2.21	4.15	10.80	0.6750	0.4723	1.8891	3.569	279.861
		m	29	6.66	–3.50	3.16	15.78	0.5441	0.3074	1.6555	2.741	304.268
		all	48	7.65	–3.50	4.15	24.76	0.5158	0.2549	1.7658	3.118	342.344
	WK Eifel/Rh	f	5	6.78	–3.01	3.77	5.24	1.0480	1.1861	2.6522	7.034	253.069
		m	6	9.77	–5.58	4.19	0.51	0.0850	1.3198	3.2329	10.452	3803.450
		all	15	9.77	–5.58	4.19	6.75	0.4500	0.6887	2.6673	7.115	292.740
	WK West G	f	10	8.03	–3.01	5.02	11.78	1.1780	0.8047	2.5447	6.476	216.022
		m	13	9.77	–5.58	4.19	0.26	0.0200	0.7231	2.6072	6.797	
		all	34	10.6	–5.58	5.02	22.58	0.6641	0.4020	2.3438	5.494	
	WK Rom	all	11	9.84	–4.63	5.21	3.54	0.3218	0.9815	3.2554	10.598	
	HK	w	20	7.12	–1.35	5.77	56.58	2.8290	0.3931	1.7579	3.090	62.139
	HK	m	28	7.61	–2.74	4.87	67.34	2.4050	0.3740	1.9789	3.916	82.282
	HK	all	67	8.51	–2.74	5.77	181.32	2.7063	0.2088	1.7094	2.922	63.163
mandH	WK Harz	all	51	5.20	8.42	13.62	572.56	11.2267	0.1599	1.1417	1.304	
	WK east G	f	18	3.28	8.42	11.70	182.98	10.1656	0.1723	0.7310	0.534	7.191
		m	33	3.79	9.32	13.11	385.24	11.6739	0.1574	0.9042	0.817	7.745
		all	55	5.20	8.42	13.62	616.66	11.2120	0.1529	1.1339	1.286	10.114
	WK Eifel/Rh	f	10	2.75	8.68	11.43	98.56	9.8560	0.2771	0.8761	0.768	8.890
		m	14	3.82	9.18	13.00	156.56	11.1829	0.3030	1.1337	1.285	10.137
		all	35	4.42	8.68	13.10	376.41	10.7546	0.2060	1.2179	1.483	11.325
	WK West G	f	15	2.99	8.68	11.67	153.27	10.2180	0.2504	0.9699	0.941	9.492
		m	21	3.82	9.18	13.00	236.45	11.2595	0.2269	1.0399	1.081	9.236
		all	54	4.81	8.68	13.49	593.49	10.9906	0.1560	1.1461	1.313	10.428
	WK Rom	all	11	2.97	9.85	12.82	122.63	11.1482	0.2870	0.9518	0.906	
	HK	w	20	5.40	6.47	11.87	197.32	9.8660	0.3060	1.3686	1.873	13.872
	HK	m	30	4.02	9.45	13.47	328.32	10.9440	0.1557	0.8529	0.727	7.793
	HK	all	75	7.00	6.47	13.47	762.36	10.1648	0.1495	1.2950	1.677	12.740
uzrl	WK Harz	all	52	6.15	24.13	30.28	1450.37	27.8917	0.1964	1.4166	2.007	
	WK east G	f	18	4.51	24.13	28.64	479.45	26.6361	0.2905	1.2324	1.519	4.627
		m	34	3.82	26.08	29.90	965.98	28.4112	0.1736	1.0123	1.025	3.563
		all	56	6.15	24.13	30.28	1560.76	27.8707	0.1865	1.3955	1.947	5.007
	WK Eifel/Rh	f	10	1.80	25.37	27.17	261.28	26.1280	0.1575	0.4982	0.248	1.907
		m	14	5.80	23.58	29.38	384.74	27.4814	0.4545	1.7007	2.892	6.189
		all	34	6.60	23.58	30.18	921.23	27.0950	0.2503	1.4595	2.130	5.387
	WK West G	f	15	3.68	25.23	28.91	397.90	26.5267	0.2600	1.0068	1.014	3.795
		m	21	6.15	23.58	29.73	582.65	27.7452	0.3347	1.5337	2.352	5.528
		all	53	6.89	23.58	30.47	1456.48	27.4808	0.2036	1.4820	2.196	5.393
	WK Rom	all	11	3.53	25.73	29.26	304.99	27.7264	0.3530	1.1709	1.371	
	HK	w	19	16.09	13.76	29.85	482.71	25.4058	0.7319	3.1905	10.179	12.558
	HK	m	30	4.34	25.19	29.53	817.09	27.2363	0.2339	1.2810	1.641	4.703
	HK	all	74	16.36	13.76	30.12	1938.57	26.1969	0.2541	2.1860	4.779	8.345
pml	WK Harz	all	52	3.93	19.57	23.50	1127.13	21.6756	0.1364	0.9833	0.967	
	WK east G	f	18	3.09	19.57	22.66	375.31	20.8506	0.2005	0.8505	0.723	4.079
		m	34	2.97	20.42	23.39	747.37	21.9815	0.1251	0.7293	0.532	3.318
		all	56	3.93	19.57	23.50	1210.46	21.6154	0.1320	0.9877	0.976	4.570
	WK Eifel/Rh	f	10	2.77	18.64	21.41	202.97	20.2970	0.2666	0.8430	0.711	4.153
		m	14	4.32	18.78	23.10	299.46	21.3900	0.3181	1.1901	1.416	5.587
		all	35	4.56	18.64	23.20	736.86	21.0531	0.1925	1.1389	1.297	5.410
	WK West G	f	15	3.65	18.64	22.29	309.59	20.6393	0.2467	0.9556	0.913	4.630
		m	21	4.32	18.78	23.10	450.82	21.4676	0.2197	1.0068	1.014	4.690
		all	54	5.86	18.64	24.50	1149.02	21.2781	0.1554	1.1418	1.304	5.366
	WK Rom	all	11	3.52	18.94	22.46	233.46	21.2236	0.3074	1.0196	1.040	

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	HK	w	19	10.08	10.85	20.93	347.93	18.3121	0.4979	2.1701	4.709	11.851
	HK	m	31	3.59	18.11	21.70	613.16	19.7794	0.1903	1.0596	1.123	5.357
	HK	all	75	10.85	10.85	21.70	1428.01	19.0401	0.1747	1.5127	2.288	7.945
lp3	WK Harz	all	52	1.71	5.21	6.92	307.18	5.9073	0.0563	0.4062	0.165	
	WK east G	f	18	1.14	5.21	6.35	101.89	5.6606	0.0775	0.3289	0.108	5.811
		m	34	1.75	5.17	6.92	204.09	6.0026	0.0667	0.3890	0.151	6.481
		all	56	1.75	5.17	6.92	329.54	5.8846	0.0542	0.4053	0.164	6.888
	WK Eifel/Rh	f	10	0.68	5.16	5.84	55.13	5.5130	0.0766	0.2421	0.059	4.392
		m	13	1.82	5.12	6.94	75.56	5.8123	0.1269	0.4574	0.209	7.869
		all	34	1.82	5.12	6.94	193.37	5.6874	0.0614	0.3581	0.128	6.297
	WK West G	f	15	1.02	5.16	6.18	83.56	5.5707	0.0729	0.2823	0.080	5.068
		m	20	1.82	5.12	6.94	116.67	5.8335	0.0929	0.4153	0.172	7.119
		all	52	1.82	5.12	6.94	298.27	5.7360	0.0513	0.3697	0.137	6.445
	WK Rom	all	11	1.22	4.97	6.19	63.28	5.7527	0.0988	0.3276	0.107	
	HK	w	19	1.55	4.44	5.99	94.11	4.9532	0.1018	0.4436	0.197	8.955
	HK	m	31	1.60	4.45	6.05	161.10	5.1968	0.0703	0.3916	0.153	7.534
	HK	all	75	2.05	4.00	6.05	378.84	5.0512	0.0489	0.4235	0.179	8.384
	Wk w / Wk e	all										
	WK W / HK											
	WK E / HK											
lp4	WK Harz	all	52	2.28	5.54	7.82	354.62	6.8196	0.0672	0.4846	0.235	
	WK east G	f	18	1.56	5.90	7.46	119.12	6.6178	0.0981	0.4162	0.173	6.289
		m	34	2.10	5.54	7.64	232.67	6.8432	0.0770	0.4491	0.202	6.563
		all	56	2.28	5.54	7.82	380.74	6.7989	0.0637	0.4763	0.227	7.006
	WK Eifel/Rh	f	10	1.72	6.03	7.75	65.51	6.5510	0.1484	0.4693	0.220	7.164
		m	14	1.67	6.12	7.79	94.92	6.7800	0.1322	0.4947	0.245	7.296
		all	35	1.77	6.03	7.80	235.29	6.7226	0.0852	0.5039	0.254	7.496
	WK West G	f	15	1.72	6.03	7.75	99.48	6.6320	0.1092	0.4229	0.179	6.376
		m	21	1.67	6.12	7.79	143.78	6.8467	0.0939	0.4303	0.185	6.266
		all	54	1.77	6.03	7.80	367.24	6.8007	0.0613	0.4503	0.203	6.621
	WK Rom	all	11	1.35	5.83	7.18	73.93	6.7209	0.1430	0.4741	0.225	
	HK	w	20	2.32	4.80	7.12	117.66	5.8830	0.1332	0.5957	0.355	10.126
	HK	m	30	2.21	5.39	7.60	189.65	6.3217	0.0996	0.5453	0.297	8.626
	HK	all	75	2.80	4.80	7.60	457.60	6.1013	0.0644	0.5576	0.311	9.139
lm1	WK Harz	all	51	3.23	6.22	9.45	432.17	8.4739	0.0908	0.6486	0.421	
	WK east G	f	17	2.54	6.36	8.90	137.77	8.1041	0.1529	0.6303	0.397	7.778
		m	34	3.09	6.36	9.45	291.65	8.5779	0.1035	0.6033	0.364	7.033
		all	55	3.23	6.22	9.45	462.03	8.4005	0.0948	0.7027	0.494	8.365
	WK Eifel/Rh	f	9	1.51	6.95	8.46	71.27	7.9189	0.1415	0.4245	0.180	5.360
		m	13	2.37	7.24	9.61	111.13	8.5485	0.1966	0.7089	0.502	8.292
		all	33	2.69	6.95	9.64	275.03	8.3342	0.1088	0.6248	0.390	7.497
	WK West G	f	14	2.16	6.95	9.11	113.36	8.0971	0.1478	0.5529	0.306	6.828
		m	20	2.37	7.24	9.61	172.17	8.6085	0.1481	0.6624	0.439	7.694
		all	52	2.69	6.95	9.64	438.68	8.4362	0.0876	0.6313	0.399	7.484
	WK Rom	all	11	1.64	7.55	9.19	93.12	8.4655	0.1592	0.5280	0.279	
	HK	w	19	3.83	4.56	8.39	132.96	6.9979	0.2180	0.9502	0.903	13.578
	HK	m	29	2.36	6.27	8.63	220.45	7.6017	0.1117	0.6016	0.362	7.914
	HK	all	73	4.13	4.56	8.69	526.52	7.2126	0.0942	0.8044	0.647	11.153
cinfl	WK Harz	all	50	11.43	3.65	15.08	292.21	5.8442	0.3520	2.4892	6.196	
	WK east G	f	17	11.31	3.65	14.96	94.05	5.5324	0.7467	3.0785	9.477	55.645
		m	33	8.88	4.51	13.39	187.20	5.6727	0.2495	1.4334	2.055	25.474
		all	54	11.43	3.65	15.08	311.97	5.7772	0.3281	2.4107	5.811	41.727
	WK Eifel/Rh	f	10	1.57	3.78	5.35	44.98	4.4980	0.1591	0.5033	0.253	11.188
		m	14	1.79	4.23	6.02	72.39	5.1707	0.1319	0.4933	0.243	9.541
		all	33	2.97	3.78	6.75	164.29	4.9785	0.1177	0.6760	0.457	13.578
	WK West G	f	15	5.51	3.78	9.29	73.43	4.8953	0.3471	1.3443	1.807	27.461
		m	21	1.79	4.23	6.02	109.02	5.1914	0.1135	0.5201	0.271	10.020
		all	52	5.51	3.78	9.29	268.13	5.1563	0.1245	0.8980	0.806	17.415
			11	10.19	3.68	13.87	70.54	6.4127	1.0476	3.4744	12.072	
	HK	w	20	2.28	2.58	4.86	78.59	3.9295	0.1336	0.5973	0.357	15.201
	HK	m	30	2.97	3.23	6.20	138.65	4.6217	0.1012	0.5544	0.307	11.996
	HK	all	75	3.62	2.58	6.20	319.03	4.2537	0.0751	0.6501	0.423	15.283
cinfh	WK Harz	all	46	9.70	4.63	14.33	530.87	11.5407	0.2936	1.9914	3.966	
	WK east G	f	14	8.07	4.63	12.70	139.69	9.9779	0.5262	1.9689	3.877	19.732
		m	33	8.92	5.41	14.33	398.61	12.0791	0.2734	1.5704	2.466	13.001
		all	50	9.70	4.63	14.33	575.04	11.5008	0.2733	1.9327	3.735	16.805

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK Eifel/Rh	f	10	3.62	9.11	12.73	103.82	10.3820	0.3767	1.1913	1.419	11.475
		m	13	4.07	10.17	14.24	161.72	12.4400	0.3532	1.2735	1.622	10.237
		all	33	9.12	5.12	14.24	375.72	11.3855	0.3278	1.8830	3.546	16.538
	WK West G	f	15	8.56	4.17	12.73	149.53	9.9687	0.5158	1.9977	3.991	20.040
		m	19	4.78	9.46	14.24	229.58	12.0832	0.3475	1.5148	2.295	12.536
		all	50	10.07	4.17	14.24	560.18	11.2036	0.2926	2.0686	4.279	18.464
	WK Rom	all	11	9.86	3.58	13.44	104.86	9.5327	1.0756	3.5674	12.726	
	HK	w	20	6.12	5.15	11.27	173.43	8.6715	0.3381	1.5120	2.286	17.437
	HK	m	29	5.60	8.01	13.61	306.44	10.5669	0.2393	1.2887	1.661	12.195
	HK	all	74	8.46	5.15	13.61	706.71	9.5501	0.1767	1.5204	2.312	15.920
ratzw	WK Harz	all	48	0.13	0.80	0.93	42.51	0.8856	0.0046	0.0319	0.001	
	WK east G	f	18	0.12	0.81	0.93	16.01	0.8893	0.0071	0.0300	0.001	3.368
		m	31	0.13	0.80	0.93	27.44	0.8852	0.0056	0.0313	0.001	3.541
		all	51	0.13	0.80	0.93	45.17	0.8858	0.0043	0.0310	0.001	3.501
	WK Eifel/Rh	f	10	0.05	0.88	0.92	8.99	0.8989	0.0048	0.0150	0.000	1.672
		m	14	0.15	0.80	0.94	12.31	0.8796	0.0100	0.0374	0.001	4.248
		all	35	0.15	0.80	0.94	31.04	0.8870	0.0056	0.0332	0.001	3.744
	WK West G	f	15	0.05	0.87	0.92	13.45	0.8970	0.0040	0.0154	0.000	1.716
		m	21	0.15	0.80	0.94	18.54	0.8829	0.0070	0.0322	0.001	3.652
		all	53	0.15	0.80	0.94	47.08	0.8884	0.0039	0.0285	0.001	3.207
	WK Rom	all	6	0.07	0.82	0.89	5.23	0.8708	0.0107	0.0261	0.001	3.207
	HK	w	21	0.09	0.85	0.95	19.38	0.9228	0.0048	0.0219	0.000	2.372
	HK	m	30	0.22	0.87	1.09	27.69	0.9230	0.0070	0.0385	0.001	4.175
	HK	all	79	0.24	0.85	1.09	73.10	0.9253	0.0033	0.0290	0.001	3.133
sagind	WK Harz	all	50	0.14	1.03	1.17	54.36	1.0872	0.0046	0.0326	0.001	
	WK east G	f	18	0.09	1.03	1.12	19.27	1.0704	0.0069	0.0293	0.001	2.740
		m	33	0.13	1.04	1.17	36.11	1.0942	0.0056	0.0319	0.001	2.917
		all	54	0.14	1.03	1.17	58.66	1.0863	0.0044	0.0320	0.001	2.946
	WK Eifel/Rh	f	9	0.11	1.01	1.12	9.64	1.0709	0.0148	0.0445	0.002	4.153
		m	13	0.14	1.00	1.14	14.01	1.0774	0.0090	0.0326	0.001	3.024
		all	31	0.14	1.00	1.14	33.40	1.0775	0.0061	0.0338	0.001	3.135
	WK West G	f	14	0.11	1.01	1.12	15.05	1.0747	0.0114	0.0426	0.002	3.961
		m	21	0.19	1.00	1.19	22.83	1.0873	0.0084	0.0385	0.001	3.542
		all	52	0.19	1.00	1.19	56.58	1.0881	0.0053	0.0383	0.001	3.523
	HK	w	23	0.17	1.01	1.18	24.99	1.0864	0.0096	0.0462	0.002	4.250
	HK	m	31	0.17	1.03	1.21	34.82	1.1234	0.0068	0.0378	0.001	3.366
	HK	all	84	0.19	1.01	1.21	92.99	1.1070	0.0047	0.0431	0.002	3.900
nasvol	WK Harz	all	48	5937.55	2920.15	8857.70	248892.85	5185.2680	171.0681	1.19E+03	1404687	
	WK east G	f	17	2787.95	2920.15	5708.10	73245.81	4308.5770	151.6561	625.2942	390993	14.128
		m	32	5307.85	3549.85	8857.70	181922.55	5685.0800	197.4031	1.12E+03	1246976	19.642
		all	53	5937.55	2920.15	8857.70	273560.69	5161.5230	158.3134	1.15E+03	1328346	22.330
	WK Eifel/Rh	f	9	2497.48	3051.51	5548.99	36280.72	4031.1910	237.3677	712.1030	507091	17.665
		m	14	4224.71	2766.88	6991.59	70516.74	5036.9100	282.3837	1.06E+03	1116367	20.977
		all	33	4224.71	2766.88	6991.59	156460.17	4741.2170	186.4241	1.07E+03	1146880	22.588
	WK West G	f	14	3219.16	3051.51	6270.67	60028.34	4287.7380	220.1272	823.6407	678384	19.209
		m	21	4224.71	2766.88	6991.59	105758.76	5036.1310	206.9689	948.4508	899559	18.833
		all	52	4567.73	2766.88	7334.61	256819.48	4938.8360	149.4553	1.08E+03	1161518	21.822
	WK Rom	all	11	5734.10	397.39	6131.52	47460.07	4314.5500	485.9630	1.61E+03	3E+06	37.360
	HK	w	21	2782.64	2725.20	5507.83	82886.77	3946.9890	187.1739	857.7384	735715	21.732
	HK	m	28	2980.18	3901.74	6881.92	140685.26	5024.4740	145.9178	772.1244	596176	15.367
	HK	all	75	4322.25	2559.67	6881.92	326850.46	4358.0060	110.0094	952.7095	907655	21.861
bullvol	WK Harz	all	51	4214.56	2137.54	6352.10	183826.33	3604.4380	104.6633	747.4454	558675	
	WK east G	f	19	3865.76	2486.34	6352.10	61089.77	3215.2510	194.1673	846.3557	716318	26.323
		m	34	3571.83	2137.54	5709.37	129054.99	3795.7350	104.8385	611.3082	373698	16.105
		all	56	4214.56	2137.54	6352.10	201227.96	3593.3560	97.6567	730.7962	534063	20.337
	WK Eifel/Rh	f	9	1402.28	2592.32	3994.60	28269.20	3141.0220	142.9416	428.8247	183891	13.652
		m	13	1483.93	3022.42	4506.35	46126.36	3548.1810	114.6819	413.4913	170975	11.654
		all	31	2341.01	2592.32	4933.33	108583.97	3502.7090	95.8646	533.7515	284891	15.238
	WK West G	f	14	1402.28	2592.32	3994.60	45840.32	3274.3090	104.1176	389.5725	151767	11.898
		m	21	1483.93	3022.42	4506.35	74702.33	3557.2540	84.7780	388.5018	150934	10.924
		all	49	2341.01	2592.32	4933.33	174715.42	3565.6210	69.5041	486.5285	236710	13.645
	WK Rom	all	10	1578.90	2927.5	4506.47	37114.61	3711.4600	191.5560	605.7540	366938	16.320
	HK	w	23	2931.56	1146.05	4077.61	60791.25	2643.0980	144.4093	692.5626	479643	26.203
	HK	m	31	2017.38	2221.47	4238.85	97455.16	3143.7150	87.2941	486.0333	236228	15.461
	HK	all	84	3092.81	1146.05	4238.85	235334.39	2801.6000	64.2496	588.8577	346753	21.019
mandsh	WK Harz	all	47	0.07	0.31	0.38	15.97	0.3398	0.0025	0.0170	0.000	

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	WK east G	f	16	0.07	0.31	0.38	5.57	0.3478	0.0043	0.0170	0.000	4.902
		m	31	0.07	0.31	0.38	10.41	0.3359	0.0026	0.0146	0.000	4.354
		all	51	0.07	0.31	0.38	17.33	0.3398	0.0023	0.0166	0.000	4.897
	WK Eifel/Rh	f	8	0.06	0.30	0.36	2.78	0.3472	0.0071	0.0200	0.000	5.768
		m	12	0.05	0.32	0.37	4.03	0.3362	0.0046	0.0158	0.000	4.709
		all	31	0.07	0.30	0.37	10.53	0.3396	0.0029	0.0161	0.000	4.740
	WK West G	f	13	0.06	0.30	0.36	4.48	0.3450	0.0045	0.0161	0.000	4.669
		m	19	0.06	0.31	0.37	6.43	0.3386	0.0037	0.0160	0.000	4.723
		all	50	0.07	0.30	0.37	16.98	0.3395	0.0021	0.0151	0.000	4.454
	WK Rom	all	8	0.07	0.30	0.37	2.67	0.3337	0.0080	0.0226	0.001	4.454
	HK	w	18	0.33	0.03	0.36	5.55	0.3084	0.0167	0.0710	0.005	23.032
	HK	m	28	0.07	0.29	0.36	8.96	0.3198	0.0030	0.0158	0.000	4.927
	HK	all	69	0.33	0.03	0.36	21.93	0.3179	0.0047	0.0390	0.002	12.265
orbar	WK Harz	all	53	276.31	440.86	717.17	32452.23	612.3063	7.2365	52.6823	2775.430	
	WK east G	f	17	223.92	440.86	664.78	9794.32	576.1364	12.1220	49.9804	2498.040	8.675
		m	36	207.28	509.89	717.17	22553.89	626.4971	7.7109	46.2652	2140.470	7.385
		all	57	276.31	440.86	717.19	34890.69	612.1174	6.8381	51.6268	2665.330	8.434
	WK Eifel/Rh	f	10	216.08	481.81	697.89	5665.32	566.5320	18.3359	57.9831	3362.050	10.235
		m	14	228.27	456.70	684.97	8609.43	614.9593	17.6434	66.0155	4358.050	10.735
		all	34	241.19	456.70	697.89	20264.23	596.0068	10.8431	63.2257	3997.490	10.608
	WK West G	f	15	346.70	351.19	697.89	8409.90	560.6599	20.4026	79.0189	6243.990	14.094
		m	22	228.27	456.70	684.97	13500.84	613.6744	12.6432	59.3019	3516.720	9.664
		all	55	346.70	351.19	697.87	32965.19	599.3670	9.2142	68.3342	4669.560	11.401
	WK Rom	all	11	683.10	26.62	709.72	6482.29	589.2990	58.6231	194.4310	37803.000	33.000
	HK	w	22	407.83	200.56	608.39	11401.18	518.2356	18.3241	85.9479	7387.050	16.585
	HK	m	31	173.02	490.71	663.74	17697.90	570.9000	9.1756	51.0878	2609.970	8.949
	HK	all	83	463.17	200.56	663.74	45009.29	542.2806	8.5314	77.7249	6041.170	14.333
formagar	WK Harz	all	49	93.78	134.31	228.10	8745.84	178.4865	2.8053	19.6371	385.617	
	WK east G	f	18	81.68	134.31	215.99	3075.98	170.8877	5.3234	22.5853	510.098	13.217
		m	34	78.41	149.69	228.10	6214.93	182.7921	3.2128	18.7334	350.942	10.249
		all	54	93.78	134.31	228.10	9647.81	178.6631	2.7800	20.4289	417.339	11.434
	WK Eifel/Rh	f	10	57.54	150.39	207.94	1822.78	182.2779	6.0646	19.1781	367.798	10.521
		m	12	70.00	147.92	217.92	2165.83	180.4858	5.2167	18.0711	326.564	10.012
		all	31	72.07	147.92	219.98	5689.14	183.5206	3.2967	18.3555	336.925	10.000
	WK West G	f	15	57.54	150.39	207.94	2729.35	181.9563	4.2199	16.3437	267.118	8.982
		m	20	70.00	147.92	217.92	3677.51	183.8757	3.6776	16.4467	270.494	8.945
		all	48	72.07	147.92	219.98	8824.79	183.8498	2.3262	16.1165	259.741	8.766
	WK Rom	all	6	79.01	161.06	240.07	1177.44	196.2390	11.9017	29.1532	849.910	14.856
	HK	w	23	71.03	111.08	182.11	3245.14	141.0929	4.2503	20.3836	415.489	14.445
	HK	m	31	128.53	109.81	238.34	4784.59	154.3416	4.4477	24.7638	613.247	16.045
	HK	all	84	139.89	98.45	238.34	12176.72	144.9609	2.3228	21.2884	453.197	14.686
y4	WK Harz	all	50	9.08	18.06	27.14	1193.09	23.8618	0.2422	1.71289	2.934	
	WK east G	f	18	6.98	18.06	25.04	400.94	22.2744	0.3222	1.3671	1.869	6.137
		m	32	5.95	20.87	26.82	783.50	24.4844	0.2025	1.1456	1.312	4.679
		all	54	9.08	18.06	27.14	1285.06	23.7974	0.2276	1.6728	2.798	7.029
	WK Eifel/Rh	f	10	3.02	20.99	24.01	224.94	22.4940	0.2746	0.8682	0.754	3.860
		m	14	6.40	20.41	26.81	341.53	24.3950	0.4703	1.7597	3.097	7.213
		all	35	6.40	20.41	26.81	831.39	23.7540	0.2870	1.6982	2.884	7.149
	WK West G	f	15	4.00	20.99	24.99	342.91	22.8607	0.2800	1.0843	1.176	4.743
		m	22	6.40	20.41	26.81	536.09	24.3677	0.3129	1.4678	2.155	6.024
		all	56	6.40	20.41	26.81	1340.63	23.9398	0.2034	1.5219	2.316	6.357
	WK Rom	all	11	5.11	21.40	26.51	268.12	24.3745	0.5408	1.7936	3.217	6.357
	HK	w	21	12.70	12.84	25.54	450.53	21.4538	0.6062	2.7779	7.717	12.948
	HK	m	30	7.13	20.45	27.58	717.15	23.9050	0.2732	1.4963	2.239	6.259
	HK	all	80	14.74	12.84	27.58	1789.21	22.3651	0.2570	2.2985	5.283	10.277
y17	WK Harz	all	49	10.94	34.89	45.83	1940.03	39.5924	0.3120	2.1836	4.768	
	WK east G	f	18	4.24	34.89	39.13	676.30	37.5722	0.3033	1.2868	1.656	3.425
		m	31	6.59	36.65	43.24	1250.71	40.3455	0.2678	1.4911	2.223	3.696
		all	53	10.94	34.89	45.83	2094.61	39.5209	0.2907	2.1159	4.477	5.354
	WK Eifel/Rh	f	10	6.30	34.57	40.87	373.14	37.3140	0.5252	1.6609	2.759	4.451
		m	14	8.32	35.06	43.38	555.32	39.6657	0.5457	2.0420	4.170	5.148
		all	35	8.81	34.57	43.38	1356.62	38.7606	0.3576	2.1153	4.475	5.457
	WK West G	f	15	6.30	34.57	40.87	565.79	37.7193	0.4459	1.7268	2.982	4.578
		m	22	8.32	35.06	43.38	874.34	39.7427	0.3823	1.7930	3.215	4.512
		all	56	10.43	34.57	45.00	2199.55	39.2777	0.2870	2.1474	4.611	5.467
	WK Rom	all	11	4.57	37.07	41.64	433.26	39.3873	0.4973	1.6495	2.721	5.467
	HK	w	20	17.64	23.75	41.39	717.38	35.8690	0.7892	3.5292	12.456	9.840

variable	taxon	sex	n	range	min	max	sum	mean	st. err	st. dev	variance	cv %
	HK	m	29	11.17	31.15	42.32	1100.56	37.9503	0.4068	2.1905		5.772
	HK	all	79	18.57	23.75	42.32	2912.16	36.8628	0.3032	2.6953	7.264	7.312
y6	WK Harz	all	50	4.48	19.37	23.85	1076.75	21.5350	0.1442	1.0193	1.039	
	WK east G	f	17	4.07	19.37	23.44	351.26	20.6624	0.2084	0.8591	0.738	4.158
		m	32	3.01	20.35	23.36	701.37	21.9178	0.1260	0.7125	0.508	3.251
		all	53	4.48	19.37	23.85	1141.44	21.5366	0.1432	1.0423	1.086	4.840
	WK Eifel/Rh	f	10	2.74	19.46	22.20	204.16	20.4160	0.2582	0.8164	0.667	3.400
		m	14	3.50	20.35	23.85	305.05	21.7893	0.2344	0.8770	0.769	4.025
		all	35	4.39	19.46	23.85	747.24	21.3497	0.1784	1.0555	1.114	4.944
	WK West G	f	15	3.49	19.46	22.95	312.18	20.8120	0.2629	1.0182	1.037	4.893
		m	22	3.50	20.35	23.85	482.16	21.9164	0.191	0.8964	0.803	4.090
		all	56	4.39	19.46	23.85	1213.33	21.6666	0.1443	1.0797	1.166	4.984
	WK Rom	all	10	2.87	20.11	22.98	219.10	21.9100	0.2827	0.8938	0.799	4.984
	HK	w	16	7.36	16.10	23.46	318.47	19.9044	0.4150	1.6598	2.755	8.339
	HK	m	27	3.52	19.14	22.66	575.04	21.2978	0.1791	0.9304	0.866	4.368
	HK	all	70	7.36	16.10	23.46	1434.40	20.4914	0.1662	1.3903	1.933	6.785
kliob	WK Harz	all	43	6.40	15.20	21.60	816.11	18.9793	0.2293	1.5037	2.261	
	WK east G	f	17	4.33	15.20	19.53	302.57	17.7982	0.2699	1.1128	1.238	6.253
		m	28	5.03	16.57	21.60	547.53	19.5546	0.2363	1.2504	1.564	6.395
		all	47	6.40	15.20	21.60	889.67	18.9291	0.2144	1.4699	2.161	7.766
	WK Eifel/Rh	f	7	2.08	17.46	19.54	128.61	18.3729	0.3177	0.8407	0.707	4.576
		m	7	3.31	17.69	21.00	137.70	19.6714	0.4540	1.2011	1.443	6.106
		all	22	3.90	17.46	21.36	418.28	19.0127	0.2554	1.1977	1.435	6.300
	WK West G	f	10	3.14	17.46	20.60	187.89	18.7890	0.3440	1.0879	1.184	5.790
		m	11	3.37	17.63	21.00	214.16	19.4691	0.3471	1.1513	1.326	5.914
		all	34	3.90	17.46	21.36	652.01	19.1768	0.1996	1.1638	1.354	6.07
	WK Rom	all	8	2.36	16.95	19.31	146.93	18.3662	0.3425	0.9689	0.939	
	HK	w	21	7.68	11.97	19.65	350.71	16.7005	0.3825	1.7529	3.072	10.496
	HK	m	30	6.08	15.14	21.22	546.54	18.2180	0.2484	1.3606		7.468
	HK	all	76	9.25	11.97	21.22	1311.27	17.2536	0.1865	1.6261	2.644	9.425

APPENDIX 2

Coefficient of variation of the differences between the measurements of the different samples of wildcats and of those of wild and domestic cats.

variable	WK west / WK east	WK west / HK	WK east / HK
gsl	0.06	0.37	0.42
cbl	0.07	0.36	0.43
zw	0.07	0.43	0.49
zwM1	0.03	0.13	0.15
nucr	0.03	0.66	0.69
hsb	0.21	1.11	0.89
dtempr	0.02	0.31	0.30
iob	0.02	0.47	0.44
bn	0.05	0.08	0.13
nasapw	0.11	0.11	0.21
nasaph	0.04	0.19	
cranh	0.09	0.46	0.38
lsagcr	0.12	0.20	0.11
bop	0.32	0.25	0.69
pob	0.05	0.49	0.46
skullh	0.04	0.74	0.67
ln_1	0.01	0.32	0.31
ln_2	0.09	10.58	17.42
facl	0.05	0.48	0.53
vertorb	0.17	0.70	0.56
hororb	0.37	0.13	0.19
hzvorb	0.05	0.43	0.41

variable	WK west / WK east	WK west / HK	WK east / HK
bCa	0.05	0.15	0.18
bCi	0.07	0.04	0.10
rostb	0.09	0.21	0.10
pw	0.12	0.26	0.38
wacrbull	0.17	0.15	0.29
formw	0.34	1.15	0.69
formh	0.03	0.87	0.88
cond	0.17	0.79	0.61
npalno	0.10	0.47	0.54
palnobull	0.04	0.49	0.42
bulll	0.09	0.37	0.46
bullw	0.10	0.40	0.30
bullh	0.09	0.88	0.66
ozrl	0.08	0.41	0.34
LP4	0.17	0.74	0.91
BP4	0.14	0.32	0.22
csuph	0.12	0.51	0.52
Csupl	0.15	0.54	0.73
afor	0.18	0.85	1.19
shbull	0.37	0.19	0.59
CranV	0.16	1.69	1.54
schind	0.33	0.81	1.58
mandl_1	0.13	0.38	0.50
mandl_2	0.12	0.39	0.48
corh	0.17	0.35	0.50
angdf	0.04	0.50	0.63
mandH	0.10	0.34	0.41
uzrl	0.14	0.35	0.47
pml	0.16	0.84	1.03
lp3	0.19	0.86	1.01
lp4	0.001	0.69	0.68
lm1	0.07	0.82	0.79
cinfl	0.19	5.58	0.50
cinfh	0.07	0.46	0.57
ratzw	0.04	0.64	0.66
sagind	0.03	0.23	0.28
nasvol	0.10	0.29	0.38
bullvol	0.02	0.71	0.60
mandsh	0.01	0.40	0.40
orbar	0.11	0.39	0.54
formagar	0.14	1.04	0.81
y4	0.05	0.41	0.36
y17	0.06	0.50	0.55
y6	0.06	0.48	0.43
kliob	0.94	0.69	0.54

APPENDIX 3

Frequency of codings for the non metric variables (see Table 1) for East and West German wildcats (WC) domestic cats (DC). Abbreviations: n – number, n. a. – not applicable, prr. – process. For explanation of variables and coding see Table 1.

character	coding	WK west		WK east		HK	
		n	%	n	%	n	%
alisph	n. a.	1	1.8	6	9.7	3	3.6
	no (on both sides)	37	64.9	29	46.8	65	77.4
	yes / no	5	8.8	5	8.1	9	10.7
	yes (on both sides)	14	24.6	22	35.5	7	8.3
palfor	n. a.	1	1.8	5	7.9	2	2.4
	in palatinum	49	86.0	55	87.3	23	27.4
	in suture	3	5.3			56	66.7
	in palatinum / in suture	4	7.0	3	4.8	3	3.6
glab	n. a.	4	6.9	6	9.5	5	6.0
	present	48	82.8	1	1.6	20	23.8
	lacking	6	10.3	53	84.1	45	53.6
	weak			3	4.8	14	16.7
frontopar	n. a.	3	5.2	7	11.1	1	1.2
	straight	27	46.6	25	39.7	24	28.6
	nearly straight	21	36.2	25	39.7	37	44.0
	misplaced	6	10.3	6	9.5	22	26.2
pariet	n. a.	1	1.8	4	11.4	1	2.1
	straight	4	7.0	2	5.7	25	53.2
	slightly undulated	12	21.1	9	25.7	13	27.7
	straight then undulated	14	24.6	4	11.4	1	2.1
	serrated	26	45.6	16	45.7	7	14.9
nas_max	n. a.	3	5.2	6	9.5	6	7.1
	nasals longer than maxillare	50	86.2	48	76.2	25	29.8
	both about equal length	3	5.2	9	14.3	49	58.3
	nasals shorter	2	3.4			4	4.8
angular	n. a.	5	8.6	10	15.9	7	8.3
	angular pr. longer	8	13.8	15	23.8	4	4.8
	about equal	18	31.0	23	36.5	6	7.1
	angular pr. shorter	27	46.6	15	23.8	67	79.8
UK_stand	n. a.	15	25.9	21	33.3	19	22.6
	stands	40	69.0	40	63.5	34	40.5
	does not stand	3	5.2	2	3.2	31	36.9
dcalc	n. a.	6	10.3	4	6.5	3	3.6
	strong	5	8.6	11	17.7	25	29.8
	weak	25	43.1	31	50.0	38	45.2
	none	22	37.9	16	25.8	18	21.4
asagcr	k.A.	3	5.2	7	11.3		
	marked-medium	33	56.9	29	46.8	16	19.0
	weak	15	25.9	18	29.0	54	64.3
	none	7	12.1	8	12.9	14	16.7
anucr	k.A.	5	8.6	6	9.7		
	marked-medium	45	77.6	42	67.7	37	44.0
	weak	8	13.8	13	21.0	42	50.0
	none			1	1.6	5	6.0
fusbas	n. a.	9	15.5	5	8.1		
	yes. completely	19	32.8	24	38.7	49	58.3
	yes. visible	9	15.5	11	17.7	9	10.7
	no	21	36.2	22	35.5	26	31.0

APPENDIX 4

The differences in the measurements of wildcats from the Eifel and Rhineland areas that were revealed by Student's t-tests.

char	all	m
lsagcr	0.012	
bop	0.031	
pob	0.048	
ln_2	0.046	
bCi	0.014	
palnobull	0.027	
mandl_1	0.034	
mandl_2	0.003	
corh	0.033	
mandH	0.037	
pm1	0.030	0.031
lm1	0.026	