TÜBİTAK

Turkish Journal of Zoology

http://journals.tubitak.gov.tr/zoology/

Short Communication

Turk J Zool
(2019) 43: 536-539
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doi:10.3906/zoo-1904-42

Siberigondolella gen. nov., a Boreal Early Triassic lanceolate conodont

Ali Murat KILIÇ[1,*], **Francis HIRSCH**[2]

[1]Department of Geological Engineering, Faculty of Engineering, Balıkesir University, Balıkesir, Turkey
[2]Laboratory of Geology, Faculty of Sciences, Naruto University, Naruto, Japan

Received: 26.04.2019 • **Accepted/Published Online:** 16.07.2019 • **Final Version:** 02.09.2019

Abstract: In the Lower Triassic, at the time that segminate gondolellid conodonts defined the Tethyan regions, endemic segminiplanate gondolellid conodonts resembling the genus "*Neogondolella*" dwelled in the northern latitudes. Without the multielement apparatus characteristic of the subfamily Neogondolellinae, these forms are phylogenetically incertae sedis and one lineage was attributed to the genus *Siberigondolella* gen. nov.

Key words: Conodont, Early Triassic, Siberia, *Siberigondolella*, gondolellid

Smithian conodonts on Kotelny Island (Novosibirsk Islands) were reported by Klets and Yadrenkin (2001) as exclusively segminiplanate.

The presence of segminiplanate morphs in the boreal zone contrasts with that of the segminate genus *Neospathodus* in cherty deep waters of the Russian Far East (Buryi, 1989; Bragin, 1991; Klets, 1998).

The new genus described herein comprises the Griesbachian-Dienerian *Siberigondolella griesbachensis* (Orchard) and Dienerian *S. mongeri* (Orchard), the Dienerian-Smithian *S. composita* (Dagys), and the Smithian *S. altera* (Klets), *S. sibirica* (Dagys), and *S. jakutensis* (Dagys).

Class Conodonta Pander, 1856

Order Ozarkodinida Dzik, 1976

Superfamily Gondolelloidea Lindström, 1970

Family Gondolellidae Lindström, 1970

Genus *Siberigondolella* **gen. nov.**

Figures 1A–1Z

Generotype: *Neogondolella composita* Dagys, 1984; Figure 1G (from Dagys, 1984, plate XIV, fig. 5)

Derivation of the name: After its region of distribution, namely high-latitude Siberia.

Diagnosis: Approximately less than 1 mm long, the pointed and slender unit has a relatively narrow platform. The rear edge of the platform is curved down. The platform bears microreticulae, and on its underside there is a small oval posterior pit. The conical main cusp is marginal and not covered by the rounded edges of the posterior platform. Triangular teeth slowly increase in height and width towards the anterior end and form a low attached blade.

Array: Griesbachian *Siberigondolella griesbachensis* (Orchard); Dienerian *S. mongeri* (Orchard); Smithian *S. composita* (Dagys), *S. altera* (Klets), *S. siberica* (Dagys), and *S. jakutensis* (Dagys).

Range: Late Griesbachian-Smithian.

Discussion: Gondolellid conodonts comprise segminiplanate and segminate forms. In the Early Triassic, segminiplanate forms were no longer present in the low latitudes but were dominant in high-latitude regions. Sun et al. (2012) reported that the diversity and evolution of segminiplanate gondolellids appear to have closely followed the temperature record of the time. The disappearance of some dominant end-Permian conodonts in the late Griesbachian coincides with a temperature rise that began at the Permo-Triassic boundary and peaked in the Late Griesbachian (Li et al., 2019). The Dienerian cooling trend coincided with the appearance of several new forms. The genus *Siberigondolella* disappeared during the latest Smithian temperature peak. The late Spathian cooling allowed the renewal of segminiplanate forms (Li et al., 2019).

Orchard (2007) suggests the derivation of *S. griesbachensis* (Orchard) from a narrower early Griesbachian form that represents a P_1 morphology distinct from the other gondolellid stocks. In a similar way to younger genera *Borinella* and *Scythogondolella*, *Siberigondolella* appears without a clear root. The late Griesbachian *S. griesbachensis* and Dienerian *S. mongeri* are phylogenetically closer to the younger species of the genus *Siberigondolella* (Figure 2).

* Correspondence: alimurat@balikesir.edu.tr

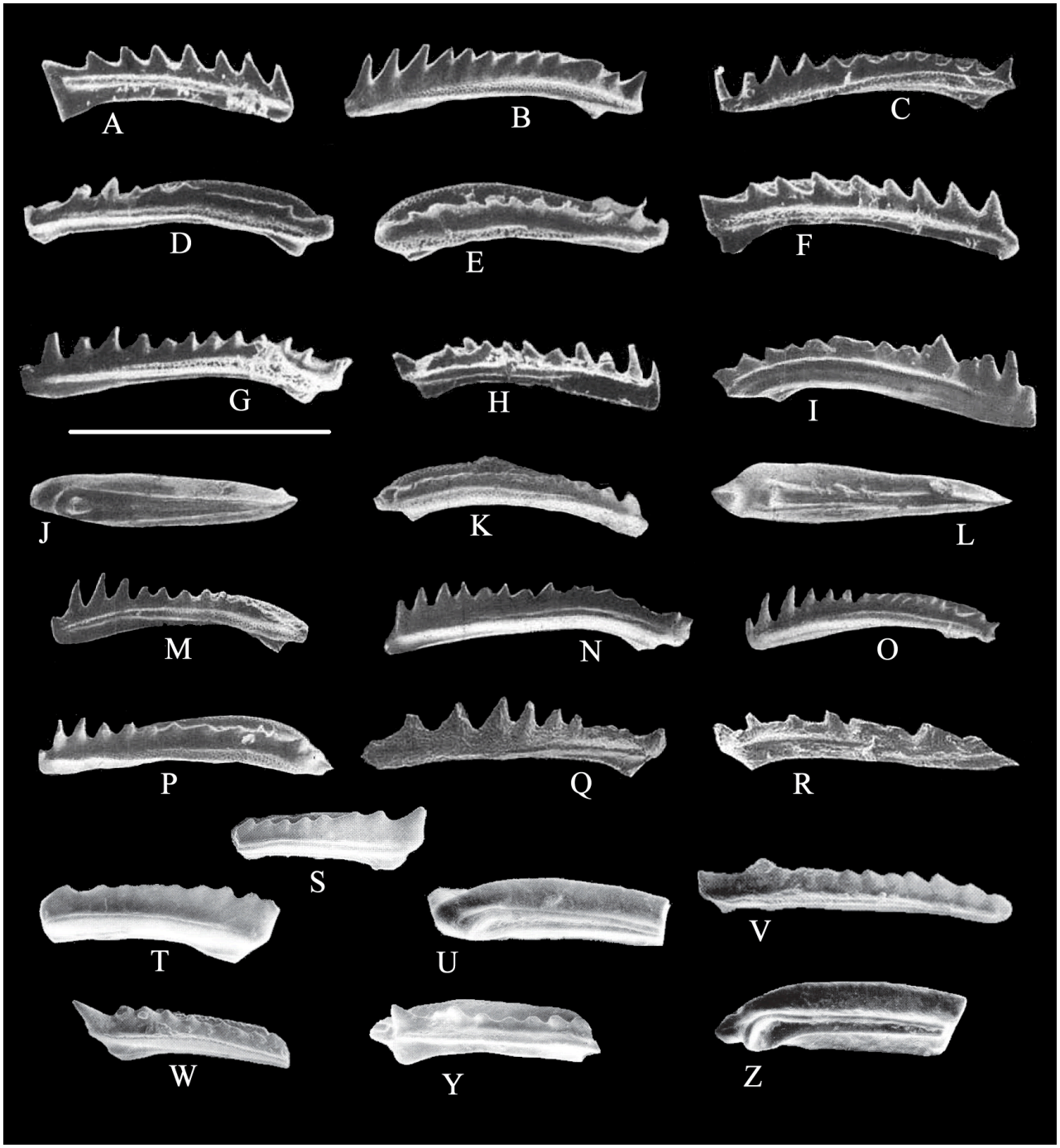

Figure 1. *Siberigondolella* **gen. nov.** A–H, W–Z) *S. composita* (A–H after Dagys, 1984, p. 22, pl. XIV, figs. 1–8; W–Z after Klets and Yadrenkin, 2001, p. 17, pl. 1, figs. 5–6), G is holotype; I–P) *S. jakutensis,* (after Dagys, 1984, p. 10, pl. I, figs. 10–12, pl. II, figs. 1–5), V) *S.* cf. *jakutensis* (after Klets and Yadrenkin, 2001, p. 18, pl. 1, fig. 1); Q–R) *S. sibirica* (after Dagys, 1984,p. 8, pl. I, figs. 8–9); S–U) *S. altera* (after Klets and Yadrenkin, 2001, p. 16, pl. 1, figs. 10–11). Approximate scale bar is 500 μm.

While Early Triassic Gondolellidae comprises Late Permian-Griesbachian *Clarkina* of the subfamily Neodondolellinae, in the Latest Griesbachian *Siberigondolella* of an uncertain subfamily appears. Klets and Kopylova (2007) discussed the Smithian appearance of *Neogondolella* in the context of the Early Olenekian of the northern latitudes that yielded endemic *Borinella buurensis*, *B. composita*, *B. jakutensis*, *B. taimyrensis*, and *B. sibirica*, all having char-

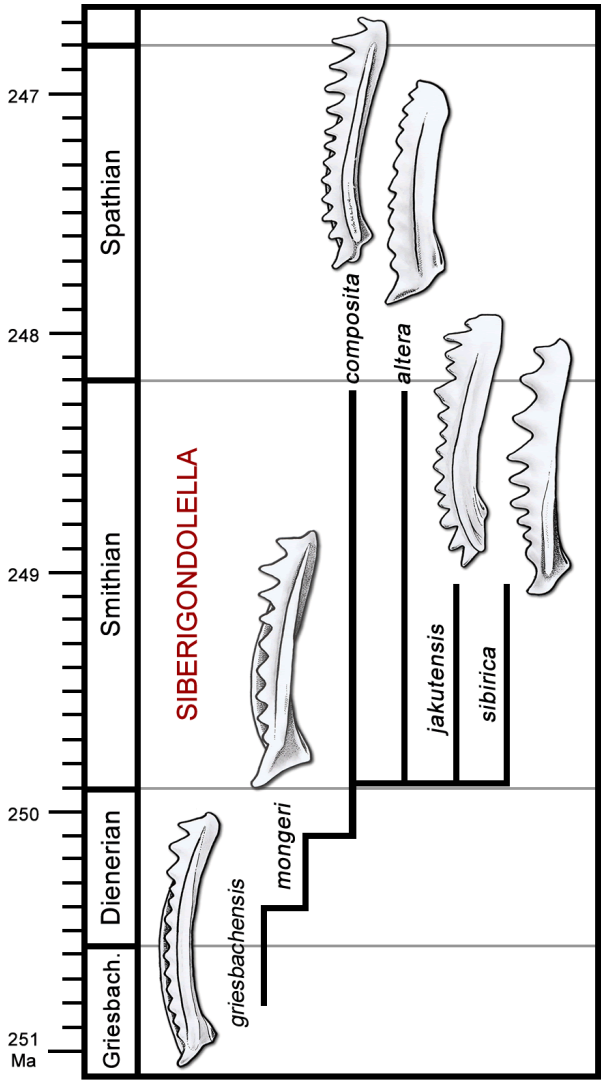

Figure 2. *Siberigondolella* **gen. nov.** lineage (modified after Orchard, 2007). In the absence of a possible phylogenetic link, the lineage is disconnected from Griesbachian Neogondolellinae.

acteristics of *Neogondolella* in the form of the basal cavity (Dagys, 1984). Specimens of *B. buurensis* from A. Dagys's collection were, however, referred by Kozur (1989) to most probably the so-called *Neogondolella*, evolved from *Neospathodus* in the Early Olenekian and widely distributed in southern and northern latitudes. Hirsch (1994) suggested the sudden Smithian appearance of *Borinella* from *Neospathodus*, branching into a lineage of *B. nevadensis-B. jubata* and "side" branches of *B. nepalensis* and *S. milleri* during a time span that would have left a time gap between the Early Dienerian extinction of *Clarkina* and the Early Smithian appearance of *Borinella*. The genus *Siberigondolella* **gen. nov.** comprises the boreal lineage described as *Neogondolella* by Dagys (1984) and Klets and Yadrenkin (2001) (Kilic et al., 2017, p. 350).

We suggest here a new genus for a separate lineage of lanceolate gondolellids mainly described from the Smithian in Siberia (Dagys, 1984; Klets and Yadrenkin, 2001) and from the Griesbachian-Dienerian of the Canadian Arctic (Orchard, 2007): *Siberigondolella* **gen. nov.** comprises the species *S. griesbachensis* (Orchard), *S. mongeri* (Orchard), *S. composita* (Dagys), *S. altera* (Klets), *S. jakutensis* (Dagys), and *S. sibirica* (Dagys).

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