The Neglected Goat

A new method to assess the role of the goat in the English Middle Ages

Lenny Salvagno
TABLES

TABLE 1.1 List of species of *Capra* with their common name................................................................. 81
TABLE 1.2 List of the major studies on the topic with a brief description of sample used, the anatomical elements considered, the morphology and/or biometry approaches adopted........ 89
TABLE 1.3 Elements, indices and summary results from Fernández (2001).................................................. 97
TABLE 1.4 Numbers of goat flocks as reported by the Domesday Book. Image reprinted with permission from Cambridge University Press, from: Darby, H.C. *Domesday England*, copyright 1977, Cambridge: Cambridge University Press..................................................................................... 102
TABLE 2.1 Reference for the morphological traits chosen for this study .................................................. 113
TABLE 2.3 Morphological characteristics adopted for the 3rd deciduous premolar........................................ 115
TABLE 2.4 Morphological characteristics adopted for the 4th deciduous premolar........................................ 115
TABLE 2.5 Morphological characteristics adopted for the 3rd permanent premolar...................................... 115
TABLE 2.6 Morphological characteristics adopted for the 4th permanent premolar...................................... 116
TABLE 2.7 Morphological characteristics adopted for the 3rd molar.......................................................... 116
TABLE 2.8 Morphological characteristics adopted for the mandible.......................................................... 117
TABLE 2.9 Morphological characteristics adopted for the scapula (images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (*Ovis aries* Linné) and goat (*Capra hircus* Linné). In *Science in Archaeology: a survey of progress and research*, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson)..................................................................................... 117
TABLE 2.10 Morphological characteristics adopted for the distal humerus (traits 1 and 2: images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (*Ovis aries* Linné) and goat (*Capra hircus* Linné). In *Science in Archaeology: a survey of progress and research*, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson)..................................................................................... 118
TABLE 2.11 Morphological characteristics adopted for the proximal radius............................................... 119
TABLE 2.12 Morphological characteristics adopted for the proximal ulna. Images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (*Ovis aries* Linné) and goat (*Capra hircus* Linné). In *Science in Archaeology: a survey of
Table 2.13 Morphological characteristics adopted for the metapodials (traits 1, 2, 5: images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (Ovis aries Linné) and goat (Capra hircus Linné). In Science in Archaeology: A Survey of Progress and Research, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson). 119

Table 2.14 Morphological characteristics adopted for the distal tibia (traits 3 and 4: images reprinted with permission from Acta Veterinaria Brno, from: Kratochvíl, Z. Species criteria on the distal section of the tibia in Ovis ammon F. aries L. and Capra aegagrus F. hircus L. Acta Vet Brno, copyright 1969, 38: 483-490). 120

Table 2.15 Morphological characteristics adopted for the astragalus (traits 1, 2, 3 and 6: images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (Ovis aries Linné) and goat (Capra hircus Linné). In Science in Archaeology: A Survey of Progress and Research, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson). 121

Table 2.16 Morphological characteristics adopted for the calcaneum (trait 1 and 3: images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (Ovis aries Linné) and goat (Capra hircus Linné). In Science in Archaeology: A Survey of Progress and Research, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson). 122

Table 2.17 Morphological characteristics adopted for the 1st phalanx. Images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (Ovis aries Linné) and goat (Capra hircus Linné). In Science in Archaeology: A Survey of Progress and Research, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson). 124

Table 2.18 Morphological characteristics adopted for the 2nd phalanx. 125

Table 2.19 Morphological characteristics adopted for the 3rd phalanx. Images reprinted with permission from Thames and Hudson, from: Boessneck, J. Osteological differences between sheep (Ovis aries Linné) and goat (Capra hircus Linné). In Science in Archaeology: A Survey of Progress and Research, (eds) D. Brothwell and E. Higgs, 331-358, copyright 1969. London: Thames and Hudson). 126

Table 2.20 List of the scores given for each morphological traits evaluated. 127

Table 2.21 References for the chosen measurements with reference to the morphological traits they translate. Measurements in which the authors name is cited with an asterisk are those that have been slightly modified from the original version, while those only represented by an asterisk have been newly devised by the author. 129
### Table 2.22 Measurements taken on teeth

<table>
<thead>
<tr>
<th>Measurements taken on teeth</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>.................................................................</td>
<td>130</td>
</tr>
</tbody>
</table>

### Table 2.23 Measurements taken on the mandible

<table>
<thead>
<tr>
<th>Measurements taken on the mandible</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>.......................................................</td>
<td>131</td>
</tr>
</tbody>
</table>

### Table 2.24 Measurements taken on the horncore

<table>
<thead>
<tr>
<th>Measurements taken on the horncore</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>..................................................</td>
<td>131</td>
</tr>
</tbody>
</table>

### Table 2.25 Measurements taken on the scapula

<table>
<thead>
<tr>
<th>Measurements taken on the scapula</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................</td>
<td>131</td>
</tr>
</tbody>
</table>

### Table 2.26 Measurements taken on the distal humerus

<table>
<thead>
<tr>
<th>Measurements taken on the distal humerus</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>...................................................</td>
<td>131</td>
</tr>
</tbody>
</table>

### Table 2.27 Measurements taken on the radius

<table>
<thead>
<tr>
<th>Measurements taken on the radius</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................</td>
<td>131</td>
</tr>
</tbody>
</table>

### Table 2.28 Measurements taken on the ulna

<table>
<thead>
<tr>
<th>Measurements taken on the ulna</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>.........................................................</td>
<td>132</td>
</tr>
</tbody>
</table>

### Table 2.29 Measurements taken on the metapodials

<table>
<thead>
<tr>
<th>Measurements taken on the metapodials</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>....................................................</td>
<td>132</td>
</tr>
</tbody>
</table>

### Table 2.30 Measurements taken on the tibia

<table>
<thead>
<tr>
<th>Measurements taken on the tibia</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>...................................................</td>
<td>132</td>
</tr>
</tbody>
</table>

### Table 2.31 Measurements taken on the astragalus

<table>
<thead>
<tr>
<th>Measurements taken on the astragalus</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>..........................................................</td>
<td>132</td>
</tr>
</tbody>
</table>

### Table 2.32 Measurements taken on the calcaneum

<table>
<thead>
<tr>
<th>Measurements taken on the calcaneum</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>..............................................................</td>
<td>132</td>
</tr>
</tbody>
</table>

### Table 2.33 Measurements taken on the 3rd phalanx

<table>
<thead>
<tr>
<th>Measurements taken on the 3rd phalanx</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>..................................................</td>
<td>133</td>
</tr>
</tbody>
</table>

### Table 2.34 Total number of sheep and goat specimens included in the study along with the description of their completeness

<table>
<thead>
<tr>
<th>Measurements taken on the 3rd phalanx</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>..................................................</td>
<td>133</td>
</tr>
</tbody>
</table>

### Table 2.35 Goat specimens included in the sample studied. The information given in this table (breed, sex and age) is as provided by the collection data-bases

<table>
<thead>
<tr>
<th>Goat specimens included in the sample studied</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>..................................................................................</td>
<td>139</td>
</tr>
</tbody>
</table>

### Table 2.36 Sheep specimens included in the sample studied. The information given in this table (breed, sex and age) is as provided by the collection data-bases consulted

<table>
<thead>
<tr>
<th>Sheep specimens included in the sample studied</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>.............................................................................</td>
<td>143</td>
</tr>
</tbody>
</table>

### Table 2.37 Form provided to the group for recording the measurements. The form included all the measurements, even though some of them could not be taken on the selected specimens

<table>
<thead>
<tr>
<th>Form provided to the group for recording the measurements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>148</td>
</tr>
</tbody>
</table>

### Table 2.38 Mean, standard deviation (SD) and coefficient of variation (CV) for each measurement for each of the specimens calculated from the measurements provided by the eight operators. The measurements highlighted with an asterisk are those which could not be taken on all the four specimens. The ‘number of specimens’ column indicates the number of specimens for which a measurement has been taken

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>151</td>
</tr>
</tbody>
</table>

### Table 2.39 List of the measurements which provided the lowest CV values per species

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>155</td>
</tr>
</tbody>
</table>

### Table 2.40 List of the measurements which provided the highest CV values per species

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>156</td>
</tr>
</tbody>
</table>

### Table 2.41 ICC value and 95% confidence interval values for different measurements taken on different anatomical elements

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>157</td>
</tr>
</tbody>
</table>

### Table 2.42 ICC value and 95% confidence interval values for different measurements taken on different anatomical elements

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>167</td>
</tr>
</tbody>
</table>

### Table 2.43 Matchings of morphological identifications with actual taxa. C= Capra, O= Ovis, CL= Capra-like, OL= Ovis-like, OC= Ovis/Capra

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>175</td>
</tr>
</tbody>
</table>

### Table 2.44 Morphological traits which have provided a high percentage of taxon attributions for goat (>90%)

<table>
<thead>
<tr>
<th>Measurements taken on different anatomical elements</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>................................................................................</td>
<td>176</td>
</tr>
</tbody>
</table>
TABLE 2.45 Morphological traits which provided a high percentage of taxon attributions for sheep (>90%). .......................................................................................................................................................... 176
TABLE 2.46 Morphological traits for the goat group which provide a high score (>95%) only when different categories were combined (C+CL). ........................................................................................................... 177
TABLE 2.47 Morphological traits for the goat group, which provide a high score (>95%) only when different categories were combined (O+OL). ........................................................................................................... 178
TABLE 2.48 Number of modern specimens according to their sex for each taxon. ........................................ 201
TABLE 2.49 Goat. Scores expressed in percentages given to different morphological characteristics of different cranial and post-cranial bones according to the sex of the animals. ....................... 202
TABLE 2.50 Sheep. Scores expressed in percentages, given to different morphological characteristics of different cranial and post-cranial bones, according to the sex of the animal. ....................... 203
TABLE 2.51 Goat. List of morphological traits per element per sex, which have provided a high initial percentage (>90%) of species attributions (C) and a high percentage (>95%) when the intermediate category (CL) was added. ........................................................................................................... 204
TABLE 2.52 Sheep. List of morphological traits per element per sex, which have provided a high initial percentage (>90%) of species attributions (O) and a high percentage (>95%) when the intermediate category (OL) was added. ........................................................................................................... 205
TABLE 2.53 Summary of the age categories established by Payne (1973; 1987) and used for this analysis. ....................................................................................................................................................... 235
TABLE 2.54 New age groups combining different Payne’s age categories. The specimens present are both those for which the age was established through Payne’s method and those for which the age at death was known. ................................................................................................................................................................................. 236
TABLE 2.55 Goat. Scores expressed in percentages given to different morphological characteristics of different cranial and post-cranial bones according to age groups. .................................................. 236
TABLE 2.56 Sheep. Scores expressed in percentages given to different morphological characteristics of different cranial and post-cranial bones according to age groups. .................................................. 238
TABLE 2.57 Summary of the reliability of the morphological traits for the two species with information regarding the factors can influence them. Reliability is expressed in scores: **** = > 90% percentage of species identification (C or O), ** = >/= 60% of species identification; * = <60% of species attribution. The overall reliability is, by and large, the mean between the reliability scores of the two species. ................................................................................................................................................................................. 274
TABLE 2.58 CV and standard values in tenths of millimeter for each measurement. ................................. 277
TABLE 2.59 CV values for the goat group rearranged from the highest to the lowest ......................... 279
TABLE 2.60 CV values for the sheep group rearranged from the highest to the lowest ....................... 280
TABLE 2.61 Median, effect size, Mann-Whitney U test and Bonferroni adjustment results, calculated for each ratio index on each skeletal element included in the study. The
Probability level was determined as significant when \( P<0.05 \) (*) and highly significant when \( P<0.01 \) (**).

Table 2.62 Results from Manova for each combination of ratios used in the allometric shape analysis (Section 2.5.3). \( P \) value significant if \( P<0.001 \) (**).

Table 2.63 Percentage of correct classifications by element and species from Linear Discriminant Analysis.

Table 2.64 Canonical correlation coefficient for the horncore.

Table 2.65 Wilks' Lambda test for the horncore.

Table 2.66 Structure matrix for the horncore showing the canonical variate correlation coefficients.

Table 2.67 Tolerance test for the horncore.

Table 2.68 Classification results for the horncore.

Table 2.69 List of the set of measurements of the horncore dropped from the analysis along with their percentage of correct attributions.

Table 2.70 Canonical correlation coefficient for the scapula.

Table 2.71 Wilks' Lambda test for the scapula.

Table 2.72 Structure matrix for the scapula showing the canonical variate correlation coefficients.

Table 2.73 Classification results for the scapula.

Table 2.74 List of the set of measurements on the scapula dropped from the analysis along with their percentage of correct attributions.

Table 2.75 Canonical correlation coefficient for the humerus.

Table 2.76 Wilks' Lambda test for the humerus.

Table 2.77 Structure matrix for the humerus showing the canonical variate correlation coefficients.

Table 2.78 Classification results for the humerus.

Table 2.79 List of the set of measurements of the humerus dropped from the analysis along with their percentage of correct attributions.

Table 2.80 Canonical correlation coefficient for the radius.

Table 2.81 Wilks' Lambda test for the radius.

Table 2.82 Structure matrix for the radius showing the canonical variate correlation coefficients.

Table 2.83 Classification results for the radius.

Table 2.84 List of the set of measurements of the radius dropped from the analysis along with their percentage of correct attributions.

Table 2.85 Canonical correlation coefficient for the ulna.
TABLE 2.145 TOTAL VARIANCE EXPLAINED FOR THE METACARPAL ................................................................. 395
TABLE 2.146 COMPONENT MATRIX FOR THE METACARPAL ................................................................. 395
TABLE 2.147 ROTATED MATRIX FOR THE METACARPAL ................................................................. 396
TABLE 2.148 KMO AND BARTLETT’S TEST FOR MEASUREMENTS TAKEN ON THE METATARSAL ................. 399
TABLE 2.149 CORRELATION MATRIX FOR THE METATARSAL ................................................................. 399
TABLE 2.150 TOTAL VARIANCE EXPLAINED FOR THE METATARSAL ...................................................... 400
TABLE 2.151 COMPONENT MATRIX FOR THE METATARSAL ................................................................. 400
TABLE 2.152 ROTATED COMPONENT MATRIX FOR THE METATARSAL ..................................................... 401
TABLE 2.153 KMO AND BARTLETT’S TEST FOR THE MEASUREMENT TAKEN ON THE TIBIA ......................... 403
TABLE 2.154 CORRELATION MATRIX FOR THE TIBIA ........................................................................ 403
TABLE 2.155 TOTAL VARIANCE EXPLAINED FOR THE TIBIA ................................................................. 404
TABLE 2.156 COMPONENT MATRIX FOR THE TIBIA ........................................................................ 404
TABLE 2.157 ROTATED COMPONENT MATRIX FOR THE TIBIA ................................................................. 405
TABLE 2.158 KMO AND BARTLETT’S TEST FOR THE MEASUREMENTS TAKEN ON THE ASTRAGALUS ............ 406
TABLE 2.159 CORRELATION MATRIX FOR THE ASTRAGALUS ................................................................. 407
TABLE 2.160 TOTAL VARIANCE EXPLAINED FOR THE ASTRAGALUS ..................................................... 407
TABLE 2.161 COMPONENT MATRIX FOR THE ASTRAGALUS ................................................................. 408
TABLE 2.162 ROTATED COMPONENT MATRIX FOR THE ASTRAGALUS ..................................................... 408
TABLE 2.163 KMO AND BARTLETT’S TEST FOR THE MEASUREMENTS TAKEN ON THE CALCANEUM ............ 410
TABLE 2.164 CORRELATION MATRIX FOR THE CALCANEUM ................................................................. 410
TABLE 2.165 TOTAL VARIANCE EXPLAINED FOR THE CALCANEUM ..................................................... 410
TABLE 2.166 COMPONENT MATRIX FOR THE CALCANEUM ................................................................. 411
TABLE 2.167 ROTATED COMPONENT MATRIX FOR THE CALCANEUM ..................................................... 411
TABLE 2.168 LIST OF THE MOST IMPORTANT MEASUREMENTS PER ANATOMICAL ELEMENT ACCORDING TO THE
DIFFERENT ANALYSES ADOPTED .................................................................................................................. 414
TABLE 3.1 DIVISION INTO CHRONOLOGICAL PERIODS FOR THE SITES EXCAVATED AT KING’S LYNN (CLARKE AND
CARTER 1977) ........................................................................................................................................ 422
TABLE 3.2 NISP FOR THE THREE CATEGORIES IDENTIFIED FOR PHASE I (1050-1250 AD) .......................... 428
TABLE 3.3 NISP FOR THE THREE CATEGORIES IDENTIFIED FOR PHASE II (1250-1350 AD) ...................... 429
TABLE 3.4 NISP FOR THE THREE CATEGORIES IDENTIFIED FOR PHASE III (1350-1550 AD) ...................... 430
TABLE 3.5 NISP FOR THE THREE CATEGORIES IDENTIFIED FOR PHASE IV (1550-1880 AD) ...................... 431
TABLE 3.6 NISP FOR THE THREE CATEGORIES IDENTIFIED AMONG THE UNSTRATIFIED BONES ............... 432
TABLE 3.7 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HORNCORES OF
PHASE I. A = PERCENTAGE OF CORRECT ATTRIBUTIONS RELATED TO THE MODERN MATERIAL (SELECTED
ORIGINAL GROUPED CASES); B = PERCENTAGE OF CORRECT ATTRIBUTIONS RELATED TO THE ARCHAEOLOGICAL
MATERIAL (UNSELECTED ORIGINAL GROUPED CASES); D = PERCENTAGE OF CORRECT ATTRIBUTIONS WHEN CROSS-VALIDATION WAS APPLIED. SAME TERMINOLOGY IS ADOPTED IN ALL THE FOLLOWING TABLES.

**Table 3.8** Results from the Discriminant Analysis when applied on the archaeological scapulae of Phase I.

**Table 3.9** Results from the Discriminant Analysis when applied on the archaeological humeri of Phase I.

**Table 3.10** Results from the Discriminant Analysis when applied on the archaeological radii of Phase I, excluding variables GL and SD.

**Table 3.11** Results from the Discriminant Analysis when applied on the archaeological ulnae of Phase I.

**Table 3.12** Results from the Discriminant Analysis when applied on the archaeological ulnae of Phase I, excluding the variables B and L.

**Table 3.13** Results from the Discriminant Analysis when applied on the archaeological metacarpals of Phase I.

**Table 3.14** Results from the Discriminant Analysis when applied on the archaeological metacarpals of Phase I, excluding the variables GL and SD.

**Table 3.15** Results from the Discriminant Analysis when applied on the archaeological metatarsals of Phase I.

**Table 3.16** Results from the Discriminant Analysis when applied on the archaeological metatarsals of Phase I, excluding variables GL and SD.

**Table 3.17** Results from the Discriminant Analysis when applied on the archaeological tibiae of Phase I.

**Table 3.18** Results from the Discriminant Analysis when applied on the archaeological tibiae of Phase I, excluding the variable GL.

**Table 3.19** Results from the Discriminant Analysis when applied on the archaeological tibiae of Phase I, excluding the variables GL and SD.

**Table 3.20** Results from the Discriminant Analysis when applied on the archaeological astragali of Phase I.

**Table 3.21** Results from the Discriminant Analysis when applied on the archaeological calcanea of Phase I.

**Table 3.22** Results from the Discriminant Analysis when applied on the archaeological horncores of Phase II.

**Table 3.23** Results from the Discriminant Analysis when applied on the archaeological horncores of Phase II, excluding E and F variables.

**Table 3.24** Results from the Discriminant Analysis when applied on the archaeological scapulae of Phase II.
TABLE 3.25 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HUMERI OF PHASE II ................................................................. 508
TABLE 3.26 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL RADIi OF PHASE II ................................................................. 508
TABLE 3.27 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL RADIi OF PHASE II, EXCLUDING VARIABLES GL AND SD ................................................................. 509
TABLE 3.28 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL ULNAE OF PHASE II ................................................................. 509
TABLE 3.29 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL ULNAE OF PHASE II, EXCLUDING VARIABLES B AND L ................................................................. 510
TABLE 3.30 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METACARPALS OF PHASE II ................................................................. 511
TABLE 3.31 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METACARPALS OF PHASE II, EXCLUDING VARIABLES GL AND SD ................................................................. 511
TABLE 3.32 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METATARSALS OF PHASE II ................................................................. 512
TABLE 3.33 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METATARSALS OF PHASE II, EXCLUDING VARIABLES GL AND SD ................................................................. 512
TABLE 3.34 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL TIBIAE OF PHASE II, EXCLUDING VARIABLE GL ................................................................. 513
TABLE 3.35 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL TIBIAE OF PHASE II, EXCLUDING VARIABLES GL AND SD ................................................................. 514
TABLE 3.36 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL ASTRAGALI OF PHASE II ................................................................. 514
TABLE 3.37 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL CALCANEA OF PHASE II ................................................................. 515
TABLE 3.38 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL CALCANEA OF PHASE II, EXCLUDING VARIABLES BS AND GL ................................................................. 516
TABLE 3.39 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HORNCORES OF PHASE III ................................................................. 516
TABLE 3.40 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HORNCORES OF PHASE III, EXCLUDING VARIABLES E AND F ................................................................. 517
TABLE 3.41 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL SCAPULAE OF PHASE III ................................................................. 517
TABLE 3.42 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HUMERI OF PHASE III ................................................................. 518
<p>| Table 3.43 | Results from the Discriminant Analysis when applied on the archaeological radii of phase III. | 519 |
| Table 3.44 | Results from the Discriminant Analysis when applied on the archaeological radii of phase III, excluding variables GL and SD. | 519 |
| Table 3.45 | Results from the Discriminant Analysis when applied on the archaeological ulnae of phase III. | 520 |
| Table 3.46 | Results from the Discriminant Analysis when applied on the archaeological ulnae of phase III, excluding variables B and L. | 520 |
| Table 3.47 | Results from the Discriminant Analysis when applied on the archaeological metacarpals of phase III. | 521 |
| Table 3.48 | Results from the Discriminant Analysis when applied on the archaeological metacarpals of phase III, excluding variables GL and SD. | 522 |
| Table 3.49 | Results from the Discriminant Analysis when applied on the archaeological tibiae of phase III, excluding variable GL. | 522 |
| Table 3.50 | Results from the Discriminant Analysis when applied on the archaeological tibiae of phase III, excluding variables GL and SD. | 523 |
| Table 3.51 | Results from the Discriminant Analysis when applied on the archaeological astragali of phase III. | 523 |
| Table 3.52 | Results from the Discriminant Analysis when applied on the archaeological calcanea of phase III. | 524 |
| Table 3.53 | Results from the Discriminant Analysis when applied on the archaeological horncores of phase IV. | 525 |
| Table 3.54 | Results from the Discriminant Analysis when applied on the archaeological calcanei of phase IV, excluding E and F variables. | 525 |
| Table 3.55 | Results from the Discriminant Analysis when applied on the archaeological scapulae of phase IV. | 526 |
| Table 3.56 | Results from the Discriminant Analysis when applied on the archaeological humeri of phase IV. | 526 |
| Table 3.57 | Results from the Discriminant Analysis when applied on the archaeological radii of phase IV. | 527 |
| Table 3.58 | Results from the Discriminant Analysis when applied on the archaeological radii of phase IV, excluding variables GL and SD. | 527 |
| Table 3.59 | Results from the Discriminant Analysis when applied on the archaeological ulnae of phase IV. | 528 |
| Table 3.60 | Results from the Discriminant Analysis when applied on the archaeological ulnae of phase IV, excluding B and L variables. | 529 |</p>
<table>
<thead>
<tr>
<th>Table</th>
<th>Results from the Discriminant Analysis when applied on the archaeological...</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.61</td>
<td>Archæological Metacarpals of Phase IV.</td>
</tr>
<tr>
<td>3.62</td>
<td>Archæological Metacarpals of Phase IV, excluding variables GL and SD.</td>
</tr>
<tr>
<td>3.63</td>
<td>Archæological Metatarsals of Phase IV.</td>
</tr>
<tr>
<td>3.64</td>
<td>Archæological Metatarsals of Phase IV, excluding variables GL and SD.</td>
</tr>
<tr>
<td>3.65</td>
<td>Archæological Tibiae of Phase IV.</td>
</tr>
<tr>
<td>3.66</td>
<td>Archæological Tibiae of Phase IV, excluding variable GL.</td>
</tr>
<tr>
<td>3.67</td>
<td>Archæological Tibiae of Phase IV, excluding variables GL and SD.</td>
</tr>
<tr>
<td>3.68</td>
<td>Archæological Astragali of Phase IV.</td>
</tr>
<tr>
<td>3.69</td>
<td>Archæological Calcanea of Phase IV.</td>
</tr>
<tr>
<td>3.70</td>
<td>Unstratified Archæological Horncores.</td>
</tr>
<tr>
<td>3.71</td>
<td>Unstratified Archæological Horncores, excluding variables E and F.</td>
</tr>
<tr>
<td>3.72</td>
<td>Unstratified Archæological Scapulæ.</td>
</tr>
<tr>
<td>3.73</td>
<td>Unstratified Archæological Humeri.</td>
</tr>
<tr>
<td>3.74</td>
<td>Unstratified Archæological Radii.</td>
</tr>
<tr>
<td>3.75</td>
<td>Unstratified Archæological Radii, excluding variables GL and SD.</td>
</tr>
<tr>
<td>3.76</td>
<td>Unstratified Archæological Ulnæ.</td>
</tr>
<tr>
<td>3.77</td>
<td>Unstratified Archæological Ulnæ, excluding variables B and L.</td>
</tr>
<tr>
<td>3.78</td>
<td>Unstratified Archæological Metacarpals.</td>
</tr>
</tbody>
</table>
TABLE 3.79 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL METACARPALS, EXCLUDING VARIABLES GL AND SD ................................................................. 540

TABLE 3.80 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL METATARSALS ................................................................. 541

TABLE 3.81 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL METATARSALS, EXCLUDING GL AND SD VARIABLES ................................. 541

TABLE 3.82 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL TIBIAE ........................................................................................................ 542

TABLE 3.83 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL TIBIAE, EXCLUDING VARIABLE GL .......................................................... 542

TABLE 3.84 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL TIBIAE, EXCLUDING VARIABLES GL AND SD .................................................. 543

TABLE 3.85 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL ASTRAGALI ........................................................................................................ 544

TABLE 3.86 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL CALCANEA ..................................................................................................... 544

TABLE 3.87 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE UNSTRATIFIED ARCHAEOLOGICAL CALCANEA, EXCLUDING VARIABLES GL AND BS ...................................................... 545

TABLE 3.88 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL HORNCORES ................................................................. 546

TABLE 3.89 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL HORNCORES, EXCLUDING VARIABLES E AND F .............................................................. 546

TABLE 3.90 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL SCAPULAE .............................................................................................................. 548

TABLE 3.91 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL HUMERI .............................................................................................................. 549

TABLE 3.92 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL RADII .............................................................................................................. 550

TABLE 3.93 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL RADII, EXCLUDING VARIABLES GL AND SD ........................................................................ 551

TABLE 3.94 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL ULNARÉS ............................................................................................................. 553

TABLE 3.95 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL ULNARÉS, EXCLUDING VARIABLES B AND L ........................................................................ 553

TABLE 3.96 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL METACARPALS ................................................................. 555
TABLE 3.97 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL METACARPALS, EXCLUDING VARIABLES GL AND SD................................................................. 556
TABLE 3.98 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL METATARSALS. ..................................................................................... 558
TABLE 3.99 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL METATARSALS, EXCLUDING VARIABLES GL AND SD......................................................... 558
TABLE 3.100 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL TIBIAE. ........................................................................................................ 560
TABLE 3.101 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL TIBIAE, EXCLUDING VARIABLE GL. ............................................................. 560
TABLE 3.102 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL TIBIAE, EXCLUDING VARIABLES GL AND SD ...................................................................... 561
TABLE 3.103 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL ASTRAGALI ......................................................................................................... 563
TABLE 3.104 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL CALCANEA. ........................................................................................................ 564
TABLE 3.105 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL CALCANEA, EXCLUDING GL AND BS VARIABLES .......................................................... 565
TABLE 3.106 PERCENTAGES OF CORRECT REATTRIBUTIONS FOR THE MODERN MATERIAL AND FOR THE ARCHAEOLOGICAL MATERIAL (WHOLE ASSEMBLAGE) PROVIDED BY THE DA. AN ASTERISK MARK SMALL SAMPLE SIZES (LESS THAN 10 SPECIMENS). ........................................................................................................ 566
TABLE 3.107 SUMMARY TABLE OF THE RESULTS OBTAINED FROM THE MORPHOLOGICAL APPROACH AND THE BIOMETRICAL APPROACH IN THE FORM OF BOTH BIOMETRICAL INDICES (BI) AND DISCRIMINANT ANALYSIS (DA), WHEN THE SHEEP/GOAT ASSEMBLAGE FROM KING’S LYNN WAS CONSIDERED IN TOTO. THE SPECIMENS CONSIDERED AS ‘MISCLASSIFIED’ ARE THOSE WHICH, AS THEY FALL ON OR BEYOND THE GROUP CENTROID LINE OF THE OPPOSITE SPECIES, ARE MORE LIKELY TO REPRESENT A MORPHOLOGICAL MISCLASSIFICATION. THE EXPECTATIONS ARE BASED ON THE RESULTS PROVIDED BY THE MODERN MATERIAL; IF THE ARCHAEOLOGICAL MATERIAL HAS GIVEN A HIGHER PERCENTAGE OF CONSISTENT ATTRIBUTIONS THAN THE MODERN, THE EXPECTATIONS ARE EXCEEDED. ........................................................................................................ 569
TABLE 3.108 NISP FOR PHASE T VII OF THE THREE IDENTIFIED CATEGORIES. .................................................................................................................. 578
TABLE 3.109 NISP FOR PHASE S VII OF THE THREE IDENTIFIED CATEGORIES. .................................................................................................................. 579
TABLE 3.110 NISP FOR PHASE S VIII OF THE THREE IDENTIFIED CATEGORIES. .................................................................................................................. 579
TABLE 3.111 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HORNCORES. A = PERCENTAGE OF CORRECT ATTRIBUTIONS RELATED TO THE MODERN MATERIAL (SELECTED ORIGINAL GROUPED CASES); B = PERCENTAGE OF CORRECT ATTRIBUTIONS RELATED TO THE ARCHAEOLOGICAL MATERIAL (UNSELECTED ORIGINAL GROUPED CASES); D = PERCENTAGE OF CORRECT ATTRIBUTIONS WHEN CROSS-VALIDATION WAS APPLIED. SAME TERMINOLOGY IS ADOPTED IN ALL THE FOLLOWING TABLES. ......................... 617
TABLE 3.112 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HORD CORES EXCLUDING MEASUREMENTS A AND B. .......................................................... 617

TABLE 3.113 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HORD CORES EXCLUDING MEASUREMENTS E AND F. ........................................................................ 618

TABLE 3.114 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL SCAPULAE. .......................................................................................................................... 620

TABLE 3.115 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL HUMERI. .......................................................... 622

TABLE 3.116 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL RADII. .......................................................................................................................... 623

TABLE 3.117 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL RADII (MEASUREMENTS GL AND SD EXCLUDED). .......................................................... 623

TABLE 3.118 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL ULNAE. .......................................................................................................................... 626

TABLE 3.119 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL ULNAE (EXCLUDING MEASUREMENTS B AND L). .......................................................................................................................... 626

TABLE 3.120 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METACARPALS. .......................................................................................................................... 628

TABLE 3.121 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METACARPALS (EXCLUDING MEASUREMENTS GL AND SD) .......................................................................................................................... 629

TABLE 3.122 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METATARSALS. .......................................................................................................................... 631

TABLE 3.123 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL METATARSALS. .......................................................................................................................... 632

TABLE 3.124 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL TIBIAE (EXCLUDING MEASUREMENT GL). .......................................................................................................................... 634

TABLE 3.125 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL TIBIAE (EXCLUDING MEASUREMENT GL AND SD) .......................................................................................................................... 635

TABLE 3.126 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL ASTRAGALI. .......................................................................................................................... 637

TABLE 3.127 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON THE ARCHAEOLOGICAL CALCANEA. .......................................................................................................................... 638

TABLE 3.128 PERCENTAGES OF CORRECT REATTRIBUTIONS FOR THE MODERN MATERIAL AND FOR THE ARCHAEOLOGICAL MATERIAL (WHOLE ASSEMBLAGE) PROVIDED BY THE DA. AN ASTERISK MARK SMALL SAMPLE SIZES (LESS THAN 10 SPECIMENS). .......................................................................................................................... 640

TABLE 3.129 SUMMARY TABLE OF THE RESULTS OBTAINED FROM THE MORPHOLOGICAL APPROACH AND THE BIOMETRICAL APPROACH IN THE FORM OF BOTH BIOMETRICAL INDICES (BI) AND DISCRIMINANT ANALYSIS (DA), WHEN THE SHEEP/GOAT ASSEMBLAGE FROM FLAXENGATE WAS CONSIDERED IN TOTAL. THE SPECIMENS CONSIDERED AS ‘MISCLASSIFIED’ ARE THOSE WHICH, AS THEY FALL ON OR BEYOND THE GROUP CENTROID LINE
OF THE OPPOSITE SPECIES, ARE MORE LIKELY TO REPRESENT A MORPHOLOGICAL MISCLASSIFICATION. THE
EXPECTATIONS ARE BASED ON THE RESULTS PROVIDED BY THE MODERN MATERIAL; IF THE ARCHAEOLOGICAL
MATERIAL HAS GIVEN A HIGHER PERCENTAGE OF CONSISTENT ATTRIBUTIONS THAN THE MODERN, THE
EXPECTATIONS ARE EXCEEDED ................................................................. 642

TABLE 3.130 CHRONOLOGY OF THE SITE WITH A BRIEF DESCRIPTION OF THE MAIN FEATURES FOUND (FOLLOWING
BROWN 2008 AND SODEN 1998-1999) ................................................................. 646
TABLE 3.131 CHRONOLOGICAL PHASES USED IN THIS STUDY ................................................. 648
TABLE 3.132 NISP FOR THE THREE IDENTIFIED CATEGORIES FOR PHASE I ................................. 652
TABLE 3.133 NISP FOR THE THREE IDENTIFIED CATEGORIES FOR PHASE II ................................. 653
TABLE 3.134 NISP FOR THE THREE IDENTIFIED CATEGORIES FOR PHASE III ................................. 653
TABLE 3.135 NISP FOR THE THREE IDENTIFIED CATEGORIES AMONGST THE UNSTRATIFIED SPECIMENS .... 654
TABLE 3.136 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
HORNCORES ............................................................................................................. 701
TABLE 3.137 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
HORNCORES, EXCLUDING VARIABLES E AND F ................................................................. 702
TABLE 3.138 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
SCAPULAE .................................................................................................................. 704
TABLE 3.139 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL HUMERI.
......................................................................................................................................... 705
TABLE 3.140 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL RADII.
............................................................................................................................................... 706
TABLE 3.141 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL RADII,
excluding variables GL and SD ............................................................................................. 707
TABLE 3.142 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL ULNAE.
............................................................................................................................................... 709
TABLE 3.143 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL ULNAE,
excluding variables B and L ................................................................................................. 709
TABLE 3.144 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
METACARPALS ............................................................................................................... 711
TABLE 3.145 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
METACARPALS, EXCLUDING VARIABLES GL AND SD ......................................................... 712
TABLE 3.146 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
METATARSALS ............................................................................................................... 714
TABLE 3.147 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL
METATARSALS, EXCLUDING VARIABLES GL AND SD ......................................................... 714
TABLE 3.148 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL TIBIAE. ................................................................. 716

TABLE 3.149 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL TIBIAE, EXCLUDING VARIABLE GL. .................................................................................................................................................... 717

TABLE 3.150 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL TIBIAE, EXCLUDING VARIABLES GL AND SD.................................................................................................................................................................. 718

TABLE 3.151 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL ASTRAGALI. ................................................................................................................................................................. 720

TABLE 3.152 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL CALCANEAI. .................................................................................................................................................................. 722

TABLE 3.153 RESULTS FROM THE DISCRIMINANT ANALYSIS WHEN APPLIED ON ALL THE ARCHAEOLOGICAL CALCANEAI, EXCLUDING GL AND BS VARIABLES........................................................................................................................................... 722

TABLE 3.154 PERCENTAGES OF CORRECT REATTRIBUTIONS FOR THE MODERN MATERIAL AND FOR THE ARCHAEOLOGICAL MATERIAL (WHOLE ASSEMBLAGE) PROVIDED BY THE DA. AN ASTERISK MARK SMALL SAMPLE SIZES (LESS THAN 10 SPECIMENS). .................................................................................................................................................. 724

TABLE 3.155 SUMMARY TABLE OF THE RESULTS OBTAINED FROM THE MORPHOLOGICAL APPROACH AND THE BIOMETRICAL APPROACH IN THE FORM OF BOTH BIOMETRICAL INDICES (BI) AND DISCRIMINANT ANALYSIS (DA), WHEN THE SHEEP/GOAT ASSEMBLAGE FROM WOOLMONGER/KINGSWELL STREET WAS CONSIDERED IN TOTO. THE SPECIMENS CONSIDERED AS "MISCLASSIFIED" ARE THOSE WHICH, AS THEY FALL ON OR BEYOND THE GROUP CENTROID LINE OF THE OPPOSITE SPECIES, ARE MORE LIKELY TO REPRESENT A MORPHOLOGICAL MISCLASSIFICATION. THE EXPECTATIONS ARE BASED ON THE RESULTS PROVIDED BY THE MODERN MATERIAL; IF THE ARCHAEOLOGICAL MATERIAL HAS GIVEN A HIGHER PERCENTAGE OF CONSISTENT ATTRIBUTIONS THAN THE MODERN, THE EXPECTATIONS ARE EXCEEDED.............................................................................................................................................................................. 726

TABLE 3.156 LIST OF THE MORPHOLOGICAL TRAIT PER ANATOMICAL ELEMENT WHICH HAVE RESULTED TO BE PARTICULARLY USEFUL IN THE IDENTIFICATION OF THE ARCHAEOLOGICAL MATERIAL......................................................................................................................... 730

TABLE 3.157 LIST OF THE BI THAT HAVE PROVEN MOST SUCCESSFUL IN SEPARATING ARCHAEOLOGICAL SHEEP AND GOATS............................................................................................................................................................ 731

TABLE A3.1 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE HORN CORE PROCESSED BY SPSS. ......................................................................................................................................................................................................................... 809

TABLE A3.2 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE HORN CORE. ................................................................................................................................................................................................................................................................................................. 810

TABLE A3.3 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE SCAPULA PROCESSED BY SPSS. ................................................................................................................................................................................................................................................................................................. 814

TABLE A3.4 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE SCAPULA. ................................................................................................................................................................................................................................................................................................. 815

TABLE A3.5 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE HUMERUS PROCESSED BY SPSS. ................................................................................................................................................................................................................................................................................................. 819
TABLE A3.6 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE HUMERUS...............................................................................................................................820

TABLE A3.7 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE RADIUS PROCESSED BY SPSS. .........................................................................................................................826

TABLE A3.8 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE RADIUS...................................................................................................................................826

TABLE A3.9 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE ULNA PROCESSED BY SPSS. ............................................................................................................................831

TABLE A3.10 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE ULNA.........................................................................................................................831

TABLE A3.11 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE METACARPAL PROCESSED BY SPSS. ............................................................................................................................836

TABLE A3.12 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE METACARPAL ......................................................................................................................................836

TABLE A3.13 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE METACARPSAL PROCESSED BY SPSS. ............................................................................................................................847

TABLE A3.14 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE METATARSAL. .....................................................................................................................847

TABLE A3.15 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE Tibia PROCESSED BY SPSS. ..........................................................................................................................858

TABLE A3.16 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE Tibia ......................................................................................................................................858

TABLE A3.17 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE ASTRAGALUS PROCESSED BY SPSS. ............................................................................................................................863

TABLE A3.18 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE ASTRAGALUS. ......................................................................................................................................863

TABLE A3.19 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE CALCANEES PROCESSED BY SPSS..........................................................................................................................869

TABLE A3.20 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE CALCANEUM. ......................................................................................................................................870

TABLE A3.21 SUMMARY OF THE SHEEP AND GOAT MODERN SPECIMENS FOR EACH MEASUREMENT TAKEN ON THE 3RD PHALANX PROCESSED BY SPSS..........................................................................................................................876

TABLE A3.22 DESCRIPTIVE STATISTICS FOR THE MODERN GOAT (CH) AND SHEEP (OA) FOR EACH MEASUREMENT TAKEN ON THE 3RD PHALANX..........................................................................................................................876
 Figures

**Figure 1.1** Diagnostic characteristics on the distal tibia (1=goat; 2=sheep; C=lateral side; D= medial side; E= distal articular surface). Image reprinted with the permission from Acta Veterinaria Brno, from: Kratochvil, Z. Species criteria on the distal section of the tibia in Ovis ammon F. aries L. and Capra aegagrus F. hircus L. Acta Vet Brno, copyright 1969, 38: 483-490. 84

**Figure 1.2** Index adopted on the distal metapodials and morphological traits considered for the 3rd phalanx following Gromova 1953 and Boessneck et al. 1964. Image reprinted with permission from Frank Hole, from: Hole, F. The context of the caprine domestication in the Zagros region. In The origins and spread of agriculture and pastoralism in Eurasia (ed.) D.R. Harris, 263-281, copyright 1996. London: University College of London press. 85

**Figure 1.3** [Not illustrated here] Some morphological traits on the fourth deciduous lower premolar (dP4) proposed by Payne (Figure 2 in: Payne, S. Morphological distinctions between the mandibular teeth of young sheep, Ovis, and goats, Capra. Journal of Archaeological Science 12: 139-147). 91

**Figure 1.4** Sequence showing the changes of third and fourth permanent lower premolars (P3 and P4) according to wear stages. Image reprinted with permission from Publications Scientifiques du Museum national d’Histoire naturelle (Paris), from: Helmer, D. Discrimination des genres Ovis et Capra a l’aide des premolaires inferieures 3 et 4 et interpretation des ages d’abattage: l’exemple de Dikili Tash (Grece). Anthropozoologica 31: 29-38, copyright 2000. © Publications Scientifiques du Museum national d’Histoire naturelle, Paris. 92

**Figure 1.5** Measurements suggested by Payne (1969) as effective for discriminating sheep from goat, on the distal metacarpal bone. Image reprinted with permission from Sebastian Payne, from: Payne, S. A metrical distinction between sheep and goat metacarpal. In The domestication and exploitation of plants and animals, (eds.) P.J. Ucko and G.W. Dimbley, 295-306, copyright 1969. London: Duckworth. 96

**Figure 1.6** [Not illustrated here] Proximal articulation of goat (left) and sheep (right) showing the points at which the measurements were taken by Rowley-Conwy (Fig. 2 in: ROWLEY-CONWY, P. Improved separation of Neolithic metapodials of sheep (Ovis) and goats (Capra) from Arene Candide cave, Liguria, Italy. Journal of Archaeological Science 25: 251-258). 97

**Figure 1.7** Percentage of occurrence of identified goat specimens by body part in Post-Iron Age period-sites. Image reprinted with permission from Umberto Albarella, from: Albarella, U. (2020). Animals of our past: zooarchaeological evidence from Central England. Portsmouth: Historic England Research Reports. 105

**Figure 1.8** Percentage occurrence of Roman, Saxon, Medieval, and Post-Medieval period-sites containing identified goat specimens, by body part and site type. Image reprinted with permission

Figure 1.9 Percentage of identified goat specimens by body part from sites organised by sub-region (west sites=39; central sites=87; east sites 59). Graph redrawn from Albarella 2003. ..................... 108

Figure 2.1 Left mandible of a modern specimen of sheep from the reference collection of Kiel (N. 22339) showing the ridge on the inter-alveolar edge of the bone. Photo by Lenny Salvagno (LS) .................................................................................................................................................................. 133

Figure 2.2 Left horncore of a modern sheep specimen from the reference collection of Portsmouth (N. 2832) showing a barely visible separation between the horn and the skull. Photo by LS..... 134

Figure 2.3 Left scapula of a modern sheep specimen from the reference collection of Portsmouth (N. 3282) showing the presence of a pecten on the caudal side of the neck. It is also possible to see the rounded area at the base of the spine mentioned in the text. Photo by LS. ......................... 135

Figure 2.4 Distal right articulation of the humerus of a modern sheep specimen from the reference collection of Portsmouth (N. 1496) showing the lack of landmarks in the region where BE is taken. Photo by LS. ........................................................................................................................................ 135

Figure 2.5 Left olecranon of an ulna from a modern specimen of sheep from the reference collection of Kiel (N. 22339) which shows how the medial side of the bone can be convex in Ovis. Photo by LS. ........................................................................................................................................ 136

Figure 2.6 Left astragalus (frontal and medial side) of a modern specimen of goat from the reference collection of Halle (N. CSWD 2) showing the lateral projection of the ridge. Photo by LS........................................................................................................................................ 136

Figure 2.7 Calcanea from a modern specimen of goat (right, N. 1315) and sheep (left, N. 1496) from the reference collection of Portsmouth showing how the morphology of the area where the articular facet of the Os Malleolare attaches can vary. Photo by LS. .................................................. 137

Figure 2.8 CV for each of the four specimens for all the different measurements ............................................. 157

Figure 2.9 Horncore trait 1 (section): number of specimens attributed to the different categories for the two species (CH=Capra hircus; OA=Ovis aries; scores on horizontal axis: C=Capra; CL=Capra-like; OC=Ovis/Capra; OL=Ovis-like; O=Ovis). ........................................................................................................ 179

Figure 2.10 Horncore trait 2 (curvature): number of specimens attributed to the different categories for the two species. For details see Fig. 2.9. .......................................................... 179

Figure 2.11 Third deciduous lower premolar dp3, trait 1 (overall shape): number of specimens attributed to the different categories for the two species. For details see Fig. 2.9. ................. 180

Figure 2.12 Third deciduous lower premolar dp3, trait 2 (metaconoid): number of specimens attributed to the different categories for the two species. For details see Fig. 2.9. ..................... 180

Figure 2.13 Fourth deciduous lower premolar dp4, trait 1 (crown aspect): number of specimens attributed to the different categories for the two species. For details see Fig. 2.9. ..................... 180

XXIII
FIGURE 2.14 FOURTH DECIDUOUS LOWER PREMOLAR DP4, TRAIT 2 (PRESENCE/ABSENCE OF BASAL SWELLING): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 .............................................................. 181

FIGURE 2.15 FOURTH DECIDUOUS LOWER PREMOLAR DP4, TRAIT 3 (PRESENCE/ABSENCE OF INTERLOBAR PILLAR): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 .............................................................. 181

FIGURE 2.16 FOURTH DECIDUOUS LOWER PREMOLAR DP4, TRAIT 4 (ENAMEL DEVELOPMENT): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 .............................................................. 181

FIGURE 2.17 THIRD PERMANENT LOWER PREMOLAR P3, TRAIT 1 (OVERALL SHAPE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 182

FIGURE 2.18 THIRD PERMANENT LOWER PREMOLAR P3, TRAIT 2 (MIDDLE VERTICAL RIDGE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 182

FIGURE 2.19 THIRD PERMANENT LOWER PREMOLAR P3, TRAIT 3 (MESIAL-BUCCAL ANGLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 182

FIGURE 2.20 FOURTH PERMANENT LOWER PREMOLAR P4, TRAIT 1 (OVERALL SHAPE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 183

FIGURE 2.21 FOURTH PERMANENT LOWER PREMOLAR P4, TRAIT 2 (MESIO-LINGUAL RIB): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 183

FIGURE 2.22 FOURTH PERMANENT LOWER PREMOLAR P4, TRAIT 3 (MESIO-BUCCAL ANGLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 183

FIGURE 2.23 THIRD LOWER MOLAR M3, TRAIT 1 (MESIAL FACE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 183

FIGURE 2.24 THIRD LOWER MOLAR M3, TRAIT 2 (BUCCAL EDGE ANGLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 184

FIGURE 2.25 THIRD LOWER MOLAR M3, TRAIT 3 (DIRECTION OF CENTRAL CUSP): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 184

FIGURE 2.26 THIRD LOWER MOLAR M3, TRAIT 4 (SYMMETRY AND SHAPE OF CUSPS): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 184

FIGURE 2.27 THIRD LOWER MOLAR M3, TRAIT 5 (DISTAL FLUTE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 185

FIGURE 2.28 MANDIBLE, TRAIT 1 (PRESENCE/ABSENCE OF FORAMEN): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 185

FIGURE 2.29 MANDIBLE, TRAIT 2 (HOLLOW): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 185

FIGURE 2.30 SCAPULA, TRAIT 1 (GLENOID TUBERCLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................. 186
FIGURE 2.31 SCAPULA, TRAIT 2 (SHAPE OF GLENOID CAVITY): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. .................................................... 186

FIGURE 2.32 HUMERUS, TRAIT 1 (LATERAL EPICONDYLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 187

FIGURE 2.33 HUMERUS, TRAIT 2 (GROOVE AT THE POSTERIOR SIDE OF THE LATERAL EPICONDYLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 187

FIGURE 2.34 HUMERUS, TRAIT 3 (PIT ON THE LATERAL EPICONDILAR SURFACE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 187

FIGURE 2.35 HUMERUS, TRAIT 4 (CREST-LIKE PROCESS ON LATERAL BORDER OF EPICONDILAR SURFACE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ........................................................................................................................................................................................................ 188

FIGURE 2.36 HUMERUS, TRAIT 5 (ANGLE AT THE DISTAL PART OF THE MEDIAL EPICONDYLE): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 188

FIGURE 2.37 RADIUS, TRAIT 1 (ASPECT OF THE LATERAL TUBEROSITY): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 188

FIGURE 2.38 RADIUS, TRAIT 2 (OVERALL ASPECT OF THE PROXIMAL END): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 188

FIGURE 2.39 ULNA, TRAIT 1 (PROJECTION OF LATERAL CORONOID PROCESS): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 189

FIGURE 2.40 ULNA, TRAIT 2 (SHAPE OF THE OLECRANON): NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ................................................................. 189

FIGURE 2.41 METACARPAL AND METATARSAL, TRAIT 1 (DIMENSION OF THE PERIPHERAL PART OF THE TROCHLEAR CONDYLES) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ............................................................................................................................ 190

FIGURE 2.42 METACARPAL AND METATARSAL, TRAIT 2 (DEFINITION OF THE PERIPHERAL PART OF THE TROCHLEAR CONDYLES) NUMBERS OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ............................................................................................................................ 190

FIGURE 2.43 METACARPAL AND METATARSAL, TRAIT 3 (ASPECT OF THE PERIPHERAL PART OF THE TROCHLEAR CONDYLES) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ............................................................................................................................ 191

FIGURE 2.44 METACARPAL AND METATARSAL, TRAIT 4 (DIRECTION OF VERTICILLI) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ............................................................................................................................ 191

FIGURE 2.45 METACARPAL AND METATARSAL, TRAIT 5 (DEVELOPMENT OF THE FOSSAE ON THE PROXIMAL PART OF THE DISTAL TROCHLEAR CONDYLES) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9. ............................................................................................................................ 192
FIGURE 2.46 METATARSAL, TRAIT 6 (ASPECT OF THE JUNCTION ON THE ANTERIOR ASPECT OF THE DISTAL DIAPHYSIS ABOVE THE DISTAL EPIPHYSIS) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9................................................................. 192

FIGURE 2.47 Tibia, trait 1 (dorsal prominence) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 193

FIGURE 2.48 Tibia, trait 2 (medial malleolus) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 193

FIGURE 2.49 Tibia, trait 3 (presence/absence of the interruption on the plantar limbus) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9.. 193

FIGURE 2.50 Tibia, trait 4 (lateral profile) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9 ................................................................. 194

FIGURE 2.51 Tibia, trait 5 (shape of the anterior side of the malleolus) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 194

FIGURE 2.52 Tibia, trait 6 (aspect of the medial malleolus) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 194

FIGURE 2.53 Astragalus, trait 1 (depth of the sulcus of the trochlea) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 195

FIGURE 2.54 Astragalus, trait 2 (inclination of the lateral part of the trochlea) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 195

FIGURE 2.55 Astragalus, trait 3 (shape of the medial ridge) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 195

FIGURE 2.56 Astragalus, trait 4 (shape of the distal articular surface on the lateral aspect) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 196

FIGURE 2.57 Astragalus, trait 5 (aspect of the proximo-plantar projection on the medial articular ridge of the trochlea) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 196

FIGURE 2.58 Astragalus, trait 6 (aspect and direction of the articular surface on the plantar side) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 196

FIGURE 2.59 Calcaneum, trait 1 (overall aspect) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 197

FIGURE 2.60 Calcaneum, trait 2 (length of the os malleolare vs length of the entire process) number of specimens attributed to the different categories for the two species. For details see Fig. 2.9................................................................. 197
FIGURE 2.61  CALCANEUM, TRAIT 3 (PRESENCE/ABSENCE OF THE JUNCTION BETWEEN THE TWO INTERNAL ARTICULAR SURFACES) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 198

FIGURE 2.62  1ST PHALANX, TRAIT 1 (SHAPE OF THE GROOVE IN THE PROXIMAL END) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ............... 198

FIGURE 2.63  1ST PHALANX, TRAIT 2 (PRESENCE OF THE SCARS FOR THE MUSCULAR LIGAMENTS ON THE POSTERIOR SIDE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 199

FIGURE 2.64  1ST PHALANX, TRAIT 3 (ASPECT OF THE POSTERIOR SIDE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 199

FIGURE 2.65  1ST PHALANX, TRAIT 4 (SHAPE OF THE DISTAL ARTICULATION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 199

FIGURE 2.66  2ND PHALANX, TRAIT 1 (ASPECT OF THE AXIAL PART OF THE POSTERIOR SIDE OF THE DISTAL ARTICULATION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 200

FIGURE 2.67  2ND PHALANX, TRAIT 2 (ASPECT OF THE RIDGE OF THE POSTERIOR SIDE OF THE DISTAL ARTICULATION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 200

FIGURE 2.68  3RD PHALANX, TRAIT 1 (PRESENCE/ABSENCE OF A SADDLE ON THE DORSAL EDGE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 200

FIGURE 2.69  3RD PHALANX, TRAIT 2 (SHAPE OF THE SOLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.9 ................................................................. 201

FIGURE 2.70  HORNCORE, TRAIT 1 (SECTION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES (C = CAPRA; CL = CAPRA-LIKE; OC = OVIS/CAPRA; OL = OVIS-LIKE; O = OVIS. ON THE HORIZONTAL AXIS: CH = CAPRA HIRCUS; OA = OVIS ARIES; ♂ = MALE; ♀ = FEMALE; ♂♀ = CASTRATE). ........................................................................................................ 206

FIGURE 2.71  HORNCORE, TRAIT 2 (CURVATURE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 207

FIGURE 2.72  THIRD DECIDUOUS LOWER PREMOLAR DP3, TRAIT 1 (OVERALL SHAPE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 207

FIGURE 2.73  THIRD DECIDUOUS LOWER PREMOLAR DP3, TRAIT 2 (APPEARANCE OF THE METACONOID) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 208

FIGURE 2.74  FOURTH LOWER DECIDUOUS PREMOLAR DP4, TRAIT 1 (CROWN ASPECT) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 208
FIGURE 2.75 FOURTH LOWER DECIDUOUS PREMOLAR DP4, TRAIT 2 (PRESENCE/ABSENCE BASAL SWELLING) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ................................................................. 209

FIGURE 2.76 FOURTH LOWER DECIDUOUS PREMOLAR DP4, TRAIT 3 (PRESENCE/ABSENCE INTER-LOBAR PILLAR) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ................................................................. 209

FIGURE 2.77 FOURTH LOWER DECIDUOUS PREMOLAR DP4, TRAIT 4 (ENAMEL DEVELOPMENT IN MEDIAL AND DISTAL FACE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ................................................................. 210

FIGURE 2.78 THIRD LOWER PREMOLAR P3, TRAIT 1 (OVERALL SHAPE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 210

FIGURE 2.79 THIRD LOWER PREMOLAR P3, TRAIT 2 (ASPECT MIDDLE VERTICAL RIDGE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 211

FIGURE 2.80 THIRD LOWER PREMOLAR P3, TRAIT 3 (ASPECT MESIAL-BUCCAL ANGLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 211

FIGURE 2.81 FOURTH LOWER PREMOLAR P4, TRAIT 1 (OVERALL SHAPE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 211

FIGURE 2.82 FOURTH LOWER PREMOLAR P4, TRAIT 2 (ASPECT OF THE MESIO-LINGUAL RIB) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 212

FIGURE 2.83 FOURTH LOWER PREMOLAR P4, TRAIT 3 (ASPECT OF THE MESIO-BUCCAL ANGLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 212

FIGURE 2.84 THIRD LOWER MOLAR M3, TRAIT 1 (ASPECT MESIAL FACE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 213

FIGURE 2.85 THIRD LOWER MOLAR M3, TRAIT 2 (ASPECT BUCCAL EDGE ANGLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 213

FIGURE 2.86 THIRD LOWER MOLAR M3, TRAIT 3 (DIRECTION OF CENTRAL CUSP) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 214

FIGURE 2.87 THIRD LOWER MOLAR M3, TRAIT 4 (SYMMETRY AND SHAPE OF CUSPS) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. ........................................................................................................... 214
FIGURE 2.88 Third lower molar M₃, trait 4 (aspect of the distal flute) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 215

FIGURE 2.89 Mandible, trait 1 (presence/absence of the foramen) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 215

FIGURE 2.90 Mandible, trait 2 (posterior groove) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 216

FIGURE 2.91 Scapula, trait 1 (shape of the glenoid tubercule) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 216

FIGURE 2.92 Scapula, trait 2 (shape of the glenoid cavity) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 216

FIGURE 2.93 Humerus, trait 1 (shape of the lateral epicondyle) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 216

FIGURE 2.94 Humerus, trait 2 (aspect of the groove on the posterior side of the lateral epicondyle) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 217

FIGURE 2.95 Humerus, trait 3 (aspect of the pit on the lateral epicondyle surface) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 217

FIGURE 2.96 Humerus, trait 4 (presence/absence of a lateral thickening on the lateral border of epicondylar surface) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 217

FIGURE 2.97 Humerus, trait 5 (aspect of the angle of the distal part of the medial epicondyle) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 218

FIGURE 2.98 Radius, trait 1 (aspect of the lateral tuberosity) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 218

FIGURE 2.99 Radius, trait 2 (overall aspect of the proximal articular surface) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 219

FIGURE 2.100 Ulna, trait 1 (projection of the lateral coronoid process) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 220

FIGURE 2.101 Ulna, trait 2 (overall shape of the olecranon) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. .......................................................... 220

XXIX
FIGURE 2.102 Metacarpal (on the left) and metatarsal (on the right), trait 1 (dimension of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 221

FIGURE 2.103 Metacarpal (on the left) and metatarsal (on the right), trait 2 (definition of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 221

FIGURE 2.104 Metacarpal (on the left) and metatarsal (on the right), trait 3 (aspect of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 222

FIGURE 2.105 Metacarpal (on the left) and metatarsal (on the right), trait 4 (direction of the verticilli) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 222

FIGURE 2.106 Metacarpal and metatarsal, trait 5 (development of the fossae on the proximal part of the distal trochlear condyles) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 223

FIGURE 2.107 Metatarsal, trait 6 (development of the fossae on the proximal part of the distal diaphysis above the distal epiphysis) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 223

FIGURE 2.108 Tibia, trait 1 (dorsal prominence) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 224

FIGURE 2.109 Tibia, trait 2 (medial malleolus) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 224

FIGURE 2.110 Tibia, trait 3 (presence/absence interruption on plantar limbus) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 225

FIGURE 2.111 Tibia, trait 4 (lateral profile) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 225

FIGURE 2.112 Tibia, trait 5 (shape of the anterior side of the malleolus) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 226

FIGURE 2.113 Tibia, trait 6 (aspect of the medial malleolus) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 226

FIGURE 2.114 Astragalus, trait 1 (depth of the sulcus of the trochlea) number of specimens attributed to the different categories for the different genders for the two species. For details see Fig. 2.70. 227
FIGURE 2.115 ASTRAGALUS, TRAIT 2 (INCLINATION OF THE LATERAL PART OF THE TROCHLEA) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 227

FIGURE 2.116 ASTRAGALUS, TRAIT 3 (SHAPE OF THE MEDIAL RIDGE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ... 228

FIGURE 2.117 ASTRAGALUS, TRAIT 4 (SHAPE ON THE DISTAL ARTICULAR SURFACE ON THE LATERAL ASPECT) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 228

FIGURE 2.118 ASTRAGALUS, TRAIT 5 (ASPECT OF THE PROXIMO-PLANTAR PROJECTION ON THE MEDIAL ARTICULAR RIDGE OF THE TROCHLEA) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 229

FIGURE 2.119 ASTRAGALUS, TRAIT 6 (ASPECT OF THE DIRECTION OF THE ARTICULAR SURFACE ON THE PLANTAR SIDE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 229

FIGURE 2.120 CALCANEUS, TRAIT 1 (OVERALL ASPECT) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 230

FIGURE 2.121 CALCANEUS, TRAIT 2 (LENGTH OF THE OS MALLEOLARE VS LENGTH OF THE ENTIRE PROCESS) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 230

FIGURE 2.122 CALCANEUS, TRAIT 3 (PRESENCE/ABSENCE OF THE JUNCTION BETWEEN THE TWO INTERNAL ARTICULAR SURFACES) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 231

FIGURE 2.123 1ST PHALANX, TRAIT 1 (SHAPE OF THE GROOVE ON THE PROXIMAL END) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 231

FIGURE 2.124 1ST PHALANX, TRAIT 2 (PRESENCE OF THE SCARS OF THE MUSCULAR LIGAMENTS ON THE POSTERIOR SIDE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 232

FIGURE 2.125 1ST PHALANX, TRAIT 3 (ASPECT OF THE POSTERIOR SIDE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 232

FIGURE 2.126 1ST PHALANX, TRAIT 4 (SHAPE OF THE DISTAL ARTICULATION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 233

FIGURE 2.127 2ND PHALANX, TRAIT 1 (ASPECT OF THE AXIAL PART OF THE POSTERIOR SIDE OF THE DISTAL ARTICULATION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70 ................................................................. 233
FIGURE 2.128 2\textsuperscript{nd} PHALANX, TRAIT 2 (ASPECT OF THE RIDGE ON THE POSTERIOR EDGE OF THE DISTAL ARTICULATION) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. .................................................................................................................. 234

FIGURE 2.129 3\textsuperscript{rd} PHALANX, TRAIT 1 (PRESENCE/ABSENCE OF A SADDLE ON THE DORSAL EDGE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. .................................................................................................................. 234

FIGURE 2.130 3\textsuperscript{rd} PHALANX, TRAIT 2 (SHAPE OF THE SOLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT GENDERS FOR THE TWO SPECIES. FOR DETAILS SEE FIG. 2.70. .................................................................................................................. 235


FIGURE 2.132 HORNCORE, TRAIT 2 (CURVATURE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 240

FIGURE 2.133 MANDIBLE, TRAIT 1 (PRESENCE/ABSENCE OF THE FORAMEN) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 241

FIGURE 2.134 MANDIBLE, TRAIT 2 (ASPECT OF THE HOLLOW) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 241

FIGURE 2.135 THIRD DECIDUOUS LOWER PREMOLAR DP\textsubscript{3}, TRAIT 1 (OVERALL ASPECT) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 242

FIGURE 2.136 THIRD DECIDUOUS LOWER PREMOLAR DP\textsubscript{3}, TRAIT 2 (APPEARANCE OF THE METACONOID) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 242

FIGURE 2.137 FOURTH DECIDUOUS LOWER PREMOLAR DP\textsubscript{4}, TRAIT 1 (CROWN ASPECT) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 243

FIGURE 2.138 FOURTH DECIDUOUS LOWER PREMOLAR DP\textsubscript{4}, TRAIT 2 (PRESENCE/ABSENCE BASAL SWELLING) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 243

FIGURE 2.139 FOURTH DECIDUOUS LOWER PREMOLAR DP\textsubscript{4}, TRAIT 3 (PRESENCE/ABSENCE INTER-LOBAR PILLAR) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131. .................................................................................................................. 244

XXXII
FIGURE 2.140 Fourth deciduous lower premolar dp4, trait 4 (enamel development on medial and distal face) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .............................................. 244

FIGURE 2.141 Third lower premolar P3, trait 1 (overall aspect) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 245

FIGURE 2.142 Third lower premolar P3, trait 2 (aspect middle vertical ridge) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 245

FIGURE 2.143 Third lower premolar P3, trait 3 (aspect mesial-buccal angle) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 245

FIGURE 2.144 Fourth lower premolar P4, trait 1 (overall shape) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 246

FIGURE 2.145 Fourth lower premolar P4, trait 2 (aspect of the mesio-lingual rib) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 247

FIGURE 2.146 Fourth lower premolar P4, trait 3 (aspect of the mesio-buccal angle) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 247

FIGURE 2.147 Third lower molar M3, trait 1 (aspect mesial face) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 248

FIGURE 2.148 Third lower molar M3, trait 2 (aspect buccal edge angle) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 248

FIGURE 2.149 Third lower molar M3, trait 3 (direction of central cusp) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 249

FIGURE 2.150 Third lower molar M3, trait 4 (symmetry and shape of the cusps) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 249

FIGURE 2.151 Third lower molar M3, trait 5 (aspect of the distal flute) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131 .......................................................... 250
FIGURE 2.152 SCAPULA, TRAIT 1 (SHAPE OF THE GLENOID TUBERCLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 250

FIGURE 2.153 SCAPULA, TRAIT 2 (SHAPE OF THE GLENOID CAVITY) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 251

FIGURE 2.154 HUMERUS, TRAIT 1 (SHAPE OF THE LATERAL EPICONDYLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.......................................................................................................................... 251

FIGURE 2.155 HUMERUS, TRAIT 2 (ASPECT OF THE GROOVE ON THE POSTERIOR SIDE OF THE LATERAL CONDYLE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131................................................................. 251

FIGURE 2.156 HUMERUS, TRAIT 3 (ASPECT OF THE PIT ON THE LATERAL EPICONDILAR SURFACE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131........................................................................................................ 252

FIGURE 2.157 HUMERUS, TRAIT 4 (ABSENCE/ PRESENCE OF THE THICKENING ON THE LATERAL BORDER OF THE EPICONDILAR SURFACE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.............. 252


FIGURE 2.159 RADIUS, TRAIT 1 (ASPECT OF THE LATERAL TUBEROITY) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 253

FIGURE 2.160 RADIUS, TRAIT 2 (OVERALL ASPECT OF THE PROXIMAL ARTICULAR SURFACE) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 254

FIGURE 2.161 ULNA, TRAIT 1 (PROJECTION OF THE LATERAL CORONOID PROCESS) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 254

FIGURE 2.162 ULNA, TRAIT 2 (OVERALL SHAPE OF THE OLECRANON) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 255

FIGURE 2.163 METACARPAL, TRAIT 1 (DIMENSION OF THE PERIPHERAL PART OF THE TROCHLEAR CONDYLES) NUMBER OF SPECIMENS ATTRIBUTED TO THE DIFFERENT CATEGORIES FOR THE DIFFERENT AGE-GROUPS FOR THE GOAT (LEFT) AND THE SHEEP (RIGHT). FOR DETAILS SEE FIG. 2.131.................................................................................................................. 255

XXXIV
FIGURE 2.164 Metatarsal, trait 1 (Dimension of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 256

FIGURE 2.165 Metacarpal, trait 2 (Definition of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 257

FIGURE 2.166 Metatarsal, trait 2 (Definition of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 257

FIGURE 2.167 Metacarpal, trait 3 (Aspect of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 258

FIGURE 2.168 Metatarsal, trait 3 (Aspect of the peripheral part of the trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 258

FIGURE 2.169 Metacarpal, trait 4 (Direction of the verticilli) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ........................................................................................................ 259

FIGURE 2.170 Metatarsal, trait 4 (Direction of the verticilli) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ........................................................................................................ 259

FIGURE 2.171 Metacarpal, trait 5 (Development of the fossae on the proximal part of the distal trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 260

FIGURE 2.172 Metatarsal, trait 5 (Development of the fossae on the proximal part of the distal trochlear condyles) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ................................................................. 260

FIGURE 2.173 Metatarsal, trait 6 (Aspect of the junction on the anterior aspect of the distal diaphysis above the distal epiphysis) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ........................................................................................................ 261

FIGURE 2.174 Tibia, trait 1 (Dorsal prominence) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ........................................................................................................ 261

FIGURE 2.175 Tibia, trait 2 (Medial malleolus) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. ........................................................................................................ 262
FIGURE 2.176 Tibia, trait 3 (presence/absence of the interruption on the plantar limbus) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 262

FIGURE 2.177 Tibia, trait 4 (lateral profile) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 263

FIGURE 2.178 Tibia, trait 5 (shape of the anterior side of the malleolus) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 263

FIGURE 2.179 Tibia, trait 6 (aspect of the medial malleolus) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 264

FIGURE 2.180 Astragalus, trait 1 (depth of the sulcus of the trochlea) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 264

FIGURE 2.181 Astragalus, trait 2 (inclination of the lateral part of the trochlea) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 265

FIGURE 2.182 Astragalus, trait 3 (shape of the medial ridge) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 265

FIGURE 2.183 Astragalus, trait 4 (shape of the distal articular surface of the lateral aspect) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 266

FIGURE 2.184 Astragalus, trait 5 (articular ridge of the trochlea) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 266

FIGURE 2.185 Astragalus, trait 6 (aspect and direction of the articular surface on the plantar side) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 267

FIGURE 2.186 Calcaneus, trait 1 (overall aspect) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 267

FIGURE 2.187 Calcaneus, trait 2 (length of the os malleolare vs length of the entire process) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.  .......................................................... 268
Figure 2.188 Calcaneus, Trait 3 (Presence/absence of the junction between the two internal articular surfaces) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131. 

Figure 2.189 1st phalanx, Trait 1 (shape of the groove on the proximal end) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.190 1st phalanx, Trait 2 (Presence of the scars for the muscular ligaments on the posterior side) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.191 1st phalanx, Trait 3 (aspect of the posterior side) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.192 1st phalanx, Trait 4 (shape of the distal articulation) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.193 2nd phalanx, Trait 1 (aspect of the axial part of the posterior side of the distal articulation) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.194 2nd phalanx, Trait 2 (aspect of the ridge on the posterior side of the distal articulation) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.195 3rd phalanx, Trait 1 (presence/absence of a saddle on the dorsal edge) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.196 3rd phalanx, Trait 2 (shape of the sole) number of specimens attributed to the different categories for the different age-groups for the goat (left) and the sheep (right). For details see Fig. 2.131.

Figure 2.197 Maximum diameter at the base of the horncore (A) plotted against the length (E).

Figure 2.198 Maximum diameter at the base of the horncore (A) plotted against the length of the outer curvature (F).

Figure 2.199 Maximum diameter of the horncore taken at the middle (C) plotted against the length (E).

Figure 2.200 Maximum diameter of the horncore taken at the middle (C) plotted against the length of the outer curvature (F).

Figure 2.201 Maximum diameter (A) plotted against the minimum diameter taken at the base of the horncore (B).
FIGURE 2.202 Maximum diameter (C) plotted against the minimum diameter (D) both taken at the middle of the horncore. ................................................................. 287

FIGURE 2.203 Maximum diameter of the horncore (A) plotted against the minimum diameter at the base (B). Animals are divided by sex. ................................................................. 288

FIGURE 2.204 Maximum diameter (C) plotted against the minimum diameter (D) both taken at the middle of the horncore. Animals are divided by sex. ................................................................. 288

FIGURE 2.205 Maximum diameter at the base (A) plotted against the length of the horncore (E). Animals are divided by sex. ................................................................. 289

FIGURE 2.206 Maximum diameter at the base (A) plotted against the length of the outer curvature of the horncore (F). Animals are divided by sex. ................................................................. 289

FIGURE 2.207 Maximum diameter at the middle of the horncore (C) plotted against the length (E). Animals are divided by sex. ................................................................. 290

FIGURE 2.208 Maximum diameter at the middle of the horncores (C) plotted against the length of the outer curvature (F). Animals are divided by sex. ................................................................. 290

FIGURE 2.209 Length of the outer curvature (F) plotted against the length of the horncore (E) ................................................................. 291

FIGURE 2.210 Length of the outer curvature (F) plotted against the length of the horncore (E). Specimens are divided by sex. ................................................................. 291

FIGURE 2.211 Breadth of the glenoid cavity (BG) plotted against the greatest length of the processus articularis (GLP) ................................................................. 292

FIGURE 2.212 Breadth of the glenoid cavity (BG) plotted against the shortest distance from the spine to the edge of the glenoid cavity (ASG) ................................................................. 293

FIGURE 2.213 Length of the glenoid cavity (LG) plotted against the greatest length of the processus articularis (GLP). ................................................................. 293

FIGURE 2.214 Shortest distance from the spine to the edge of the glenoid cavity (ASG) plotted against the smallest length of the collum scapulae (SLC) ................................................................. 294

FIGURE 2.215 Shortest distance from the spine to the edge of the glenoid cavity (ASG) plotted against the greatest length of the processus articularis (GLP) ................................................................. 294

FIGURE 2.216 Diameter of the trochlear constriction (HTC) plotted against the breadth of the trochlea (BT). ................................................................. 295

FIGURE 2.217 Height of the trochlea (HT) plotted against its breadth (BT). ................................................................. 295

FIGURE 2.218 Breadth from the lateral crest to the capitulum (BE) plotted against the breadth of the trochlea (BT). ................................................................. 296

FIGURE 2.219 Height of the trochlea (HT) plotted against the breadth of the capitulum (BE). ................................................................. 297

FIGURE 2.220 Breadth of the epicondylus lateralis (BEI) plotted against the distal breadth (BD). ................................................................. 297

FIGURE 2.221 Breadth of the epicondylus lateralis (BEI) plotted against the depth of the trochlea (DD). ................................................................. 298

XXXVIII
FIGURE 2.222 Diameter of the trochlear constriction (HTC) plotted against the breadth of the capitulum (BE). ................................................................. 298
FIGURE 2.223 Breadth of the epicondylus lateralis (BEI) plotted against the breadth of the trochlea (BT). .................................................................................. 299
FIGURE 2.224 Breadth of the proximal articulation (BP) plotted against the breadth of the facies articularis proximalis (BFP). ......................................................... 300
FIGURE 2.225 Greatest length (GL) plotted against the smallest depth of the shaft (SD)............... 300
FIGURE 2.226 Depth across the processus anconaeus to the caudal border (DPA) plotted against the greatest breadth across the coronoid process (BPC). ................................................................. 301
FIGURE 2.227 Smallest depth of the olecranon (SDO) plotted against greatest breadth across the coronoid process (BPC). ........................................................................ 302
FIGURE 2.228 Length of the olecranon (L) plotted against its breadth (B). ................................................. 302
FIGURE 2.229 Diameter of the external trochlea of the medial condyle (1) plotted against the medio-lateral width of the medial condyle (A) ....................................................... 303
FIGURE 2.230 Diameter of the external trochlea of the lateral condyle (4) plotted against the medio-lateral width of the lateral condyle (B). ..................................................... 303
FIGURE 2.231 Diameter of the verticillus on the medial condyle (2) plotted against the diameter of the external trochlea of the medial condyle (1). .................................................. 304
FIGURE 2.232 Diameter of the verticillus on the lateral condyle (5) plotted against the diameter of the external trochlea of the lateral condyle (4). .................................................. 305
FIGURE 2.233 Greatest length (GL) plotted against the smallest depth of the shaft (SD)............... 305
FIGURE 2.234 Greatest length (GL) plotted against the breadth at the fusion point of the distal end (BatF). ...................................................................................... 306
FIGURE 2.235 Greatest length plotted (GL) against the breadth of the distal end (BFD). ................. 306
FIGURE 2.236 Goat. Greatest length (GL) plotted against the breadth of the distal end (BFD).
Specimens divided by sex. ............................................................................................... 307
FIGURE 2.237 Sheep. Greatest length (GL) plotted against the breadth of the distal end (BFD).
Specimens divided by sex. ............................................................................................... 307
FIGURE 2.238 Diameter of the verticillus on the medial condyle (2) plotted against the diameter of the external trochlea of the medial condyle (1). ........................................ 308
FIGURE 2.239 Diameter of the verticillus on the lateral condyle (5) plotted against the diameter of the external trochlea of the lateral condyle (4). ........................................ 309
FIGURE 2.240 Greatest length (GL) plotted against the smallest depth of the shaft (SD)............... 309
FIGURE 2.241 Greatest length (GL) plotted against the breadth at the fusion point of the distal end (BatF). ...................................................................................... 310
FIGURE 2.242 Greatest length (GL) plotted against the breadth of the distal end (BFD). ................. 310
Figure 2.243 Goat. Greatest length (GL) plotted against the breadth of the distal end (BFD). Specimens are divided by sex. ................................................................. 311

Figure 2.244 Sheep. Greatest length (GL) plotted against the breadth of the distal end (BFD). Specimens are divided by sex. ................................................................. 311

Figure 2.245 Depth of the distal end on the medial side (Dda) plotted against the depth of the distal end on the lateral side (Ddb). ......................................................... 312

Figure 2.246 Depth of the distal end on the medial side (Dda) plotted against the breadth of the distal end (BD). ................................................................................. 313

Figure 2.247 Greatest length (GL) plotted against the smallest depth of the shaft (SD) .......... 313

Figure 2.248 Breadth of the distal end (BD) plotted against the greatest length of the lateral half (GLL). ................................................................................................................. 314

Figure 2.249 Height at the central constriction (H) plotted against the greatest depth of the lateral half (DL). ................................................................................................. 314

Figure 2.250 Height at the central constriction (H) plotted against the breadth of the distal end (BD). ................................................................................................. 315

Figure 2.251 Smallest breadth of the plantar trochlea (BpT) plotted against the greatest depth of the lateral half (DL) ........................................................................ 315

Figure 2.252 Length of the articular facet of the os malleolare (C) plotted against length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). .......................................................... 316

Figure 2.253 Length of the articular facet of the os malleolare (C) plotted against its breadth (B). .................................................................................................................. 316

Figure 2.254 Greatest length (GL) plotted against the greatest depth of the substentaculum tali (DS). ........................................................................................................... 317

Figure 2.255 Length of the articular facet of the os malleolare (C) plotted against the greatest depth of the substentaculum tali (DS) ......................................................... 317

Figure 2.256 Greatest diagonal length of the sole (DLS) plotted against the middle breadth of the sole (MBS) .............................................................................................. 318

Figure 2.257 Maximum diameter taken at the base (A) plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. Redrawn from Salvagno and Albarella 2017. .............................................................................. 319

Figure 2.258 Ratio between the length (E) and the length of the outer curvature (F) plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. Redrawn from Salvagno and Albarella 2017. ................................................... 320

Figure 2.259 Ratio between the shortest distance from the base of spine to the edge of the glenoid cavity (ASG) and the breadth of the glenoid cavity (BG) plotted against the ratio between the


FIGURE 2.270 Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Redrawn from Salvagno and Albarella 2017. ................................................................. 328

FIGURE 2.271 Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Redrawn from Salvagno and Albarella 2017. ................................................................. 329

FIGURE 2.272 Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Redrawn from Salvagno and Albarella 2017. ................................................................. 330

FIGURE 2.273 Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Redrawn from Salvagno and Albarella 2017. ................................................................. 330

FIGURE 2.274 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side of the distal articulation. Redrawn from Salvagno and Albarella 2017. ......................................................................................................................................... 331

FIGURE 2.275 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Redrawn from Salvagno and Albarella 2017. ...... 332

FIGURE 2.276 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Redrawn from Salvagno and Albarella 2017. ......... 333

FIGURE 2.277 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against a ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Redrawn from Salvagno and Albarella 2017. ...... 333

FIGURE 2.278 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) and the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Redrawn from Salvagno and Albarella 2017. ................................................................. 334

FIGURE 2.279 Ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os malleolare (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Redrawn from Salvagno and Albarella 2017... 335

FIGURE 2.280 Ratio between the depth of the substentaculum talii (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Redrawn from Salvagno and Albarella 2017. ......................................................................................................................................... 335
FIGURE 2.281 Ratio between the depth of the *substentaculum tali* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare*. Redrawn from Salvagno and Albarella 2017. 336

FIGURE 2.282 Greatest diagonal length of the sole (DLS) plotted against the ratio between the greatest diagonal length (DLS) and the middle breadth (MBS) of the sole. Redrawn from Salvagno and Albarella 2017. 336

FIGURE 2.283 Horncore: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 347

FIGURE 2.284 Scapula: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 350

FIGURE 2.285 Humerus: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 353

FIGURE 2.286 Radius: scatterplot of the individual discriminant scores. 355

FIGURE 2.287 Ulna: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 358

FIGURE 2.288 Metacarpal: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 360

FIGURE 2.289 Metatarsal: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 363

FIGURE 2.290 Tibia: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 366

FIGURE 2.2.291 Astragalus: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 368

FIGURE 2.292 Calcaneum: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 371

FIGURE 2.293 3rd phalanx: MBS plotted against DLS shows the presence of multicollinearity. 372

FIGURE 2.294 3rd phalanx: scatterplot of the individual discriminant scores. Redrawn from Salvagno and Albarella 2017. 374

FIGURE 2.295 Horncore: scatterplot of the individual component scores. 377

FIGURE 2.296 Scapula: scatterplot of the individual discriminant score for component I and component II. 380

FIGURE 2.297 Scapula: scatterplot of the individual component scores for component I. 380

FIGURE 2.298 Scapula: rotated variable loadings for component I and II. 381

FIGURE 2.299 Humerus: individual component scores for component I and II. 384

FIGURE 2.300 Humerus: rotated variable loadings for each component. 385

FIGURE 2.301 Radius: scatterplot of the individual component scores for component I and II. 387


FIGURE 3.9 MAXIMUM DIAMETER TAKEN AT THE BASE (A) PLOTTED AGAINST A RATIO BETWEEN THE LENGTH (E) AND THE LENGTH OF THE OUTER CURVATURE (F) OF THE HORNCORE. THE MODERN DATA ARE REPRESENTED BY THE SQUARE EMPTY SYMBOL, BLUE FOR MODERN GOATS, RED FOR MODERN SHEEP, WHILE THE ARCHAEOLOGICAL MATERIAL IS REPRESENTED BY THE FILLED DOT SYMBOL: BLUE FOR GOATS, RED FOR SHEEP AND GREEN FOR SHEEP/GOAT. 431


FIGURE 3.14 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9.......................................................... 436

FIGURE 3.15 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlea constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9 ......................................................... 437

FIGURE 3.16 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.9 .............................................. 437

FIGURE 3.17 Ratio between the breadth of the facies articularis proximalis (BFp) and the breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.9 ........................................................................................................ 438

FIGURE 3.18 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the ratio between the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.9 ........................................................................................................ 438

FIGURE 3.19 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9 .......................................................... 439

FIGURE 3.20 Metacarpal. Ratio between the diameter of the external trochlea of the lateral trochlea (4) and the medio-lateral width of the lateral condyle (B) and plotted against the ratio between the diameter of the external trochlea of the lateral trochlea (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.9 ....................................................... 439

FIGURE 3.21 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9 .......................................................... 440

FIGURE 3.22 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.9 ....................................................... 440

FIGURE 3.23 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side to the distal end. Symbols explained in Fig. 3.9 .......................................................... 441

FIGURE 3.24 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9 .......................................................... 441
FIGURE 3.25 Ratio between the height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.9.......................... 442

FIGURE 3.26 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.9.......................... 442

FIGURE 3.27 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) plotted against the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.9.......................... 443

FIGURE 3.28 Ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare* plotted against the ratio between the length of the articular facet of the *os malleolare* (C) and the length taken from the articular facet of the *os malleolare* to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9.......................... 443

FIGURE 3.29 Ratio between the depth of the *substentaculum tali* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the length from the articular facet of the *os malleolare* to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9.......................... 444

FIGURE 3.30 Ratio between the depth of the *substentaculum tali* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare*. Symbols explained in Fig. 3.9.......................... 444

FIGURE 3.31 Maximum diameter taken at the base (A) plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.9............ 445

FIGURE 3.32 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.9............ 445

FIGURE 3.33 Ratio between the greatest length of the *processus articularis* (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the *processus articularis* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9............ 446

FIGURE 3.34 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the *collum scapulae* (SLC) plotted against a ratio between the greatest length of the *processus articularis* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9............ 446

FIGURE 3.35 Ratio between the breadth of the trochlea (BT) and its greatest height (HT) plotted against the ratio between the breadth of the trochlea (BT) and the diameter of the trochlear constriction (HTC). Symbols explained in Fig. 3.9.......................... 447
FIGURE 3.36 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. ................................. 447

FIGURE 3.37 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. ......................................................... 448

FIGURE 3.38 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.9. ........................................ 448

FIGURE 3.39 Ratio between the breadth of the facies articularis proximalis (BFP) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.9. .......................................................................................................................... 449

FIGURE 3.40 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.9. .......................................................................................................................... 449

FIGURE 3.41 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9. .......................................................................................................................... 450

FIGURE 3.42 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.9. .......................................................................................................................... 450

FIGURE 3.43 Metacarpal. Ratio between the greatest breadth of the distal end (BFd) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.9. .......................................................................................................................... 451

FIGURE 3.44 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9. .......................................................................................................................... 451

FIGURE 3.45 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.9. .......................................................................................................................... 452
FIGURE 3.46 Metatarsal. Ratio between the greatest breadth of the distal end (BFd) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.9. ............................................................ 452

FIGURE 3.47 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDa) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.9. ................................. 453

FIGURE 3.48 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.9. .................................. 454

FIGURE 3.49 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.9. ..................................... 454

FIGURE 3.50 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.9. ............................................ 454

FIGURE 3.51 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) and the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.9. ............................................................ 455

FIGURE 3.52 Ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os malleolare (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9. .................................. 455

FIGURE 3.53 Ratio between the depth of the substentaculum tali (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare. Symbols explained in Fig. 3.9. ............................................. 456

FIGURE 3.54 Ratio between the depth of the substentaculum tali (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9. ................................ 456

FIGURE 3.55 Maximum diameter taken at the base (A) plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.9. .......................................................... 457

FIGURE 3.56 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.9. ............................................. 458

FIGURE 3.57 Ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9. .... 459
FIGURE 3.58 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the collum scapulae (SLC) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9. .............................................. 459

FIGURE 3.59 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trochlear constriction (HTC). Symbols explained in Fig. 3.9. ......................................................................................... 460

FIGURE 3.60 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. ........................................................................................................ 460

FIGURE 3.61 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. ....................................................... 460

FIGURE 3.62 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.9. ........................................................................................................ 461

FIGURE 3.63 Ratio between the breadth of the facies articularis proximalis (BFP) and the breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.9. ........................................................................................................ 461

FIGURE 3.64 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.9. ........................................................................................................ 462

FIGURE 3.65 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the diameter of the external trochlea of the medial condyle (1) and the ratio between the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9. ........................................................................................................ 463

FIGURE 3.66 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the diameter of the external trochlea of the lateral condyle (4) and the ratio between the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.9. ........................................................................................................ 463

FIGURE 3.67 Metacarpal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.9. ........................................................................................................ 464

FIGURE 3.68 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.9. ........................................................................................................ 465
FIGURE 3.69 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9. 466

FIGURE 3.70 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.9. 466

FIGURE 3.71 Ratio between the breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9. 467

FIGURE 3.72 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) and the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9. 467

FIGURE 3.73 Ratio between the breadth (B) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os malleolare (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9. 468

FIGURE 3.74 Ratio between the depth of the substentaculum tali (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare. Symbols explained in Fig. 3.9. 468

FIGURE 3.75 Ratio between the depth of the substentaculum tali (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9. 469

FIGURE 3.76 Maximum diameter taken at the base (A) plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.9. 469

FIGURE 3.77 Ratio between the length (E) and the length of the outer curvature (F) plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.9. 470

FIGURE 3.78 Ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9. 470

FIGURE 3.79 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the collum scapulae (SLC) plotted against a ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9. 471
FIGURE 3.80 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trochlear constriction (HTC). Symbols explained in Fig. 3.9. ................................................................. 472

FIGURE 3.81 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. ................................................................. 472

FIGURE 3.82 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. ................................................................. 473

FIGURE 3.83 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.9. ................................................................. 473

FIGURE 3.84 Ratio between the breadth of the facies articularis proximalis (BFP) and the breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.9. ................................................................. 474

FIGURE 3.85 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.9. ................................................................. 475

FIGURE 3.86 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9. ................................................................. 475

FIGURE 3.87 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle(5). Symbols explained in Fig. 3.9. ................................................................. 476

FIGURE 3.88 Metacarpal. Ratio between the greatest breadth of the distal end (BFd) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.9. ................................................................. 476

FIGURE 3.89 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9. ................................................................. 477

FIGURE 3.90 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio
BETWEEN THE DIAMETER OF THE EXTERNAL TROCHLEA OF THE LATERAL CONDYLE (4) AND THE DIAMETER OF THE VERTICILLUS OF THE LATERAL CONDYLE (5). SYMBOLS EXPLAINED IN Fig. 3.9..........................477

FIGURE 3.91 Metatarsal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). SYMBOLS EXPLAINED IN Fig. 3.9. ..........................................................478

FIGURE 3.92 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side of the distal end. SYMBOLS EXPLAINED IN Fig. 3.9. .........................................................478

FIGURE 3.93 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). SYMBOLS EXPLAINED IN Fig. 3.9..........................479

FIGURE 3.94 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). SYMBOLS EXPLAINED IN Fig. 3.9.......................................................479

FIGURE 3.95 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). SYMBOLS EXPLAINED IN Fig. 3.9..........................480

FIGURE 3.96 Ratio between the height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). SYMBOLS EXPLAINED IN Fig. 3.9..........................480

FIGURE 3.97 Ratio between the length (C) and the breadth (B) of the articular facet of the OS MALLEOLARE plotted against the ratio between the length of the articular facet of the OS MALLEOLARE (C) and the length taken from the articular facet of the OS MALLEOLARE to the end of the articulation-free part of the process (D). SYMBOLS EXPLAINED IN Fig. 3.9.................................................................481

FIGURE 3.98 Ratio between the depth of the SUBSTENTACULUM TALI (DS) and the length of the articular facet of the OS MALLEOLARE (C) plotted against the ratio between the length (C) and taken from the articular facet of the OS MALLEOLARE to the end of the articulation-free part of the process (D). SYMBOLS EXPLAINED IN Fig. 3.9.................................................................481

FIGURE 3.99 Ratio between the depth of the SUBSTENTACULUM TALI (DS) and the length of the articular facet of the OS MALLEOLARE (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the OS MALLEOLARE. SYMBOLS EXPLAINED IN Fig. 3.9..........................482

FIGURE 3.100 Maximum diameter taken at the base (A) of the horncore plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. SYMBOLS EXPLAINED IN Fig. 3.9. ........................................................................482

FIGURE 3.101 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. SYMBOLS EXPLAINED IN Fig. 3.9..........................483
FIGURE 3.102 Ratio between the greatest length of the *processus articolaris* (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the *processus articolaris* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9. 483

FIGURE 3.103 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the *collum scapulae* (SLC) plotted against a ratio between the greatest length of the *processus articolaris* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.9. 484

FIGURE 3.104 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against a ratio between the breadth of the trochlea (BT) and the diameter of the troclear constriction (HTC). Symbols explained in Fig. 3.9. 485

FIGURE 3.105 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. 485

FIGURE 3.106 Ratio between the breadth of the capitulum (BE) and the diameter of the troclear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.9. 486

FIGURE 3.107 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.9. 487

FIGURE 3.108 Ratio between the breadth of the *facies articularis proximalis* (BFp) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.9. 487

FIGURE 3.109 Ratio between the breadth across the coronoid process (BPC) and the depth across the *processus anconaeus* to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.9. 487

FIGURE 3.110 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the *verticillus* of the medial condyle (2). Symbols explained in Fig. 3.9. 488

FIGURE 3.111 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the *verticillus* of the lateral condyle (5). Symbols explained in Fig. 3.9. 489

FIGURE 3.112 Metacarpal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.9. 489
FIGURE 3.113 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.9. ................................. 490

FIGURE 3.114 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.9. ................................. 490

FIGURE 3.115 Metatarsal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.9. ................................. 491

FIGURE 3.116 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.9. ................................. 491

FIGURE 3.117 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9. ................................. 492

FIGURE 3.118 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.9. ................................. 492

FIGURE 3.119 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9. ................................. 493

FIGURE 3.120 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) plotted against the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.9. ................................. 493

FIGURE 3.121 Ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os malleolare (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9. ................................. 494

FIGURE 3.122 Ratio between the depth of the substantaculum talii (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.9. ................................. 494

FIGURE 3.123 Ratio between the depth of the substantaculum talii (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare. Symbols explained in Fig. 3.9. ................................. 495
FIGURE 3.124 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the horncore (from Salvagnano and Albarella 2019). .................................................. 547

FIGURE 3.125 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the horncore when variables E and F were excluded (from Salvagnano and Albarella 2019). .................................................................................................................. 547

FIGURE 3.126 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the scapula. Blue arrows indicate the position of the two archaeological goats (from Salvagnano and Albarella 2019). ........................................................................................................ 549

FIGURE 3.127 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the humerus (from Salvagnano and Albarella 2019). .......................................................... 550

FIGURE 3.128 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the radius (from Salvagnano and Albarella 2019). .......................................................... 552

FIGURE 3.129 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the radius when variables GL and SD were excluded (from Salvagnano and Albarella 2019). .................................................................................................................. 552

FIGURE 3.130 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the ulna (from Salvagnano and Albarella 2019). .......................................................... 554

FIGURE 3.131 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the ulna when variables B and L were excluded (from Salvagnano and Albarella 2019). .................................................................................................................. 555

FIGURE 3.132 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the metacarpal (from Salvagnano and Albarella 2019). .......................................................... 557

FIGURE 3.133 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the metacarpal when variables GL and SD were excluded (from Salvagnano and Albarella 2019). .................................................................................................................. 557

FIGURE 3.134 Diagram of the individual discriminant scores attributed to archaeological material by DA for the metatarsal (from Salvagnano and Albarella 2019). .......................................................... 559

FIGURE 3.135 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the metatarsal when variables GL and SD were excluded (from Salvagnano and Albarella 2019). .................................................................................................................. 559

FIGURE 3.136 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the tibia (from Salvagnano and Albarella 2019). .......................................................... 562

FIGURE 3.137 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the tibia when variable GL was excluded. .......................................................... 562

FIGURE 3.138 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the tibia when variables GL and SD were excluded (from Salvagnano and Albarella 2019). .................................................................................................................. 563
FIGURE 3.139 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the astragalus (from Salvagno and Albarella 2019). ........................................... 564

FIGURE 3.140 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the calcaneum (from Salvagno and Albarella 2019). ........................................... 565

FIGURE 3.141 Diagram of the individual discriminant scores attributed to the archaeological material by DA for the calcaneum when variables GL and BS were excluded. ........................................... 566

FIGURE 3.142 Goat horncores from King’s Lynn. On the left: cut and chop marks at the base of the horncore, evidence for the removal of the keratinous sheath which covered the bony core. On the right: example of goat horncore with tip sawn (photos by LS). ........................................... 572

FIGURE 3.143 Location map of the site in relation to modern streets (image reprinted with permission from City of Lincoln Council, from: Perrin, D. Early medieval occupation at Flaxengate Lincoln. The archaeology of Lincoln, IX-1. London: Council for British Archaeology for the Lincoln Archaeological Trust, copyright 1981). ................................................................................ 574

FIGURE 3.144 Number of fragments by phases identified by O’Connor (image reprinted with permission from Terry O’Connor, from: O’Connor, T. Animal Bones from Flaxengate, Lincoln c. 870-1500. The archaeology of Lincoln, XVIII-1. London: Council for British Archaeology for the Lincoln Archaeological Trust, copyright 1982). ............................................................................................... 576

FIGURE 3.145 Maximum diameter taken at the base (A) of the horncore plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. The modern data are represented by the square empty symbol: blue for modern goats and red for modern sheep. The archaeological material is represented by the filled dot symbol: blue for goats, red for sheep and green for sheep/goat. ........................................................................................................ 581

FIGURE 3.146 Maximum diameter taken at the middle (C) of the horncore plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.145. ........................................................................................................ 581

FIGURE 3.147 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F)of the horncore. Symbols explained in Fig. 3.145. .......................... 582

FIGURE 3.148 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the middle (C) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.145. .......................... 582

FIGURE 3.149 Ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG). Symbols explained in Fig. 3.145. .......................... 583

FIGURE 3.150 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the collum scapulae (SLC) plotted against a

**Figure 3.151** Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trocholear constriction (HTC). Symbols explained in Fig. 3.145. .................................................................................................................. 584

**Figure 3.152** Ratio between the breadth of the *capitulum* (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the *capitulum* (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.145................................................................. 584

**Figure 3.153** Ratio between the breadth of the *capitulum* (BE) and the diameter of the trocholear constriction (HTC) plotted against the ratio between the breadth of the *capitulum* (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.145................................................................. 585

**Figure 3.154** Ratio between the breadth of the epicondyle *lateralis* (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle *lateralis* (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.145................................................................. 585

**Figure 3.155** Ratio between the breadth of the *facies articularis proximalis* (BFP) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.145................................................................. 585

**Figure 3.156** Ratio between the breadth across the coronoid process (BPC) and the depth across the *processus anconaeus* to the caudal border (DPA) plotted against the ratio between the breadth across the coronoid process (BPC) and the smallest depth of the *olecranon* (SDO). Symbols explained in Fig. 3.145................................................................. 586

**Figure 3.157** Metacarpal. Ratio between the diameter of the external trocholea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trocholea of the medial condyle (1) and the diameter of the *verticillus* of the medial condyle (2). Symbols explained in Fig. 3.145................................................................. 586

**Figure 3.158** Metacarpal. Ratio between the diameter of the external trocholea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trocholea of the lateral condyle (4) and the diameter of the *verticillus* of the lateral condyle (5). Symbols explained in Fig. 3.145................................................................. 587

**Figure 3.159** Metacarpal. Ratio between the greatest breadth of the distal end (BFd) and the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.145................................................................. 588

**Figure 3.160** Metatarsal. Ratio between the diameter of the external trocholea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trocholea of the medial condyle (1) and the diameter of the *verticillus* of the medial condyle (2). Symbols explained in Fig. 3.145................................................................. 588
Figure 3.161 Metatarsal. Ratio between the diameter of external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (b) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the *verticillus* of the lateral condyle (5). Symbols explained in Fig. 3.145.

Figure 3.162 Metatarsal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.145.

Figure 3.163 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.145.

Figure 3.164 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.145.

Figure 3.165 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.145.

Figure 3.166 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.145.

Figure 3.167 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) plotted against the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.145.

Figure 3.168 Ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare* plotted against the ratio between the length of the articular facet of the *os malleolare* (C) and the length taken from the articular facet of the *os malleolare* to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.145.

Figure 3.169 Ratio between the depth of the *substantaculum tali* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare*. Symbols explained in Fig. 3.145.

Figure 3.170 Ratio between the depth of the *substantaculum tali* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the the length taken from the articular facet of the *os malleolare* to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.145.

Figure 3.171 Greatest diagonal length of the sole (DLS) plotted against a ratio between the greatest diagonal length of the sole (DLS) and the middle breadth of the sole (MBS). Symbols explained in Fig. 3.145.
FIGURE 3.172 Ratio between the greatest length of the *processus articularis* (GLP) and the length of
the glenoid cavity (LG) plotted against the ratio between the greatest length of the *processus
articolaris* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.145. 595

FIGURE 3.173 Ratio between the shortest distance from the base of the spine to the edge of the
glenoid cavity (ASG) and the smallest length of the *collum scapulae* (SLC) plotted against a
ratio between the greatest length of the *processus articularis* (GLP) and the breadth of the
glenoid cavity (BG). Symbols explained in Fig. 3.145. ................................................................. 595

FIGURE 3.174 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against
the breadth of the trochea (BT) and the diameter of the trochelear constriction (HTC). Symbols
explained in Fig. 3.145. .................................................................................................................. 596

FIGURE 3.175 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted
against the ratio between the breadth of the capitulum (BE) and the breadth of the trochea
(BT). Symbols explained in Fig. 3.145......................................................................................... 596

FIGURE 3.176 Ratio between the breadth of the capitulum (BE) and the diameter of the trochea
constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the
breadth of the distal end (BD). Symbols explained in Fig. 3.145 .................................................. 597

FIGURE 3.177 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the
trochea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI)
and the breadth of the distal end (BD). Symbols explained in Fig. 3.145 ........................................ 597

FIGURE 3.178 Ratio between the breadth of the facies articularis proximalis (BFP) and the greatest
breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols
explained in Fig. 3.145 ............................................................................................................... 598

FIGURE 3.180 Metacarpal. Ratio between the diameter of the external trochea of the medial
condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio
between the diameter of the external trochea of the medial condyle (1) and the diameter of the
verticillus of the medial condyle (2). Symbols explained in Fig. 3.145 ........................................ 599

FIGURE 3.181 Metacarpal. Ratio between the diameter of the external trochea of the lateral
condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio
between the diameter of the external trochea of the lateral condyle (4) and the diameter of the
verticillus of the lateral condyle (5). Symbols explained in Fig. 3.145 ........................................ 599

FIGURE 3.182 Metacarpal. Ratio between the greatest breadth of the distal end (BFD) with the
greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD)
and the greatest length (GL). Symbols explained in Fig. 3.145 ................................................. 600

LX
FIGURE 3.183 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.145 ......................................................... 600

FIGURE 3.184 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.145 ...................................... 601

FIGURE 3.185 Metatarsal. Ratio between the greatest breadth of the distal end (BfD) and the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.145 .......................................................... 601

FIGURE 3.186 Breadth of the distal end (Bd) plotted against the ratio between the depth of the medial (DDa) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.145 ................. 601

FIGURE 3.187 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (Bd) and the height at the central constriction (H). Symbols explained in Fig. 3.145 .................................................. 602

FIGURE 3.188 Ratio between the length (c) and the breadth (b) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os malleolare (c) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (d). Symbols explained in Fig. 3.145 ................................. 603

FIGURE 3.189 Ratio between the depth of the substentaculum talii (DS) and the length of the articular facet of the os malleolare (c) plotted against the ratio between the length (c) and the breadth (b) of the articular facet of the os malleolare. Symbols explained in Fig. 3.145 ............................... 603

FIGURE 3.190 Ratio between the depth of the substentaculum talii (DS) and the length of the articular facet of the os malleolare (c) plotted against the ratio between the length (c) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (d). Symbols explained in Fig. 3.145 ........................................ 604

FIGURE 3.191 Ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.145. 605

FIGURE 3.192 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the collum scapulae (SLC) plotted against the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.145. .............................................................................. 605

FIGURE 3.193 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trochllear constriction (HTC). Symbols explained in Fig. 3.145. .......................................................................................................................... 606
FIGURE 3.194 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.145. 606

FIGURE 3.195 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.145. 607

FIGURE 3.196 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.145. 607

FIGURE 3.197 Ratio between the breadth of the facies articularis proximalis (BFP) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.145. 608

FIGURE 3.198 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.145. 608

FIGURE 3.199 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.145. 609

FIGURE 3.200 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.145. 609

FIGURE 3.201 Metacarpal. Ratio between the greatest breadth of the distal end (BD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.145. 610

FIGURE 3.202 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.145. 610

FIGURE 3.203 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.145. 611
FIGURE 3.204 Metatarsal. Ratio between the greatest breadth of the distal end (BFd) and the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.145. ........................................................ 611

FIGURE 3.205 Breadth of the distal end (Bd) plotted against the ratio between the depth of the medial (DDa) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.145. ............... 612

FIGURE 3.206 Ratio between the height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (Bd) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.145................................. 613

FIGURE 3.207 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (Bd) and the height at the central constriction (H). Symbols explained in Fig. 3.145................................. 613

FIGURE 3.208 Ratio between breadth of the distal end (Bd) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.145................................. 614

FIGURE 3.209 Ratio between the breadth of the distal end (Bd) and the height at the central constriction (H) plotted against the ratio between the breadth of the distal end (Bd) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.145................................. 614

FIGURE 3.210 Ratio between the length (c) and the breadth (B) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os malleolare (c) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.145................................. 615

FIGURE 3.211 Ratio between the depth of the substentaculum talii (DS) and the length of the articular facet of the os malleolare (c) plotted against the ratio between the length (c) and the breadth (B) of the articular facet of the os malleolare. Symbols explained in Fig. 3.145................................. 615

FIGURE 3.212 Ratio between the depth of the substentaculum talii (DS) and the length of the articular facet of the os malleolare (c) plotted against the ratio between the length (c) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.145................................. 615

FIGURE 3.213 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the horncores (from Salvagno and Albarella 2019). ..... 619

FIGURE 3.214 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the horncores (measurements A and B excluded). .......... 619

FIGURE 3.215 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the horncores when measurements E and F are excluded (from Salvagno and Albarella 2019). ................................................................. 620

FIGURE 3.216 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the scapula (from Salvagno and Albarella 2019). .......... 621

LXIII
FIGURE 3.217 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for humeri (from Salvagnino and Albarella 2019). .........................622
FIGURE 3.218 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the radius (from Salvagnino and Albarella 2019) ...............624
FIGURE 3.219 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the radius when measurements GL and SD are excluded (from Salvagnino and Albarella 2019) .................................................................625
FIGURE 3.220 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the ulna (from Salvagnino and Albarella 2019) ...............627
FIGURE 3.221 Scatterplot of the individual discriminant scores attributed to the modern and archaeological material by DA for the ulna when measurements B and L are excluded (from Salvagnino and Albarella 2019) .................................................................628
FIGURE 3.222 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the metacarpal (from Salvagnino and Albarella 2019) ........630
FIGURE 3.223 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the metacarpal when measurements GL and SD are excluded (from Salvagnino and Albarella 2019) .................................................................630
FIGURE 3.224 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the metatarsal (from Salvagnino and Albarella 2019) ....632
FIGURE 3.225 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the metatarsal when measurements GL and SD are excluded (from Salvagnino and Albarella 2019) .................................................................633
FIGURE 3.226 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the tibia (excluding measurement GL) .....................636
FIGURE 3.227 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the tibia when measurements GL and SD are excluded (from Salvagnino and Albarella 2019) .................................................................636
FIGURE 3.228 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the astragalus (from Salvagnino and Albarella 2019) .....638
FIGURE 3.229 Diagram of the individual discriminant scores attributed to the modern and archaeological material by DA for the calcaneum (from Salvagnino and Albarella 2019) ....639
FIGURE 3.230 Location of the sites and of minor fieldworks. Red arrows indicate the areas where 1994-1997 (left) and 2005 (right) excavations occurred (image reprinted with permission from Northamptonshire Archaeology, now MOLA Northampton, from: Brown, J. Excavations at the corner of Kingswell Street and Woolmonger Street, Northampton. Northamptonshire Archaeology 35: 173-214, copyright 2008). .................................................................................................................647

LXIV
Figure 3.231 List of the written resources and the archaeological evidence attesting crafts at the site (image reprinted with permission from Iain Soden, from: Soden, I. A history of urban regeneration: excavations in advance of development off St Peter’s walk, Northampton, 1994-7. Northamptonshire Archaeology 28: 61-127, copyright 1998-99) ................................................................. 649


Figure 3.233 List of the identified species from the 2005 excavation (image reprinted with permission from Philip Armitage, from: Armitage, P. Mammal, bird and fish bones. In: Excavations at the corner of Kingswell Street and Woolmonger Street, Northampton, J. Brown, Northamptonshire Archaeology 35: 206-208, copyright 2008). ................................................................................ 651

Figure 3.234 Maximum diameter taken at the base (A) of the horncore plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. The modern data are represented by the square empty symbol: blue for modern goats, red for modern sheep. The archaeological material is represented by the filled dot symbol: blue for goats, red for sheep and green for sheep/goat. .............................................................................................................. 655

Figure 3.235 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.234 .................................................. 655

Figure 3.236 Ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG). Symbols explained in Fig. 3.234.... 656

Figure 3.237 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the collum scapulae (SLC) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.234. ................................................................. 656

Figure 3.238 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trochlear constriction (HTC). Symbols explained in Fig. 3.234................................................................. 657

Figure 3.239 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.234........................................................................ 657

Figure 3.240 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlea constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.234. .............................................................................. 658
FIGURE 3.241 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (Bd). Symbols explained in Fig. 3.234 ........................................... 658

FIGURE 3.242 Ratio between the breadth of the facies articularis proximalis (BFp) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.234 ................................................................. 659

FIGURE 3.243 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.234 ................................................................. 659

FIGURE 3.244 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.234 ........................................... 660

FIGURE 3.245 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.234 ........................................... 660

FIGURE 3.246 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.234 ........................................... 661

FIGURE 3.247 Metatarsal. Ratio between the the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.234 ........................................... 661

FIGURE 3.248 Metatarsal. Ratio between the greatest breadth of the distal end (BFd) and the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.234 ........................................... 662

FIGURE 3.249 Breadth of the distal end (Bd) plotted against the ratio between the depth of the medial (DDa) and lateral (Ddb) side of the distal end. Symbols explained in Fig. 3.234 .............................. 662

FIGURE 3.250 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (Bd) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.234 ........................................... 663

FIGURE 3.251 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (Bd) and the height at the central constriction (H). Symbols explained in Fig. 3.234 ........................................... 663
FIGURE 3.252 Ratio between breadth of the distal end (Bd) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234. 664

FIGURE 3.253 Ratio between the breadth of the distal end (Bd) and the height at the central constriction (H) plotted against the ratio between the breadth of the distal end (Bd) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234. 664

FIGURE 3.254 Ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare* plotted against the ratio between the length of the articular facet of the *os malleolare* (C) and the length taken from the articular facet of the *os malleolare* to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.234. 665

FIGURE 3.255 Ratio between the depth of the *substantaculum talii* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the *os malleolare*. Symbols explained in Fig. 3.234. 665

FIGURE 3.256 Ratio between the depth of the *substantaculum talii* (DS) and the length of the articular facet of the *os malleolare* (C) plotted against the ratio between the length (C) and the breadth of the *os malleolare*. Symbols explained in Fig. 3.234. 665

FIGURE 3.257 Greatest diagonal length of the sole (DLS) plotted against a ratio between the greatest diagonal length of the sole (DLS) and the middle breadth of the sole (MBS). Symbols explained in Fig. 3.234. 666

FIGURE 3.258 Ratio between the greatest length of the *processus articularis* (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the *processus articularis* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.234. 667

FIGURE 3.259 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the *collum scapulae* (SLC) plotted against a ratio between the greatest length of the *processus articularis* (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.234. 668

FIGURE 3.260 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the troclear constriction (HTC). Symbols explained in Fig. 3.234. 669

FIGURE 3.261 Ratio between the breadth of the *capitulum* (BE) and the distal breadth (Bd) plotted against the ratio between the breadth of the *capitulum* (BE) and the breadth of the trochea (BT). Symbols explained in Fig. 3.234. 669

FIGURE 3.262 Ratio between the breadth of the *capitulum* (BE) and the diameter of the troclear constriction (HTC) plotted against the ratio between the breadth of the *capitulum* (BE) and the breadth of the trochea (BT). Symbols explained in Fig. 3.234. 670
Figure 3.263 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (Bd). Symbols explained in Fig. 3.234. ............................ 670

Figure 3.264 Ratio between the breadth of the facies articularis proximalis (BFp) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.234. ................................................................................... 671

Figure 3.265 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.234. ....................................................................... 671

Figure 3.266 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the diameter of the external trochlea of the medial condyle (1) and the ratio between the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.234.......................................................... 672

Figure 3.267 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.234........................................................................ 672

Figure 3.268 Metacarpal. Ratio between the greatest breadth of the distal end (BFd) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.234. ......................................................... 673

Figure 3.269 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.234................................. 673

Figure 3.270 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.234.................................................. 674

Figure 3.271 Breadth of the distal end (Bd) plotted against the ratio between the depth of the medial (DDa) and lateral (Ddb) side of the distal end. Symbols explained in Fig. 3.234............ 674

Figure 3.272 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (Bd) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234.................................................. 675

Figure 3.273 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (Bd) and the height at the central constriction (H). Symbols explained in Fig. 3.234............................. 675
FIGURE 3.274 Ratio between breadth of the distal end (Bd) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234. ................................. 676

FIGURE 3.275 Ratio between the breadth of the distal end (Bd) and the height at the central constriction (H) plotted against the ratio between the breadth of the distal end (Bd) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234. ................................. 676

FIGURE 3.276 Ratio between the length (C) and the breadth (B) of the articular facet of the Os malleolare plotted against the ratio between the length of the articular facet of the Os malleolare (C) and the length taken from the articular facet of the Os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.234. ............................. 677

FIGURE 3.277 Ratio between the depth of the substentaculum tali (DS) and the length of the articular facet of the Os malleolare (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the Os malleolare. Symbols explained in Fig. 3.234. ................................. 677

FIGURE 3.278 Ratio between the depth of the substentaculum tali (DS) and the length of the articular facet of the Os malleolare (C) plotted against the ratio between the length (C) and the breadth of the articulation-free part of the process (D). Symbols explained in Fig. 3.234. ................................. 678

FIGURE 3.279 Greatest diagonal length of the sole (DLS) plotted against a ratio between the greatest diagonal length of the sole (DLS) and the middle breadth of the sole (MBS). Symbols explained in Fig. 3.234. ............................................................................................................................... 678

FIGURE 3.280 Ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.234. ................................. 679

FIGURE 3.281 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trochlear constriction (HTC). Symbols explained in Fig. 3.234. ............................................................................................................................... 680

FIGURE 3.282 Ratio between the breadth of the capitulum (BE) and the distal breadth (Bd) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.234. ............................................................................................................................... 680

FIGURE 3.283 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.234. ............................................................................................................................... 681

FIGURE 3.284 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (Bd). Symbols explained in Fig. 3.234. ............................................................................................................................... 681
FIGURE 3.285 Ratio between the breadth of the facies articularis proximalis (BFp) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.234. .......................................................... 682

FIGURE 3.286 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.234. .................................................. 682

FIGURE 3.287 Metacarpal. Ratio between the the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.234. .................................................................. 683

FIGURE 3.288 Metacarpal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.234. .......................................................... 683

FIGURE 3.289 Metatarsal. Ratio between the diameter of the external trochle of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the verticillus of the medial condyle (2). Symbols explained in Fig. 3.234. .................................................................. 684

FIGURE 3.290 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (B) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the verticillus of the lateral condyle (5). Symbols explained in Fig. 3.234. .................................................................. 684

FIGURE 3.291 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDA) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.234. ................. 685

FIGURE 3.292 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.234. .......................................................... 685

FIGURE 3.293 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.234. .......................................................... 686

FIGURE 3.294 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.234. .......................................................... 686

FIGURE 3.295 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLl). Symbols explained in Fig. 3.234. .......................................................... 687
FIGURE 3.296 Greatest diagonal length of the sole (DLS) plotted against a ratio between the greatest diagonal length of the sole (DLS) and the middle breadth of the sole (MBS). Symbols explained in Fig. 3.234. ................................................................. 687

FIGURE 3.297 Maximum diameter taken at the base (A) of the horncore plotted against a ratio between the length (E) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.234. ................................................................. 688

FIGURE 3.298 Ratio between the length (E) and the length of the outer curvature (F) of the horncore plotted against the ratio between the maximum diameter taken at the base (A) and the length of the outer curvature (F) of the horncore. Symbols explained in Fig. 3.234. ................................. 688

FIGURE 3.299 Ratio between the greatest length of the processus articularis (GLP) and the length of the glenoid cavity (LG) plotted against the ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.234. 689

FIGURE 3.300 Ratio between the shortest distance from the base of the spine to the edge of the glenoid cavity (ASG) and the smallest length of the collum scapulae (SLC) plotted against a ratio between the greatest length of the processus articularis (GLP) and the breadth of the glenoid cavity (BG). Symbols explained in Fig. 3.324. ........................................... 689

FIGURE 3.301 Ratio between the breadth of the trochlea (BT) and its height (HT) plotted against the breadth of the trochlea (BT) and the diameter of the trochlear constriction (HTC). Symbols explained in Fig. 3.234. ................................................................. 690

FIGURE 3.302 Ratio between the breadth of the capitulum (BE) and the distal breadth (BD) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.234................................................................. 690

FIGURE 3.303 Ratio between the breadth of the capitulum (BE) and the diameter of the trochlear constriction (HTC) plotted against the ratio between the breadth of the capitulum (BE) and the breadth of the trochlea (BT). Symbols explained in Fig. 3.234................................................................. 691

FIGURE 3.304 Ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the trochlea (BT) plotted against the ratio between the breadth of the epicondyle lateralis (BEI) and the breadth of the distal end (BD). Symbols explained in Fig. 3.234. ................................................................. 691

FIGURE 3.305 Ratio between the breadth of the facies articularis proximalis (BFp) and the greatest breadth of the proximal end (BP) plotted against the depth of the proximal end (DP). Symbols explained in Fig. 3.234. ................................................................. 692

FIGURE 3.306 Ratio between the breadth across the coronoid process (BPC) and the depth across the processus anconaeus to the caudal border (DPA) plotted against the breadth across the coronoid process (BPC) and the smallest depth of the olecranon (SDO). Symbols explained in Fig. 3.234. ................................................................. 692

FIGURE 3.307 Metacarpal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio

LXXI
BETWEEN THE DIAMETER OF THE EXTERNAL TROCHLEA OF THE MEDIAL CONDYLE (1) AND THE DIAMETER OF THE VERTICILLUS OF THE MEDIAL CONDYLE (2). SYMBOLS EXPLAINED IN Fig. 3.234.............................................. 693

Figure 3.308 Metacarpal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (b) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the VERTICILLUS of the lateral condyle (5). Symbols explained in Fig. 3.234.............................................. 694

Figure 3.309 Metacarpal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.234.............................................. 694

Figure 3.310 Metatarsal. Ratio between the diameter of the external trochlea of the medial condyle (1) and the medio-lateral width of the medial condyle (A) plotted against the ratio between the diameter of the external trochlea of the medial condyle (1) and the diameter of the VERTICILLUS of the medial condyle (2). Symbols explained in Fig. 3.234.............................................. 695

Figure 3.311 Metatarsal. Ratio between the diameter of the external trochlea of the lateral condyle (4) and the medio-lateral width of the lateral condyle (b) plotted against the ratio between the diameter of the external trochlea of the lateral condyle (4) and the diameter of the VERTICILLUS of the lateral condyle (5). Symbols explained in Fig. 3.234.............................................. 695

Figure 3.312 Metatarsal. Ratio between the greatest breadth of the distal end (BFD) with the greatest length (GL) plotted against the ratio between the smallest depth of the shaft (SD) and the greatest length (GL). Symbols explained in Fig. 3.234.............................................. 696

Figure 3.313 Breadth of the distal end (BD) plotted against the ratio between the depth of the medial (DDa) and lateral (DDB) side of the distal end. Symbols explained in Fig. 3.234......................... 696

Figure 3.314 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against a ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234......................... 697

Figure 3.315 Ratio between height at the central constriction (H) and the greatest depth of the lateral half (DL) plotted against the ratio between the breadth of the distal end (BD) and the height at the central constriction (H). Symbols explained in Fig. 3.234......................... 697

Figure 3.316 Ratio between breadth of the distal end (BD) and the greatest depth of the lateral half (DL) plotted against the ratio between the greatest depth of the lateral half (DL) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234......................... 698

Figure 3.317 Ratio between the breadth of the distal end (BD) and the height at the central constriction (H) and the ratio between the breadth of the distal end (BD) and the greatest length of the lateral half (GLL). Symbols explained in Fig. 3.234......................... 698

Figure 3.318 Ratio between the length (c) and the breadth (B) of the articular facet of the os malleolare plotted against the ratio between the length of the articular facet of the os
MALLEOLARE (C) AND THE LENGTH TAKEN FROM THE ARTICULAR FACET OF THE OS MALLEOLARE TO THE END OF THE ARTICULATION-FREE PART OF THE PROCESS (D). SYMBOLS EXPLAINED IN FIG. 3.234

**Figure 3.319** Ratio between the depth of the Substantaculum Tali (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the breadth (B) of the articular facet of the os malleolare. Symbols explained in Fig. 3.234

**Figure 3.320** Ratio between the depth of the Substantaculum Tali (DS) and the length of the articular facet of the os malleolare (C) plotted against the ratio between the length (C) and the length taken from the articular facet of the os malleolare to the end of the articulation-free part of the process (D). Symbols explained in Fig. 3.234

**Figure 3.321** Greatest diagonal length of the sole (DLS) plotted against a ratio between the greatest diagonal length of the sole (DLS) and the middle breadth of the sole (MBS). Symbols explained in Fig. 3.234

**Figure 3.322** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the horncore (from Salvagno and Albarella 2019).

**Figure 3.323** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the horncore when variables E and F are excluded (from Salvagno and Albarella 2019).

**Figure 3.324** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the scapula (from Salvagno and Albarella 2019).

**Figure 3.325** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the humerus (from Salvagno and Albarella 2019).

**Figure 3.326** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the radius (from Salvagno and Albarella 2019).

**Figure 3.327** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the radius when variables GL and SD are excluded (from Salvagno and Albarella 2019).

**Figure 3.328** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the ulna (from Salvagno and Albarella 2019).

**Figure 3.329** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the ulna when variables B and L are excluded (from Salvagno and Albarella 2019).

**Figure 3.330** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the metacarpal (from Salvagno and Albarella 2019).

**Figure 3.331** Diagram of the individual discriminant scores attributed to the archaeological material by DA for the metacarpal when variables GL and SD are excluded (Salvagno and Albarella 2019).
FIGURE A3.10 SCAPULA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GLP. ............................................................................................................................................................... 819
FIGURE A3.11 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BT. ............................................................................................................................................................................. 822
FIGURE A3.12 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BD. ............................................................................................................................................................................. 823
FIGURE A3.13 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT HT. ............................................................................................................................................................................. 823
FIGURE A3.14 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT HTC. ............................................................................................................................................................................. 824
FIGURE A3.15 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BE. ............................................................................................................................................................................. 824
FIGURE A3.16 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BEI. ............................................................................................................................................................................. 825
FIGURE A3.17 HUMERUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DD. ............................................................................................................................................................................. 825
FIGURE A3.18 RADIUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT Bp. ............................................................................................................................................................................. 828
FIGURE A3.19 RADIUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BFP. ............................................................................................................................................................................. 829
FIGURE A3.20 RADIUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DP. ............................................................................................................................................................................. 829
FIGURE A3.21 RADIUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GL. ............................................................................................................................................................................. 830
FIGURE A3.22 RADIUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT SD. ............................................................................................................................................................................. 830
FIGURE A3.23 ULNA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT B. ............................................................................................................................................................................. 833
FIGURE A3.24 ULNA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT L. ............................................................................................................................................................................. 834
FIGURE A3.25 ULNA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT SDO. ............................................................................................................................................................................. 834
FIGURE A3.26 ULNA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DPA. ............................................................................................................................................................................. 835
FIGURE A3.27 ULNA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BPC. ............................................................................................................................................................................. 835
FIGURE A3.28 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement GL. .................................................................................................................. 841
FIGURE A3.29 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement SD. .................................................................................................................. 841
FIGURE A3.30 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement BFD. .................................................................................................................. 842
FIGURE A3.31 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement BatF. .................................................................................................................. 842
FIGURE A3.32 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement A. .................................................................................................................. 843
FIGURE A3.33 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement B. .................................................................................................................. 843
FIGURE A3.34 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement 1. .................................................................................................................. 844
FIGURE A3.35 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement 2. .................................................................................................................. 844
FIGURE A3.36 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement 4. .................................................................................................................. 845
FIGURE A3.37 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement 5. .................................................................................................................. 845
FIGURE A3.38 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement 3. .................................................................................................................. 846
FIGURE A3.39 Metacarpal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement 6. .................................................................................................................. 846
FIGURE A3.40 Metatarsal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement GL. .................................................................................................................. 852
FIGURE A3.41 Metatarsal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement SD. .................................................................................................................. 852
FIGURE A3.42 Metatarsal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement BFD. .................................................................................................................. 853
FIGURE A3.43 Metatarsal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement BatF. .................................................................................................................. 853
FIGURE A3.44 Metatarsal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement A. .................................................................................................................. 854
FIGURE A3.45 Metatarsal. Box plot for the modern sample of goat (CH) and sheep (OA) for measurement B. .................................................................................................................. 854
FIGURE A3.46 METATARSAL. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT 1. ........................................................................................................................................ 855
FIGURE A3.47 METATARSAL. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT 2. ........................................................................................................................................ 855
FIGURE A3.48 METATARSAL. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT 4. ........................................................................................................................................ 856
FIGURE A3.49 METATARSAL. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT 5. ........................................................................................................................................ 856
FIGURE A3.50 METATARSAL. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT 6. ........................................................................................................................................ 857
FIGURE A3.51 METATARSAL. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT 3. ........................................................................................................................................ 857
FIGURE A3.52 TIBIA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DDA. ........................................................................................................................................ 860
FIGURE A3.53 TIBIA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DDB. ........................................................................................................................................ 861
FIGURE A3.54 TIBIA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BD. ........................................................................................................................................ 861
FIGURE A3.55 TIBIA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GL. ........................................................................................................................................ 862
FIGURE A3.56 TIBIA. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT SD. ........................................................................................................................................ 862
FIGURE A3.57 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BD. ........................................................................................................................................ 866
FIGURE A3.58 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GLM. ........................................................................................................................................ 866
FIGURE A3.59 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GLL. ........................................................................................................................................ 867
FIGURE A3.60 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DM. ........................................................................................................................................ 867
FIGURE A3.61 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DL. ........................................................................................................................................ 868
FIGURE A3.62 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT H. ........................................................................................................................................ 868
FIGURE A3.63 ASTRAGALUS. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BPT. ........................................................................................................................................ 869
FIGURE A3.64 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT BS. ................................................................. 872
FIGURE A3.65 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GL. ................................................................. 873
FIGURE A3.66 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT C. ................................................................. 873
FIGURE A3.67 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT D. ................................................................. 874
FIGURE A3.68 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT B. ................................................................. 874
FIGURE A3.69 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DS. ................................................................. 875
FIGURE A3.70 CALCANEUM. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT GD. ................................................................. 875
FIGURE A3.71 3RD PHALANX. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT DLS. ................................................................. 877
FIGURE A3.72 3RD PHALANX. BOX PLOT FOR THE MODERN SAMPLE OF GOAT (CH) AND SHEEP (OA) FOR MEASUREMENT MBS. ................................................................. 877
FIGURE A6.0.1 SPSS IN ‘VARIABLE VIEW’. WHEN THE FIELD ‘VALUES’ IS CHOSEN, A NEW WINDOW APPEARS IN WHICH THE NUMBERS CORRESPONDING TO THE SAMPLES - IN THIS CASE 0 = MODERN MATERIAL AND 1 = ARCHAEOLOGICAL MATERIAL- CAN BE INPUT. THE NEW VARIABLE HAS TO BE ‘NOMINAL’ AS THE FIELD ‘MEASURE’ SHOWS. ................................................................. 881
FIGURE A6.2 SPSS IN ‘DATA VIEW’. HOW TO CHOOSE AND START RUNNING A DISCRIMINANT ANALYSIS. ........ 881
FIGURE A6.3 SPSS IN ‘DATA VIEW’. BY CLICKING ON ‘DEFINE RANGE’ A NEW WINDOW APPEARS WHERE TO DEFINE THE DIFFERENT GROUPS- 1=GOAT AND 2= SHEEP FOR THE GROUPING VARIABLE ‘TAXA’. ......................... 882
FIGURE A6.4 SPSS IN ‘DATA VIEW’. HOW TO ENTER THE VALUE INDICATING THE MODERN MATERIAL WHEN CLICKING ON ‘SELECTION VARIABLE’. ......................................................... 882
FIGURE A6.5 SPSS IN ‘DATA VIEW’. CLICK ON THE ‘SAVE’ COMMAND AND A NEW WINDOW WILL APPEAR. TICK ‘PREDICTED GROUP MEMBERSHIP’ AND ‘DISCRIMINANT SCORES’. ......................................................... 883
FIGURE A6.6 SPSS IN ‘DATA VIEW’. TWO NEW COLUMNS ARE NOW PRESENT ON THE DATABASE, ONE CONTAINING THE NEW ATTRIBUTION FOR EACH CASE AND THE OTHER CONTAINING THE INDIVIDUAL SCORES. ......................... 883
1 Introduction and background

1.1 Research questions and book structure

‘Many historical essays and books begin with the claim that their subject has been neglected, but in the case of the medieval goat this really is the case. The evidence is scattered and thin, and although historians and archaeologists have devoted some space to this animal there is no study of any length’ (Dyer 2004: 20).

The study of the goat (*Capra hircus*) has been largely disregarded by British archaeologists, and this neglect is due to a number of different reasons. In part it is a methodological problem, related to the difficulty of distinguishing goat remains from those of the more common sheep (*Ovis aries*). At the same time, the relative scarcity of this species in the archaeological records for the Middle Ages (c. 1066-1500 AD) has contributed to the perception that this animal was not important, and therefore not worth analysing in detail.

There are in fact, various important historical and archaeological questions related to the medieval goat that call for an answer, but their understanding is dependent on our ability to identify goat bones accurately. Both historical (Dyer 2004) and archaeological (Albarella 1997) sources indicate a gradual decline of this species in the course of the Middle Ages. Although some hypotheses for this decline have been raised, the dynamics, extent and timing are still far from understood. In addition, from the study of English medieval bone assemblages an intriguing pattern emerges; on the one hand, a scarcity of goat bones and teeth is recorded but, on the other, there is a much greater abundance of horncores. This has led to different hypotheses, such as the possibility of an international trade in goat skins (Albarella 2003). In more general terms, the overall role that the goat played in English medieval husbandry is still far from clear. The goat is, for instance, more commonly recorded in the 11th century Domesday Book than one would expect from its occurrence in the archaeological record (Albarella 1999). Whether the reason behind this discrepancy is due to an overestimation in the written sources, or an under-recording of goat bones by zooarchaeologists, is unclear.

Medieval bone assemblages have been studied by a wide variety of researchers, each possessing highly variable skills in identifying goat bones, and also at different times when different identification criteria were available. The most commonly used morphological criteria for sheep/goat postcranial identification were published over 40 years ago (e.g. Boessneck 1969; Boessneck *et al.* 1964; Kratochvíl 1969), but identification methods based on teeth are much more recent (Halstead *et al.* 2002; Payne 1985). All these criteria have recently been subjected to various refinements and verifications (e.g. Fernández 2001; Fernández 2002; Zeder and Lapham 2010; Zeder and Pilaar 2010).

Despite these contributions, problems still affect the ability of zooarchaeologists to correctly differentiate the two species. For instance, many of the adopted criteria have been established by analysing goat specimens from many different parts of the world, and not all of them necessarily apply to British populations. A further problem is that many criteria are based on morphological differences whose assessment may be highly subjective (visibility and reliability of known morphological traits vary according to different factors: breed and age of the animals, ability and experience of the observer, as well as the completeness of reference collections). In addition, since archaeological reports often include the two taxa (sheep and goat) in a single sheep/goat category, with no or little attempt to separate the
two, it is very difficult to compare sites reliably and also get a realistic overview of the importance of the goat in different regions and at different times in England.

A review of the literature concerning the role that the goat played during the Middle Ages in England, have led to the formulation of the following aims for this study:

1. To determine to what extent the published morphological criteria generally used for the separation of sheep and goat bones are applicable to breeds and populations from England.
2. To establish the degree of influence of factors such as sex and age on the visibility and reliability of morphological criteria.
3. To translate morphological features into biometrical indices, focusing, as much as possible, on central and northern European modern animals.
4. To provide a baseline of modern sheep and goat morphometric data useful to zooarchaeologists.
5. To provide a new methodology based on morphometry, which will:
   I. represent an objective tool for the identification of sheep and goat archaeological bones;
   II. have the potential to be applied beyond the Middle Ages as an additional *Ovis* and *Capra* identification tool.
6. To start a re-assessment of the role that the goat played during the Middle Ages in England by re-analysing a number of English medieval sheep and goat bone assemblages with a proposed new methodology.
7. To reconsider the hypotheses regarding the potential trade in goat horns and skins with the continent during the medieval period.

1.1.1 Description of the structure of this book

This book is divided into two correlated parts: Part I (Chapters 1 and 2) focuses on the development of a new methodology through the study of modern sheep and goat material. Part II (Chapters 3 and 4) presents the application of such new methodology on a number of English medieval sheep and goat assemblages, thus assessing the reliability of previous identifications and estimating the abundance of the goat in such case studies.

Chapter 1 of the book contains:

- an opening section on taxonomy;
- the methodological background in order to contextualise the research questions of the study. In this same section the limits of previous approaches (morphological, biometrical and bio-molecular) are highlighted and the benefits of the proposed new methodology are discussed;
- an evaluation of the historical and archaeological issues regarding the goat in medieval England, beginning with a consideration of the evidence from written sources. The archaeological evidence follows, and an overview of the relative frequency of goats during the Middle Ages is provided. A brief explanation of the main hypotheses concerning the decline of the goat is also included, followed by the analysis of the anatomical representation of this animal in medieval archaeological assemblages.
Chapter 2 of the book contains:

- an in-depth description of the methods and materials. The morphological traits selected from published literature are presented along with the measurements which form the new recording protocol;
- a description of the modern sheep and goat specimens making up the modern samples with the full set of information such as age, sex, breed and degree of completeness;
- the results of the Inter and Intra-Observer Error trial, conducted to verify the replicability and reliability of the measurements included in the new recording protocol;
- the presentation of the results from the analysis of the modern material which includes A) the study of the reliability of the chosen morphological traits, leading to a proposed short-list of the most diagnostic and reliable traits; B) the results of the biometrical analysis which includes linear measurements and biometrical indices as well as statistical analysis (Mann-Whitney U test, Manova test, Discriminant Analysis and Principal Component Analysis);
- general considerations about the results obtained from the application of the new methodology on modern material.

Chapter 3 focuses on the application of the new methodology to a number of medieval English archaeological sheep/goat assemblages. The first case study is the port and town of King’s Lynn in Norfolk, the second case study is represented by the site of Flaxengate, Lincoln and the third and final case study is Woolmonger/Kingswell Street in Northampton. Only some key contexts have been chosen from the late two sites. For all case studies results are presented followed by a discussion of the level of success of the new methodological approach on the archaeological material. A section focusing on the re-assessment of the likely role that the goat had in medieval England in light of the presented results follows. The book then proceeds with an evaluation of how the research could be expanded and improved.

The book concludes with Chapter 4, which summarises the results obtained by this study.

1.2 Taxonomy

The domestic goat *Capra hircus*, belongs to the mammalian order Artiodactyla, suborder Ruminantia, family Bovidae, sub-family Caprinae, tribe Caprini, genus *Capra*. The sheep (*Ovis aries*) is also included in the tribe Caprini, and is therefore closely related to the goat.

The genus *Capra* includes several species (Corbet 1978; Corbet and Hill 1980 in Mason 1984: 87; Willson and Reeder 2005), as shown by Table 1.1.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capra aegagrus</td>
<td>the bezoar or wild goat, the animal which is recognized as the ancestor of the domestic goat</td>
</tr>
<tr>
<td>Capra ibex</td>
<td>the alpine ibex</td>
</tr>
<tr>
<td>Capra caucasica</td>
<td>the west Caucasian tur, sometimes regarded as a subspecies of <em>Capra ibex</em> (<em>C.i. severtzo</em>)</td>
</tr>
<tr>
<td>Capra cylindricornis</td>
<td>the tur of the eastern Caucasus</td>
</tr>
<tr>
<td>Capra pyrenaica</td>
<td>the Spanish ibex or Spanish wild goat</td>
</tr>
<tr>
<td>Capra falconieri</td>
<td>the markhor</td>
</tr>
<tr>
<td>Capra nubiana</td>
<td>the Nubian ibex</td>
</tr>
<tr>
<td>Capra sibirica</td>
<td>the Siberian ibex</td>
</tr>
<tr>
<td>Capra wallie</td>
<td>the Wallia ibex</td>
</tr>
</tbody>
</table>

**Table 1.1 List of species of Capra with their common name.**