NONGEOGRAPHIC VARIATION IN TATERILLUS GRACILIS

(THOMAS) (RODENTIA: CRICETIDAE)

by

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ABSTRACT

Variation in 27 cranial and 6 external body measurements was examined within a single population of the gerbil Taterillus gracilis, in Upper Volta, West Africa. This population will be used in a future analysis of the entire genus.

Intrapopulation comparisons were made within both sexes for five age classes. Analysis was based on univariate statistical methods.

Significant statistical differences were found in age variations and to a lesser degree in sexual differences. It is probable that future analysis can be undertaken without regard for sex. Other factors probably contribute to some of the unexplained variations and these should be determined in examination of additional populations and species. Some will be difficult to quantify and other methods of analysis will be necessary.

This population typifies the recognized variability of small polyestrous rodents and emphasizes the importance of the quantification of any parameters concerned in recognizing morphological features usable in making taxonomic and phylogenetic judgements.

CHAPTER 1

INTRODUCTION

The gerbils are a widespread group of rodents in the family Cricetidae, distributed over much of Africa and Asia (Rosevear, 1969:174). The genus Taterillus is found in Africa south of the Sahara desert, and is primarily a tropical woodland dweller (Rosevear, 1969:203). In Appendix A is a description of the tropical woodlands and Figure 1 shows their geographic locations. Species of Taterillus are found west to the Atlantic ocean in Senegal and Mauritania, east to Ethiopia, and south to the eastern Congo and northern Kenya (Rosevear, 1969:203). Specimens have been collected from the moist Guinea woodland to extremely arid conditions in the Sahel woodland (Dekeyser, 1955:220; Booth, 1960:47; Rosevear, 1969:203). The gerbils have not been found in the closed forest.

Taterillus gracilis Thomas (1892:77-78), the slender gerbil, has been described by Rosevear (1969:174, 206). A summary of his discussion follows. It is small and lightly built, its head and body is about four and one-half inches long and its pencilled tail averages about twenty-five per cent longer. The entire pelage is soft and fine.

Figure 1. Distribution of tropical woodlands in West Africa.

Current major political units are designated by numbers as follows: 1. Mauritania; 2. Senegal; 3. Gambia; 4. Portuguese Guinea; 5. Guinea; 6. Sierra Leone; 7. Liberia; 8. Mali; 9. Ivory Coast; 10. Upper Volta; 11. Ghana; 12. Togo; 13. Dahomey; 14. Algeria; 15. Niger; 16. Nigeria; 17. Cameroon; 18. Libya; 19. Chad; 20. Central African Republic; 21. Congo. Adapted from Rosevear (1965) and Grove (1967).

Figure 1. Distribution of tropical woodlands in West Africa

The dry zone forms are of a characteristic sandy hue. This pale coloration lies solely in the ends of the hairs while the bases are slate. Even the darker, Guinea woodland forms show some tendency to sandiness in the pelage. The underparts are pure white; the backs of both fore and hind feet are white; the ears are fairly large. The tail is pale sandy-brown above to white below for most of its length and the terminal part has long dark hairs forming the pencil. The hindfeet and legs are longer than average for rats and by habit they are somewhat saltatorial. The first and fifth digits of the hindfeet are much shorter than the remaining three. In the forefeet the first digit is rudimentary but clawed; the fifth digit is reduced.

Because of the relatively small geographical area to which this genus is restricted it would seem that the existing species should be well known. However, according to Allen (1939:339-41) and Ellerman (1941:520-22), this is not true. Sixteen species and twenty subspecies are listed of which three species and four subspecies are West African. Setzer (1956:495-500) has changed some of the many named species that occur outside West Africa to subspecific rank. It may well be that the entire group, as suggested by Ellerman (1941:520), is in fact a single polymorphic species. Obviously then, the number of recognized subspecies would be increased. Rosevear (1969:203) was even more convinced that the West African taxa were

actually members of only a single species. Currently, two species are recognized in West Africa, Taterillus gracilis and T. nigeriae (Thomas, 1911:459; Rosevear, 1969:203-205).

According to Rosevear(1966:76-77, 1969:204), Thomas based his description of T. gracilis on a young animal thus giving a false impression of size. In fact, Rosevear (1966:77) states that the type specimen is the smallest of all T. gracilis in the British Museum. Further, in T. g. angelus (Thomas and Hinton, 1920:317), not only is the type young, but apparantly the whole series on which this subspecies was based was quite young or juvenile (Rosevear, 1966:77, 1969:204). Thomas was not consistent and according to Rosevear (1966:77, 1969:204) the series used in the description of T. lacustrus (Thomas and Wroughton, 1907:378) from Lake Chad was composed of all old specimens. Rosevear (1969:204) now assigns them to subspecific rank (T. g. lacustrus). In his study of T. gracilis, Rosevear (1969:205) compounds the problem by calculating grand means for seventy specimens which were based on small samples from scattered localities (Gambia to Nigeria) without regard for subspecies, habitat, age, or sex differences. Also, even the means for a given species or locality did not take into account the age or sex differences. With this in mind, the range of measurements and the mean values derived from them are unfairly distorted. Obviously any size comparisons based on them are unreliable.

Taterillus nigeriae was described originally from a single specimen from Kabwir, Nigeria. To date only a few specimens from Kabwir and Panyam (twenty-five miles apart) have been assigned to this species. Rosevear (1966:76) states that this species description is based on inadequate and inappropriate material. To date, the scarcity of museum specimens has made impossible any attempt to resolve this problem.

Rosevear (1969:203) reports that "almost nothing is known of their lives." In the past few years several hundred of these gerbils have been collected by field teams from the Smithsonian Institution. The following information has been taken from field notes and 'Journals' written by these collectors.

Taterillus prefers to live in open or grassy regions in the Guinea woodland and in turn congregates near permanent or periodic water courses in the Sudan and Sahel woodlands. In all cases they prefer loose sandy soils. Their diet consists mainly of seeds. They occur in association with but are not restricted to peanut fields. The dependence of Taterillus on loose soils is evidenced by their occurrence in cultivated fields throughout a great part of their range. Their abundance, as one goes from Guinea to Sahel woodland increases and this is quite probably due to an increase in suitable habitat, specifically an increase in sandy soils. Taterillus is nocturnal.

The confusion of the above taxa and preliminary examination of many specimens has suggested several points. If one is to agree with Ellerman (1941:520-22) and Rosevear (1969:204) and designate all specimens from West Africa as Taterillus gracilis, two assumptions must be made: (1) there is an extreme variation in measurements within a single species as well as in single populations, and (2) there is wide variation in coloration.

It is not easy to distinguish between Taterillus and other gerbils in the genus Tatera. Their external size, color, and general appearance are very much the same. Members of the genus Taterillus are usually smaller and the tail is always longer than the head and body length with a well developed pencil of hairs. Possible confusion can occur in West Africa where Tatera guinea has both a long tail and a pencil of hairs. Both genera have the soles of their hind feet naked but in some Taterillus there is a narrow band of hairs across the sole. The only character which always separates these genera is found in the skull. In Taterillus the posterior palatine foramina are very nearly as long as the molar tooth row, while in Tatera they are half or less this length.

The purpose of this research was to analyze statistically, variations occurring within a single, large (150+) series from a single population from Upper Volta in West Africa. This includes color,

skull measurements and proportions, body measurements, sex differences, and age variations. Hopefully, the end result is the emergence of several characters which can be utilized not only as direct statistical comparisons to other geographically separated populations but also to separate two or more sympatric species. This research will be used as a basis for a future complete analysis and resulting revision of the species and subspecies in the genus Taterillus.

CHAPTER 2

MATERIALS AND METHODS

A total of 158 specimens of Taterillus gracilis from 6 Km SE Seguenega, Upper Volta, were examined during the course of this investigation. They were prepared by Mr. Ralph E. Vaden from 4 March to 8 March, 1969, and are housed in the African Mammal Project collection of the United States National Museum, Washington, D. C. All are represented by both a skull and study skin.

Age Class Determination

Many methods for age determination in various kinds of mammals exist. Several of these are summarized by Cockrum (1962:33-35). The criteria most utilized in age determination for rodents are pelage changes; weight; cranial suture closing; ossification of bulla; and tooth eruption, development, and wear.

Close inspection of the many cranial and body measurements taken in this study seemed to show trends that appear to be correlated with increasing age. In order to make the statistical analysis as unbiased as possible, none of these measurements were utilized.

The reproductive season of gerbils is variable and an analysis of several related genera shows a trend toward a year round breeding season (Asdell, 1964:309-315). For this reason pelage would not be useful. Weight was also quite variable and was not used. For the initial age classification, a combination of cranial characters were used.

Tooth Structure

According to Petter (1956:419-426, 1959:310-314) and Rosevear (1969:19-20, 175), the cusps are simple and in most gerbils the molars are laminate. This is typified by deep re-entrant folds in the enamel which keeps the lamina from meeting. In some species a slight variation in the re-entrant folds, failure to meet medially, results in an occlusal pattern that is diamond shaped rather than laminate. In Taterillus, both the upper and lower first molars have three lamina, while the upper and lower second molars have only two. The third molars are small, the upper has two lamina while the lower has only one. Petter (1956:419-426) pointed out that tooth wear greatly influences the crown pattern. The cuspidate-lamellate teeth are characteristic of a young animal with little tooth wear. The prismatic or diamond shaped pattern, caused by increasing tooth wear, is seen in older animals. Variations in the depth of the various re-entrant folds result in a wide range of crown patterns. Commonly

the first and second lamina of the first molar are connected at different ages. Thus, the use of a progressive series of wear patterns as judgement for age class determination is not meaningful.

Age Classes

In this study, the lower molar series was found to be most useful in defining age classes. The stage of eruption and degree of wear in the third molar was important. The degree of wear for the entire molar series as determined by comparisons of the depths of the re-entrant folds was also used. The population was divided into five age classes with their distinguishing characteristics as follows:

Age class 1. The upper and lower third molars are not completely erupted. The braincase as well as the bulla are not completely ossified.

Age class 2. The lower third molar just reaches the level of the lowermost limit of the second re-entrant fold in molar one (Figure 2, point A). There is no noticeable tooth wear. The bulla are not completely ossified although the braincase is.

Age class 3. The lower third molar reaches the level of the occlusal surface between molar one and molar two (Figure 2, point B). There is some wear on the first and second molars. The bulla may or may not be completely ossified. The braincase is completely ossified.

Figure 2. Diagram showing criteria of age classes.

The degree of eruption and wear of the lower molars in *Taterillus* and used to define arbitrary age classes as discussed in the text. Note the following points: A. Lower limit of re-entrant folds; B. level of wear of molars 1 and 2; and, C. wear on second lamina of molar 2.

Age class 4. The third lower molar shows some signs of wear and is usually above the level of the occlusal surface between molar one and molar two (Figure 2, point B). The bulla are ossified as shown by their semi-transparent appearance. Wear is very noticeable on molars one and two.

Age class 5. The third lower molar is at the level of or just below the occlusal surface of molar two (Figure 2, point C) and shows considerable wear. The complete molar series also shows advanced wear and in some cases is worn below most of the re-entrant folds. This wear together with the connected lamina produces the prismatic or diamond shaped occlusal pattern.

Baculum Preparation

The techniques used for preparation of the bacula in this study were modified from those reported by Hamilton (1946:378-379), White (1951:125), and Lidicker (1968:610-611) as follows:

Only museum specimens were available for examination. An area of dried skin at the base of the tail was removed from the region that would insure, if the baculum was still present, it would be recovered. Twenty-five per cent recovery was achieved. This piece of dried skin was placed in a vial with 2% KOH with Alizarine Red stain (1 part in 10,000) for twenty-four hours. After separating the baculum from its surrounding tissue it was placed in a fresh solution

of KOH and stain for an additional twelve hours. It was then transferred to 80% glycerine for twenty-four hours and finally into 100% glycerine until mounted. For measurements, the bacula were mounted on a glass slide (White, 1951:125) and imbedded in 'Permunt'. Measurements were taken with the aid of a binocular dissecting microscope equipped with a calibrated ocular micrometer.

The length and diameter of the baculum were used whenever possible to correlate with and substantiate the previous age classes.

Measurements

External Body Measurements

The mammals used in this study were all prepared under field conditions as museum study skins following the procedures given by Setzer (1968:3-14). Before these mammals were prepared the following measurements were taken: (see Cockrum, 1962:29-30; and Setzer, 1968:6-7)

Total length (TOT).

Tail length (TAL).

Length of hind foot (HF).

Length of ear (from notch) (E).

Weight (in grams) (W).

One additional measurement was derived in the lab from the above.

Head and body length (HB). This measurement is calculated by subtracting the Tail length from the Total length.

Unless otherwise noted, all measurements are in millimeters.

Cranial Measurements

Twenty-seven different measurements were made of various parameters of the skull and its parts in an effort to determine all possible aspects of variation. As will be seen below in the definitions of the various cranial measurements, a number of different points were used resulting in values for different aspects of the length, width, and depth of the skull and its parts. Most measurements were taken with the aid of dial calipers and recorded to the nearest 0.01 millimeter. Where possible, measurements involving very short distances were made using a calibrated ocular micrometer in a dissecting microscope to the nearest 0.1 millimeter. These are designated with an asterisk. The following list of measurements, with abbreviations, were adapted from Cockrum (1962:30-33) and are described as follows:

Greatest length of skull (GLS). The overall length from the anterior tip of the nasals to the most posterior projection of the supraoccipital.

Basilar length (BAL). The distance along the midline of the skull, from the posterior margins of the alveoli of the upper incisors to the anterior inferior border of the foramen magnum.

Condylbasilar length (CBAL). The distance, along the midline of the skull, from the posterior margins of the alveoli of the upper incisors to the posterior margin of the condyles.

Occipitonasal length (OCNL). The length from the anterior tip of the nasals to the posterior margin of the condyles.

Zygomatic breadth (ZB). The greatest distance across the zygomatic arches measured perpendicular to the midline of the skull.

Cranial breadth (BBC). The greatest distance across the braincase immediately posterior to the zygomatic arches.

Least interorbital constriction (IOC). The least distance across the top of the skull between the orbits.

Rostral breadth (BR). Width of rostrum taken where the maxillary and premaxillary bones meet on the sides of the rostrum, just anterior to the maxillary processes.

Greatest breadth across the bulla (GBAB). The greatest distance across the widest portion of the bulla, excluding the projections of the external auditory meatus.

Greatest width across the upper molars (Br M1M1). The greatest distance from the buccal sides of the upper molars, taken with the face of the calipers between the second and third lamina of the first molar.

Depth of cranium (DS). Vertical distance from a line connecting the tips of the upper incisors with the most ventral portion of the posterior part of the cranium, to the highest part of the cranium. This measurement was taken by placing the skull on a glass slide of known thickness, then measuring the distance from the lower surface of the glass to the highest point of the skull, then subtracting the thickness of the slide.

Palatilar length (PAL). The distance, in the midventral line of the skull, from the anteriormost border of the interpterygoid fossa to a line connecting the posteriormost margins of the alveoli of the upper incisors.

Postpalatal length (PPAL). The distance, in the midventral line, from the anteriormost border of the interpterygoid fossa, to the anteriormost inferior border of the foramen magnum.

Length of diastema (DAL). The distance from the posteriormost margin of the alveolus of the upper incisors to the anteriormost margin of the alveolus of the first molar.

Length of anterior palatine foramina (LAPF). The greatest length of the anterior palatine foramina.

Length of posterior palatine foramina* (LPPF). The greatest length of the posterior palatine foramina.

Length of palatal bridge (LPB). The distance from a line connecting the posteriormost margins of the anterior palatine foramina to the anteriormost border of the interpterygoid fossa.

Length of nasals (NL). The distance from the anteriormost tip of the nasals to a line connecting the posteriormost extension of the nasal bones.

Length of rostrum (LR). The distance from the anteriormost part of the nasals to a line joining the posteriormost superior part of the infraorbital canals.

Frontonasal length (FNL). The distance from the anteriormost tip of the nasals to the frontoparietal suture.

Interparietal length (IL). The greatest length of the interparietal bone.

Interparietal width* (IW). The greatest width of the interparietal bone.

Length of auditory bulla (LAB). The greatest length of the auditory bulla.

Width of auditory bulla (BAB). The greatest width of the auditory bulla.

Alveolar length of the first molar* (ALM1). Alveolar distance from the anterior border to the posterior border of the first molar.

Alveolar width of the first molar* (AWM1). Alveolar distance across the greatest width of the first molar.

Length of maxillary cheek teeth* (ALM). Alveolar distance from the anterior border of the anterior molar to the posterior border of the posterior molar.

Methods of Analysis

The mean ($\bar{x}$), standard deviation (s), variance (s^2), standard error of the mean ($s_{\bar{x}}$), 95% confidence interval (95% CI), and the coefficient of variation (V) were computed for each measurement. Two way (sex to age class) least squares analysis of variance was also computed utilizing a program adapted to handle unequal individual measurement frequencies within the data. These statistical techniques for population analysis are reviewed in Simpson, Roe, and Lewontin (1960:78-89, 259-260, 277-287). These data are summarized in Figures 3-14, Table 1, and Appendix B. Comparisons of the measurements within each age class and sex as well as of the population as a whole were made following the methods of Hubbs and Hubbs (1953:49-96). These results were compared to those shown by the analysis of variance (Table 1). The significance of the

Table 1. Summary of the Least Squares Analysis of Variance tests.

An asterisk indicates significance at the 0.05 level. For an explanation of abbreviations see p. 13-18.

F VALUES			
Parameter	Age	Sex	Interaction
TOT	100.64*	2.85	0.41
TAL	55.99*	2.96	1.02
HB	133.63*	0.11	0.56
HF	23.68*	7.42*	1.30
E	27.04*	4.33*	1.36
W	131.22*	0.78	0.52
GLS	181.66*	2.20	0.60
BAL	153.49*	0.05	1.06
CBAL	73.37*	7.02*	1.17
OCNL	133.84*	2.88	0.28
ZB	39.91*	0.60	0.67
BBC	41.66*	0.29	0.75
IOC	29.86*	2.38	0.71
BR	56.91*	4.13*	0.27
GBAB	47.13*	5.83*	1.05
Br M1M1	65.86*	0.02	1.64
DS	90.56*	1.38	1.51
PAL	55.60*	1.05	3.28*
PPAL	58.06*	0.00	0.97
DAL	109.46*	0.02	1.27
LAPF	81.40*	5.37*	0.56
LPPF	10.92*	0.18	3.25*
LPB	19.47*	0.25	3.28*
NL	128.19*	0.02	1.89
LR	151.94*	1.06	1.62
FNL	168.72*	0.34	1.10
IL	1.76	0.37	0.65
IW	6.29*	4.70*	0.70
LAB	60.22*	4.40*	1.74
BAB	12.66*	0.33	0.29
ALM1	24.54*	6.87*	0.45
AWM1	2.04	5.90*	0.66
ALM	13.49*	18.34*	0.17

coefficient of variation data was analyzed following Simpson et al. (1960:89-95). All computations were made on the CDC 6400 computer in the Computer Center of the University of Arizona, Tucson, Arizona.

CHAPTER 3

RESULTS AND DISCUSSION

Variability within a given population of small polyestrous rodents has long been recognized. The quantification of such variation resulting from age, sex, and other parameters is all important in recognizing morphological features usable in making taxonomic and phylogenetic judgements.

It has long been recognized that sexual dimorphism in size is well pronounced in many mammals. Ranck (1968:65) treated the sexes of rodents separately "to prevent erroneous conclusions arising from sexual dimorphism."

Most measurable changes in body and skeletal size are associated with an increase in age (Layne, 1968:238-246). Ranck (1968:65-66) among many others also recognized this variability and used only animals of comparable age, eliminating any showing "seasonal characters, pathological conditions, or other abnormalities." To date no investigator has been able to demonstrate meaningful age classes in museum specimens associated with precise units of time such as age 12-18 months, 19-30 months, etc., in any small

polyestrus rodent groups. Rather utilization of arbitrary age classes has been most used (Christianson, 1967:5-6; Setzer, 1969:283-284).

Age Variation

There is no evidence that this sample falls into recognized age groups (such as one year, two years, etc.), rather the Analysis of Variance test indicates that most measurements increase with age (Table 1). Several of the parameters show a steady increase throughout the five arbitrary age classes. These are Total Length, Head and Body Length, Weight, Greatest Length of Skull, Basilar Length, Condylbasilar Length, Occipitonasal Length, Zygomatic Breadth, Depth of Cranium, Width across Upper Molars, Palatilar Length, Postpalatal Length, Length of Diastema, Length of Nasals, Length of Rostrum, Frontonasal Length, Length of Auditory Bulla, Alveolar Length of the First Molar, and the Length of the Maxillary Cheek Teeth (see Appendix B).

When considering the totals for each age class without regard for sex, several parameters show a significant difference at all age classes (Hubbs and Hubbs, 1953:49-96). These are Head and Body, Weight, Greatest Length of Skull, Basilar Length, Condylbasilar Length, Occipitonasal Length, Depth of Cranium, Postpalatal Length, Length of Diastema, Length of Anterior Palatine Foramina, Length

of Nasals, Length of Rostrum, and Frontonasal Length. Five examples are shown in Figures 3-7. Correlation of these measurements with the five age classes could aid in future defining these age classes but no comparison to the actual age of the animals is possible.

The Total Length, Zygomatic Breadth, Width across the Upper Molars, Palatilar Length, Length of Palatal Bridge, Length of Auditory Bulla, Alveolar Length of the First Molar, and Length of the Maxillary Cheek Teeth reach maximum size by age class four. Two examples are shown using the modified graphical methods of Hubbs and Hubbs (1953:49-96) in Figures 8 and 9. The Alveolar Length of the First Molar and the Length of the Maxillary Cheek Teeth seem to increase after age class 3 but this is distorted by a receding in the alveolus and not actually due to an increase in tooth size.

Several parameters seem to reach maximum size at age class 3. These are Tail Length, Cranial Breadth, Least Interorbital Constriction, Rostral Breadth, Greatest Breadth across Bulla, and Length of the Posterior Palatine Foramina. Two examples are shown in Figures 10-11.

A few parameters, some showing variation according to the Analysis of Variance test (Table 1) for age and/or sex, have a very

Figure 3. Length of Head and Body in *Taterillus gracilis*.

Horizontal line indicates the range, vertical line the mean, solid bar the 95% confidence interval. Number in parentheses indicates sample size. Measurements are in millimeters.

Figure 4. Greatest Length of Skull in *Taterillus gracilis*.
For legend see Figure 3.

Figure 5. Basilar Length in *Taterillus gracilis*.
For legend see Figure 3.

Figure 6. Length of Nasals in *Taterillus gracilis*.
For legend see Figure 3.

Figure 7. Frontonasal Length in *Taterillus gracilis*.
For legend see Figure 3.

Figure 8. Total Length in *Taterillus gracilis*.
For legend see Figure 3.

Figure 9. Length of Auditory Bulla in *Taterillus gracilis*.
For legend see Figure 3.

Figure 10. Tail Length in *Taterillus gracilis*.
For legend see Figure 3.

Figure 11. Cranial Breadth in *Taterillus gracilis*.
For legend see Figure 3.

narrow range in size. The Interparietal Length and the Alveolar Width of the First Molar are the only two parameters examined which, according to the Analysis of Variance test (Table 1) show no variation with age (see example in Figure 12). The Length of the Hind Foot, Length of Ear, Interparietal Width, and Width of the Auditory Bulla show no significant increase beyond age class 1 using the graphical analysis methods of Hubbs and Hubbs (1953:49-96). Two examples are shown in Figures 13 and 14.

The above discussion emphasizes the fact that there is a gradual increase in the length, width, and height of the skull as age increases. The overall size of the animal also reflects this increase with age. The utilization of those parameters best showing the various size increases should be useful in future population analysis as well as population and species comparisons.

The measurements which show little fluctuation after age class 3 or 4 should be even more valuable in population, subspecies, and species comparisons.

Sexual Variation

A primary concern in a population analysis is the overall variation in the parameters caused by sex differences. The Analysis of Variance test (Table 1) shows that eleven of these do vary because of sex. These are Length of Hind Foot, Length of Ear, Condylbasilar

Figure 12. Interparietal Length in *Taterillus gracilis*.
For legend see Figure 3.

Figure 13. Length of Hind Foot in *Taterillus gracilis*.
For legend see Figure 3.

Figure 14. Width of Auditory Bulla in *Taterillus gracilis*.
For legend see Figure 3.

Length, Breadth of Rostrum, Greatest Breadth across Bulla, Length of Anterior Palatine Foramina, Interparietal Width, Length of the Auditory Bulla, Alveolar Length of the First Molar, Alveolar Width of the First Molar, and Length of Maxillary Cheek Teeth. Of these only the Alveolar Width of the First Molar varies due to sex alone (Table 1 and Figure 15). The others, in general showing a slight trend toward males being larger than the females, are not significantly different using the methods of Hubbs and Hubbs (1953:49-96). Some are significantly different within only one or two age classes and this probably reflects a bias within the sample tested and not a true reflection of the population variation in regards to sex. In most cases, a comparison of the 'F Values' in the Analysis of Variance test (Table 1) for a given parameter shows that those values for sex are much smaller than those for age. Another factor is that due to the large sample size, significant differences are shown even though the range of measurements is very small, thus no significant value can be placed on these results.

Variability within single Age-Sex Groups

Several parameters show differences between age classes and/or sex groups in an inconsistent manner. For example, in a given parameter the males in age class 4 may be larger than the

Figure 15. Alveolar Width of the First Molar in *Taterillus gracilis*.
For legend see Figure 3.

females while in age class 5 the reverse may be true. Another variation is that both males and females of one age class may be larger than those in the next older age class. These variations do not appear to be the result of some animals being placed in the wrong age class. However, close analysis of all parameters reveals that such variability is uncommon. These unusual deviations are seen most often in age classes 1, 2, and 5 and are probably a result of small sample sizes within these groups.

Bacula Variation

The length and width respectively of the bacula for each age class are as follows: Age Class 1, 2.30-2.74 and 0.80-0.93; Age Class 2, 2.72-2.88 and 0.88-1.08; Age Class 3, 2.72-3.55 and 0.80-1.75; Age Class 4, 3.50-4.25 and 1.20-1.80; and Age Class 5, 4.00 and 1.95.

In general the length and diameter increase rapidly through age class 2, with a slower increase until age class 4. It does not appear to be ever growing and apparently reaches maximum size during age class 4.

Variation from other Intrinsic or Extrinsic Factors

The Coefficient of Variation statistic is of great value in analyzing and comparing the range in variation between the various

parameters. Appendix B lists the computed values for the age class totals and for both sexes within each age class. According to Simpson et al. (1960:89-95) this statistic has meaning only when considering the adult portion of the sample. The values obtained in the line headed 'Adult Total' (Appendix B) was obtained by utilizing only age classes 3 through 5. This value for the Coefficient of Variation can be compared not only against all of the other parameters but also within each age class and sex group. Differences can be seen in age classes 1 and 2 which support Simpson et al. (1960:89-95) in using only adult specimens for obtaining a true perspective of how a given measurement varies within a population. 'Adult Total' also shows a closer approximation to the true size of the various parameters in this population.

It is probable that the parameters which show a large Coefficient of Variation will be consistent throughout this species. If this is true then direct comparisons between populations would be relatively meaningless since intrapopulation variability could be greater than interpopulation differences and no significant differences would be evident. Those parameters with a small Coefficient of Variation will be most useful in defining population differences since there would be a smaller chance for population overlap. This statistic makes possible a direct comparison between those measurements

which are very large (Total Length, Head and Body Length, Greatest Length of Skull, etc.) to those which are very small (Alveolar Width of the First Molar, Width of Interparietal, etc.).

Variation of coloration is also evident. Although all of the specimens reflect their occurrence in the light sandy soils of the Sahel Woodland, several differences occur. The juveniles have the characteristic sparse pelage of grayish (instead of buff) color. As the age increases, the specimens go from a sandy buff to a reddish buff. Due to a probable year round breeding season (Asdell, 1964: 309-315) this pelage change is not always evident nor consistent within the age classes or between them. As a result, only a general appearance is evident which correlates with the habitat where the population occurs.

Some of the unexplained variations could be a result of food habit differences, dominant individuals, reproductive status, or season of birth. These and probably other variations are virtually impossible to determine while examining museum specimens. A complete analysis of population variation can only be determined by an ecological, behavioral, and physiological study in the area where Taterillus exists.

SUMMARY AND CONCLUSIONS

The intrapopulation variation in 27 cranial and 6 external body measurements was examined in the gerbil, Taterillus gracilis. All specimens were from the Sahel Woodland, 6 Km SE Seguenega, Upper Volta, West Africa.

The specimens were assigned to arbitrary age classes on the basis of the degree of eruption and wear of the lower molars. They showed considerable variation with age and as a result analysis was carried out separately within the age classes. The population was further divided into the two sexes and subsequent analysis was carried out. Separate variation analysis was examined for each parameter of the population as a whole and also on only age classes 3 through 5. Growth analysis was also examined in the length and width of the bacula.

Comparison between the age classes, in general showed a steady size increase with age. Some of the parameters reached maximum size at age class 2, while others increased until age classes 3, 4, or 5.

Sexual dimorphism was evident only within eleven of the parameters. This phenomenon was evident as well within certain age classes in an inconsistent manner. In most cases further analysis

revealed that this dimorphism was not significant. An increase in sample size could reveal that in some parameters the trend toward males being larger than females is valid. This trend, however, as shown in this study, could be a result of bias within the specimens examined. This variation could also be the result of a sex-age interaction, but this is evident in only a few cases.

Several important aspects have emerged in this investigation. Some of the parameters should be useful in further defining age classes. The parameters showing little variation throughout all of the age classes can be used in direct comparison with other populations, subspecies, or species in this genus. The population shows no significant consistency in pelage changes or coloration. The bacula are useful in further defining growth with age and possibly as a future aid in determining population or species differences on the basis of structure. There are some unexplained variations which need further study on the basis of ecological, behavioral, and physiological considerations.

It is my opinion that the differences observed in this population are due largely to age variation. I also believe that further study will show little or no variation based on sex, resulting in a simplification of further comparisons. The parameters which show either

consistency with other similar ones or a wide range in variability,
can probably be eliminated from future analysis.

APPENDIX A

TROPICAL WOODLANDS OF WEST AFRICA

The West African vegetation has two main divisions; the high forest and the woodlands. Since the genus Taterillus has not been found in the closed forest, only a description of the woodlands follows. Woodland, sometimes termed savanna, is characterized by a ground cover of grass. Rosevear (1965:384) prefers the term woodland to savanna as being more descriptive of the vegetation concerned. This leaves savanna as a designation for treeless grasslands. Grasses, in direct contrast, are virtually absent from the forest except in clearings open to the sky.

The tropical woodlands of West Africa have been divided into three distinct parts: Guinea woodland, Sudan woodland, and Sahel woodland. These are usually situated, as listed, in belts from south to north. The Guinea woodland has been further divided by Rosevear (1953:23, 1965:387-388) into three parts. From south to north these are derived woodland, southern Guinea woodland, and northern Guinea or Doka woodland.

Recognition of the large woodland is easy. It is characterized by its almost continuous grass cover. Among this grass cover are

usually small, irregularly shaped trees which only rarely form a canopy. The different regions of the woodland each have their own characteristics and a summary as taken from Rosevear (1953:19-32, 1965:383-390) and Hopkins (1965:41-63) follows.

Guinea Woodland

This zone is the most southerly and the most extensive of the woodlands (Figure 1). Its chief characteristic is a thick and continuous ground cover of tall coarse grasses, five to eight feet high. Trees are mostly of small size, occurring in numbers large enough to constitute important woodlands, but not close enough to allow their crowns to touch. Most trees are usually small with twisted trunks and poor crowns, but some grow straight to heights of fifty feet or more with large, well shaped crowns.

The appearance of the Guinea woodland is affected by two main factors, fire and farming. Each year the whole zone is burned during the dry season. Natural burnings are uncommon. Most burnings are started by humans, for farming, hunting, rejuvenation for grazing, or custom. The burning of the zone takes place in patches. The fires are confined to the grasses because most of the trees have a thick corky bark that is fire resistant.

This woodland stretches across the African continent as far as the White Nile. Its three sub-regions are not easily distinguishable.

The derived woodland, adjacent to the forest zone, would, in the absence of fire, support closed forest. The other two sub-regions comprise the main Guinea zone. Throughout the Guinea woodland, forested areas occur along water courses. The derived woodland has additional patches of forest which are not associated with streams or other water courses.

The main determining factor for the vegetation is the length of the dry season. This lasts four to five months of the year and the relative humidity may be as low as fourteen per cent. Rainfall is forty inches a year or more.

Sudan Woodland

The vegetation is heterogeneous; the grass cover is sparser and reaches only four or five feet in height (Figure 1). The trees are scattered, having mostly small or fine leaves including many thorny species.

Fires do occur, but since the grass is not so thick, they are not so intense. The grasses do not regrow as fast as in the Guinea woodland, so that the landscape retains a barren appearance until the rainy season. For these reasons, fires are not as common and are discouraged. This zone has the highest density of humans. Resultingly, the vegetation is greatly modified. Farming is extensive, but seems to be centered near towns.

This zone has a dry season which lasts for about seven months of the year. The relative humidity may go as low as eight per cent. Rainfall is between twenty and thirty inches per year.

Sahel Woodland

This is the most northerly of the three woodlands (Figure 1). Situated just below the sub-desert, it is very arid. The diversity of trees present is greatly reduced; usually only one or two main species being present in a given region. Both the trees and bushes are widely scattered, occurring only in favorable situations. The grass cover is short, never more than three feet in height. It is rarely burned since it would take years to regrow; thus grazing would be impossible. Cattle and sheep are the main product, farming occurring only where permanent soil moisture is present.

The dry season lasts for at least eight months of the year and is extremely severe. Rainfall is below twenty inches per year.

APPENDIX B

DATA REDUCTION TABLES FOR ALL PARAMETERS EXAMINED

The following tables show the data reduction for all of the parameters examined. These include the number of specimens (N) for each age class total as well as both sexes, the mean and plus-minus the standard error of the mean ($\bar{x} + s_{\bar{x}}$), the range, the 95% confidence interval (95% CI) (calculated by using Student's 't' at the 0.05 level for the appropriate degree of freedom), and the coefficient of variation (V). The line headed 'Adult Total' utilizes males and females in age classes three through five, while the 'Grand Total' includes all age classes and both sexes.

TOTAL LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	203.6 $\pm$ 5.14	169 - 233	192.7 - 214.6	10.10
Males	10	206.2 $\pm$ 5.96	176 - 233	192.7 - 219.7	9.14
Females	6	199.5 $\pm$ 9.97	169 - 230	173.9 - 225.1	12.24
Age Class 2					
Total	21	240.5 $\pm$ 2.81	221 - 261	234.6 - 246.3	5.34
Males	8	242.1 $\pm$ 4.77	222 - 261	230.8 - 253.4	5.57
Females	13	239.5 $\pm$ 3.58	221 - 259	231.7 - 247.3	5.39
Age Class 3					
Total	50	259.8 $\pm$ 1.77	233 - 287	256.3 - 263.4	4.81
Males	22	265.0 $\pm$ 2.65	233 - 287	259.4 - 270.5	4.69
Females	28	255.8 $\pm$ 2.11	235 - 283	251.5 - 260.2	4.38
Age Class 4					
Total	30	276.1 $\pm$ 1.93	253 - 294	272.1 - 280.1	3.83
Males	16	277.5 $\pm$ 3.01	253 - 294	271.1 - 283.9	4.34
Females	14	274.5 $\pm$ 2.35	257 - 284	269.4 - 279.6	3.21
Age Class 5					
Total	16	278.8 $\pm$ 1.65	267 - 293	275.3 - 282.3	2.36
Males	9	278.8 $\pm$ 2.66	267 - 293	272.6 - 284.9	2.86
Females	7	278.9 $\pm$ 1.83	270 - 286	274.4 - 283.3	1.74
Adult Total	96	268.1 $\pm$ 1.43	233 - 294	265.2 - 270.9	5.24
Grand Total	133	251.8 $\pm$ 1.26	169 - 294	249.3 - 254.3	--

TAIL LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	116.3 $\pm$ 3.61	90 - 132	108.6 - 123.9	12.41
Males	10	118.5 $\pm$ 4.07	95 - 132	109.3 - 127.7	10.87
Females	6	112.5 $\pm$ 7.06	90 - 132	94.3 - 130.7	15.37
Age Class 2					
Total	21	140.1 $\pm$ 2.27	124 - 158	135.4 - 144.8	7.44
Males	8	142.1 $\pm$ 4.01	124 - 158	132.6 - 151.6	7.98
Females	13	138.8 $\pm$ 2.79	125 - 156	132.7 - 144.9	7.25
Age Class 3					
Total	50	149.8 $\pm$ 1.28	128 - 168	147.3 - 152.4	6.03
Males	22	154.3 $\pm$ 2.03	128 - 168	150.0 - 158.5	6.19
Females	28	146.3 $\pm$ 1.32	132 - 160	143.6 - 149.1	4.77
Age Class 4					
Total	30	156.2 $\pm$ 1.48	140 - 171	153.1 - 159.2	5.20
Males	16	156.5 $\pm$ 2.14	142 - 171	151.9 - 161.1	5.48
Females	14	155.8 $\pm$ 2.11	140 - 165	151.2 - 160.3	5.06
Age Class 5					
Total	16	155.6 $\pm$ 1.37	145 - 165	152.7 - 158.5	3.52
Males	9	154.7 $\pm$ 2.13	145 - 165	149.8 - 159.6	4.13
Females	7	156.8 $\pm$ 1.58	150 - 162	153.0 - 160.7	2.66
Adult Total	96	152.8 $\pm$ 0.89	128 - 171	151.0 - 154.6	5.73
Grand Total	133	143.6 $\pm$ 0.91	90 - 171	141.8 - 145.4	--

HIND FOOT

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	18	28.3 $\pm$ 0.24	26 - 30	27.8 - 28.8	3.60
Males	11	28.5 $\pm$ 0.31	27 - 30	27.9 - 29.2	3.63
Females	7	27.9 $\pm$ 0.34	26 - 29	27.0 - 28.7	3.23
Age Class 2					
Total	24	29.4 $\pm$ 0.20	28 - 31	29.0 - 29.8	3.30
Males	9	29.9 $\pm$ 0.35	28 - 31	29.1 - 30.7	3.53
Females	15	29.1 $\pm$ 0.21	28 - 30	28.6 - 29.5	2.75
Age Class 3					
Total	57	30.1 $\pm$ 0.14	28 - 32	29.8 - 30.3	3.49
Males	26	30.4 $\pm$ 0.21	28 - 32	29.9 - 30.8	3.61
Females	31	29.8 $\pm$ 0.17	28 - 32	29.4 - 30.1	3.17
Age Class 4					
Total	41	30.8 $\pm$ 0.14	29 - 32	30.5 - 31.1	2.92
Males	21	30.7 $\pm$ 0.20	29 - 32	30.3 - 31.1	2.94
Females	20	30.9 $\pm$ 0.20	29 - 32	30.5 - 31.3	2.95
Age Class 5					
Total	18	30.5 $\pm$ 0.27	28 - 32	30.0 - 31.1	3.76
Males	10	30.8 $\pm$ 0.44	28 - 32	29.8 - 31.8	4.54
Females	8	30.2 $\pm$ 0.25	29 - 31	29.6 - 30.8	2.34
Adult Total	116	30.4 $\pm$ 0.10	28 - 32	30.2 - 30.6	3.50
Grand Total	158	29.8 $\pm$ 0.09	26 - 32	29.6 - 30.0	--

EAR

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	18	17.9 $\pm$ 0.29	15 - 19	17.3 - 18.5	6.88
Males	11	17.5 $\pm$ 0.37	15 - 19	16.7 - 18.4	6.92
Females	7	18.4 $\pm$ 0.43	16 - 19	17.4 - 19.5	6.15
Age Class 2					
Total	24	19.2 $\pm$ 0.18	18 - 21	18.9 - 19.6	4.66
Males	9	19.2 $\pm$ 0.22	18 - 20	18.7 - 19.7	3.47
Females	15	19.3 $\pm$ 0.27	18 - 21	18.7 - 19.8	5.36
Age Class 3					
Total	57	19.8 $\pm$ 0.12	17 - 21	19.6 - 20.0	4.52
Males	26	19.9 $\pm$ 0.14	18 - 21	19.6 - 20.2	3.58
Females	31	19.7 $\pm$ 0.18	17 - 21	19.4 - 20.1	5.23
Age Class 4					
Total	41	20.6 $\pm$ 0.14	18 - 22	20.3 - 20.8	4.22
Males	21	20.4 $\pm$ 0.18	19 - 22	20.1 - 20.8	3.97
Females	20	20.7 $\pm$ 0.21	18 - 22	20.3 - 21.1	4.46
Age Class 5					
Total	18	20.3 $\pm$ 0.21	19 - 22	19.8 - 20.7	4.41
Males	10	20.0 $\pm$ 0.25	19 - 21	19.4 - 20.6	4.08
Females	8	20.6 $\pm$ 0.32	19 - 22	19.8 - 21.4	4.44
Adult Total	116	20.1 $\pm$ 0.09	17 - 22	20.0 - 20.3	4.69
Grand Total	158	19.6 $\pm$ 0.08	15 - 22	19.4 - 19.8	--

WEIGHT

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	18	16.0 $\pm$ 0.78	11 - 22	14.4 - 17.7	20.78
Males	11	15.9 $\pm$ 0.97	11 - 20	13.8 - 18.1	20.16
Females	7	16.1 $\pm$ 1.42	11 - 22	12.7 - 19.6	23.30
Age Class 2					
Total	24	25.7 $\pm$ 0.64	21 - 31	24.3 - 27.0	12.30
Males	9	25.5 $\pm$ 1.00	23 - 31	23.2 - 27.9	11.76
Females	15	25.7 $\pm$ 0.86	21 - 31	23.9 - 27.6	13.01
Age Class 3					
Total	57	33.0 $\pm$ 0.66	26 - 54	31.7 - 34.4	15.16
Males	26	34.8 $\pm$ 0.98	27 - 54	32.7 - 36.8	14.44
Females	31	31.6 $\pm$ 0.82	26 - 45	29.9 - 33.3	14.50
Age Class 4					
Total	41	41.8 $\pm$ 0.97	30 - 54	39.9 - 43.7	14.83
Males	21	42.2 $\pm$ 1.14	31 - 51	39.9 - 44.6	12.41
Females	20	41.4 $\pm$ 1.61	30 - 54	38.0 - 44.7	17.37
Age Class 5					
Total	18	48.8 $\pm$ 1.03	41 - 57	46.6 - 51.0	8.99
Males	10	49.0 $\pm$ 1.38	42 - 57	45.9 - 52.1	8.92
Females	8	48.5 $\pm$ 1.66	41 - 55	44.6 - 52.4	9.67
Adult Total	116	38.6 $\pm$ 0.74	26 - 57	37.1 - 40.1	20.68
Grand Total	158	33.1 $\pm$ 0.45	11 - 57	32.2 - 34.0	--

HEAD AND BODY

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95%CI	V
Age Class 1					
Total	18	87.1 $\pm$ 1.55	79 - 101	83.8 - 90.4	7.55
Males	11	87.1 $\pm$ 1.98	79 - 101	82.7 - 91.5	7.55
Females	7	87.1 $\pm$ 2.69	79 - 98	80.6 - 93.7	8.15
Age Class 2					
Total	24	99.8 $\pm$ 1.08	84 - 109	97.6 - 102.1	5.32
Males	9	98.2 $\pm$ 2.38	84 - 109	92.7 - 103.7	7.27
Females	15	100.8 $\pm$ 0.98	93 - 106	98.7 - 102.9	3.79
Age Class 3					
Total	57	109.8 $\pm$ 0.79	98 - 133	108.2 - 111.4	5.41
Males	26	110.5 $\pm$ 1.34	99 - 133	107.8 - 113.3	6.16
Females	31	109.2 $\pm$ 0.92	98 - 123	107.3 - 111.1	4.70
Age Class 4					
Total	41	119.7 $\pm$ 0.88	106 - 129	117.9 - 121.5	4.71
Males	21	120.4 $\pm$ 1.08	111 - 129	118.2 - 122.7	4.11
Females	20	118.9 $\pm$ 1.42	106 - 129	116.0 - 121.9	5.32
Age Class 5					
Total	18	123.5 $\pm$ 1.16	110 - 132	121.1 - 125.9	3.98
Males	10	124.3 $\pm$ 1.88	110 - 132	120.0 - 128.6	4.80
Females	8	122.5 $\pm$ 1.64	118 - 126	119.7 - 125.2	2.69
Adult Total	116	115.4 $\pm$ 0.74	98 - 133	113.9 - 116.9	6.94
Grand Total	158	107.9 $\pm$ 0.53	79 - 133	106.8 - 109.0	--

GREATEST LENGTH OF SKULL

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	13	28.22 $\pm$ 0.32	25.7 - 29.6	27.52 - 28.92	4.11
Males	7	28.16 $\pm$ 0.39	26.5 - 29.5	27.20 - 29.12	3.68
Females	6	28.29 $\pm$ 0.57	25.7 - 29.6	26.83 - 29.75	4.91
Age Class 2					
Total	21	30.97 $\pm$ 0.20	29.3 - 32.0	30.55 - 31.40	3.00
Males	6	31.08 $\pm$ 0.43	29.6 - 32.0	29.97 - 32.20	3.41
Females	15	30.93 $\pm$ 0.23	29.3 - 32.0	30.43 - 31.43	2.94
Age Class 3					
Total	56	32.70 $\pm$ 0.10	31.3 - 34.4	32.49 - 32.90	2.35
Males	25	33.06 $\pm$ 0.13	31.6 - 34.0	32.79 - 33.32	1.96
Females	31	32.41 $\pm$ 0.13	31.3 - 34.4	32.14 - 32.68	2.29
Age Class 4					
Total	38	34.42 $\pm$ 0.12	32.2 - 35.8	34.16 - 34.67	2.25
Males	20	34.50 $\pm$ 0.16	33.5 - 35.8	34.17 - 34.83	2.05
Females	18	34.32 $\pm$ 0.20	32.2 - 35.4	33.90 - 34.74	2.48
Age Class 5					
Total	18	35.35 $\pm$ 0.20	34.1 - 36.5	34.93 - 35.77	2.40
Males	10	35.54 $\pm$ 0.28	34.1 - 36.5	34.90 - 36.17	2.50
Females	8	35.12 $\pm$ 0.28	34.4 - 36.4	34.46 - 35.77	2.24
Adult Total	112	33.71 $\pm$ 0.12	31.3 - 36.5	33.46 - 33.96	3.90
Grand Total	146	32.35 $\pm$ 0.08	25.7 - 36.5	32.19 - 32.51	--

BASILAR LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	20.05 $\pm$ 0.22	18.5 - 21.4	19.54 - 20.53	4.37
Males	10	19.97 $\pm$ 0.28	18.5 - 21.4	19.34 - 20.60	4.41
Females	6	20.20 $\pm$ 0.38	18.5 - 20.9	19.22 - 21.18	4.63
Age Class 2					
Total	23	22.61 $\pm$ 0.27	21.3 - 23.4	22.04 - 23.18	5.77
Males	8	22.36 $\pm$ 0.24	21.6 - 23.4	21.78 - 22.93	3.08
Females	15	22.75 $\pm$ 0.40	21.3 - 23.4	21.89 - 23.60	6.79
Age Class 3					
Total	56	23.70 $\pm$ 0.09	22.0 - 25.3	23.53 - 23.88	2.78
Males	25	23.95 $\pm$ 0.10	22.9 - 24.8	23.75 - 24.16	2.06
Females	31	23.50 $\pm$ 0.13	22.0 - 25.3	23.24 - 23.76	3.04
Age Class 4					
Total	39	25.19 $\pm$ 0.09	23.7 - 26.2	25.01 - 25.37	2.26
Males	20	25.24 $\pm$ 0.11	24.5 - 26.1	25.02 - 25.46	1.86
Females	19	25.13 $\pm$ 0.15	23.7 - 26.2	24.81 - 25.46	2.66
Age Class 5					
Total	18	26.19 $\pm$ 0.17	25.0 - 27.3	25.84 - 26.54	2.69
Males	10	26.30 $\pm$ 0.24	25.0 - 27.3	25.75 - 26.85	2.93
Females	8	26.04 $\pm$ 0.22	25.1 - 27.0	25.51 - 26.57	2.43
Adult Total	113	24.61 $\pm$ 0.11	22.0 - 27.3	24.40 - 24.83	4.31
Grand Total	152	23.55 $\pm$ 0.08	18.5 - 27.3	23.39 - 23.71	--

CONDYLOBASILAR LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	22.09 $\pm$ 0.24	20.2 - 23.3	21.58 - 22.60	4.32
Males	10	22.02 $\pm$ 0.29	20.3 - 23.3	21.37 - 22.66	4.12
Females	6	22.22 $\pm$ 0.45	20.2 - 23.2	21.05 - 23.38	4.99
Age Class 2					
Total	23	24.60 $\pm$ 0.28	23.2 - 29.9	24.01 - 25.18	5.49
Males	8	25.01 $\pm$ 0.75	23.4 - 29.9	23.23 - 26.79	8.49
Females	15	24.38 $\pm$ 0.17	23.2 - 25.3	24.00 - 24.75	2.79
Age Class 3					
Total	56	25.74 $\pm$ 0.09	23.9 - 27.4	25.55 - 25.93	2.75
Males	25	25.99 $\pm$ 0.11	25.0 - 26.8	25.76 - 26.23	2.17
Females	31	25.53 $\pm$ 0.13	23.9 - 27.4	25.26 - 25.81	2.94
Age Class 4					
Total	39	27.22 $\pm$ 0.10	25.8 - 28.3	27.03 - 27.42	2.23
Males	20	27.23 $\pm$ 0.12	26.5 - 28.2	26.98 - 27.48	1.95
Females	19	27.22 $\pm$ 0.16	25.8 - 28.3	26.88 - 27.55	2.55
Age Class 5					
Total	18	28.11 $\pm$ 0.17	26.8 - 29.4	27.75 - 28.46	2.56
Males	10	28.31 $\pm$ 0.22	27.2 - 29.4	27.80 - 28.82	2.50
Females	8	27.85 $\pm$ 0.24	26.8 - 28.8	27.27 - 28.43	2.48
Adult Total	113	26.63 $\pm$ 0.11	23.9 - 29.4	26.41 - 26.85	4.31
Grand Total	152	25.38 $\pm$ 0.13	20.2 - 29.4	25.12 - 25.64	--

OCCIPITONASAL LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	12	26.87 $\pm$ 0.36	24.3 - 28.3	26.07 - 27.67	4.70
Males	6	26.87 $\pm$ 0.52	24.6 - 28.3	25.54 - 28.19	4.71
Females	6	26.88 $\pm$ 0.56	24.3 - 28.3	25.43 - 28.33	5.14
Age Class 2					
Total	21	29.44 $\pm$ 0.36	23.2 - 30.8	28.69 - 30.20	5.64
Males	6	29.70 $\pm$ 0.44	28.4 - 30.8	28.58 - 30.82	3.59
Females	15	29.34 $\pm$ 0.48	23.2 - 30.6	28.31 - 30.38	6.37
Age Class 3					
Total	56	31.41 $\pm$ 0.10	29.6 - 33.2	31.20 - 31.62	2.47
Males	25	31.80 $\pm$ 0.12	30.3 - 32.5	31.55 - 32.04	1.89
Females	31	31.10 $\pm$ 0.14	29.6 - 33.2	30.82 - 31.39	2.48
Age Class 4					
Total	37	33.25 $\pm$ 0.13	31.3 - 34.6	32.99 - 33.50	2.33
Males	19	33.37 $\pm$ 0.16	32.3 - 34.6	33.03 - 33.72	2.14
Females	18	33.11 $\pm$ 0.20	31.3 - 34.1	32.70 - 33.53	2.51
Age Class 5					
Total	18	34.26 $\pm$ 0.22	32.8 - 35.8	33.80 - 34.72	2.68
Males	10	34.46 $\pm$ 0.30	32.8 - 35.8	33.79 - 35.14	2.75
Females	8	34.01 $\pm$ 0.31	32.8 - 35.4	33.28 - 34.74	2.57
Adult Total	111	32.49 $\pm$ 0.13	29.6 - 35.8	32.22 - 32.75	4.27
Grand Total	144	31.07 $\pm$ 0.10	23.2 - 35.8	30.87 - 31.27	--

ZYGOMATIC BREADTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	5	14.56 $\pm$ 0.19	14.2 - 15.1	14.03 - 15.10	2.94
Males	2	14.29 $\pm$ 0.02	14.2 - 14.3	---	0.15
Females	3	14.75 $\pm$ 0.28	14.2 - 15.1	---	3.31
Age Class 2					
Total	11	15.21 $\pm$ 0.22	13.9 - 16.0	14.73 - 15.69	4.69
Males	4	15.53 $\pm$ 0.34	14.5 - 16.0	14.46 - 16.61	4.34
Females	7	15.02 $\pm$ 0.27	13.9 - 16.0	14.36 - 15.69	4.76
Age Class 3					
Total	30	16.25 $\pm$ 0.10	14.1 - 17.1	16.03 - 16.46	3.54
Males	15	16.37 $\pm$ 0.12	15.5 - 17.1	16.12 - 16.62	2.77
Females	15	16.13 $\pm$ 0.17	14.1 - 17.1	15.76 - 16.50	4.15
Age Class 4					
Total	15	17.36 $\pm$ 0.09	16.8 - 18.0	17.16 - 17.56	2.07
Males	8	17.40 $\pm$ 0.13	17.0 - 18.0	17.08 - 17.71	2.15
Females	7	17.32 $\pm$ 0.14	16.8 - 17.8	16.99 - 17.66	2.11
Age Class 5					
Total	9	17.45 $\pm$ 0.14	16.9 - 18.2	17.12 - 17.78	2.46
Males	6	17.56 $\pm$ 0.16	17.1 - 18.2	17.16 - 17.96	2.18
Females	3	17.23 $\pm$ 0.29	16.9 - 17.8	15.97 - 18.49	2.94
Adult Total	54	16.76 $\pm$ 0.10	14.1 - 18.2	16.55 - 16.97	4.52
Grand Total	70	16.17 $\pm$ 0.08	13.9 - 18.2	16.01 - 16.33	--

CRANIAL BREADTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	13.34 $\pm$ 0.09	12.7 - 14.1	13.16 - 13.52	2.59
Males	9	13.26 $\pm$ 0.08	12.7 - 13.6	13.07 - 13.45	1.90
Females	7	13.44 $\pm$ 0.16	12.9 - 14.1	13.04 - 13.85	3.24
Age Class 2					
Total	24	13.79 $\pm$ 0.07	12.9 - 14.3	13.63 - 13.94	2.65
Males	9	13.87 $\pm$ 0.11	13.4 - 14.3	13.63 - 14.12	2.31
Females	15	13.74 $\pm$ 0.10	12.9 - 14.1	13.52 - 13.95	2.84
Age Class 3					
Total	56	14.24 $\pm$ 0.04	13.7 - 14.9	14.16 - 14.32	2.04
Males	25	14.30 $\pm$ 0.06	13.7 - 14.8	14.17 - 14.42	2.15
Females	31	14.19 $\pm$ 0.05	13.7 - 14.9	14.09 - 14.30	1.91
Age Class 4					
Total	38	14.46 $\pm$ 0.06	13.2 - 15.3	14.35 - 14.58	2.52
Males	20	14.46 $\pm$ 0.06	13.9 - 14.9	14.33 - 14.58	1.84
Females	18	14.48 $\pm$ 0.11	13.2 - 15.3	14.24 - 14.70	3.16
Age Class 5					
Total	18	14.54 $\pm$ 0.09	14.1 - 15.3	14.35 - 14.73	2.60
Males	10	14.60 $\pm$ 0.13	14.1 - 15.3	14.30 - 14.89	2.82
Females	8	14.46 $\pm$ 0.12	14.1 - 15.0	14.17 - 14.75	2.38
Adult Total	112	14.37 $\pm$ 0.03	13.2 - 15.3	14.30 - 14.43	2.45
Grand Total	152	14.08 $\pm$ 0.03	12.7 - 15.3	14.02 - 14.14	--

LEAST INTERORBITAL CONSTRICTION

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	5.59 $\pm$ 0.04	5.3 - 5.9	5.52 - 5.67	2.59
Males	10	5.61 $\pm$ 0.05	5.4 - 5.9	5.51 - 5.72	2.58
Females	7	5.57 $\pm$ 0.06	5.3 - 5.7	5.43 - 5.71	2.74
Age Class 2					
Total	24	5.81 $\pm$ 0.05	5.3 - 6.2	5.69 - 5.92	4.63
Males	9	5.79 $\pm$ 0.11	5.3 - 6.2	5.54 - 6.04	5.67
Females	15	5.82 $\pm$ 0.06	5.3 - 6.1	5.69 - 5.95	4.09
Age Class 3					
Total	57	6.04 $\pm$ 0.03	5.5 - 6.6	5.98 - 6.11	4.04
Males	26	6.13 $\pm$ 0.04	5.6 - 6.5	6.04 - 6.22	3.70
Females	31	5.97 $\pm$ 0.04	5.5 - 6.6	5.88 - 6.06	3.95
Age Class 4					
Total	40	6.19 $\pm$ 0.04	5.7 - 6.9	6.11 - 6.27	3.82
Males	21	6.23 $\pm$ 0.05	5.9 - 6.9	6.12 - 6.35	4.10
Females	19	6.14 $\pm$ 0.05	5.7 - 6.7	6.04 - 6.24	3.41
Age Class 5					
Total	18	6.29 $\pm$ 0.05	5.8 - 6.7	6.18 - 6.40	3.49
Males	10	6.32 $\pm$ 0.07	5.8 - 6.6	6.16 - 6.48	3.49
Females	8	6.26 $\pm$ 0.08	5.9 - 6.7	6.07 - 6.45	3.65
Adult Total	115	6.13 $\pm$ 0.02	5.5 - 6.9	6.09 - 6.18	4.14
Grand Total	156	5.98 $\pm$ 0.02	5.3 - 6.9	5.94 - 6.02	--

ROSTRAL BREADTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	12	3.83 $\pm$ 0.07	3.3 - 4.2	3.68 - 3.97	5.94
Males	7	3.82 $\pm$ 0.11	3.3 - 4.2	3.54 - 4.09	7.81
Females	5	3.83 $\pm$ 0.04	3.7 - 3.9	3.72 - 3.95	2.40
Age Class 2					
Total	24	4.14 $\pm$ 0.04	3.8 - 4.5	4.06 - 4.22	4.56
Males	9	4.21 $\pm$ 0.07	4.0 - 4.5	4.04 - 4.37	5.10
Females	15	4.11 $\pm$ 0.04	3.8 - 4.4	4.01 - 4.20	4.08
Age Class 3					
Total	57	4.41 $\pm$ 0.02	4.1 - 4.7	4.37 - 4.45	3.49
Males	26	4.47 $\pm$ 0.03	4.1 - 4.7	4.42 - 4.52	3.01
Females	31	4.36 $\pm$ 0.03	4.1 - 4.7	4.31 - 4.42	3.52
Age Class 4					
Total	40	4.57 $\pm$ 0.03	4.2 - 5.0	4.51 - 4.63	4.34
Males	21	4.61 $\pm$ 0.04	4.2 - 5.0	4.52 - 4.70	4.37
Females	19	4.53 $\pm$ 0.04	4.2 - 4.8	4.44 - 4.62	4.22
Age Class 5					
Total	18	4.69 $\pm$ 0.05	4.4 - 5.1	4.58 - 4.80	4.67
Males	10	4.73 $\pm$ 0.07	4.4 - 5.1	4.56 - 4.89	4.94
Females	8	4.64 $\pm$ 0.07	4.4 - 4.9	4.47 - 4.81	4.41
Adult Total	115	4.51 $\pm$ 0.02	4.1 - 5.1	4.47 - 4.55	4.62
Grand Total	151	4.33 $\pm$ 0.02	3.3 - 5.1	4.29 - 4.37	--

GREATEST BREADTH ACROSS BULLA

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	12.25 $\pm$ 0.11	11.3 - 13.0	12.03 - 12.48	3.48
Males	9	12.24 $\pm$ 0.09	11.8 - 12.6	12.03 - 12.45	2.25
Females	7	12.27 $\pm$ 0.22	11.3 - 13.0	11.73 - 12.82	4.83
Age Class 2					
Total	23	12.87 $\pm$ 0.10	12.0 - 14.1	12.67 - 13.08	3.67
Males	8	13.19 $\pm$ 0.15	12.6 - 14.1	12.84 - 13.54	3.19
Females	15	12.70 $\pm$ 0.11	12.0 - 13.4	12.47 - 12.93	3.27
Age Class 3					
Total	55	13.37 $\pm$ 0.05	12.3 - 14.1	13.27 - 13.46	2.75
Males	24	13.48 $\pm$ 0.07	12.7 - 14.1	13.33 - 13.62	2.56
Females	31	13.28 $\pm$ 0.06	12.3 - 13.9	13.14 - 13.41	2.76
Age Class 4					
Total	37	13.83 $\pm$ 0.08	12.6 - 14.7	13.68 - 13.98	3.30
Males	18	13.90 $\pm$ 0.11	13.0 - 14.7	13.67 - 14.13	3.35
Females	19	13.76 $\pm$ 0.10	12.6 - 14.6	13.55 - 13.98	3.27
Age Class 5					
Total	17	13.66 $\pm$ 0.10	12.9 - 14.4	13.44 - 13.89	3.24
Males	9	13.74 $\pm$ 0.15	13.1 - 14.3	13.40 - 14.09	3.27
Females	8	13.58 $\pm$ 0.16	12.9 - 14.4	13.20 - 13.95	3.30
Adult Total	109	13.57 $\pm$ 0.04	12.3 - 14.7	13.48 - 13.66	3.39
Grand Total	148	13.22 $\pm$ 0.04	11.3 - 14.7	13.14 - 13.30	--

GREATEST WIDTH ACROSS UPPER MOLARS

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	14	6.34 $\pm$ 0.05	6.0 - 6.7	6.25 - 6.44	2.65
Males	9	6.28 $\pm$ 0.04	6.0 - 6.5	6.18 - 6.38	2.02
Females	5	6.46 $\pm$ 0.08	6.2 - 6.7	6.22 - 6.69	2.93
Age Class 2					
Total	24	6.53 $\pm$ 0.04	6.1 - 7.0	6.44 - 6.63	3.43
Males	9	6.60 $\pm$ 0.08	6.2 - 7.0	6.41 - 6.79	3.72
Females	15	6.49 $\pm$ 0.05	6.1 - 6.8	6.38 - 6.61	3.22
Age Class 3					
Total	56	6.89 $\pm$ 0.03	6.5 - 7.4	6.84 - 6.95	2.98
Males	26	6.95 $\pm$ 0.04	6.6 - 7.4	6.87 - 7.03	2.87
Females	30	6.84 $\pm$ 0.04	6.5 - 7.3	6.77 - 6.92	2.94
Age Class 4					
Total	38	7.15 $\pm$ 0.03	6.7 - 7.8	7.09 - 7.22	2.89
Males	19	7.16 $\pm$ 0.04	6.7 - 7.5	7.06 - 7.25	2.74
Females	19	7.15 $\pm$ 0.05	6.8 - 7.8	7.04 - 7.26	3.11
Age Class 5					
Total	18	7.24 $\pm$ 0.05	7.0 - 7.6	7.14 - 7.34	2.70
Males	10	7.21 $\pm$ 0.06	7.0 - 7.6	7.08 - 7.35	2.60
Females	8	7.27 $\pm$ 0.07	7.0 - 7.6	7.09 - 7.45	2.92
Adult Total	112	7.04 $\pm$ 0.02	6.5 - 7.8	6.99 - 7.08	3.57
Grand Total	150	6.84 $\pm$ 0.02	6.0 - 7.8	6.80 - 6.88	--

DEPTH OF CRANIUM

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	15	12.07 $\pm$ 0.12	11.0 - 12.8	11.82 - 12.32	3.75
Males	9	11.98 $\pm$ 0.10	11.6 - 12.5	11.75 - 12.20	2.46
Females	6	12.21 $\pm$ 0.26	11.0 - 12.8	11.55 - 12.87	5.16
Age Class 2					
Total	22	12.67 $\pm$ 0.08	12.0 - 13.3	12.50 - 12.84	2.96
Males	7	12.69 $\pm$ 0.19	12.0 - 13.3	12.23 - 13.16	3.96
Females	15	12.66 $\pm$ 0.08	12.2 - 13.2	12.48 - 12.84	2.52
Age Class 3					
Total	54	13.27 $\pm$ 0.04	12.2 - 13.9	13.19 - 13.35	2.19
Males	24	13.35 $\pm$ 0.05	12.7 - 13.8	13.25 - 13.44	1.74
Females	30	13.21 $\pm$ 0.06	12.2 - 13.9	13.09 - 13.33	2.42
Age Class 4					
Total	39	13.65 $\pm$ 0.04	12.6 - 14.2	13.57 - 13.74	2.04
Males	20	13.63 $\pm$ 0.05	13.3 - 14.1	13.53 - 13.72	1.53
Females	19	13.68 $\pm$ 0.09	12.6 - 14.2	13.52 - 13.85	2.49
Age Class 5					
Total	17	13.90 $\pm$ 0.09	13.3 - 15.0	13.71 - 14.09	2.63
Males	9	13.79 $\pm$ 0.09	13.3 - 14.3	13.58 - 14.00	1.96
Females	8	14.02 $\pm$ 0.15	13.6 - 15.0	13.66 - 14.38	3.10
Adult Total	110	13.50 $\pm$ 0.04	12.2 - 15.0	13.43 - 13.58	2.84
Grand Total	147	13.12 $\pm$ 0.03	11.0 - 15.0	13.06 - 13.18	--

PALATILAR LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	6	11.69 $\pm$ 0.23	10.6 - 12.1	11.10 - 12.28	4.80
Males	3	11.47 $\pm$ 0.46	10.6 - 12.1	9.48 - 13.46	6.99
Females	3	11.90 $\pm$ 0.05	11.8 - 12.0	11.68 - 12.12	0.73
Age Class 2					
Total	11	12.94 $\pm$ 0.15	12.0 - 13.6	12.61 - 13.27	3.74
Males	5	12.79 $\pm$ 0.28	12.0 - 13.6	12.01 - 13.57	4.91
Females	6	13.06 $\pm$ 0.13	12.6 - 13.4	12.71 - 13.41	2.55
Age Class 3					
Total	39	13.56 $\pm$ 0.08	12.5 - 14.6	13.40 - 13.72	3.78
Males	18	13.71 $\pm$ 0.13	12.8 - 14.6	13.43 - 14.00	4.15
Females	21	13.43 $\pm$ 0.09	12.5 - 14.4	13.23 - 13.62	3.20
Age Class 4					
Total	29	14.45 $\pm$ 0.09	13.6 - 15.4	14.26 - 14.64	3.47
Males	14	14.44 $\pm$ 0.13	13.6 - 15.2	14.17 - 14.72	3.30
Females	15	14.47 $\pm$ 0.14	13.8 - 15.4	14.17 - 14.76	3.74
Age Class 5					
Total	9	14.85 $\pm$ 0.23	13.9 - 15.9	14.32 - 15.38	4.62
Males	4	15.50 $\pm$ 0.18	15.0 - 15.9	14.91 - 16.08	2.37
Females	5	14.33 $\pm$ 0.13	13.9 - 14.6	13.97 - 14.69	2.03
Adult Total	77	14.05 $\pm$ 0.08	12.5 - 15.9	13.88 - 14.21	5.20
Grand Total	94	13.51 $\pm$ 0.07	10.6 - 15.9	13.37 - 13.65	--

POSTPALATAL LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	6	8.48 $\pm$ 0.14	8.1 - 9.1	8.13 - 8.83	3.93
Males	3	8.33 $\pm$ 0.10	8.1 - 8.4	7.90 - 8.75	2.07
Females	3	8.64 $\pm$ 0.24	8.2 - 9.1	7.59 - 9.68	4.86
Age Class 2					
Total	10	9.13 $\pm$ 0.16	8.4 - 9.8	8.78 - 9.49	5.39
Males	4	9.00 $\pm$ 0.25	8.4 - 9.4	8.20 - 9.78	5.55
Females	6	9.23 $\pm$ 0.21	8.4 - 9.8	8.70 - 9.76	5.51
Age Class 3					
Total	39	9.96 $\pm$ 0.07	9.1 - 11.4	9.82 - 10.09	4.26
Males	18	10.06 $\pm$ 0.08	9.4 - 10.6	9.88 - 10.23	3.47
Females	21	9.87 $\pm$ 0.10	9.1 - 11.4	9.65 - 10.08	4.76
Age Class 4					
Total	27	10.72 $\pm$ 0.09	9.6 - 11.5	10.54 - 10.89	4.19
Males	13	10.85 $\pm$ 0.12	10.0 - 11.5	10.58 - 11.11	4.05
Females	14	10.60 $\pm$ 0.12	9.6 - 11.4	10.34 - 10.85	4.14
Age Class 5					
Total	9	11.22 $\pm$ 0.13	10.7 - 11.9	10.90 - 11.53	3.61
Males	4	11.29 $\pm$ 0.14	11.0 - 11.7	10.83 - 11.73	2.50
Females	5	11.16 $\pm$ 0.23	10.7 - 11.9	10.53 - 11.79	4.55
Adult Total	75	10.38 $\pm$ 0.07	9.1 - 11.9	10.23 - 10.53	6.11
Grand Total	91	9.90 $\pm$ 0.06	8.1 - 11.9	9.78 - 10.02	--

LENGTH OF DIASTEMA

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	6.39 $\pm$ 0.11	5.4 - 6.9	6.15 - 6.63	7.06
Males	10	6.37 $\pm$ 0.13	5.7 - 6.9	6.07 - 6.67	6.56
Females	6	6.42 $\pm$ 0.22	5.4 - 6.8	5.85 - 6.99	8.44
Age Class 2					
Total	24	7.52 $\pm$ 0.13	6.5 - 9.9	7.25 - 7.79	8.50
Males	9	7.35 $\pm$ 0.15	6.5 - 8.0	6.99 - 7.70	6.29
Females	15	7.63 $\pm$ 0.18	7.0 - 9.9	7.23 - 8.03	9.43
Age Class 3					
Total	56	8.10 $\pm$ 0.05	7.0 - 8.8	8.00 - 8.20	4.66
Males	26	8.20 $\pm$ 0.06	7.8 - 8.8	8.08 - 8.31	3.50
Females	30	8.01 $\pm$ 0.08	7.0 - 8.8	7.85 - 8.17	5.33
Age Class 4					
Total	41	8.66 $\pm$ 0.05	8.0 - 9.3	8.57 - 8.75	3.44
Males	21	8.64 $\pm$ 0.05	8.2 - 9.1	8.53 - 8.75	2.82
Females	20	8.68 $\pm$ 0.08	8.0 - 9.3	8.52 - 8.84	4.04
Age Class 5					
Total	18	8.99 $\pm$ 0.09	8.5 - 9.8	8.79 - 9.19	4.49
Males	10	9.06 $\pm$ 0.13	8.5 - 9.8	8.76 - 9.36	4.65
Females	8	8.91 $\pm$ 0.14	8.6 - 9.8	8.58 - 9.24	4.40
Adult Total	115	8.44 $\pm$ 0.05	7.0 - 9.8	8.35 - 8.53	5.88
Grand Total	155	7.93 $\pm$ 0.04	5.4 - 9.9	7.85 - 8.01	--

LENGTH OF ANTERIOR PALATINE FORAMINA

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	4.41 $\pm$ 0.09	3.8 - 5.0	4.22 - 4.60	8.49
Males	11	4.40 $\pm$ 0.12	3.9 - 5.0	4.13 - 4.67	9.03
Females	6	4.44 $\pm$ 0.15	3.8 - 4.8	4.05 - 4.82	8.18
Age Class 2					
Total	24	5.07 $\pm$ 0.54	4.5 - 5.7	4.96 - 5.18	5.26
Males	9	5.21 $\pm$ 0.07	4.9 - 5.7	5.05 - 5.38	4.09
Females	15	4.98 $\pm$ 0.07	4.5 - 5.4	4.84 - 5.13	5.28
Age Class 3					
Total	56	5.35 $\pm$ 0.04	4.3 - 5.9	5.27 - 5.42	5.35
Males	26	5.43 $\pm$ 0.05	5.0 - 5.9	5.34 - 5.53	4.32
Females	30	5.27 $\pm$ 0.06	4.3 - 5.7	5.16 - 5.39	5.86
Age Class 4					
Total	40	5.68 $\pm$ 0.04	5.2 - 6.2	5.60 - 5.76	4.31
Males	20	5.75 $\pm$ 0.04	5.4 - 6.2	5.65 - 5.84	3.35
Females	20	5.61 $\pm$ 0.06	5.2 - 6.2	5.48 - 5.74	4.92
Age Class 5					
Total	18	5.95 $\pm$ 0.06	5.2 - 6.4	5.82 - 6.09	4.60
Males	10	6.00 $\pm$ 0.10	5.2 - 6.4	5.77 - 6.23	5.33
Females	8	5.89 $\pm$ 0.07	5.7 - 6.4	5.72 - 6.07	3.52
Adult Total	114	5.56 $\pm$ 0.03	4.3 - 6.4	5.49 - 5.62	6.33
Grand Total	155	5.30 $\pm$ 0.03	3.8 - 6.4	5.25 - 5.35	--

LENGTH OF POSTERIOR PALATINE FORAMINA

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	16	3.45 $\pm$ 0.05	3.0 - 3.8	3.33 - 3.57	6.35
Males	10	3.52 $\pm$ 0.05	3.3 - 3.8	3.41 - 3.62	4.19
Females	6	3.33 $\pm$ 0.11	3.0 - 3.7	3.04 - 3.63	8.41
Age Class 2					
Total	24	3.58 $\pm$ 0.04	3.1 - 4.0	3.50 - 3.66	5.46
Males	9	3.54 $\pm$ 0.06	3.3 - 3.8	3.40 - 3.69	5.30
Females	15	3.60 $\pm$ 0.05	3.1 - 4.0	3.49 - 3.71	5.65
Age Class 3					
Total	57	3.73 $\pm$ 0.03	3.3 - 4.3	3.67 - 3.78	5.47
Males	26	3.77 $\pm$ 0.04	3.4 - 4.3	3.68 - 3.85	5.67
Females	31	3.69 $\pm$ 0.03	3.3 - 4.1	3.62 - 3.76	5.23
Age Class 4					
Total	41	3.77 $\pm$ 0.05	3.1 - 4.5	3.67 - 3.86	7.99
Males	21	3.67 $\pm$ 0.06	3.2 - 4.1	3.55 - 3.78	6.97
Females	20	3.88 $\pm$ 0.07	3.1 - 4.5	3.73 - 4.02	8.11
Age Class 5					
Total	18	3.89 $\pm$ 0.06	3.5 - 4.7	3.77 - 4.02	6.56
Males	10	3.94 $\pm$ 0.10	3.5 - 4.7	3.71 - 4.17	8.13
Females	8	3.84 $\pm$ 0.05	3.6 - 4.0	3.72 - 3.96	3.67
Adult Total	116	3.77 $\pm$ 0.02	3.1 - 4.7	3.72 - 3.81	6.76
Grand Total	156	3.68 $\pm$ 0.02	3.0 - 4.7	3.64 - 3.72	--

LENGTH OF PALATAL BRIDGE

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	6	5.78 $\pm$ 0.16	5.2 - 6.4	5.38 - 6.19	6.68
Males	3	5.78 $\pm$ 0.33	5.2 - 6.4	4.34 - 7.21	9.98
Females	3	5.79 $\pm$ 0.12	5.6 - 6.0	5.28 - 6.29	3.49
Age Class 2					
Total	11	6.52 $\pm$ 0.12	5.7 - 7.1	6.26 - 6.79	6.05
Males	5	6.42 $\pm$ 0.26	5.7 - 7.1	5.69 - 7.15	9.14
Females	6	6.61 $\pm$ 0.05	6.4 - 6.7	6.48 - 6.75	1.90
Age Class 3					
Total	39	6.68 $\pm$ 0.06	6.0 - 7.5	6.56 - 6.80	5.48
Males	18	6.73 $\pm$ 0.09	6.0 - 7.5	6.53 - 6.93	5.93
Females	21	6.64 $\pm$ 0.07	6.1 - 7.3	6.48 - 6.79	5.11
Age Class 4					
Total	28	7.06 $\pm$ 0.08	6.3 - 7.9	6.90 - 7.21	5.68
Males	14	6.91 $\pm$ 0.10	6.3 - 7.6	6.68 - 7.13	5.63
Females	14	7.21 $\pm$ 0.10	6.7 - 7.9	7.00 - 7.42	5.06
Age Class 5					
Total	9	7.19 $\pm$ 0.14	6.7 - 7.9	6.85 - 7.52	6.03
Males	4	7.57 $\pm$ 0.16	7.2 - 7.9	7.05 - 8.09	4.31
Females	5	6.88 $\pm$ 0.08	6.7 - 7.1	6.66 - 7.11	2.64
Adult Total	76	6.88 $\pm$ 0.05	6.0 - 7.9	6.78 - 6.98	6.34
Grand Total	93	6.66 $\pm$ 0.05	5.2 - 7.9	6.56 - 6.76	--

LENGTH OF NASALS

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	10	10.15 $\pm$ 0.25	8.3 - 11.1	9.58 - 10.72	7.85
Males	5	9.91 $\pm$ 0.39	8.3 - 10.4	8.82 - 10.99	8.85
Females	5	10.40 $\pm$ 0.32	9.2 - 11.1	9.51 - 11.28	6.88
Age Class 2					
Total	22	11.79 $\pm$ 0.09	10.9 - 12.6	11.60 - 11.98	3.66
Males	7	11.75 $\pm$ 0.17	11.2 - 12.6	11.34 - 12.17	3.85
Females	15	11.81 $\pm$ 0.11	10.9 - 12.4	11.57 - 12.05	3.70
Age Class 3					
Total	57	12.55 $\pm$ 0.06	11.6 - 13.6	12.42 - 12.68	3.91
Males	26	12.75 $\pm$ 0.08	11.6 - 13.5	12.57 - 12.92	3.36
Females	31	12.38 $\pm$ 0.09	11.6 - 13.6	12.21 - 12.56	3.92
Age Class 4					
Total	40	13.32 $\pm$ 0.07	12.7 - 14.2	13.19 - 13.45	3.09
Males	21	13.34 $\pm$ 0.09	12.7 - 13.9	13.15 - 13.54	3.18
Females	19	13.29 $\pm$ 0.09	12.7 - 14.2	13.09 - 13.48	3.06
Age Class 5					
Total	18	13.92 $\pm$ 0.13	12.8 - 14.9	13.64 - 14.19	3.97
Males	10	13.96 $\pm$ 0.59	12.8 - 14.6	13.53 - 14.40	4.23
Females	8	13.87 $\pm$ 0.19	13.1 - 14.9	13.42 - 14.32	3.87
Adult Total	115	13.03 $\pm$ 0.07	11.6 - 14.9	12.90 - 13.16	5.38
Grand Total	147	12.35 $\pm$ 0.05	8.3 - 14.9	12.25 - 12.45	--

LENGTH OF ROSTRUM

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	14	9.31 $\pm$ 0.19	8.1 - 10.2	8.90 - 9.72	7.62
Males	8	9.18 $\pm$ 0.26	8.3 - 10.2	8.57 - 9.79	8.01
Females	6	9.48 $\pm$ 0.29	8.2 - 10.2	8.74 - 10.21	7.41
Age Class 2					
Total	22	10.90 $\pm$ 0.11	9.7 - 11.6	10.67 - 11.13	4.74
Males	7	10.94 $\pm$ 0.19	10.3 - 11.6	10.49 - 11.40	4.49
Females	15	10.86 $\pm$ 0.14	9.7 - 11.5	10.58 - 11.19	5.01
Age Class 3					
Total	57	11.71 $\pm$ 0.06	10.9 - 12.5	11.60 - 11.83	3.61
Males	26	11.91 $\pm$ 0.07	11.1 - 12.4	11.78 - 12.05	2.83
Females	31	11.55 $\pm$ 0.08	10.9 - 12.5	11.39 - 11.70	3.63
Age Class 4					
Total	41	12.39 $\pm$ 0.06	11.4 - 13.0	12.27 - 12.51	3.16
Males	21	12.43 $\pm$ 0.07	11.7 - 13.0	12.28 - 12.59	2.75
Females	20	12.34 $\pm$ 0.10	11.4 - 12.9	12.13 - 12.55	3.57
Age Class 5					
Total	18	12.80 $\pm$ 0.12	11.8 - 13.7	12.55 - 13.05	3.94
Males	10	12.92 $\pm$ 0.17	11.8 - 13.7	12.53 - 13.30	4.15
Females	8	12.66 $\pm$ 0.16	12.1 - 13.4	12.28 - 13.04	3.60
Adult Total	116	12.12 $\pm$ 0.06	10.9 - 13.7	12.01 - 12.23	4.93
Grand Total	152	11.43 $\pm$ 0.04	8.1 - 13.7	11.35 - 11.51	--

FRONTONASAL LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	14	20.67 $\pm$ 0.29	18.7 - 22.5	20.04 - 21.29	5.23
Males	8	20.50 $\pm$ 0.37	18.7 - 21.9	19.64 - 21.37	5.05
Females	6	20.89 $\pm$ 0.49	18.8 - 22.5	19.63 - 22.15	5.75
Age Class 2					
Total	22	22.92 $\pm$ 0.14	21.7 - 23.8	22.63 - 23.21	2.88
Males	7	22.98 $\pm$ 0.31	21.7 - 23.8	22.21 - 23.75	3.61
Females	15	22.89 $\pm$ 0.15	21.7 - 23.7	22.56 - 23.22	2.61
Age Class 3					
Total	57	24.38 $\pm$ 0.09	22.8 - 26.1	24.19 - 24.57	2.93
Males	26	24.65 $\pm$ 0.10	23.2 - 25.7	24.44 - 24.86	2.11
Females	31	24.15 $\pm$ 0.14	22.8 - 26.1	23.87 - 24.44	3.23
Age Class 4					
Total	40	25.59 $\pm$ 0.10	24.0 - 27.1	25.38 - 25.80	2.59
Males	21	25.66 $\pm$ 0.12	24.7 - 27.0	25.40 - 25.92	2.23
Females	19	25.52 $\pm$ 0.17	24.0 - 27.1	25.15 - 25.88	2.97
Age Class 5					
Total	18	26.44 $\pm$ 0.16	25.3 - 27.8	26.10 - 26.77	2.56
Males	10	26.48 $\pm$ 0.22	25.3 - 27.4	25.98 - 26.99	2.65
Females	8	26.38 $\pm$ 0.24	25.5 - 27.8	25.81 - 26.95	2.60
Adult Total	115	25.12 $\pm$ 0.10	22.8 - 27.8	24.93 - 25.32	4.16
Grand Total	151	24.02 $\pm$ 0.07	18.7 - 27.8	23.88 - 24.18	--

INTERPARIETAL LENGTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	18	8.19 $\pm$ 0.10	7.5 - 9.0	8.00 - 8.39	5.02
Males	11	8.09 $\pm$ 0.11	7.7 - 9.0	7.85 - 8.34	4.50
Females	7	8.33 $\pm$ 0.18	7.5 - 9.0	7.90 - 8.76	5.59
Age Class 2					
Total	24	8.17 $\pm$ 0.06	7.9 - 8.8	8.05 - 8.29	3.48
Males	9	8.22 $\pm$ 0.09	7.9 - 8.6	8.02 - 8.43	3.25
Females	15	8.14 $\pm$ 0.08	7.9 - 8.8	7.98 - 8.31	3.67
Age Class 3					
Total	56	8.36 $\pm$ 0.06	7.2 - 9.5	8.25 - 8.48	5.28
Males	25	8.38 $\pm$ 0.08	7.4 - 9.2	8.20 - 8.56	5.08
Females	31	8.35 $\pm$ 0.08	7.2 - 9.5	8.18 - 8.52	5.51
Age Class 4					
Total	39	8.45 $\pm$ 0.08	7.4 - 9.7	8.29 - 8.61	5.90
Males	19	8.49 $\pm$ 0.10	7.9 - 9.4	8.28 - 8.70	5.12
Females	20	8.41 $\pm$ 0.13	7.4 - 9.7	8.15 - 8.68	6.68
Age Class 5					
Total	18	8.27 $\pm$ 0.11	7.3 - 9.0	8.04 - 8.50	5.71
Males	10	8.18 $\pm$ 0.18	7.3 - 9.0	7.77 - 8.59	6.97
Females	8	8.38 $\pm$ 0.11	8.0 - 8.8	8.12 - 8.64	3.72
Adult Total	113	8.38 $\pm$ 0.04	7.2 - 9.7	8.29 - 8.47	5.57
Grand Total	154	8.30 $\pm$ 0.04	7.2 - 9.7	8.22 - 8.38	--

INTERPARIETAL WIDTH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	18	3.29 ± 0.05	3.0 - 3.7	3.18 - 3.39	6.50
Males	11	3.31 ± 0.07	3.0 - 3.7	3.15 - 3.46	6.95
Females	7	3.26 ± 0.08	3.0 - 3.6	3.07 - 3.44	6.10
Age Class 2					
Total	24	3.39 ± 0.06	2.8 - 3.8	3.29 - 3.49	7.17
Males	9	3.48 ± 0.10	2.8 - 3.8	3.25 - 3.71	8.60
Females	15	3.34 ± 0.05	3.0 - 3.7	3.23 - 3.45	5.86
Age Class 3					
Total	57	3.50 ± 0.03	2.7 - 4.1	3.44 - 3.56	6.24
Males	26	3.51 ± 0.05	2.7 - 4.0	3.41 - 3.60	6.84
Females	31	3.49 ± 0.04	3.2 - 4.1	3.42 - 3.56	5.79
Age Class 4					
Total	39	3.60 ± 0.04	3.1 - 4.1	3.52 - 3.68	6.96
Males	19	3.63 ± 0.05	3.2 - 4.1	3.52 - 3.75	6.56
Females	20	3.58 ± 0.06	3.1 - 4.0	3.45 - 3.70	7.42
Age Class 5					
Total	18	3.57 ± 0.05	3.2 - 3.9	3.46 - 3.67	6.01
Males	10	3.66 ± 0.06	3.3 - 3.9	3.53 - 3.79	5.02
Females	8	3.45 ± 0.07	3.2 - 3.7	3.28 - 3.62	5.80
Adult Total	114	3.54 ± 0.02	2.7 - 4.1	3.50 - 3.59	6.56
Grand Total	157	3.47 ± 0.02	2.7 - 4.1	3.43 - 3.51	--

LENGTH OF AUDITORY BULLA

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	7.92 $\pm$ 0.07	7.5 - 8.5	7.76 - 8.08	3.84
Males	10	7.92 $\pm$ 0.08	7.6 - 8.5	7.74 - 8.10	3.21
Females	7	7.91 $\pm$ 0.15	7.5 - 8.5	7.55 - 8.27	4.89
Age Class 2					
Total	24	8.38 $\pm$ 0.07	7.6 - 9.1	8.25 - 8.52	3.84
Males	9	8.61 $\pm$ 0.09	8.2 - 9.1	8.40 - 8.82	3.16
Females	15	8.25 $\pm$ 0.07	7.6 - 8.7	8.09 - 8.40	3.31
Age Class 3					
Total	57	8.74 $\pm$ 0.04	8.0 - 9.3	8.66 - 8.81	3.36
Males	26	8.84 $\pm$ 0.05	8.4 - 9.3	8.74 - 8.93	2.73
Females	31	8.65 $\pm$ 0.06	8.0 - 9.3	8.54 - 8.77	3.59
Age Class 4					
Total	41	9.09 $\pm$ 0.04	8.3 - 9.5	9.01 - 9.18	2.93
Males	21	9.09 $\pm$ 0.05	8.5 - 9.5	8.98 - 9.20	2.64
Females	20	9.09 $\pm$ 0.07	8.3 - 9.5	8.96 - 9.23	3.27
Age Class 5					
Total	18	9.10 $\pm$ 0.08	8.6 - 9.7	8.94 - 9.26	3.52
Males	10	9.10 $\pm$ 0.11	8.6 - 9.7	8.85 - 9.34	3.73
Females	8	9.10 $\pm$ 0.11	8.8 - 9.7	8.83 - 9.36	3.48
Adult Total	116	8.92 $\pm$ 0.03	8.0 - 9.7	8.86 - 8.98	3.79
Grand Total	157	8.66 $\pm$ 0.03	7.5 - 9.7	8.60 - 8.72	--

WIDTH OF AUDITORY BULLA

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	5.01 $\pm$ 0.06	4.5 - 5.5	4.89 - 5.13	4.76
Males	10	5.00 $\pm$ 0.07	4.7 - 5.5	4.84 - 5.16	4.46
Females	7	5.02 $\pm$ 0.10	4.5 - 5.4	4.76 - 5.27	5.50
Age Class 2					
Total	24	5.34 $\pm$ 0.04	5.0 - 5.7	5.26 - 5.42	3.55
Males	9	5.40 $\pm$ 0.04	5.2 - 5.6	5.31 - 5.49	2.14
Females	15	5.30 $\pm$ 0.06	5.0 - 5.7	5.18 - 5.42	4.09
Age Class 3					
Total	57	5.46 $\pm$ 0.04	4.8 - 5.9	5.38 - 5.53	5.23
Males	26	5.49 $\pm$ 0.07	4.8 - 5.9	5.35 - 5.63	6.32
Females	31	5.43 $\pm$ 0.04	5.0 - 5.9	5.35 - 5.51	4.13
Age Class 4					
Total	41	5.51 $\pm$ 0.04	5.0 - 6.1	5.43 - 5.58	4.53
Males	21	5.52 $\pm$ 0.06	5.1 - 6.1	5.40 - 5.64	4.79
Females	20	5.49 $\pm$ 0.05	5.0 - 5.9	5.38 - 5.61	4.36
Age Class 5					
Total	18	5.40 $\pm$ 0.05	5.1 - 5.9	5.30 - 5.50	3.84
Males	10	5.39 $\pm$ 0.06	5.1 - 5.8	5.25 - 5.52	3.56
Females	8	5.42 $\pm$ 0.08	5.2 - 5.9	5.22 - 5.62	4.38
Adult Total	116	5.46 $\pm$ 0.02	4.8 - 6.1	5.41 - 5.51	4.81
Grand Total	157	5.35 $\pm$ 0.02	4.5 - 6.1	5.31 - 5.39	--

ALVEOLAR LENGTH OF THE FIRST MOLAR

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	2.36 ± 0.02	2.2 - 2.5	2.33 - 2.40	2.97
Males	10	2.39 ± 0.02	2.3 - 2.5	2.35 - 2.43	2.38
Females	7	2.33 ± 0.03	2.2 - 2.4	2.26 - 2.40	3.25
Age Class 2					
Total	24	2.46 ± 0.02	2.2 - 2.6	2.41 - 2.50	4.31
Males	9	2.49 ± 0.03	2.4 - 2.6	2.42 - 2.56	3.73
Females	15	2.44 ± 0.03	2.2 - 2.6	2.38 - 2.50	4.59
Age Class 3					
Total	57	2.52 ± 0.02	2.3 - 2.8	2.48 - 2.55	4.97
Males	26	2.55 ± 0.02	2.3 - 2.8	2.50 - 2.60	4.87
Females	31	2.49 ± 0.02	2.3 - 2.7	2.44 - 2.53	4.84
Age Class 4					
Total	41	2.60 ± 0.02	2.3 - 2.8	2.56 - 2.63	4.43
Males	21	2.60 ± 0.03	2.3 - 2.8	2.54 - 2.66	5.16
Females	20	2.60 ± 0.02	2.5 - 2.8	2.55 - 2.64	3.64
Age Class 5					
Total	18	2.73 ± 0.04	2.4 - 3.0	2.65 - 2.82	6.02
Males	10	2.78 ± 0.05	2.5 - 3.0	2.66 - 2.90	6.07
Females	8	2.68 ± 0.05	2.4 - 2.9	2.55 - 2.80	5.56
Adult Total	116	2.58 ± 0.01	2.3 - 3.0	2.55 - 2.61	5.76
Grand Total	157	2.53 ± 0.01	2.2 - 3.0	2.51 - 2.55	--

ALVEOLAR WIDTH OF THE FIRST MOLAR

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	1.86 ± 0.01	1.8 - 1.9	1.83 - 1.88	2.73
Males	10	1.86 ± 0.02	1.8 - 1.9	1.82 - 1.90	2.78
Females	7	1.86 ± 0.02	1.8 - 1.9	1.81 - 1.91	2.88
Age Class 2					
Total	24	1.87 ± 0.01	1.8 - 2.0	1.84 - 1.90	3.76
Males	9	1.88 ± 0.03	1.8 - 2.0	1.81 - 1.94	4.44
Females	15	1.86 ± 0.02	1.8 - 2.0	1.82 - 1.90	3.40
Age Class 3					
Total	57	1.89 ± 0.01	1.8 - 2.0	1.88 - 1.91	3.52
Males	26	1.92 ± 0.01	1.8 - 2.0	1.90 - 1.95	3.05
Females	31	1.87 ± 0.01	1.8 - 2.0	1.85 - 1.89	3.43
Age Class 4					
Total	41	1.90 ± 0.01	1.8 - 2.0	1.88 - 1.93	3.81
Males	21	1.91 ± 0.02	1.8 - 2.0	1.88 - 1.95	3.80
Females	20	1.89 ± 0.02	1.8 - 2.0	1.86 - 1.92	3.80
Age Class 5					
Total	18	1.89 ± 0.02	1.8 - 2.0	1.86 - 1.92	3.58
Males	10	1.91 ± 0.02	1.8 - 2.0	1.87 - 1.95	2.97
Females	8	1.86 ± 0.03	1.8 - 2.0	1.80 - 1.92	3.99
Adult Total	116	1.90 ± 0.01	1.8 - 2.0	1.88 - 1.91	3.61
Grand Total	157	1.88 ± 0.01	1.8 - 2.0	1.86 - 1.90	--

LENGTH OF MAXILLARY CHEEK TEETH

	N	$\bar{x} \pm s_{\bar{x}}$	RANGE	95% CI	V
Age Class 1					
Total	17	4.96 $\pm$ 0.03	4.8 - 5.3	4.89 - 5.03	2.77
Males	10	4.99 $\pm$ 0.05	4.8 - 5.3	4.87 - 5.11	3.33
Females	7	4.91 $\pm$ 0.03	4.8 - 5.0	4.85 - 4.98	1.40
Age Class 2					
Total	24	4.94 $\pm$ 0.03	4.6 - 5.2	4.88 - 5.01	3.10
Males	9	5.03 $\pm$ 0.04	4.8 - 5.2	4.95 - 5.12	2.22
Females	15	4.89 $\pm$ 0.04	4.6 - 5.2	4.80 - 4.97	3.08
Age Class 3					
Total	57	5.07 $\pm$ 0.02	4.7 - 5.6	5.02 - 5.12	3.67
Males	26	5.15 $\pm$ 0.04	4.8 - 5.6	5.07 - 5.23	4.01
Females	31	5.00 $\pm$ 0.02	4.7 - 5.3	4.95 - 5.05	2.75
Age Class 4					
Total	41	5.19 $\pm$ 0.03	4.9 - 5.5	5.14 - 5.25	3.35
Males	21	5.25 $\pm$ 0.04	4.9 - 5.5	5.17 - 5.32	3.22
Females	20	5.13 $\pm$ 0.04	4.9 - 5.5	5.06 - 5.21	3.16
Age Class 5					
Total	18	5.27 $\pm$ 0.05	5.0 - 5.8	5.16 - 5.38	4.17
Males	10	5.34 $\pm$ 0.06	5.0 - 5.8	5.17 - 5.51	4.43
Females	8	5.18 $\pm$ 0.06	5.0 - 5.4	5.04 - 5.31	3.23
Adult Total	116	5.14 $\pm$ 0.02	4.7 - 5.8	5.11 - 5.18	3.91
Grand Total	157	5.09 $\pm$ 0.02	4.6 - 5.8	5.05 - 5.13	--

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