

Dietary reconstruction of *Hezhengia bohlini* (Artiodactyla, Bovidae) from the late Miocene Linxia Basin of China using enamel microwear

Gina M. Semprebon^{a,*}, Nikos Solounias^b, Deng Tao^{c,d}

^a Bay Path University, Department of Biology, Longmeadow, MA, USA

^b New York Institute of Technology, New York College of Osteopathic Medicine, Old Westbury, NY, USA

^c Key Laboratory of Vertebrate Evolution and Human Origins, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, China

^d CAS Center for Excellence in Tibetan Plateau Earth Sciences, Beijing, China

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ABSTRACT

Dietary behavior of the middle late Miocene bovid *Hezhengia bohlini* from the Linxia Basin (Liushu Formation) of China was reconstructed using enamel microwear. Results were compared to a large comparative database of known ungulate microwear patterns. Results indicate a dietary regime that included both grass and browse. While scratch numbers reflect this heterogeneous dietary pattern, scratch width scores of *H. bohlini* are more typical of extant grazers. Also, enamel surfaces did not display the heavy pitting and large pits and gouges typical of extensive grit consumption indicating that fairly abrasive browse and/or grass was likely consumed. These results are consistent with paleohabitat reconstructions of the late Miocene Linxia Basin as mixed habitat including woodland/grassland mosaics.

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1. Introduction

1.1. Background

The Linxia Basin is located at the junction of the western Qinling Mountains, the Loess Plateau, and the northeastern Tibetan Plateau in the Gansu Province of China (Fig. 1A). The localities of this basin are well known for their abundant, well-preserved large mammal fossils that are often complete, partially articulated and densely concentrated (Deng, 2010). The basin consists of 700–2000 m of Late Cenozoic deposits which are dominated by lacustrine siltstones and mudstones with fluvial conglomerates or sandstones as well as other overbank deposits. There are also 30–200 m of Quaternary loess sediments found in the basin (Deng et al., 2013).

Although the Linxia Basin is well known for its rich Late Cenozoic fossil mammals, most fossils have not yet been described or studied in detail, including *Hezhengia bohlini* from the Liushu Formation – the subject of this study (but see Qiu et al., 2000). Much work also is needed regarding the geological background and stratigraphical correlations of the deposits where the fossils have been found.

Deng (2004) correlated 27 mammalian fossil localities of the most fossiliferous areas in the Linxia Basin and sequestered them into seven faunas— the late Oligocene Jiaozigou Fauna; the middle Miocene Laogou Fauna; the late Miocene Guonigou, Dashengou, and Yangjiashan faunas;

the early Pliocene Shilidun Fauna; and the early Pleistocene Longdan Fauna. *H. bohlini* has been recovered from red clays of the middle part of the Liushu Formation and is reported to be one of the most typical taxa in the Dashengou assemblage which is of middle late Miocene age (Deng, 2004).

The Linxia Basin offers one of the best Neogene terrestrial fossil records in the world due to the richness and diversity of the fossils it has produced. Consequently, its fossils have been scrutinized and likely paleoclimate and paleovegetation has been reconstructed for the Late Cenozoic via stable carbon and oxygen isotopes in mammalian tooth enamel and paleosols from 25 million years to the present (Wang and Deng, 2005) and by comparing cenograms of Late Cenozoic fossil faunas to modern faunas (Deng, 2009). The data provide a useful framework to assess our paleodietary results.

1.2. *Hezhengia bohlini*

Qiu et al. (2000) detailed the discovery in 1998 of a number of skulls of *H. bohlini* – a then unrecorded “ovibovine” ungulate – during a visit to the museum of the Linxia Hui Autonomous Prefecture and the later realization that they had found one of the most characteristic forms of the *Hipparion* Fauna of the whole Hezheng district and a new genus. In this study, we will refer to *Hezhengia bohlini* as a late Miocene Chinese “ovibovine” following the traditional view (e.g., Solounias, 1981; Qiu et al., 2000). However, the phylogenetic relationships of the late Miocene “ovibovines” are currently subject to dispute. Shi et al. (2014) provide a succinct review of the concept of the tribe Ovibovini as somewhat

* Corresponding author.

E-mail address: gsempreb@baypath.edu (G.M. Semprebon).

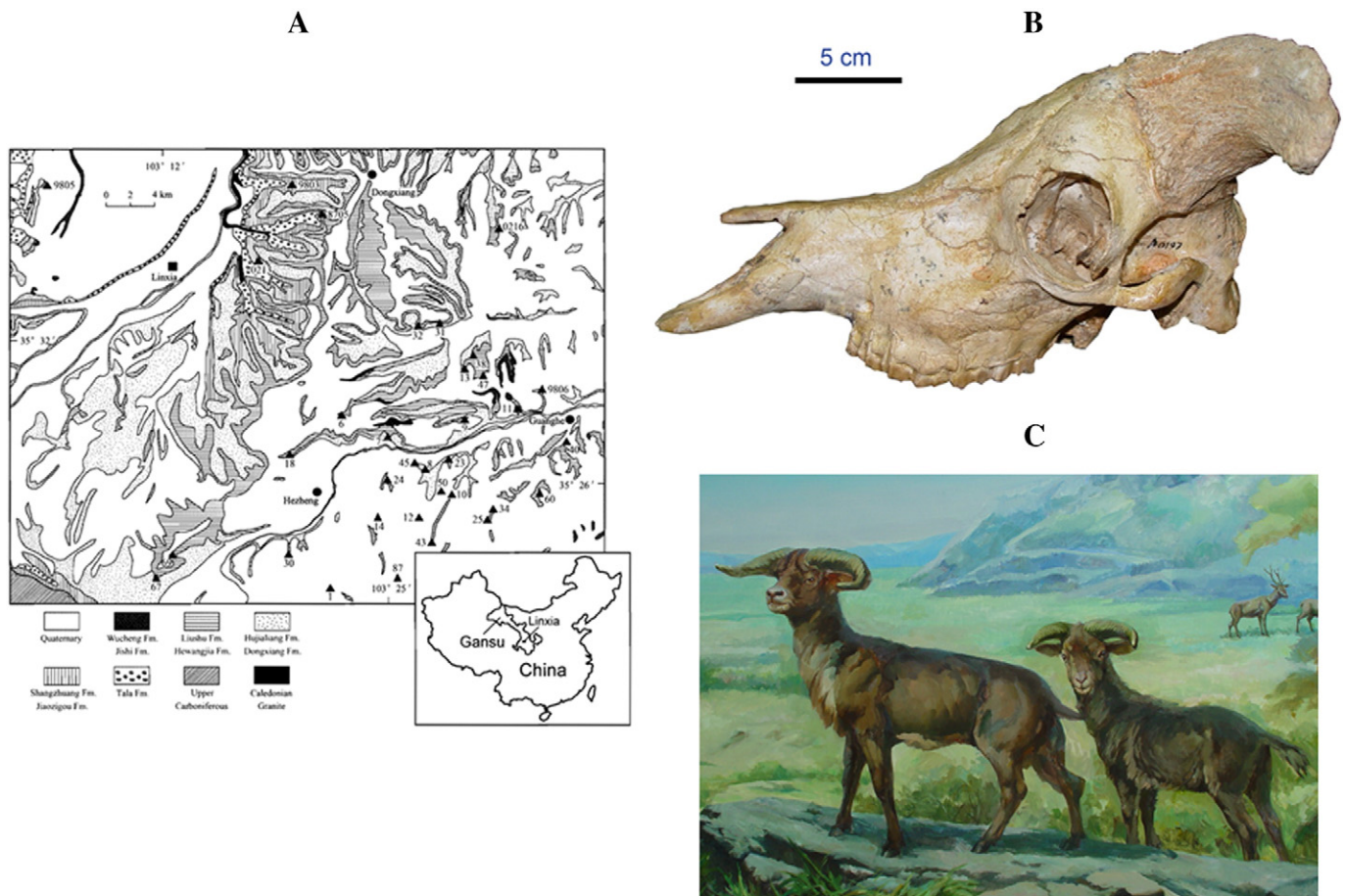


Fig. 1. A. Geological map of the Linxia Basin in Gansu Province, China showing representative mammal fossil localities (from Deng et al., 2013). The fossil specimens analyzed in this study were recovered from the late Miocene Liushu Formation (horizontal lined area) (Locality key may be found in Fig. 9.1, Deng et al., 2013). B. Lateral view of the skull of *Hezhengia bohlini* (Hezheng Paleozoological Museum -HMV 1412). C. Artist's rendition of *Hezhengia bohlini* (reproduced with permission by from the Hezheng Paleozoological Museum).

controversial and point out that it is thought of by many as being a non-monophyletic grouping (e.g., Bouvraïn and de Bonis, 1984; Groves and Shields, 1996; Gatesy et al., 1997; Lalueza-Fox et al., 2005; Ropiquet and Hassanin, 2005; Bibi et al., 2009, 2012). Shi et al. (2014) point out that late Miocene ovibovines have been traditionally referred to as Ovibovini (Solounias, 1981; Qiu et al., 2000), or even as members of a tribe of their own (e.g. Köhler, 1987; Chen and Zhang, 2004, 2009) and that their affinities with each other have also been questioned and the genus *Urmitherium* has been classified by some researchers as Oiocerina or Oiocerinae (e.g., Gentry, 2010; Kostopoulos, 2014). Even so, because certain specialized features of the skull are unique to this group, it remains conceivable that they may have evolved from a common ancestor (Shi et al., 2014) and consequently, we will refer to them as “ovibovines” here.

The discovery in 1998 of a number of skulls of *H. bohlini* led to a preliminary report by Qiu et al. (2000) on the morphology of this new genus – *Hezhengia* – and a description of the type specimen HMV 0922, a skull without a muzzle kept in the Hezheng County Museum. The generic name was assigned to signify the main distribution area of the animal and the species in honor of the Swedish paleontologist (Berger Bohlin) who contributed greatly to the study of Chinese fossil “ovibovines”.

Qiu et al. (2000) described *H. bohlini* as a medium sized “ovibovine” with less specialized horncores than those of middle-late Late Miocene ovibovines such as *Plesiadax* (i.e., horncores are robust and have relatively blunt tips and are covered with multiple longitudinal grooves) (Fig. 1B). They also reported its molars as sub-hypsodont (Fig. 1B) and its premolars as relatively long, with strong ribs and styles – primitive characters that imply that its age should be considered to be earlier than those of the middle-late Late Miocene ovibovines. Other than this

preliminary description, *Hezhengia bohlini* has not been described in detail. An artist's reconstruction of *H. bohlini* is shown in Fig. 1C.

1.3. Microwear

Enamel microwear provides a snapshot into short-term dietary behavior of the last days or weeks before an animal's death (Grine, 1986). Its primary value is: (1) it is a mostly taxon-independent method and direct source of dietary behavior, (2) it gives insight into seasonal, regional and even daily variations in diet that are not discernible with gross craniodental methodologies and demonstrates what an animal's trophic behavior was at the time of its death despite what it might have been optimally crafted for through deep time (Rivals and Semprebon, 2011).

Microwear has been long been employed to examine the direct dietary behavior of mammals by visualizing scars left on dental enamel by food items (i.e., plant phytoliths) or exogenous grit or dust coating the surfaces of the vegetation consumed. Microwear was first performed using a scanning electron microscope (e.g., Rensberger, 1978; Walker et al., 1978) but more recently, the light microscope has been employed more commonly either via confocal microscopic techniques (e.g., Scott et al., 2005, 2006; Ungar et al., 2008, 2010) or stereomicroscopic techniques (e.g., Semprebon, 2002; Solounias and Semprebon, 2002; Merceron et al., 2004, 2005; Semprebon et al., 2004).

While different technological approaches have been employed (i.e., scanning electron microscopy (SEM), light microscopy for dental microwear (LDM), and dental microwear texture analysis (DMTA), all methodologies have been shown to have different strengths and weaknesses. The more recently developed DMTA utilizes an automated approach, while SEM and LDM rely on observer measurements. Because

SEM and LDM rely on observer measurements, studies have been done to identify and/or quantify potential inter- and intra-observer error when employing either methodology (e.g., Grine et al., 2002; Semprebon et al., 2004; Galbany et al., 2005; Fraser et al., 2009; Mihlbachler et al., 2012; DeSantis et al., 2013; Williams and Geissler, 2014; Hoffman et al., 2015). Such studies have been very useful for elucidating potential sources of error in microwear analyses. For example, LDM has been questioned in relation to repeatability and inter-observer error (DeSantis et al., 2013; Mihlbachler et al., 2012). Such studies have pointed out that problems may arise when observers are not properly trained in the microwear method or when comparing data that is collected by different researchers. With these considerations in mind, in the present study all the data were collected by a single experienced observer (GMS) and results are available in the [Appendix A](#).

Consequently, it has become clear that all microwear methodologies have strengths and weaknesses and each should be evaluated in terms of the specific questions being studied and the specific protocols employed to attain results. Stereomicroscopic microwear (after Semprebon, 2002) was used in this study to allow for the attainment of a large sample and to take advantage of the extensive and broad comparative stereomicroscopic database of extant artiodactyls and perissodactyls of known diets that exists. All counts on fossil and extant casts were compiled by a single observer (GMS) to minimize error in the analysis.

1.4. Aim of the study

The purpose of this study is to analyze the paleodietary behavior of *Hezhengia bohlini* from the Linxia Basin of China using microwear analysis of the microscopic scars etched into dental enamel by food items. Unlike mesowear, crown height, or gross craniodental morphology, microwear is thought to turn over rapidly (Grine, 1986), making it a useful proxy for discerning seasonal, local and/or individual variations in diet before changes in gross craniodental morphology become realized. Microwear is also valuable for providing more specific dietary information about food items actually consumed than gross morphological assessments. Our intention is to explore the paleodietary ecology of Chinese late Miocene *Hezhengia bohlini* from the Linxia Basin (Liushu Formation, Gansu Province) using stereomicroscopic analysis (LDM).

2. Materials and methods

36 molars of *Hezhengia bohlini* from the Hezheng Paleozoological Museum (Hezheng County, Gansu Province, China) were studied (second enamel band of the paracone of the upper M2 or the protoconid of the lower m2 of adult individuals - young and old adults were discarded). The microwear features were examined using a light stereomicroscope and 35× magnification following the cleansing, molding, casting, and examination regime outlined in Solounias and Semprebon (2002). The average number of pits versus average number of scratches per taxon were assessed within a 0.4 mm square area using an ocular reticle. These results were then compared to a database constructed from extant ungulate taxa (Solounias and Semprebon, 2002) which allows for the discernment of the dietary categories of browser versus grazer as there is no overlap in microwear average scratch and pit results between extant browsing and grazing ungulates (Solounias and Semprebon, 2002; Semprebon et al., 2004).

It was also noted if more than four large pits were present or absent per microscope field and whether gouges were present. The percentage of individuals per taxon displaying more than 4 large pits and gouges was calculated. Scratch textures were qualitatively scored as being either predominantly fine, predominantly coarse, or a mixture of fine and coarse types of textures per tooth surface following the criteria described in Solounias and Semprebon (2002) and Semprebon et al. (2004). Percentages of individuals in each taxon possessing fine, coarse, and mixed fine and coarse scratches were calculated. Typical extant browsers

have mostly finely textured scratches while grazers and mixed feeders have fewer finely textured scratches.

A scratch width score (SWS) was obtained as follows: a score of 0 was given to teeth with predominantly fine scratches per tooth surface, a score of 1 to those with a mixture of fine and coarse types of textures, and a score of 2 to those with predominantly coarse scratches per tooth surface. Individual scores for a sample were then averaged to get the average scratch width score for that taxon (i.e., SWS).

Because extant mixed feeders alternate between browse and grass seasonally or as they migrate regionally, we constructed a bivariate plot of raw scratch results for each individual animal to determine if browsing and grazing subsets were present. We also calculated the percentage of raw scratches per taxon that fell into the low scratch range and compared them to an extant ungulate database (data from Semprebon, 2002).

3. Results

3.1. Microwear - quantitative variables

Microwear results are summarized in [Table 1](#), [Fig. 2](#), and in the [Appendix A](#). [Fig. 2A](#) shows average scratch/pit quantitative results for *Hezhengia bohlini* plotted in reference to Gaussian confidence ellipses ($p = 0.95$) on the centroid and plots of the extant browser (B) and grazer (G) data adjusted by sample size from Semprebon (2002). *H. bohlini* has a quantitative average scratch/pit result that falls in the gap between leaf browsers and grazers. [Fig. 2B](#) shows the raw scratch distribution of *H. bohlini*. Scratches are widely dispersed indicating a heterogeneous dietary regime. It is apparent in [Fig. 2B](#) that some *H. bohlini* individuals have low numbers of scratches typical of extant browsers and some individuals have high numbers of scratches typical of extant browsers (Solounias and Semprebon, 2002). [Fig. 2C](#) and [Table 1](#) show that 55.55% of *H. bohlini* individuals have raw scratch numbers that fall between 0 and 17, a pattern typical of extant ungulates that engage in both browsing and grazing, but distinctive from modern species with a narrower breadth of scratch values such as ungulate browsers and grazers (Semprebon, 2002).

3.2. Microwear - qualitative variables

[Table 1](#) reveals that *H. bohlini* molars have relatively few large pits, no gouges and scratch textures that are mostly a mixture of finely and coarsely textured scratches. [Fig. 2D](#) shows that typical extant leaf-dominated ungulate browsers as a group have relatively low scratch width scores - that is, most scratches are finely textured; whereas typical extant grazers have relatively high scratch width scores (i.e., they have fewer fine and more coarse scratches) and do not overlap leaf browsers. Extant mixed feeders that consume browse and grass regionally or seasonally predictably overlap both leaf browsers and grazers (data from Semprebon, 2002). *H. bohlini*'s scratch width score (1.03) overlaps with values seen in some modern mixed feeders and grazers ([Fig. 2](#)).

4. Discussion

Prior studies utilizing microwear analysis for dietary reconstruction have demonstrated that mammals may engage in a variety of feeding behaviors although optimally adapted over deep time for one particular food regime (Semprebon and Rivals, 2007; Calandra et al., 2008; Asevedo et al., 2012; Rivals and Semprebon, 2011; Domingo et al., 2012). Thus, taxa with similar gross dental morphologies may engage in quite disparate feeding behaviors. For this reason and also because it is largely taxon-independent, microwear analysis is increasingly recognized as an important component of dietary reconstruction for both living and extinct mammals because it allows for the discernment of what an animal most likely actually ate despite what it might have been optimally adapted to eat over vast tracts of time. In other words, microwear

Table 1
Microwear results for differences in pits and scratches for adult molars of *Hezhengia bohlini*.

Species	N	Pit Mean	Pit SD	Scratch mean	Scratch SD	%LP	%G	%F	%M	%C	SWS	0–17%
<i>Hezhengia bohlini</i>	39	26.35	6.76	16.64	5.55	12.82	0	20.50	69.23	10.26	1.03	43.59

Microwear summary data for the second molars *Hezhengia bohlini*. Abbreviations: N = number of specimens; Pit Mean = mean number of pits; Pit SD = standard deviation of pits; Scratch Mean = mean number of scratches; Scratch SD = standard deviation of scratches; %LP = percentage of individuals per taxon with large pits; %G = percentage of individuals per taxon with gouges; %F = percentage of individuals per taxon with fine scratches; %M = percentage of individuals per taxon with a mixture of fine and coarse scratches; %C = percentage of individuals per taxon with coarse scratches; SWS = mean scratch width score from 0 to 2 (a score of 0 was given to teeth with predominantly fine scratches per tooth surface, a score of 1 to those with a mixture of fine and coarse types of textures, and a score of 2 to those with predominantly coarse scratches per tooth surface; 0–17% = low scratch percentage (i.e., percentage of individuals per taxon with scratch counts (between 0 and 17)).

produces a “snapshot in time” of the dietary behavior of an animal at the time of its death and thus allows a window into dietary behavioral shifts in relatively short time frames such as regional migratory changes in diet or seasonal changes in diet.

When other dietary proxies are employed such as gross skull and tooth anatomy, a longer behavioral time frame is captured such as the cumulative wear imposed on the cusps of dentition during the lifetime of animal – over months or years (e.g., mesowear) or the gradually-acquired morphological changes of a taxon as a response to long-term dietary or exogenous abrasives in food materials (e.g., hypsodonty and skull morphology). Such longer-term proxies of dietary behavior, while very

useful and important, may be influenced by taxonomic affiliation of a species as the genetic basis of gross morphology must be considered (Butler, 1983; Fortelius, 1985).

Also, such relatively indirect proxies do not always allow for a specific dietary interpretation (Rivals and Semprebon, 2011) but rather record the degree of abrasion the animal was exposed to during its lifetime or even what its ancestors were exposed to over deep time (Semprebon and Rivals, 2007). Any disparities between the results of these different dietary proxies should not be interpreted as relative weaknesses of one proxy over the other but simply the recognition that different temporal scales reveal different things.

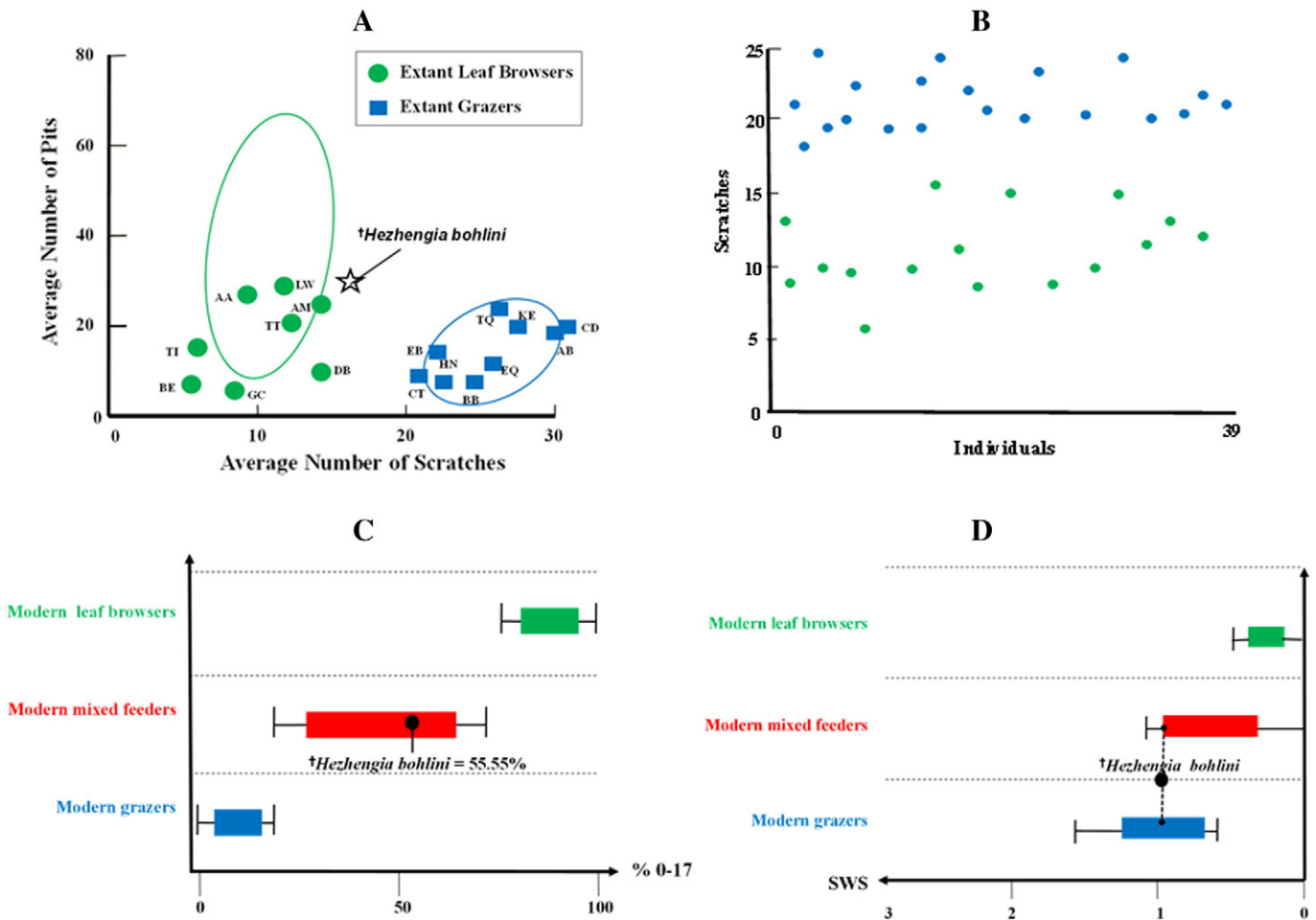


Fig. 2. Microwear scratch and pit results. A. Bivariate plot of the average number of pits versus average number of scratches for the extant ungulates and *Hezhengia bohlini*. Gaussian confidence ellipses ($p = 0.95$) on the centroid are indicated for the extant browsers (B) and grazers (G- Red) (convex hulls) adjusted by sample size (extant ungulate data from Semprebon, 2002 and Solounias and Semprebon, 2002). (abbreviations: AA, *Alces alces*; AM, *Antilocapra americana*; BE, *Boocercus euryceros*; DB, *Diceros bicornis*; GC, *Giraffa camelopardalis*; LW, *Litocranius walleri*; TI, *Tragelaphus imberbis*; TT, *Tragelaphus strepsiceros*). Grazers are represented by squares (abbreviations: AB, *Alcelaphus buselaphus*; BB, *Bison bison*; CD, *Cervus duvauceli*; CT, *Connochaetes taurinus*; EB, *Equus burchelli*; EQ, *Equus grevyi*; HN, *Hippotragus niger*; KE, *Kobus ellipsiprymnus*; TQ, *Tetracerus quadricornis*). B. Raw scratch distribution of *Hezhengia bohlini*. Green = low scratch values typical of extant leaf browsers; blue = high scratch values typical of extant grazers. C. Box plots of the percentage of scratches per taxon that fall within the low scratch range (i.e., between 0 and 17) for *Hezhengia bohlini* compared to results for extant ungulates (extant data from Semprebon, 2002). D. Box plots of the scratch width score of *Hezhengia bohlini* compared to results for extant ungulates (extant data from Semprebon, 2002).

Hezhengia bohlini is a good example of how different dietary proxies taken together provide a more informative picture of dietary behavior than employing a single technique alone. For example, microwear suggests that *H. bohlini* ate both browse and grass. This is because average scratch/pit values for the taxon fall in between extant leaf browsers and grazers and individual raw scratch values (Fig. 2B) show both high and low scratch subsets as almost exactly half (20 out of 36 total) of the individuals studied had scratch numbers in the high scratch range (above 17) and about half in the low scratch range (below 17).

While microwear scratch numbers reveal browsing phases and grazing phases, Solounias and Semprebon (2002) and Semprebon et al. (2016) have shown that scratch textures may reflect overall dietary abrasion incurred in the diet such as the consumption of coarse grass versus fresh grass or C3 versus C4 grasses. Interestingly, while scratch numbers indicate a heterogeneous diet of both browse and grass, scratch width scores of *H. bohlini* fall within the range of extant grazers (Fig. 2D) indicating that fairly abrasive browse and/or grass was likely consumed.

This conclusion is consistent with the mesowear of *Hezhengia bohlini* (recorded by GS in Solounias et al., 2013; raw data shown in the Appendix A), which places *H. bohlini* with extant grazers. Thus, microscopic scratch texture and macroscopic cusp wear show similar results and appear to reveal the relative abrasiveness of food or exogenous grit consumed (see also, Semprebon et al., 2016). Wolf et al. (2012) stress that discrepancies between microwear and mesowear may ensue because of the relative abrasiveness of a particular food item consumed (e.g., C3 versus C4 grasses) rather than due solely to different overall trophic preferences such as browse versus grass. Solounias and Semprebon (2002) and Semprebon et al. (2016) report grazing type (but finely textured scratches) microwear in late Eocene and Oligocene fossil horses whose gross molar morphology, hypsodonty and/or mesowear reflect a relatively non-abrasive diet.

While it is tempting to assign a strict grazing diet to *Hezhengia bohlini* based on its mesowear alone, *H. bohlini* does not display the high levels of hypsodonty generally found in extant hypergrazers (Fig. 1B) as its crown height has been reported to be mesodont (Fortelius, 2009) or subhypsodont (Qiu et al., 2000). Also, as previously discussed, microwear clearly establishes that some individuals (about half) of *H. bohlini* studied here were not strictly grazing.

We interpret our results as reflecting a mixed feeding dietary behavior for *H. bohlini* but one that exposed its dentition to relatively abrasive wear. Since enamel surfaces did not display heavy pitting and large pits and gouges typical of extensive grit consumption (Solounias and

Semprebon, 2002), these results make it likely that *H. hezhengia* encountered relatively coarse browse and grass in its dietary regime.

Our results are consistent with what is known about the paleoecology of the late Miocene Linxia Basin. For example, Deng (2009) reports that the Linxia Basin most likely experienced alternating ecological and climatic conditions during the Late Cenozoic with closed and more humid conditions in the middle Miocene gradually giving way to more open and arid conditions in the late Miocene conducive to the appearance of grasses. Deng (2009) also reports that less aridity was likely present during the late versus earliest late Miocene which is consistent with the lack of heavy pitting and gouging present in *H. bohlini*'s enamel surfaces. Using results from mammalian carbon and oxygen isotopes on mammalian teeth and paleosols, Wang and Deng (2005) suggest that prior to about 2–3 million years ago, the landscape of the Linxia Basin was most likely a mixed habitat which included woodland/grassland mosaics and that C4 grasses became more and more dominant until they were an important component of local Linxia Basin ecosystems by the Quaternary. These results are highly consistent with our reconstruction of *Hezhengia bohlini* as a mixed feeder – consuming both browse and grass.

This analysis accomplished two main things: 1. it provided for the first time direct evidence of feeding behavior (i.e., feeding on both browse and grass) in *H. bohlini*, a taxon that has not been extensively studied; 2. it provided a window into the paleoecology of the late Miocene Dashengou assemblage from the Liushu Formation, Gansu Province China and confirmed earlier reconstructions.

5. Conclusions

Our data suggest: (1) that the middle late Miocene bovid *Hezhengia bohlini* from the Liushu Formation of the Linxia Basin of China ate both browse and grass; (2) that vegetation consumed was most likely not significantly coated with exogenous grit but rather relatively abrasive itself in nature; (3) that prior reconstructions of a mixed habitat including woodland/grassland mosaics prior to the Quaternary are supported by the varying dietary behavior revealed by microwear of *Hezhengia bohlini*.

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Appendix A. Raw mesowear and microwear data for *Hezhengia bohlini*

Specimen number HMV	Mesowear score	Microwear pits	Microwear scratches	Scratch texture	Scratch width score	Gouges	Large pits
0874	3	34	13	Mixed	1	0	0
0875	5	–	–	–	–	–	–
0846	5	–	–	–	–	–	–
0831	4	25	25	Fine	0	0	0
0830	3	–	–	–	–	–	–
0903	2	26	8	Fine	0	0	0
0110	3	17	19	Fine	0	0	0
0811	–	31	20	Fine	0	0	0
0122	3	–	–	–	–	–	–
0840	2	23	18	Fine	0	0	0
0850	3	31	10	Mixed	1	0	0
0810	3	19	22	Mixed	1	0	0
1954	5	23	18	Mixed	1	0	0
0879	3	34	6	Fine	0	0	0
0877	2	18	19	Mixed	1	0	0
0854	4	34	21	Mixed	1	0	0
0870	–	32	23	Fine	0	0	0
0861	3	33	10	Mixed	1	0	0
1953	6	23	24	Mixed	1	0	0
0828	4	28	17	Mixed	1	0	0
0854	5	18	24	Coarse	2	0	0
1324	2	31	12	Mixed	1	0	0

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Specimen number HMV	Mesowear score	Microwear pits	Microwear scratches	Scratch texture	Scratch width score	Gouges	Large pits
0884	3	24	23	Mixed	1	0	0
0869	5	18	21	Mixed	1	0	0
0853	4	39	16	Mixed	1	0	0
0873	–	28	24	Coarse	2	0	0
0114	3	43	9	Mixed	1	0	0
0819	5	37	10	Mixed	1	0	0
0813	–	20	19	Mixed	1	0	0
0883	3	27	21	Mixed	1	0	0
0124	3	27	10	Mixed	1	0	0
0125	4	27	22	Coarse	2	0	0
0862	–	31	18	Mixed	1	0	0
0899	2	31	20	Fine	0	0	0
0880	5	28	15.5	Mixed	1	0	0
0808	4	32	21	Mixed	1	0	0
0122	5	31	13	Mixed	1	0	0
0885	–	31	12	Mixed	1	0	0
0922	3	–	–	–	–	–	–
0812	4	28	12	Mixed	1	0	0
0874	3	34	13	Mixed	1	0	0
0875	5	–	–	–	–	–	–
0846	5	–	–	–	–	–	–
0831	4	25	25	Fine	0	0	0
0830	3	–	–	–	–	–	–
0903	2	26	8	Fine	0	0	0
0100	3	17	19	Fine	0	0	0
0811	–	31	20	Fine	0	0	0
0122	3	–	–	–	–	–	–
0840	2	23	18	–	0	0	0
0850	3	31	10	Mixed	1	0	0
0810	3	19	22	Mixed	1	0	0
0260	5	23	18	Mixed	1	0	0
0879	3	34	6	Fine	0	0	0
0877	2	18	19	Mixed	1	0	0
0854	4	34	21	Mixed	1	0	0
0870	–	32	23	Fine	0	0	0
0861	3	33	10	Mixed	1	0	0

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