8. INVENTORY AND ANALYSIS OF RODENT, INSECTIVORE, AND BAT CRANIAL ELEMENTS

Holmes A. Semken, Jr.[1]

Introduction

Micromammal remains were prolific in Scattered Village (32MO31) and, because micromammal dentitions are regarded as the taxonomically most useful elements, only these elements were examined to establish the systematic composition of the Slant Village micromammal fauna. Because of the thousands of micromammal remains recovered, Falk and Ahler selected a sample from 17 especially rich features, primarily undercut pits. Each of the four Plains Village time periods, separated by artifact analysis (Chapter 4, this volume), were represented. Matrix from a total of 88 levels produced 1,202 micromammal cranial elements, 570 of which could be identified to species. Eleven species represented by a minimum number of 179 individuals were recorded from the identified elements. This report presents this data and summarizes the interpretations based on this sample.

The analysis of the micromammal fraction from the Scattered Village local fauna was designed to provide the following information and interpretations. (1) Provide an inventory of the micromammal species present in the site and quantify any changes in species composition and relative abundance through the four periods of occupation. (2) Examine differences in micromammal composition based entirely on screen size. (3) Prepare a paleoecological analysis based on the micromammal component for the time of occupation. (4) Consider any possible taxonomic signatures that may relate faunal composition and relative abundance to cultural activities. (5) Compare the micromammal component with that recovered from Slant Village, located ca. 6 miles to the south. (6) Add to the Holocene biogeographic faunal database and record the presence of any rare taxa known from the northern plains. And, (7) address the time of introduction of European rodents (e.g., house mouse) onto the northern Great Plains.

Collection Preparation and Curation

Microvertebrate cranial elements from the waterscreened (size grades G3, G4, and G5) matrix were separated from the Scattered Village concentrate under the supervision of Stanley A Ahler (this volume), collated by provenience (Feature /Level) and sent to Carl R. Falk. Falk separated the micromammal remains from the sample and sent them to the author, Department of Geoscience, University of Iowa, for identification. Larger specimens were sent to Kathy Cruz-Uribe at the University of Northern Arizona. Cranial elements of the prairie dog, muskrat, and pocket gopher from G3 materials were identified by Cruz-Uribe and are incorporated into the tables in this chapter. Any discrepancies in NISP and MNI for these taxa between these two chapters can be attributed to use of post-cranial elements in the chapter on larger mammals.

[1] Department of Geosciences, University of Iowa, Iowa City, Iowa 52242

Identifiable micromammal dental elements were then sorted by genus and species, recorded by element (e. g. left, first lower molar), and tabulated by both archaeological provenience and time period. Relevant data were recorded in digital format, and a copy of this database has been deposited at the State Historical Society of North Dakota, Bismarck. Microfaunal inventories were summarized by Number of Identified Specimens (NISP) and Minimum Number of Individuals (MNI) for each size grade and time period following the protocol of Klein and Cruz-Uribe (1984) assuming that there was little mixing between chronological periods. As with the Scattered Village megamammals (Cruz-Uribe, this volume), comparisons are based, where possible, on MNI because the numbers are less affected by differential fragmentation. After identification and recording burned, cut, or acidized modifications, the cranial elements from each unit were then returned to the original container for that accession number. In instances where there could be doubt about taxonomic identification of specimens in a container (e. g., *Peromyscus* vs. *Onychomys*), the least most common taxon was placed in gelatin capsules with a tag bearing archaeological provenience, catalog number, element and taxonomic designation. Delicate, comparatively rare specimens, for example, the prairie shrew, also were treated in this manner. None of the specimens were repaired and no preservatives were used to enhance their future potential for isotopic analysis. All specimens were returned to the State Historical Society of North Dakota via Carl R. Falk.

Systematics of Selected Taxa

Sorex haydeni, the prairie shrew, was regarded as a subspecies of the masked shrew, until van Zell de Jong (1980) proposed specific rank for the subspecies, but this was not universally accepted at the time (Jones et al. 1985: Jones and Birney 1988). Van Zell de Jong (1983) separated the two taxa on the Canadian plains on the presence of two pigmented areas on the lower incisor of *S. haydeni* versus one on *S. cinereus*. However, this characteristic is not applicable further south (Whidden 2000, personal communication). Although Whidden agrees that the plains shrew probably represents a species, he feels that *S. haydeni* and *S. cinereus* have overlapping osteological characters. Therefore, the *S. haydeni* designation here is based solely on biogeography. *Sorex* from other northern plains archaeological sites previously identified by this author almost certainly are the same taxon and all should be treated as monotypic in regional systematic comparisons.

Incisor fragments from a beaver/porcupine-sized rodent were encountered in levels 1 through 3 in Feature 133. These undoubtedly are beaver because Cruz-Uribe has an abundance of beaver remains from this feature and the fact that no porcupine remains, other than gnawed bone samples, are known from Scattered Village (Cruz-Uribe, this volume). The incisor fragments are significant taxonomically because chips from all three levels articulate and indicate nearly contemporaneous filling of this feature. Beaver remains from grades G4 and G5 were recovered from this feature only because of fragmentation, and they are not included in faunal lists because they would be redundant with specimens from the larger grades.

Microtines (voles) identifications were based on the morphology outlined by Semken and Wallace (In Press). All other taxa (bat, ground squirrels and pocket gopher) were established by comparison to specimens in the recent mammal collection, Department of Geoscience, University of Iowa.

Peromyscus (white-footed and deer mice) usually is the most common micromammal in all Plains Village sites (Semken and Falk 1987), but because of morphological variability, specific identification is difficult. Only two species of this genus, *P. leucopus* (white-footed mouse) and *P. maniculatus* (deer mouse), presently occupy the northern Great Plains with the closest ranging alternative species of *Peromyscus* being over 500 miles distant in north-central Colorado. In view of the essentially modern age of Scattered Village, AD 1550-1700, either the white-footed and/or deer mouse are the logical candidates for association with Scattered Village. Both of these mice are present in some northern Plains Village samples, e.g. Jake White Bull, but most Plains Village specimens are recorded as either *P. maniculatus* or *Peromyscus* species (Semken and Falk 1987). Following Bowles (1975), Semken (1980) found that the length of the mandibular tooth row was an index to separate the two, the longer tooth row belonging to *P. leucopus* and the shorter to *P. maniculatus*. *P. leucopus* is separated from *P. maniculatus* on the plains by size with *P. leucopus* being the larger of the two (Jones, et al. 1983). This size distinction was confirmed by measuring over 400 modern mandibular tooth rows for each species in Nebraska Natural History Museum (Semken and Tatum, file data). Also Hoffmeister (1989), in his guide to the mammals of Illinois, indexes a mandibular tooth row length of <3.5 mm as the deer mouse and > 3.5 mm length for the white-footed mouse. Hoffmeister (1989) also noted that the zygomatic arches of *P. leucopus* were square anteriorly while those of the deer mouse were compressed. *P. leucopus* usually has a higher incidence of stylids and lophids than *P. maniculatus* as well as a more bilaterally symmetrical anterior cone.

The Scattered Village *Peromyscus* first molars are characterized by structureless re-entrants, both symmetrical and asymmetrical anterocones, and an alveolar row length between 3.5 and 4.0 mm (Figure 8.1). Based on size, the most definitive character, the specimens represent the white-footed mouse. The other features, however, have many characteristics of the deer mouse, none of which are absolutely definitive. For this reason the *Peromyscus* sample is attributed to *P*. cf. *leucopus*. This is in contrast to the much more variable size range in the On-A-Slant *Peromyscus* sample (Semken 1997) that ranged from 3.3-4.1 mm. Those specimens were recorded as *Peromyscus* species and the On-A-Slant sample probably includes both taxa. Another northern plains cricedid, the grasshopper mouse (*Onychomys leucogaster*), has a similar dentition to *Peromyscus*, but it generally is larger than the white-footed mouse, the re-entrants are broad, U-shaped structures versus a V-shaped in *Peromyscus* and *Onychomys* molars invariably lack lophids and stylids.

In measuring *Peromyscus* alveolar rows, a large variation in the median body depth of the mandibles became apparent. This dimension was added to the first 52 right mandibles measured upon re-examination of the taxon. If teeth were present, the amount of wear also was recorded. Dental wear was categorized as emerging (no wear or poorly formed roots in the alveolus), slightly worn (circular dentine field on each cusp), moderately worn (cusps with elongate dentine fields), and heavily worn (cusps removed). These data, along with those for *Onychomys* are plotted on Figure 8.1. The specimens with low median body depths (<2.9 mm), except for one at 3.0 mm, are juveniles. Specimens in a central cluster, 2.9-3.5 mm, show all degrees of wear with 1 emerging, 3 slight, 11 medium and 7 heavily worn specimens. An exception to the correlation between age based on dental ware and size is found in the specimen with the greatest medium body depth. It is only slightly worn. The overall distribution in Figure 8.1 appears to reflect a

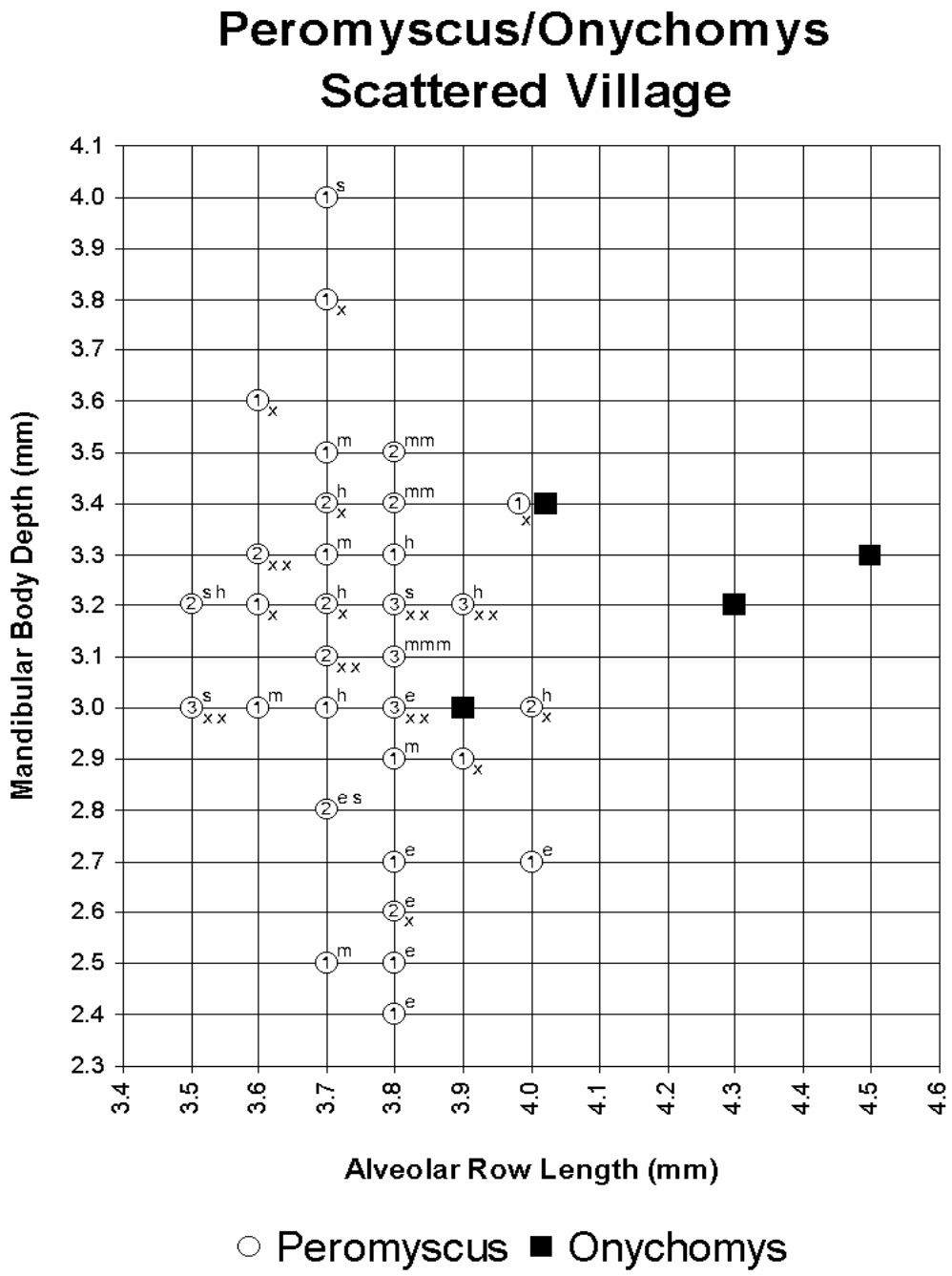

Figure 8.1. Alveolar molar row lengths versus mandibular body depths for the first 52 measurable right *Peromyscus* (white-footed mouse) mandibular encountered in the Scattered Village local fauna. *Onychomys leucogaster* (grasshopper mouse) right alveolar lengths encountered in the same search are included for comparison. The numbers in the open circles represent the number of specimens at a given intersection. Tooth wear acronyms are e-erupting, s-slight, m-medium, h-heavy and x-edentate. These are defined in the text.

natural population and suggests that these animals are residents in the site. Four right mandibles of the grasshopper mouse were included to illustrate that *Onychomys* usually can be separated by size but that *Peromyscus*-sized *Onychomys* specimens are possible. Edentulous mandibles can be separated from those of *Peromyscus* by an elongate coronoid process and a relatively small m3 (or m3 alveolus). *Peromyscus* dentitions, measured for the bivariate plot (Figure 8.1), are indicated by an asterisk in the faunal inventories.

Scattered Village Faunal Analysis

A total of 1162 specimens from Scattered Village was examined. Of these, 530 were identified to specific level (Table 8.1). These reflect a total of 11 species represented by a MNI of 175. With the exception of *Myotis* cf. *lucifugus*, the little brown bat, all taxa have been previously identified from Late Prehistoric/Historic Plains Village sites. This represents the first record for *Myotis* from 63 Plains Village faunal lists recorded by Semken and Falk (1987) from North and South Dakota. The probability of recovery of bats from some sites may be artificially low, as some were not waterscreened and some excavations were more intensive than others. Lower Grand, Lower Hidatsa and Mondrian Tree contain chiropterians that were not identified to genus, and *Myotis* could be represented. Bats are rare even in extensively excavated Plains Village sites, but the big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*) and silver-haired bat (*Lasionycteris noctivagans*) also have been identified from Plains Village associations.

Thirty-five burned micromammal cranial elements were recovered with each time period represented. The northern plains pocket gopher, muskrat, white-footed mouse and prairie dog were identified in this sample. The meadow vole, white-footed mouse, grasshopper mouse and thirteen-lined ground squirrel were included in the 11 elements from periods TP1, TP2 and TP3 that exhibited frosting characteristic of digestive processing. Burning and digestive modification suggest that these specimens were not intrusive and support the concept that most micromammal remains in Plains Village sites are contemporaneous, or nearly so, with occupation (Falk and Semken 1999, Semken and Falk 1991). Although not quantified, neither seemed to be present in the numbers recorded from most other Plains Village sites.

Relative Abundance of Micromammals by Size Grade

Eleven species were identified from micromammal cranial elements recovered from the G3 (0.223-inch screen[approximately the same as ¼-inch hardware cloth]), G4 (0.100-inch screen), and G5 (0.046-inch screen) fractions collectively (Table 8.1). Eight taxa were recovered from the G3 fraction, each of which was also identified in both the G4 and G5 samples. As expected, the larger rodents, prairie dog, pocket gopher and muskrat were most common in the G3 fraction. The G3 sample also proved helpful in the tentative identification of *Peromyscus* cf. *leucopus.* The diagnostic shape of the zygomatic plate, preserved in the few relatively complete *Peromyscus* anterocrania from the G3 sample, reinforced assignment of the Scattered Village specimens to *P.* cf. *leucopus*. Nine species were present in the G4 sample, one of which, the prairie shrew, was unique to this fraction. The G5 sample produced 10 taxa with the little brown bat and the red back vole being unique to G5. Thus, each size grade produced a unique blend of species and different relative with G4 producing the greatest number of specimens, taxa and minimum number of individuals. G3 contained more species commonly regarded as economic (prairie dog, pocket gopher and muskrat) either for their value for subsistence and pelt or, in the case of the fossorial species, for their destructiveness in gardens.

Table 8.1. Number of identified specimens (NISP) and minimum number of individuals (MNI) for micromammals recovered from size grades G3, G4, and G5, Scattered Village (32MO31), 1998 excavations. Cranial elements of the prairie dog, pocket gopher and muskrat identified by Cruz-Uribe from size G3 are incorporated into this table.

	Size Grade								
	G3		G4		G5		Total		
Taxon	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	Common Name
Sorex haydeni	0	0	3	1	0	0	3	1	prairie shrew
Myotis cf lucifugus	0	0	0	0	1	1	1	1	little brown bat
C. ludovicianus	2	2	18	3	3	1	23	6	white-tailed prairie dog
S. richardsoni	1	1	3	1	2	1	6	3	Richardson's ground squirrel
S. tridecemlineatus	2	2	2	1	21	2	25	5	13-lined ground squirrel
T. talpoides	0	0	10	4	7	2	17	6	northern pocket gopher
Castor canadensis	0	0	9	1	0	0	9	1	beaver
C. gapperi	0	0	0	0	1	1	1	1	red back vole
O. zibethicus	0	0	1	1	1	1	2	2	muskrat
M. pennslyvanicus	1	1	14	3	13	6	28	10	meadow vole
O. leucogaster	1	1	10	5	7	2	18	8	northern grasshopper mouse
P. cf. leucopus	6	3	356	126	65	12	427	141	white-footed mouse
Total	13	10	426	146	121	29	560	185	

The relatively small number of specimens in the G3 sample (Table 8.1) initially was surprising but can be explained taphonomically. The majority of specimens from G3 are larger rodents and their cranial elements would be expected in this grade. The paucity of cranial elements for the remaining species, which are large enough for complete skulls to be captured in this fraction, can be attributed to preservation. The posterior portion of the skull of most micromammals is fragile, in part because micromammals ordinarily do not live long enough for cranial sutures to fuse. Incorporation, burial, and recovery will reduce the cranial remains of these taxa to individual elements that readily pass through G3 screens, even given the care exerted by the excavators. This effect is apparent in the number of identified specimens recorded in each size grade (Table 8.1) where there was an NISP of 13, 426, and 121 for grades 3, 4, and 5, respectively. Other things being equal, recovery of at least a G4 fraction appears to be essential for an interpretable micromammal component, but two of the 11 recovered species came from the G5 fraction. Shaffer (1992) as well as Semken and Graham (1996), among others, have presented detailed analyses of the effect of screen size on faunal recovery.

Area of Sympatry

With the exception of Richardson's ground squirrel, all of the rodents and insectivores identified from Scattered Village presently are recorded (Jones et. al 1983) as living in Morton County today. The western-most range of Richardson's ground squirrel in the vicinity is mapped immediately east of Mandan on the east bank of the Missouri River (Jones et. al 1983). This contrasts with the eastern-most range of the white-tailed prairie dog, which is plotted along the west bank of the Missouri River in the Mandan vicinity. The Missouri River in this region is either serving as a barrier to the eastern and western distribution of these species or it provides a reasonable location to terminate a species range at the margins of their distribution. As the

Missouri periodically dried prior to construction of dams along the river, it could not form a physical barrier to either species at the time Scattered Village was occupied. Either the species were more allopatric than mapped or competitive exclusion controlled the distribution of the two. Although slightly allopatric on the database, the two species are mapped as co-inhabitants on Figure 8.2; the proximity of their distributions is illustrated as a peninsula extending from a large area of sympatry to the west where all taxa presently are regionally sympatric.

All taxa in the Scattered Village local fauna are sympatric to the west where their combined ranges cover most of Montana east of the Rocky Mountains. This area lies totally in the Great Plains Short-Grass Prairie Province of Bailey (1981). The western and northern margins of the sympatry (Figure 8.2) are defined by the prairie dog; the southern boundary is marked by Richardson's ground squirrel. The sympatry also represents the center of distribution of the northern pocket gopher. Without allowance for cultural impact, the Scattered Village local fauna reflects a northern short-grass prairie association.

Relative Abundance of Individuals

The white-footed mouse is by far the dominant taxon in the Scattered Village micromammal sample. It is represented by 76%, 81%, 78%, and 89% of the MNI in periods TP1, TP2, TP3, and TP4 respectively; the average relative abundance in the site is 78% (Table 8.2). The meadow vole is a long second in relative abundance with a maximum representation of 6% in TP1. Overall, it reflects 5% of the total composition. The other 10 micromammals comprise between 0.6% and 3.3% of the faunal sample. Scattered Village perhaps is the most unbalanced Plains Village local fauna in terms of both species richness and density examined by this author. The most similar local fauna in this regard is that from nearby On-A-Slant Village (Semken 1997), occupied at the same, but slightly longer, period of time, AD 1575-1785 versus AD 1550 and 1700. In the On-A-Slant sample, the deer/white-footed mouse complex comprised 68% of the MNI versus 78% in Scattered Village. The prairie dog and meadow vole, represented by 5% and 4% of the On-A-Slant species respectively, show a slightly better balance. By way of comparison (Semken and Falk 1987), the white-footed/deer mouse complex comprises 22% of the fauna at Walth Bay (39WW203), progressively increases from 30%, 45% to 60% through sequential intervals at White Buffalo Robe (32ME7) and culminates at a maximum of 82% at Big Hidatsa (32ME12).

On-A-Slant Village also had 13 species compared to 11 in Scattered Village. Taxonomically, On-A-Slant contained two species not present in Scattered Village, a pocket mouse, and a hoary bat. Scattered Village contained one species not present in On-A-Slant, the little brown bat. As there was no significant chi-square difference between three time periods at On-A-Slant and the time periods at Scattered Village are more similar to each other than at the former, the differences would be even less significant at Scattered Village. The Scattered Village sample does differ from other time sequenced sites in that species richness does not decrease but may increase through time (Table 8.2). This may result from: (1) insignificant differences between the time periods involved, (2) the relatively short period of occupation, (3) the majority of species being so uncommon in any period that chance of recovery offsets actual distributions, or (4) that there was a reduction in lodge density in the area sampled.

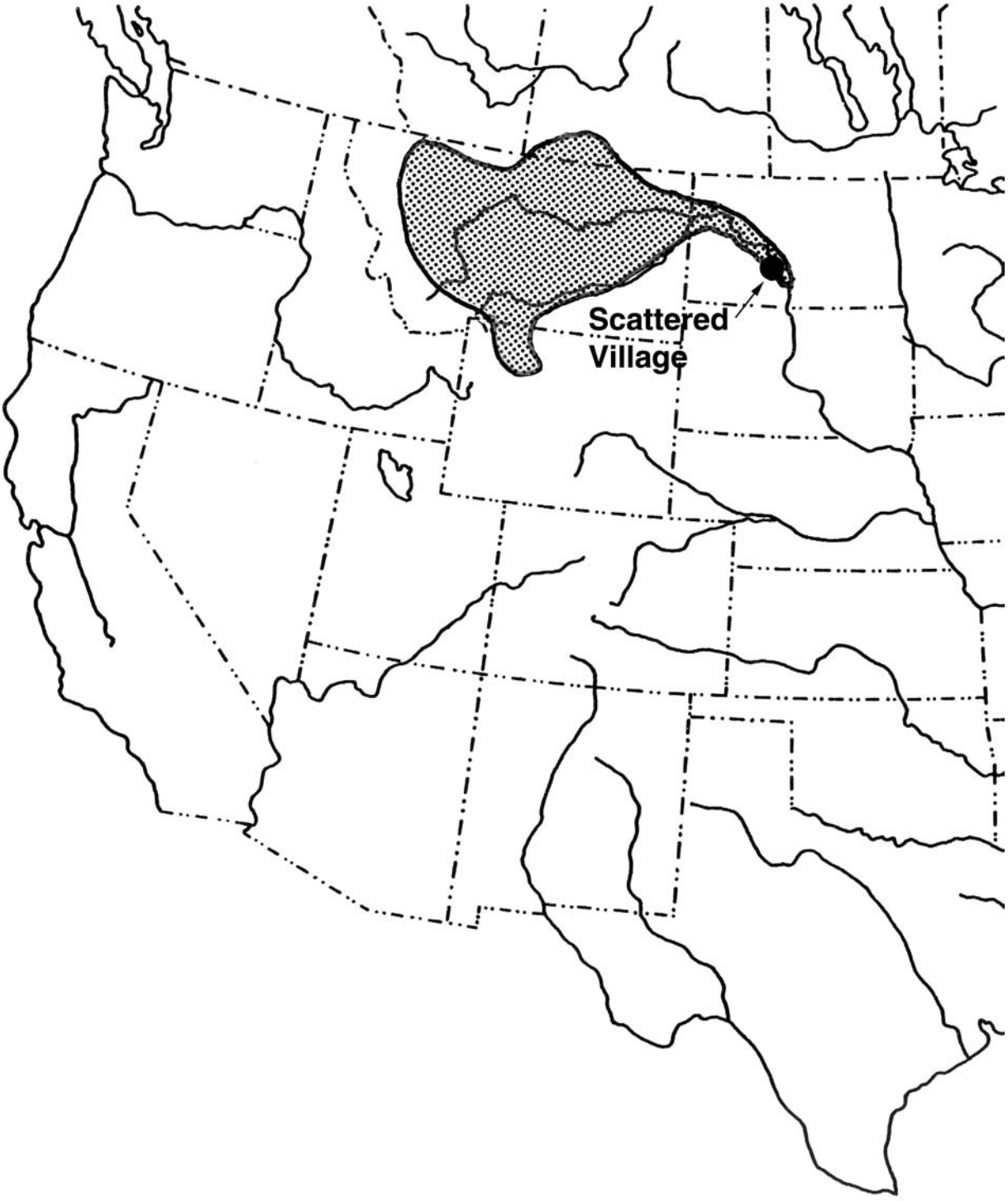

Figure 8.2. Area of Sympatry for the micromammal component of the Scattered Village (32MO31) local fauna. The portion of the sympatry along the Missouri River is enlarged for clarity.

Table 8.2. Number of identified specimens (NISP), and minimum number of individuals (MNI), and relative abundance of individuals for micromammal cranial elements according to time period, Scattered Village (32MO31), 1998 excavations. Cranial elements of the prairie dog, pocket gopher and muskrat identified by Cruz-Uribe from size G3 are incorporated into this table.

	Time Period										
	TP1		TP2		TP3		TP4		Total		
Taxon	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	Common Name
Count Data											
Sorex haydeni	0	0	3	1	0	0	0	0	3	1	prairie shrew
Myotis cf lucifugus	0	0	0	0	1	1	0	0	1	1	little brown bat
C.ludovicianus	20	3	2	1	3	1	0	0	25	5	white-tailed prairie dog
S. richardsoni	6	1	0	0	0	0	0	0	6	1	Richardson's ground squirrel
S. tridecemlineatus	13	2	4	1	7	1	1	1	25	5	13-lined ground squirrel
T. talpoides	8	3	6	2	3	1	0	0	17	6	northern plains pocket gopher
Castor canadensis	0	0	0	0	7	1	0	0	7	1	beaver
C.gapperi	1	1	0	0	0	0	0	0	1	1	red back vole
O. zibethicus	2	1	0	0	0	0	0	0	2	1	muskrat
M. pennslyvanicus	20	5	2	1	4	2	2	1	28	9	meadow vole
O. leucogaster	6	3	8	2	4	1	0	0	18	6	northern grasshopper mouse
P. cf. leucopus	169	61	144	34	74	28	17	16	404	139	white-footed mouse
Ident. to species	245	80	169	42	103	36	20	18	537	176	
TOTAL NISP , TP	*470*		*393*		*184*		*115*		*1162*		
Percentage Data	MNI%		MNI%		MNI%		MNI%		MNI%		
Sorex haydeni	0		2.4		0		0		0.6		prairie shrew
Myotis cf lucifugus	0		0		2.8		0		0.6		little brown bat
C.ludovicianus	3.6		2.4		2.8		0		2.8		white-tailed prairie dog
S. richardsoni	1.3		0		0		0		0.6		Richardson's ground squirrel
S. tridecemlineatus	2.5		2.4		2.8		5.6		2.8		13-lined ground squirrel
T. talpoides	3.6		4.8		2.8		0		3.4		northern plains pocket gopher
Castor canadensis	0		0		2.8		0		0.6		beaver
C.gapperi	1.3		0		0		0		0.6		red back vole
O. zibethicus	1.3		0		0		0		0.6		muskrat
M. pennslyvanicus	6.3		2.4		5.6		5.6		5.1		meadow vole
O. leucogaster	3.6		4.8		2.8		0		3.4		northern grasshopper mouse
P. cf. leucopus	76.3		80.9		77.8		88.9		77.8		white-footed mouse
Ident. to species	99.8%		100.1%		100.2%		100.1%		98.9%		

Cultural Impact

Earthlodges provide ideal home sites for white-footed mice, and these structures probably are responsible for the breeding population suggested by and progressive age distribution in the Scattered Village *Peromyscus* sample. Garbage associated with human activities (Falk and Semken 1999) also is attractive to these animals. Neither the house mouse (*Mus musculus*), which often displaces white-footed mice in modern households, nor the European rat (*Rattus* sp.), also domestically orientated, appeared in this sample which dates between AD 1550 and 1700. In fact, these animals are rare in the early postcontact Plains Village samples elsewhere in the Heart and Knife River regions (Semken and Falk 1987). A cursory examination of the

micromammal remains from Ft. Clark and associated Mandan and Arikara villages, about 50 miles north of Scattered Village, indicates that murids were present in these sites between AD 1822 and 1860. Infestation, where present, occurred sometime after AD 1700 in the Knife/Heart River area. Richardson's ground squirrel also may be present in Scattered Village as a direct result of human occupation. This ground squirrel now is not distributed west of the Missouri River in the Heart River area but it is mapped immediately across the Missouri from Mandan. As noted above, this boundary may be somewhat artificial in that most biogeographers look for a break in the landscape to determine limits of species. The actual boundary could be some miles away. Nonetheless, this suggests importation of Richardson's ground squirrel into the village. Finally, the unbalanced nature of this local fauna is indicative of badly disturbed land, a condition that would develop quickly in a village environment. Why do some Plains Villages (e.g., Walth Bay, noted above), have a more even species density and richness than others (e.g. Scattered Village)? The answer will require continued detailed examination of micromammals from these village sites.

Summary and Conclusions

1. Burned and digested specimens, while rare, indicate contemporaneous association of the micromammals with occupation. The species recorded at Scattered Village presently are widely sympatric to the northwest of the site in central Montana. However, a narrow band of sympatry does extend from this region along the Missouri River to the site location. This Montana area is characteristic of the northern short-grass prairie and best represents the regional biota around Scattered Village at the time of occupation.

2. All species identified in the Scattered Village sample presently reside in the immediate area of the site. Richardson's ground squirrel is a possible exception in that its western boundary in the region is mapped immediately across the Missouri River from Mandan; the nearest population actually could be further to the east. If its range was similar during occupation of Scattered Village, the inhabitants must have harvested this ground squirrel from across the river.

3. If the Scattered Village sample is representative, the ideal size grade for recovery of rodents and insectivores is G4. However, isolated teeth, the most taxonomically utile micromammal elements, are most common in the G5 size fraction. Thus, rarer species recovered from G5 materials at Scattered Village represent almost 20% of the species identified and invariably have added to the micromammal faunal list at other sites examined. This is significant for Holocene mammalian biogeography. Moreover, rarer species can fine tune paleoecological evaluations from a zooarchaeological sample. The G3 fraction produced most of the larger rodent remains, and these included three species that some regard as having economic value either for fur and subsistence or having been removed as pests from gardens. More complete skulls from the Scattered Village G3 sample also assisted in the specific identification of the white-footed mouse but did not contribute to the Scattered Village faunal list.

4. The *Peromyscus* component of the Scattered Village local fauna is comprised of individuals from juveniles with erupting molars followed by equal abundances of animals with slight, medium and heavy wear. This suggests an indigenous village *Peromyscus* population. *P.*

leucopus, primarily an inhabitant of gallery forests on the plains, commonly invades domestic structures today and undoubtedly did so in the past. Earth lodges, such as those at Scattered Village, provide ideal habitat for these animals.

5. Scattered Village produced the most unbalanced micromammal fauna recorded to date. Between 76% and 84% of the individuals in each time period, as well as the site collectively, were white-footed mice. This unbalance is most similar to but slightly greater that that recorded for On-A-Slant Village located approximately five miles to the South. It is reminiscent of micromammal relative abundance on badly disturbed ground, for example, strip mine spoil piles.

6. Insignificant differences of both species composition and relative abundance between the time periods involved at Scattered Village may be related to a combination of factors including no change in the local environment during occupation. However, the relatively short period of time that the village was occupied and a biologically insignificant duration within and between time periods also would explain this distribution. Other things being equal, a longer occupation would increase the opportunity of rarer species to be incorporated into the site and these could provide differences that would not be expected with a brief period of accumulation.

7. Neither the house mouse nor the European rat is present in the Scattered Village or On-A-Slant local fauna; these animals appeared in the area sometime after AD 1700 and certainly were common circa 1830.