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Ostracodes from Recent Surface Deposits in Tibet, Response to Environmental Changes

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1 Introduction

Ostracodes are good materials for studying palaeoenvironmental evolution because of their sensitive response to environment changes. At present, the environmental implications of ostracodes are mainly based on the fossil ostracodes in stratum and the comparison to other environmental proxies (Li et al., 1991). The more reliable approach, however, is to study the recent ostracodes in surface deposits or living ostracodes, because their living environment is clearly known (Mezquita et al., 2005; Mischke et al., 2007,2010).

2 Material and Results

In this paper, 117 surface sediment samples in different water environment, such as lakes with different salinity and water depth, swamps, shallow puddles and rivers in Ali and Naqu regions in Tibet, were collected to study the ecological distribution of recent ostracodes and their environmental implications. Total of 11 genera and 38 species living ostracodes were identified. The identification refers to Hou et al.(2002), Li et al.(2001) and Wang et al.(2010). The common species in Ali and Naqu are *Limnocythere dubiosa*, *Limnocytherellina kunlunensis*, *Ilyocypris bradyi*, *Candona candida*, *Eucypris rischtanica* and *Leucocythere dilatata*, among which *L. dubiosa* is the most frequently occurred species.

3 Discussion

Water salinity is the primary controlling factor in all environment factors that affect the distribution of recent ostracodes (Yang, 2006). Table 1 shows that *Ilyocypris tuberculata*, *I. gibba*, *Candoniella lactea* and *Canona*

Table 1 Occurance of ostracodes in different salinity waters

species	FW	OW	MW	PW	EW	HW
<i>Ilyocypris tuberculata</i>	●					
<i>Ilyocypris gibba</i>	●					
<i>Leucocythere parasculta</i>	●					
<i>Ilyocypris echinata</i>	●					
<i>Ilyocypris subdunshanensis</i>	●					
<i>Ilyocypris neoaspera</i>	●					
<i>Candoniella mirabilis</i>	●					
<i>Eucypris zandaensis</i>	●					
<i>Candoniella lactea</i>		●				
<i>Candona rawsoni</i>		●				
<i>Cyprideis littoralis</i>		●				
<i>Candona lijiangensis</i>		●				
<i>Eucypris inflata</i>				●		
<i>Candoniella albicans</i>					●	
<i>Prionocypris gansenensis</i>					●	
<i>Ilyocypris xizangensis</i>						●
<i>Candona candida</i>	●	●				
<i>Leucocythere subsculpta</i>	●	●				
<i>Leucocythere exilitropis</i>	●	●				
<i>Cypricercus moguntiensis</i>	●	●				
<i>Heterocypris salinus</i>	●	●				
<i>Leucocythere pseudosculpta</i>	●	●				
<i>Leucocythere mirabilis</i>	●	●				
<i>Candona xizangensis</i>	●	●				
<i>Ilyocypris dunschanensis</i>	●				●	
<i>Candona neglecta</i>	●				●	
<i>Ilyocypris cornae</i>	●					●
<i>Limnocytherellina trispinosa</i>		●		●		
<i>Limnocytherellina bispinosa</i>		●				●
<i>Candona houae</i>		●				●
<i>Leucocythere dorsotuberosa</i>	●	●			●	
<i>Leucocythere tropis</i>	●	●			●	
<i>Eucypris rischtanica</i>	●	●			●	
<i>Leucocythere posterica</i>	●	●	●			●
<i>Limnocytherellina kunlunensis</i>	●	●			●	●
<i>Ilyocypris bradyi</i>	●	●		●	●	●
<i>Leucocythere dilatata</i>	●	●	●	●	●	●
<i>Limnocythere dubiosa</i>	●	●	●	●	●	●

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According to the Venice taxonomy in 1958, waters were divided into fresh water(FW, salinity<0.5‰), oligohaline water(OW, salinity 0.5-5‰), mesohaline water(MW, salinity 5-18‰), polyhaline water (PW, salinity 18-30‰), euhaline water (EW, salinity 30-40‰)and hyperhaline water(HW, salinity>40‰).

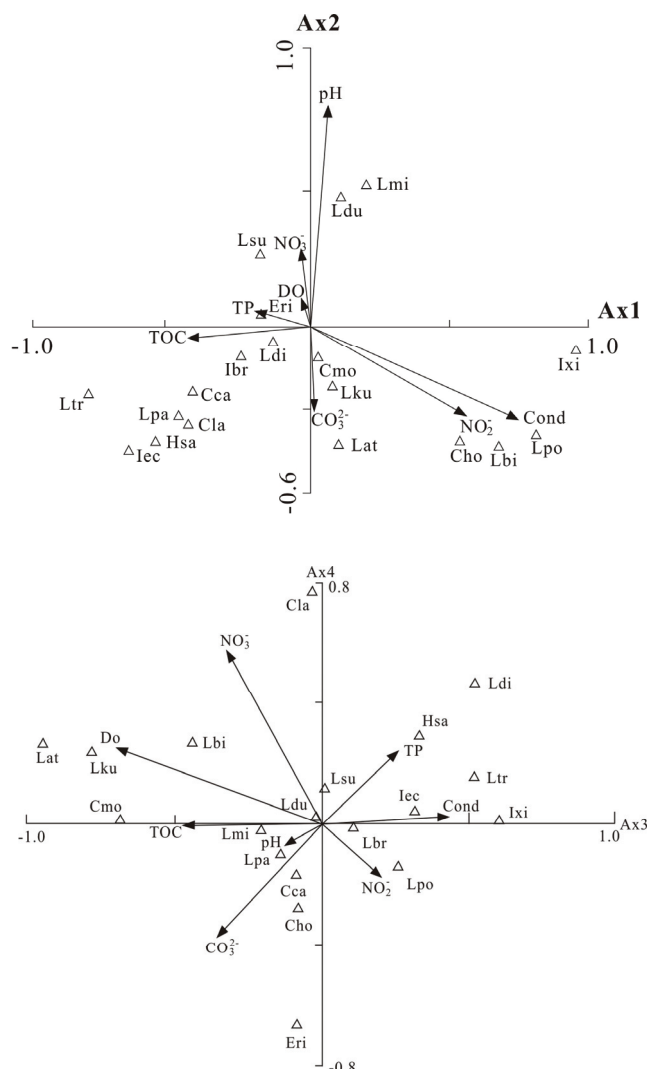


Fig. 1. CCA ordination plot of species ordinated with environmental factors by Ax1 vs. Ax2 and Ax3 vs Ax4.

Ldi : *Leucocythere dilatata* ; Ltr : *Leucocythere tropis* ; Lmi : *Leucocythere mirabilis* ; Lsu : *Leucocythere subsculpta* ; Lpa : *Leucocythere parasculta* ; Lpo : *Leucocythere postericosta* ; Ldu : *Limnocythere dubiosa* ; Lku : *Limnocytherellina kunlunensis* ; Lat : *Limnocytherellina trispinosa* ; Lbi : *Limnocytherellina bispinosa* ; Ibr : *Ilyocypris bradyi* ; Iec : *Ilyocypris echinata* ; Ixi : *Ilyocypris xizangensis* ; Cca : *Candona candida* ; Cho : *Candona houae* ; Cla : *Candoniella lactea* ; Eri : *Eucypris rischtanica* ; Hsa : *Heterocypris salinus* ; Cmo : *Cypricercus moguntiensis*

candida are typical fresh water species. And *Eucypris inflata* prefers to high salinity water environment. While *Leucocythere dilitata*, *L. postericosta*, *Ilyocypris bradyi*,

Limnocythere dubiosa, *Limnocytherellina kunlunensis* and *Eucypris rischtanica* are euryhaline ostracodes that can develop in various water salinity.

pH is also highly related to the development of ostracodes in water (Fan et al., 1998) with most of the ostracodes preferring to alkaline environment. In this paper, there are 6 species which occur in acidulous water, i.e., *Leucocythere dorsotuberosa*, *L. Tropis*, *Limnocytherellina bispinosa*, *L. Trispinosa*, *Ilyocypris bradyi* and *Eucypris rischtanica*. However, for most of the species, the pH range is restricted from 8 to 10.

According to the results of Canonical Correspondence Analysis (CCA) (Fig. 1), most of the species in these regions have strong adaptation to the environment, and the distribution of some species is affected by the main habitat factors. water bodies of high conductivity, nitrite and low TOC have *Ilyocypris xizangensis* and *Leucocythere posterica* as the dominant species; waters enriched with dissolved oxygen, nitrate and with low nitrite are characterized by *Leucocythere subsculpta* and *Leucocythere mirabilis*.

Water bodies with high carbonate and low total phosphorus are characterized by *Limnocytherellina trispinosa*, *Limnocytherellina kunlunensis*, *Limnocytherellina bispinosa*, *Cypricercus moguntiensis* and *Candona houae*; *Leucocythere parasculta* and *Candona candida* are characteristic species in the waters enriched with carbonate, TOC and with low conductivity.

Key words: surface sediments, recent ostracodes, ecological environment, Tibet

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