

## A Dendroid Hydrozoan from the Uppermost Cambrian of Pulau Langkawi, Malaysia

JOSÉ ANTONIO GÁMEZ VINTANED & ANDREY YU. ZHURAVLEV<sup>2</sup>

<sup>1</sup>Dept of Geosciences, Faculty of Geosciences & Petroleum Engineering, Universiti Teknologi PETRONAS (UTP), 32610 Bandar Seri Iskandar (Tronoh), Perak, Malaysia

<sup>2</sup>Dept of Biological Evolution, Faculty of Biology, Lomonosov Moscow State University, Leninskie Gory 1(12), Moscow 119234, Russia

Email: jose.gamez@utp.edu.my; gamez@unizar.es; ayzhur@mail.ru

During the last decades, the presence of fossiliferous Cambrian strata was established in northwestern Langkawi Island, State of Kedah, Peninsular Malaysia (Lee, 1980, 2006; Mohd Shafeea Leman, 1997; Gámez Vintaned *et al.*, 2016). The siliciclastic Machinchang Formation embraces a similar Cambrian interval – in base of its close sedimentological and palaeontological similarities – to the one recorded by the Tarutao Formation at Tarutao Island, Thailand (Kobayashi, 1957; Shergold *et al.*, 1988), which is ascribed to the uppermost Cambrian Stage 10 of the Furongian Series. Despite of a fragmentary preservation of the fossils, the trilobites *Prosaukia?* sp., *Hoytaspis?* sp., *Lichengia?* *tarutaoensis*, “*Eosaukia*” *buravasi*, *Lophosaukia* sp., and *Quadraticephalus* sp., as well as nisusiid, billingselid, and strophomenid brachiopods, are identified from the middle Chinchin Member of the Machinchang Formation.

Besides, delicate sessile dendroid fossils are distinguished within the same assemblage. The fossil is tubular and, probably, postmortem flattened; thus, tube margins are swollen and reach 0.034 to 0.096 mm. Tubular segments vary in diameter from 0.13 to 0.45 mm and the largest segment is over 24 mm long. Common tube bifurcations – trifurcations do also exist – were probably produced by budding, with new tubes arising at an acute angle; but some minute tubes are attached to the surface of a larger one by a holdfast and are deviated at a right angle to it. The fossil displays a high phenotypic plasticity producing either polygonal encrusting colonies

on trilobite carapaces in high energy (sandy) microfacies or erect branching freely standing ones in low energy (silty) microfacies. SEM studies revealed a pure organic (carbon only) composition of tubes.

Among Palaeozoic fossils, archaeoplastid algae, colonial hydroids, and pterobranchs including graptolites possess a similar habit, size range, and sometimes composition. However, neither colonial nor siphonous algae do produce propagules with holdfasts, while pterobranch tubaria show a fusellar structure of the wall (Maletz, Steiner, 2015; LoDuca *et al.*, 2017). Hydrozoans only have a similar set of features. Among them, *Marcusodictyon* Bassler, 1952 from the Furongian and Tremadocian of Baltica (Vinn, 2016; see also Taylor, 1984, for a challenge of previous interpretations of the genus as an early bryozoan) and *Sinobryon* Baliński *et al.*, 2014 from the Floian of South China are identical to the Langkawi dendroid fossil: *Marcusodictyon* to individuals encrusting on trilobites and *Sinobryon* to erect ones. Also, some Furongian erect branching forms from Baltica, ascribed to *Sphenothallus* Hall, 1847 (Stewart *et al.*, 2015), can actually belong to *Marcusodictyon*. The only difference is in the phosphatic composition of the Baltic specimens, but all of them have been studied as encrusters of phosphatic brachiopods, while Chinese ones are pyritized. Thus, Malaysian specimens reveal a synonymy of *Marcusodictyon* and *Sinobryon* and their probable primary organic (chitinous?) composition.