Pig Husbandry Strategies During the Middle Neolithic in China : A Case-Study from Three Neolithic Sites in the Wei River Valley

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1. Research Focus

This research focuses on pig management during the Neolithic in China. It is based on pig remains at three Neolithic sites in the Wei River valley: Lingkou, Wayaogou, Quanhucun.

The Pig is the main domesticate in the Neolithic China and its domesticated status has been well documented by morphometrics, kill-off patterns, species spectrum change and pathology evidence in various areas of China. However, pig husbandry strategies have seldom been considered

Research questions: In which season were pigs birthing and being slaughtered? Did double farrowing occur?

2. Background

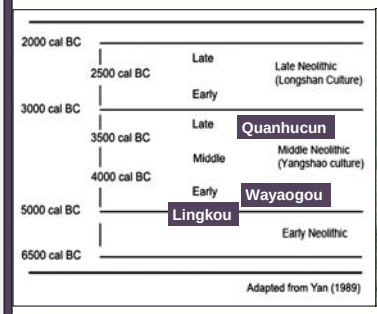


Fig. 1 The chronology of the Neolithic culture in the Wei River Valley

Fig. 2 Modern topography of the Wei River valley

The Wei River valley located in the north-west China; about 800 km long; one of the most prominent tributaries of the Yellow River; The Qinling Mountains on its southern edge; loess plateau in the Northwest.
Temperature: 6-14℃; Precipitation: 450-700 mm
Vegetation: broadleaved forest in the south and forest-steppe in the north
Crops: wheat, millet, corn and barley
Livestock: pig, dog, cattle, goat, chicken and occasionally horse

3. Methods and Theory

3.1 Tooth wear stage

The seasonal slaughtering pattern in pig population can be explored by detailed recording of tooth eruption and wear (Ervynck 1997, 2005, following Grant 1982).

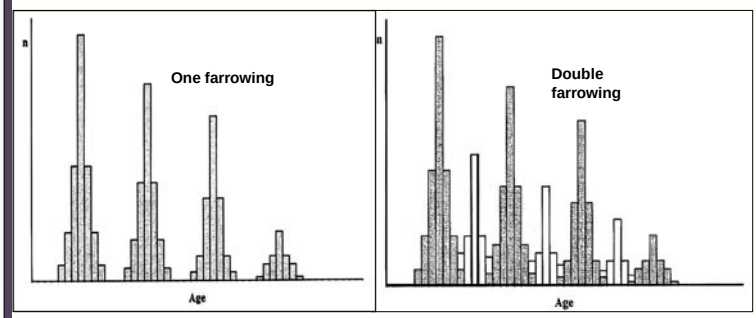


Fig. 3 Theoretical distribution of age classes of one farrowing and double farrowing pig populations (adapted from Ervynck 1997: 69); derived from a population of animal reproducing and being slaughtered seasonally; the shade represents spring born population and the white represents autumn born population; the distance between each peak with the same color represents the time span of one year

3.2 Linear enamel hypoplasia: Pathology on human and animal teeth

Fig. 4 The identification and measurement of linear enamel hypoplasia (measurement: the distance between LEH line and the cemento-enamel junction) (After Dobney and Ervynck 1998)

Why use LEH? It is a chronological marker occurred during crown formation, different teeth recording events during the development stages of an animal's life. Birth and weaning — M1; The first winter — M2; The second winter — M3

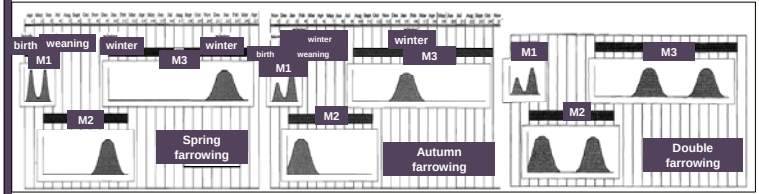


Fig. 5 Theoretical representation of the occurrence of LEH on the permanent molars compared with major event in the life cycle of the primitive domestic pig (adapted from Ervynck and Dobney 2002)

Spring farrowing: the peak of LEH on M2 and M3 located on the lower half of the teeth;
Autumn farrowing: the peak of LEH on M2 and M3 located on the upper half of the teeth;
Double farrowing: two peaks of LEH on M2 and M3

4.Results

4.1 Mandible wear stage distribution

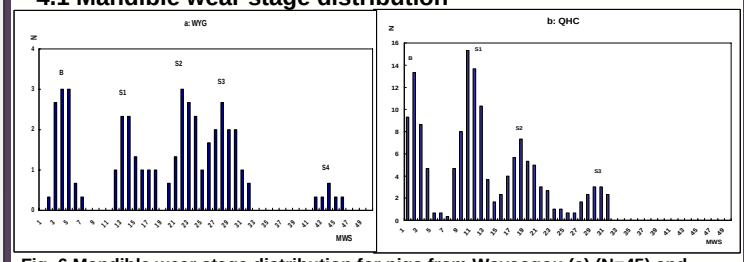
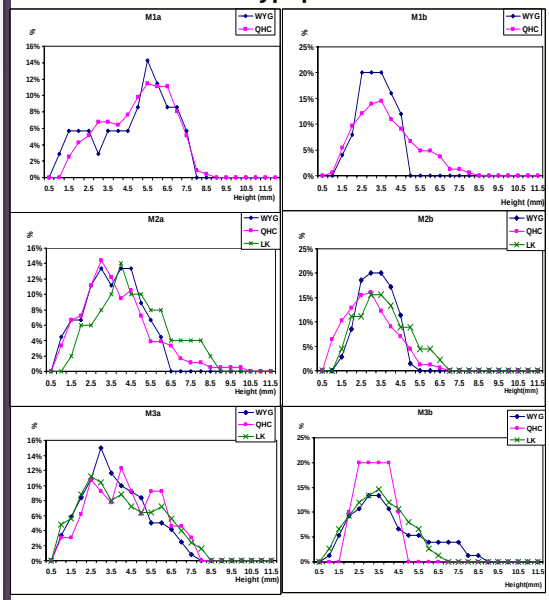


Fig. 6 Mandible wear stage distribution for pigs from Wayaogou (a) (N=45) and Quanhucun (b) (N=152); class values are expressed as running means, with a factor n=1

Patterns:

1. Clear peaks and troughs in the frequency distribution of MWS at WYG and QHC, indicating seasonal slaughtering patterns.
2. The distances between each peaks probably represent the time span of one year, so only one farrowing occurred at the sites; assuming pigs were born in spring, the peak 1: a high mortality rate during birth; Peak 2: slaughtering in the first winter; Peak 3: killings in the second winter
3. Unequal distributions of the peak and troughs at WYG and QHC could be the results of many factors: mass slaughtering may happened at different months at different sites; tooth wear rates may vary between two sites due to food abundance and quality, or genetic differences in wear rates.

4.2 Linear enamel hypoplasia



Patterns:

1. The locations of the peaks for the same teeth do not differ significantly between sites
2. M2: both cusps show peaks on the lower portion of the crown (all around 3 mm)
3. M3: broad concentration of LEH on the lower half of the crown on both cusps
4. The pattern of the chronology of LEH is more consistent with theoretical model of spring farrowing population

Fig.7 Frequency distribution of LEH height (mm, running means) per LEH type for molars (WYG=Wayaogou;QHC=Quanhucun; LK=Lingkou)

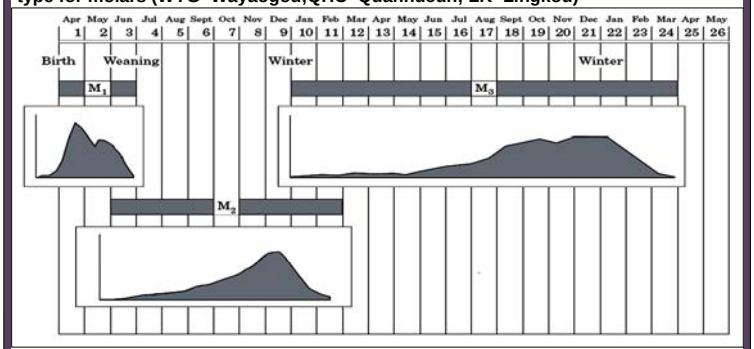


Fig.8 Schematic representation of the occurrence of LEH compared with major events in the life cycle of the primitive domestic pig

Pattern: the timing of the occurrence of LEH is mostly in winter

5. Conclusion

Evidence from mandible wear stage and linear enamel hypoplasia at three Neolithic sites in the Wei River suggests that single farrowing occurred during the Neolithic; double farrowing was rare or absent.

Pigs were born in spring and slaughtered during the lean season, probably in winter.

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