

## The Early Ordovician trilobite genus *Jujuyaspis* in Australia

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*Jujuyaspis*, a stratigraphically useful trilobite for the definition of the earliest Ordovician, has been identified in the onshore Bonaparte Basin of northeastern Western Australia. It occurs in single collections (JSK 251 and JSK 268) from two sections (CG 231 and CG 249) in the Pander Greensand at Clark Jump Up, on Carlton Hill Station, 39 km north of Kununurra. The Pander Greensand, the youngest outcropping Cambrian-Ordovician formation of the Bonaparte Basin, is a deeply weathered, highly glauconitic quartz sandstone, approximately 125 m thick at section CG 249.

*Jujuyaspis* is a component of Faunal Unit XII in the informal biostratigraphic scheme proposed for the Ord and Bonaparte Basins by Opik (in Kaulback and Veevers, 1969). This Unit contains three distinct faunal assemblages. The earliest one, possibly of terminal Cambrian, latest Datsonian or earliest Warendan age, in Australian stadial nomenclature, contains *Aristokainella* cf. *A. calvicepitis* Zhou and Zhang, 1978, and undetermined species of *Hystericurus* (*Hystericurus*), *Leiostrigium* (*L. leiostrigium*) and *Yosimuraspis*. The second assemblage consists of *Aristokainella* cf. *A. calvicepitis*, and undetermined species of *Jijia*? *Jujuyaspis*, *Leiostrigium* (*Leiostrigium*) and *Parpilekia*? This has an early Ordovician, early Warendan age, within the *Cordylodus lindstromi* conodont zone. The youngest trilobite assemblage of Unit XII, comprising *Tienschihnia* cf. *T. constricta* Kuo and Duan, 1982, and undetermined species of *Apatokephalops* and *Asaphellus*, is associated with conodonts which include *Cordylodus angulatus*, *Chosonodina berfurthi*, *Drepanoistodus* and *Rossodus*? which confirm a late Warendan age within the *Cordylodus angulatus*-*Chosonodina berfurthi* Zone.

The two collections which have yielded *Jujuyaspis* contain six cranidia, two librigenae and thirteen pygidia. Cranidia are all incomplete and details of the preglabellar morphology cannot be documented with confidence. Nevertheless, the tagma is transversely moderately convex. The glabella is anteriorly gently tapered and bluntly rounded, extending to the anterior cranial margin; the glabellar furrows are effaced and the occipital furrow only faintly indicated. The occipital ring is relatively narrow (sag.), is not raised above the dorsal of the glabella in profile, and lacks a median node. Palpebral lobes are short (exsag.), and situated close to the glabella, anterior to the midlength of the glabella. The posterolateral limbs are expansive and bluntly rounded, and bear posterior border furrows which widen slightly distally. The preocular fixigenae are much restricted, and may not connect anteriorly. The librigenae are characterised by small eyes, and have prominent lateral border furrows. There is no genal spine or even a prominent genal angle. Pygidia are parabolic or slightly subtriangular, have low convexity (tr.) and entire, nonspinose, margins. There are three axial rings and an ill-defined terminal piece, not extending to the posterior margin. Pleural and interpleural furrows are effaced and there is no border furrow.

The type species of *Jujuyaspis*, *J. keideli* Kobayashi, 1936, and its synonyms (according to Aceñolaza and Aceñolaza, 1992), occurs in Argentina, Bolivia, Colombia and Norway where Nikolaisen and Henningsmoen (1985) recognised *J. keideli norvegica*, *J. angusta* Henningsmoen, 1957 also occurs in Norway. In North

America, *J. bocealis* Kobayashi, 1955 occurs in British Colombia, Alberta, Utah and Texas. *J. colombiana*

Baldis *et al.*, 1984 occurs in Colombia, and *J. sinensis* Zhou, 1980 (in Chen *et al.*, 1980) occurs in Hebei, China. Nikolaisen and Henningsmoen (1985) also consider *Alimbataaspis kelleri* Balashova, 1961 from Aktyubinsk, Kazakhstan, to be a species of *Jujuyaspis*. Furthermore, the fragments described by Shergold and Sdzuy (1991) as olenid genus and species undetermined, from Celtiberia, Spain, also seem likely to represent this genus. Everywhere, species of *Jujuyaspis* occur close to the beginning of the Tremadoc, being either associated with subspecies of *Rhabdinoporaflabelliforme* or conodonts of the *Cordylodus lindstromi* Zone.

## References

- Ace Aceñolaza, F. G. and Aceñolaza, G. F., 1992. The genus *Jujuyaspis* as a world reference fossils for the Cambrian-Ordovician boundary. In: Webby, B. D. and Laurie, J. R. (Eds) *Global Perspectives on Ordovician Geology*, 115 -120. Balkema, Rotterdam.
- Balashova, E. A., 1961. Some Tremadocian trilobites from the Aktyubinsk region. *Akademiya Nauk SSSR, Trudy Geologicheskogo Instituta*, 18, 102-145 [In Russian].
- Baldis, B., Gonzalez, S. and Perez, V., 1984. Trilobites tremadocianos de la Formacion Negritos (Perforacion La Heliera), Llanos de Colombia. 3rd *Latinamerican Congress, Paleontology, Mexico, Memoirs* 28-41.
- Chen Jun-yuan and nine others, 1980. Outline of the Ordovician deposits and faunas of Shandong, N. Anhui and N. Jiangsu, E. China. *Academia Sinica, Nanjing Institute of Geology and Palaeontology, Memoir* 16, 15 9-195.
- Henningsmoen, G., 1957. The trilobite Family Olenidae. *Skrifter utgitt av det Norske Videnskaps-Akademi i Oslo. 1 Matematisk-naturvidenskapelig klasse*, 1957, 1, 303 pp.
- Kaulback, J. A. and Veivers, J. J., 1969. Cambrian and Ordovician geology of the southern part of the Bonaparte Gulf Basin, Western Australia. *Bureau of Mineral Resources of Australia, Report* 109, 80 pp.
- Kobayashi, T., 1936. On the *Parabolinella* fauna from Province Jujuy. Argentina, with notes on the Olenidae. *Japanese, journal of Geology and Geography*, 13, 85-102.
- Kobayashi, T., 1955. The Ordovician fossils from the McKay Group in British Columbia, western Canada, with a note on the Early Ordovician palaeogeography. *Journal of the Faculty of Science, University of Tokyo*, 11, 9 (3), 493 pp.
- Kuo Hung-chun, Duan Ji-yi and An Su-lan, 1982. Cambrian-Ordovician boundary in the North China Platform with descriptions of trilobites. Paper for 4th International Symposium on the Ordovician System, Dept Geology, Changchun University, China, 31 pp.

Nikolaisen, F and Henningsmoen, G,1985. Upper Cambrian and lower Tremadoc olenid trilobites from Digermul Peninsula, Finmark, northern Norway. *Norges geologiske undersøkelse, Bulletin* 400, 49 pp.

Shergold, J. H. and Szalay, K.,1991. Late Cambrian trilobites from the Iberian Mountains, Zaragoza Province, Spain. *Beringeria*, 4,193-234.

Zhou Zhiyi and Zhang Jinlin, 1978. The Cambrian-Ordovician boundary of the Tangshan area with descriptions of the related trilobite fauna. *Acta Palaeontologica Sinica*, 17, 10-23 [In Chinese], 23-26 [In English].