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IRANOKIRKBYA BRANDNERI N. GEN. N. SP., A NEW KIRKBYID OSTRACOD FROM THE LATE PERMIAN (DORASHAMIAN) OF ZAL, NW IRAN

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With 6 figures

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Abstract

The new genus *Iranokirkbya* with the new species *I. brandneri* n. sp. is described from the basal Dorashamian of Zal, NW Iran. The earliest Dorashamian age of the stratum typicum is determined by conodont faunas from immediately under- and overlying beds.

Introduction

Upper Permian ostracods are mostly dominated by Bairdiacea (Belousova, 1965, Chen De-qiong & Shi Cong-guang, 1982, Crasquin-Soleau & Baud, 1998, Crasquin-Soleau et al. (2004a, b), Gerry et al., 1987,Hao Weicheng, 1994, 1996, Jordan, 1968, Kirkby, 1858, Kozur, 1984, 1985, Krömmelbein, 1958, Reuss, 1854, Richter, 1855, 1867, Shi Cong-Guang & Chen De-Qiong, 1985, 1987, Wang, Shang-qi, 1978, Zalányi, 1974). Kirkbyacea (and Kloedenellacea) are characteristic components of Upper Permian ostracod faunas but are less dominant, and mainly confined to shallow water deposits (Crasquin-Soleau et al. 2004a, Gerry & Honigstein, 1984, Gerry et al., 1987, Hao Weicheng, 1994, 1996, Kirkby, 1858, Knüpfer, 1967, Kozur, 1984, 1985, 1993, Olempska & Błaszyk, 1996). In Upper Permian pelagic Tethyan deposits of NW and Central Iran, Transcaucasia and Sicily, Kirkbyacea are rare (Belousova, 1965), but maintain the considerable diversity that characterised this group in the Late Palaeozoic (Kozur, 1991). In this paper, *Iranokirkbya* n. gen. n. sp. from pelagic Upper Permian sediments is described from Zal (NW Iran), and the age of the stratum typicum is discussed.

Geological setting and age of the investigated sample

The Zal sections are situated about 22 km SSW of Jolfa, 2-2.5 km NNW of Zal village (Fig. 1). Sections Zal I and II were sampled by Kozur in 1998 and 2002. Section Zal I is situated at the base of a westward facing slope and exposes the upper Dzhulfian to lowermost Triassic interval. Only the upper Dorashamian to lowermost Triassic beds were sampled in detail. Section Zal II exposes the upper 2 m of the *Codonofusiella* beds, the *Araxilevis* Beds and the lower part of the *Araxoceras* Beds, all of Lower Dzhulfian age. Only the upper 2 m of the *Codonofusiella* beds and the lowermost *Araxilevis* Beds were investigated. The conodonts and stratigraphy of these sections are described in Kozur (2004, 2005), the carbon isotope trends around the Permian-Triassic boundary by Korte et al. (2004).
The section Zal III (Figs. 1, 2) was sampled by Mette and Mohtat-Aghai in 2002. Foraminifers were studied by Mohtat-Aghai. This section exposes the Dzhulfian, Dorashamian and lowermost Triassic. For the present paper the Dzhulfian-Dorashamian boundary interval was studied. A new ostracod species, Iranokirkbya brandneri n. gen. n. sp. is descri-

Fig. 1: Location map. 1a: Studied area 22 km SSW of Jolfa, 2.2 to 2.5 km NNW of Zal village. A) position of the studied area within NW Iran. B) detail of the studied area with position of the Zal I and II section investigated by Kozur (2004, 2005), section Zal I also by Korte et al. (2004), and section Zal III studied in the present paper.

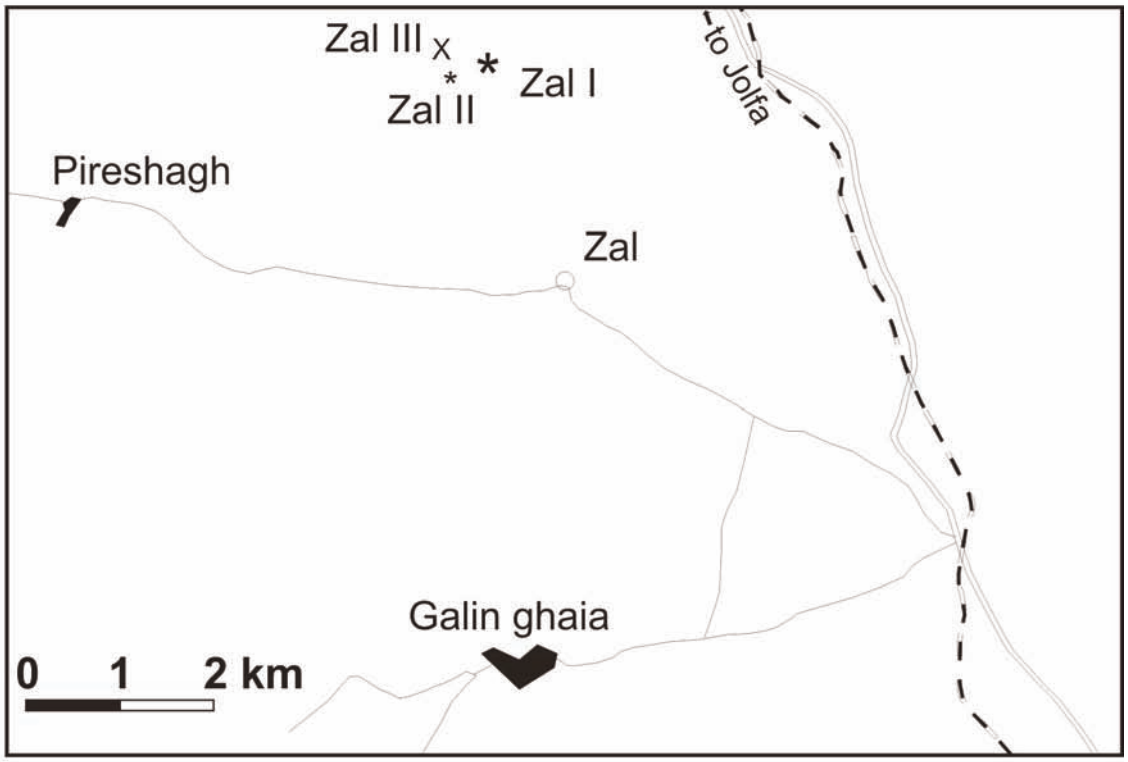

Figure 1

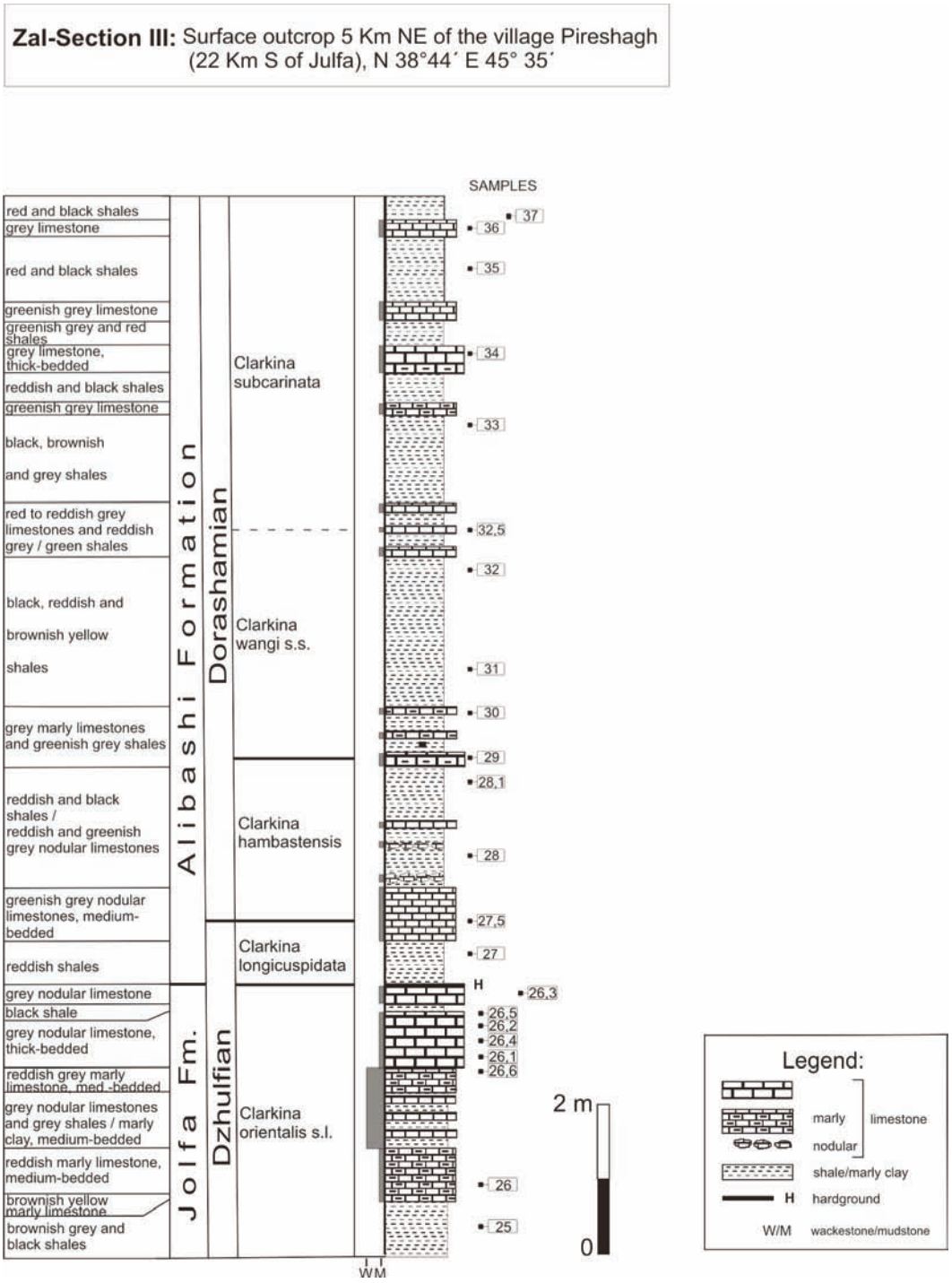

Fig. 2: Uppermost Dzhulfian and lower Dorashamian of section Zal III.

bed from sample 28 from the lowermost Dorashamian lower Alibashi Formation, 1.70 m above a distinct hardground which marks the boundary between the Jolfa Formation and the Alibashi Formation (Fig. 2).

Sample 26; situated about 4.5 m below sample 28 yielded a rich pelagic conodont fauna with numerous *Clarkina orientalis* (Barskov & Koroleva) and some transition forms between *C. orientalis* and *C. inflecta* Mei & Wardlaw. This sample about 2.5 m

below the hardground (Fig. 2) belongs to the upper *C. orientalis* Zone s.l. which can be also discriminated as *C. inflecta* Zone. The reddish shales immediately above the hardground did not yield conodonts, but in section Zal I conodonts of the *C. longicuspidata* Zone are present in that level.

An especially interesting conodont fauna occurs in sample 27.5, situated 0.8 m below sample 28. The conodont fauna of sample 27.5 consists of *C. longicuspidata* Mei & Wardlaw and a new species or new subspecies of *C. hambastensis* Kozur. The latter species was assigned by Jin Yugan et al. (2004a, b) to *C. wangi* (Dai & Zhang), but is clearly distinguished by the carina which does not continue beyond the posterior margin in form of a long protrusion as typical for *C. wangi* pointed out both in the original diagnosis by Wang, Chengyuan & Wang, Zhihao (1981) and in the nearly identical emended diagnosis by Jin et al. (2004a, b). In Iran, *C. hambastensis* begins much earlier than true *C. wangi*. Jin Yugan et al. (2004a, b) illustrated assumed transitional forms between *C. longicuspidata* and *C. wangi* (including *C. hambastensis*), but these forms are *C. longicuspidata* with a small gap between the cusp and the carina, which occur in a longer interval beside *C. longicuspidata* with big gap between the cusp and the carina. They are regarded as intraspecific variants of *C. longicuspidata*. Among *C. longicuspidata* there occur forms, in which the anterior edge of the cusp is prolonged across the gap until the end of the carina. Such forms are also present in the type material, illustrated by Mei Shilong et al. (1994) from South China. In the uppermost *C. longicuspidata* Zone 2 or 3 highly fused denticles evolved on this edge and fill up a large part of the gap between the cusp and the end of the carina. However, a small gap remains between these denticles and the end of the carina. By disappearance of this gap typical *C. hambastensis* evolved from these transition forms, which will be described in another paper. The occurrence of these transition forms indicates a position close to the base of the *C. hambastensis* Zone for sample 27.5.

Sample 29 (Fig. 2), 1.30 m above sample 28 contains numerous transition forms between *C. hambastensis* and *C. wangi* and a single specimen of typical *C. wangi*. This fauna is characteristic for the upper *C. hambastensis* Zone s.l. which can be also discriminated as *C. wangi* Zone s.s. (without the *C. hambastensis* Zone), but typical *C. wangi* were found in Iran only in Zal. As sample Zal 28 with ostracods, but without conodonts lies in the middle part of the interval between samples 27.5 (close to the base of the *C. hambastensis* Zone) and sample 29 (immediately above the *C. hambastensis* Zone s.s.), sample 28 belongs surely to the *C. hambastensis* Zone and therefore to the lowermost Dorashamian. As the base of the Changhsingian stage at Meishan was defined (Jin Yugan et al., 204a, b) by the FAD of *C. wangi*, in which *C. hambastensis* was included (and from the lowermost Changhsingian only *C. hambastensis* was illustrated under *C. wangi*), sample 28 can be correlated with the basal Changhsingian.

Samples 32.5 and 36 (Fig. 2) yielded conodonts of the *C. subcarinata* Zone. As the interval between samples 29 and 32.5 has not yielded conodonts, the lower boundary of the *C. subcarinata* Zone may be situated somewhat lower than indicated in Fig. 2, but this is irrelevant for the dating of sample 28, the stratum typicum of the *Iranokirkbya brandneri*.

Systematics

Order Reticulocopida Kozur, 1993
Suborder Punciocopina Schallreuter, 1968
Superfamily Kirkbyacea Ulrich & Bassler, 1906
Family inc.

Genus *Iranokirkbya* n. gen.

Type species:
Iranokirkbya brandneri n. gen. n. sp.

Diagnosis:
Carapace large, equivalved, subrectangular, flat (low convexity). Lateral surface reticulated, with distinct adductorial pit (kirkbyan pit). A distinct straight or indistinctly curved oblique ridge is present above the adductorial pit, which runs from the lower anteromedial field to the upper posteromedial field. A low rib runs parallel and with small distance to the free margin. A second, very distinct and high rib is present parallel to the low rib and join it at the anterodorsal corner. It ends in the posterodorsal corner in a posteriorly-upward directed short spine. The dorsal rib overreaches slightly the dorsal margin. It ends before the anterior and posterior ends

Figs 3-6: *Iranokirkbya brandneri* n. gen. n. sp., section Zal III (NW Iran), sample 28, lower Alibashi Formation, *Clarkina hambastensis* Zone, lowermost Dorashamian, scale 200 µm, collection of Institute of Geology and Palaeontology, Innsbruck University; Fig. 3: RV; Fig. 4: carapace, view from left, holotype (repository number Kozur/Mette 1-2005); Fig. 5: carapace, upper view; Fig. 6: other carapace, lower view.

of the dorsal margin. The ventral surface is flat and throughout of the same width. The dorsal surface is slightly concave, narrowest at the end of the anterior fourth of the carapace and widest at the beginning of the posterior fourth of the carapace. The muscle scars in the adductorial pit consist of at least 6 small spots.

Assigned species: *Iranokirkbya brandneri* n. gen. n. sp.

Distribution: Lower Dorashamian of Iran.

Remarks: *Kirkbya* Jones, 1859 is similar in outline and sculpture but is more convex, has a posterior shoulder and no lateral rib. It does not appear to be closely related to the proposed new genus.

The forerunner of *Iranokirkbya* is not known. There are two possibilities, either *Tubulikirkbya* Kozur, 1985 (family Kirkbyidae Ulrich & Bassler, 1906, subfamily Coronakirkbyinae Kozur, 1985) or "*Kirkbya*" sp. n. Olempska & Błaszyk, 1996 (n. gen., Amphissitidae Knight, 1928).

In *Tubulikirkbya* the marginal ridge along the free margin consists of fused tubules, which are difficult to recognise in advanced forms, and are apparently absent in the new genus. Otherwise *Tubulikirkbya* is very similar in outline and sculpture, also a lateral rib may be present but it is not straight. It is possible that *Iranokirkbya* evolved from *Tubulikirkbya* by disappearance of the marginal tubules. However, it cannot be excluded that both genera are unrelated.

"*Kirkbya*" sp. n. from the Permian of Spitsbergen is a representative (new genus) of the Amphissitidae. It is similar to *Amphissites* Girty, 1910 in outline and sculpture, especially in the two vertical carinae in similar position as in *Amphissites*, but the characteristic subcentral node is absent. There are 1-3 lateral ribs below or above the adductorial kirkbyan pit, which are, however, mostly not straight. By disappearance of the vertical carinae *Iranokirkbya* may have evolved from this amphissitid new genus. The absence of transition forms means we cannot determine the phylomorphogenetic lineage to which

Iranokirkbya belongs, and cannot assign this genus to a family within the superfamily Kirkbyacea.

Iranokirkbya brandneri n. gen. n. sp.
(Figs. 3-6)

Derivatio nominis: In honour of Univ. Prof. Dr. R. Brandner, Innsbruck
Holotypus: Carapace (repository number Kozur/Mette 1-2005), illustrated on Fig. 4

Locus typicus: Section Zal III, NW Iran

Stratum typicum: Shales of lower Alibashi Formation, sample 28 (see Fig. 2). *C. hambastensis* Zone of lowermost Dorashamian

Material: 5 specimens.

Diagnosis: Carapace large, up to 1000 µm long, equivalved, subrectangular, flat (low convexity). Dorsal margin straight, ventral margin straight to slightly concave; ventral outline in lateral view straight. Anterior margin strongly and symmetrically rounded, a little higher than the slightly obliquely rounded posterior margin. Lateral surface reticulated, with distinct adductorial pit. A distinct straight or indistinctly curved oblique ridge is present above the adductorial pit, which runs from the lower anteromedial field to the upper posteromedial field. A low rib runs parallel and with small distance to the free margin. This rib is not to seen in lateral view, if the carapace is not tilted, but well recognisable in lower view (Fig. 6). A second, very distinct and high rib is present parallel to the low rib and join it in the antrodorsal corner (Fig. 5). It ends in the posterodorsal corner in a posteriorly-upward directed short spine. The dorsal rib overreaches slightly the dorsal margin. It ends before the anterior and posterior ends of the dorsal margin. Below the dorsal rib the reticulation may be arranged in an indistinct rib. The muscle scars in the adductorial n pit consist of at least 6 small spots.

Dimensions. l = 756-1000 µm, h = 366-457 µm, l/h = 2.15-2.19, maximum width: 311-356 µm

Distribution and remarks as for the genus.

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