

RECOGNITION OF BADENIAN PALEOENVIRONMENTS AND ZONES FROM MEDVEDNICA MT. (CROATIA) BASED ON EDXRF ANALYSES



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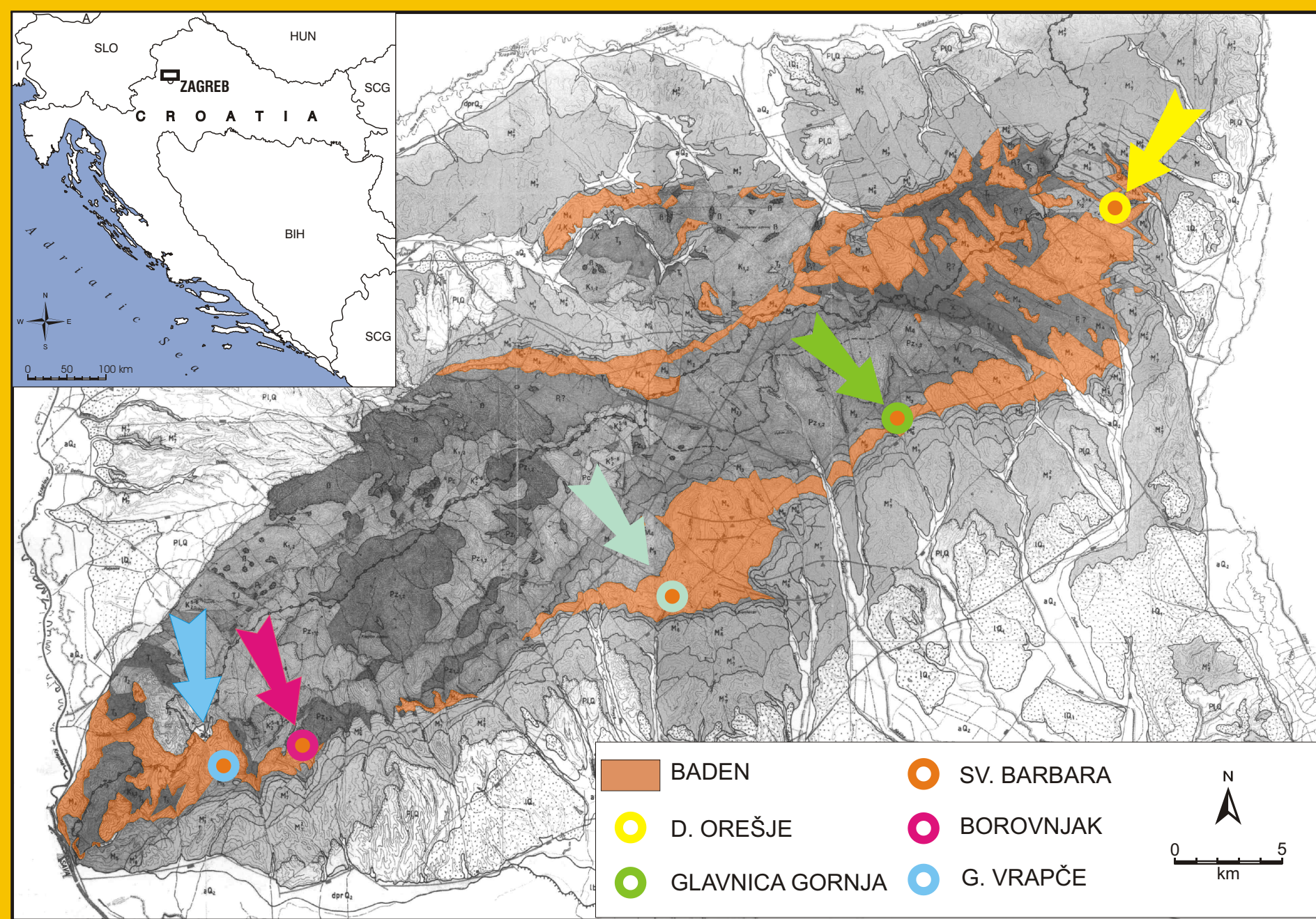


Fig. 1. Simplified geological map of the Medvednica Mt. with geographic range of the Badenian sediments. Localities are marked with rings and arrows (after Šikić, 1997; modified).

Elemental composition of the Badenian sediment deposits from the Medvednica Mt. (Fig. 1, 2) was applied for the first time in recognition and differentiation of paleoecological facies and biozones, previously determined on the basis of typical microfossil communities (MURRAY, 1991; CICHÁ et al., 1998; VAN DER ZWAAN et al., 1999). Five Badenian fossil environments (marginal marine, inner shelf, middle shelf, outer shelf and upper bathyal) and three Badenian biozones (Upper Lagenidae Zone, Bulimina Bolivina Zone and *Ammonia beccarii* Zone) were identified. Afterwards, the same rock samples were subjected to elemental analyses using source excited energy dispersive X-ray fluorescence method (ORESCANIN et al., 2002; 2004). Increase in the percentage of fine grained particles from marginal marine to the outer shelf could be the reason for almost linear increase of the elements Pb, Rb, K, Ni, Cr, Fe, Co, Cu and Zn, since the concentrations of all mentioned elements are grain size dependent

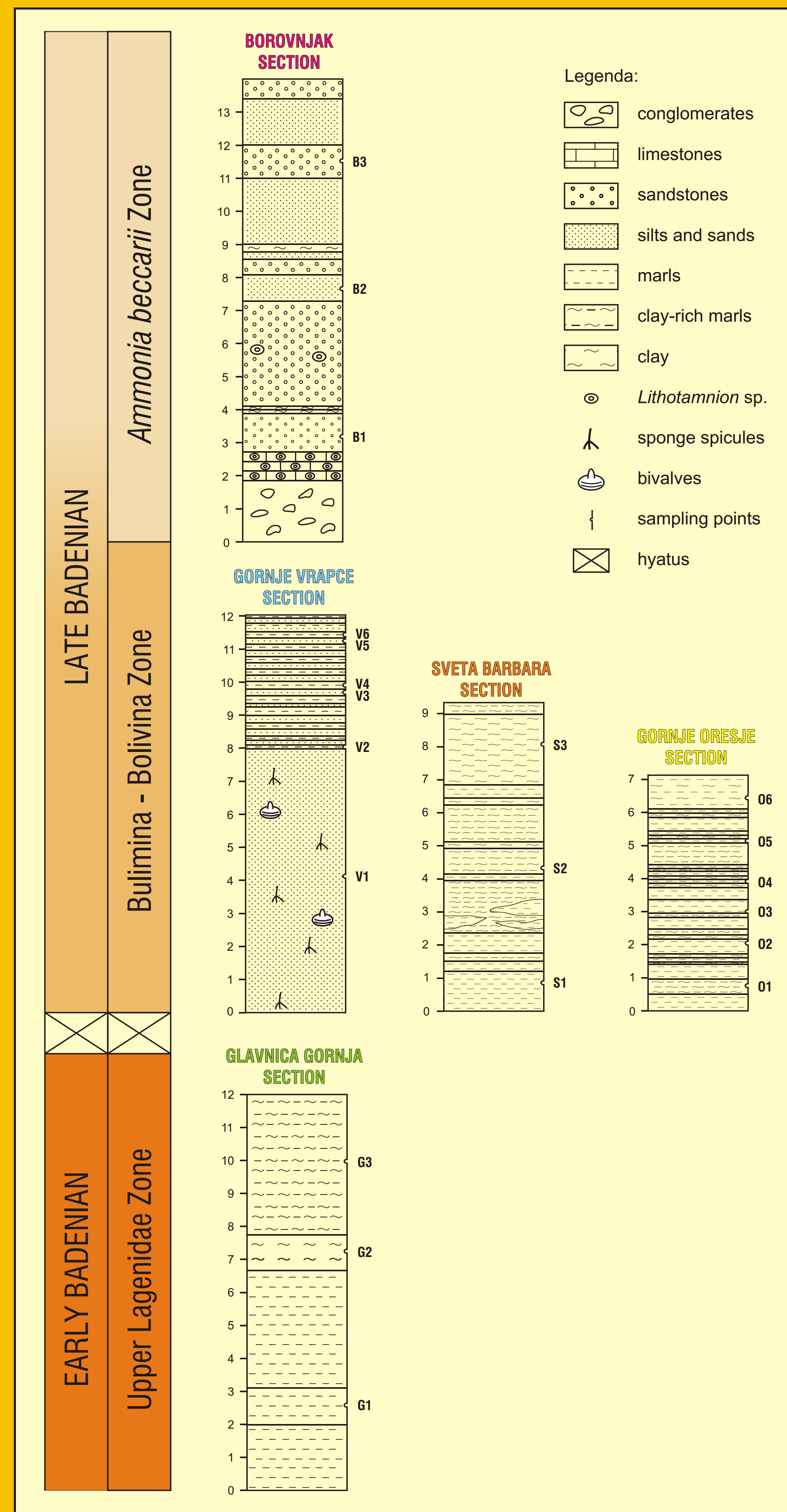


Fig. 2. Simplified stratigraphic columns of the Early to Late Badenian sediments from Glavnica Gornja, Gornje Vrapče, Gornje Orešje, Sveta Barbara and Borovnjak sections.

(Fig. 3). Another possible explanation is the decreased amount of oxygen in the deeper part of the basin, which favored sedimentation of heavy metals. Further increase in the depth toward upper bathyal resulted in slightly decreasing concentrations of all above mentioned elements, probably due to the higher oxygen content in this environment. All elements with exception of Ca and Ti showed the lowest concentrations in *Ammonia beccarii* Zone. In Bulimina-Bolivina Zone maximum values of Pb, Sr, Ca, Cr, Ni and Cu were determined, while maximum concentrations of Rb, Zr, K, Mn, Fe, Co and Zn were found in Upper Lagenidae Zone. Discriminant function analysis on the basis of six variables (concentration of the elements Pb, Rb, K, Ni, Cu and Zn) clearly separated tested samples into defined groups (Fig. 4, 5) confirming the hypotheses that chemical composition data could be used for recognition of different Badenian sedimentation environments and Zones.

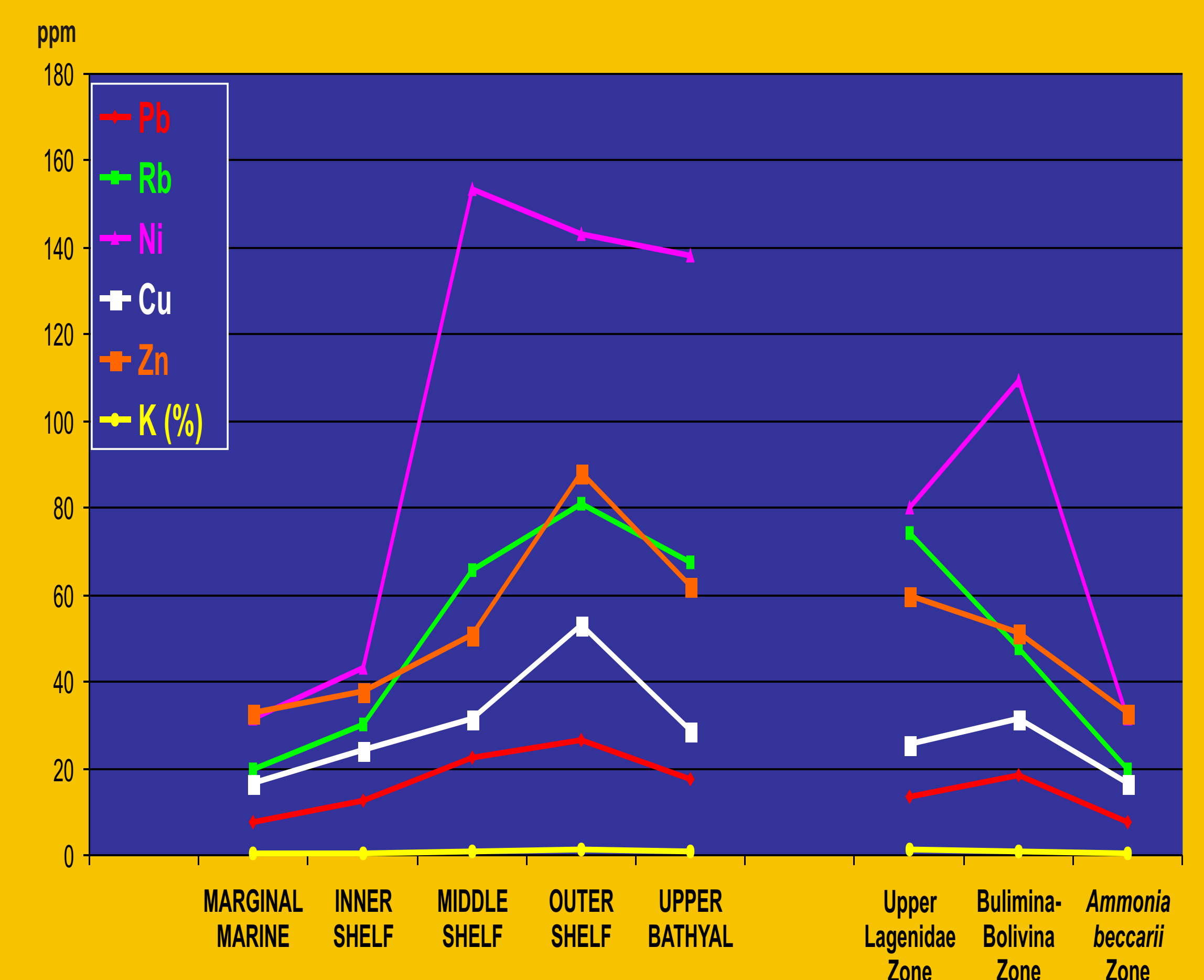


Fig. 3. Mean values of concentrations for the elements Pb, Rb, K, Ni, Cu Zn determined in five Badenian sediment deposits and three Badenian Zones

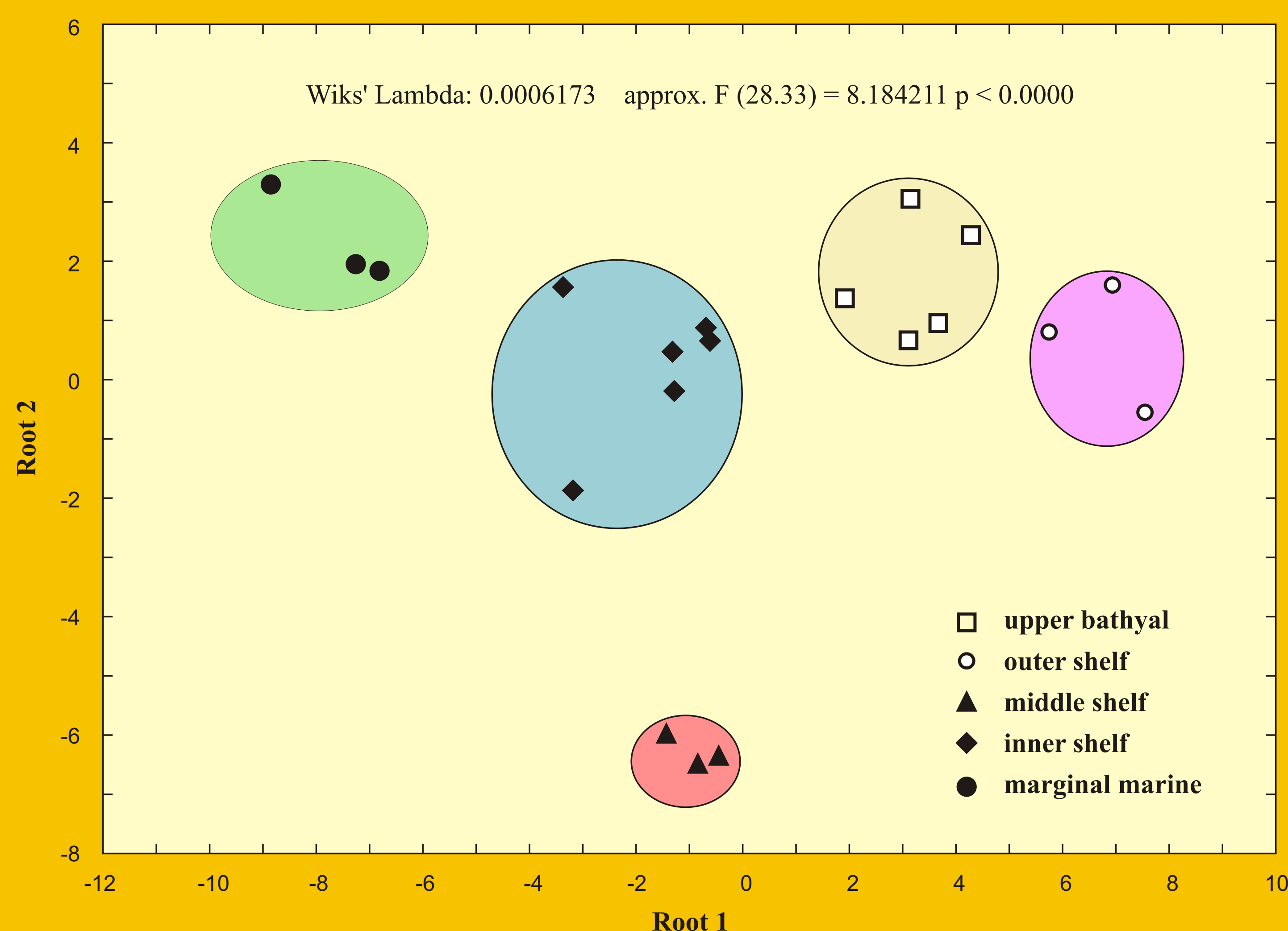


Figure 4. Results of discriminant function analyses - a plot of means of the canonical variables for five Badenian environments.

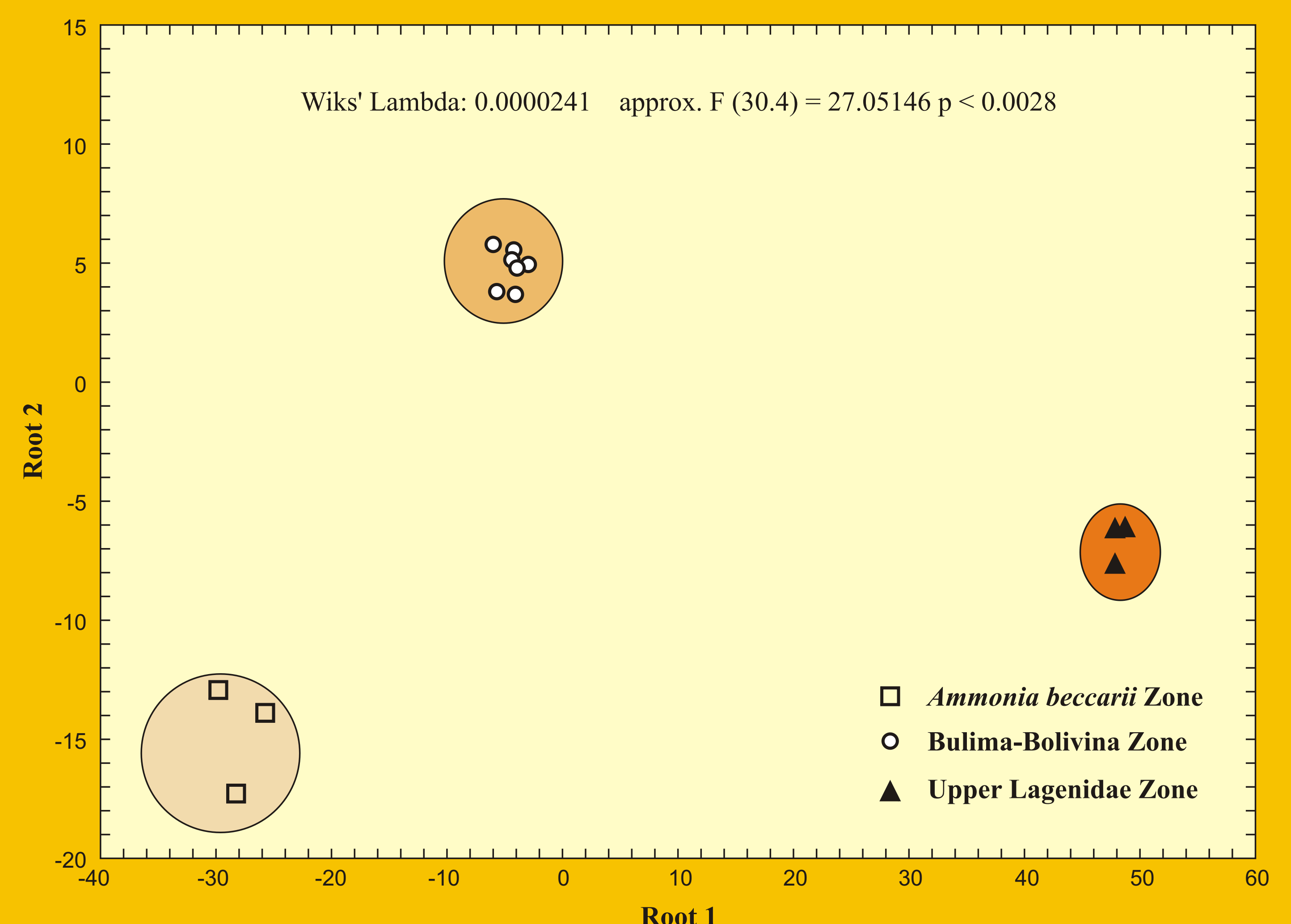


Figure 5. Results of discriminant function analyses - a plot of means of the canonical variables for three Badenian Zones.