Stop 18: Tori Põrgu ("Tori Hell")

Tõnu Meidla and Peep Männik

Location: Latitude 58°29´1˝N, longitude 24°48´59,9˝E; Pärnu County, Estonia.
Stratigraphy: Middle Devonian, Eiffelian, Tori and Tamme Mb-s of the Pärnu RS.
Status: Cliff is under protection; no hammering, but loose material may be collected.
More information: https://geoloogia.info/en/locality/13573

Fig. 18.1. Tori outcrop, left bank of the Pärnu River in Tori. Photo: Tõnu Meidla.

Fig. 18.2. The westernmost part of the Tori outcrop near the bridge. Photo: Tõnu Meidla.

The Tori outcrop (Fig. 18.1) is widely known as the 'Tori Hell' because of a cave in it. However, the former deep cave collapsed stepwise during the 20th century. The escarpment is situated on the left bank of the Pärnu River under Tori cemetery and reaches further to the west, up to the bridge across the Pärnu River (Fig. 18.2). The length of the outcrop wall is ca 400 m, height reaches up to 8 m.

Tori Põrgu is the stratotype of the Pärnu RS, the Pärnu Formation and the Tori Member of the latter. This is the most representative outcrop of this interval in the East Baltic.

Stratigraphy

The fossiliferous sandstones cropping out near the historical Tori Manor were first mentioned already in the middle of the 19th century (Sokolov 1844). Orviku (1930) described the rocks exposed in this locality first as the "basal beds of the Middle Devonian", re-naming them later as the Tori Sandstone (Orviku 1932). He subdivided the unit

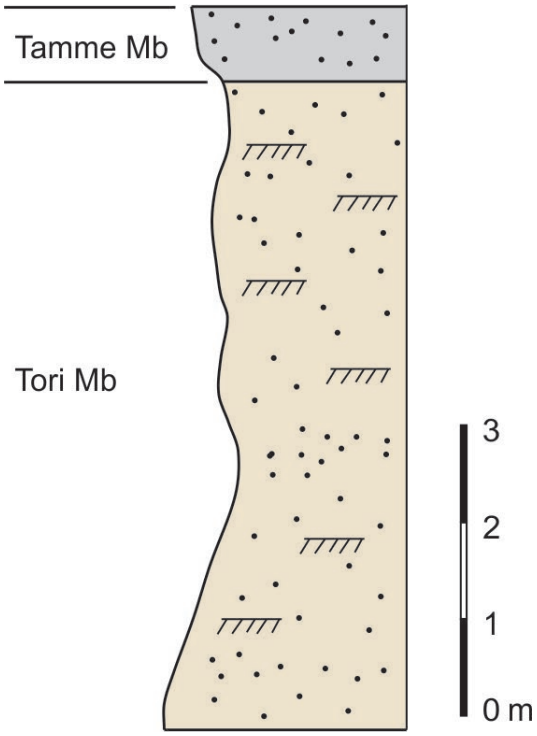

Fig. 18.3. The Tori section, modified from Kleesment (1991). For the details see the description.

into the lower *Aulacophycus* and the upper 'trochiliscid sandstone', corresponding to the Tori Mb and the Tamme Mb of the Pärnu Formation, respectively, in the modern sense. The sandstone was earlier referred to as the Pärnu Beds (Obruchev 1933) and the Pärnu Stage by E. Mark-Kurik (Mark 1958). Based on the fish fossils, Gross (1942) assigned the rocks to the *Guerichosteus heterolepis* Zone (Eifelian; former *Schizosteus heterolepis* Zone). The Tori outcrop is the type locality of the zonal species.

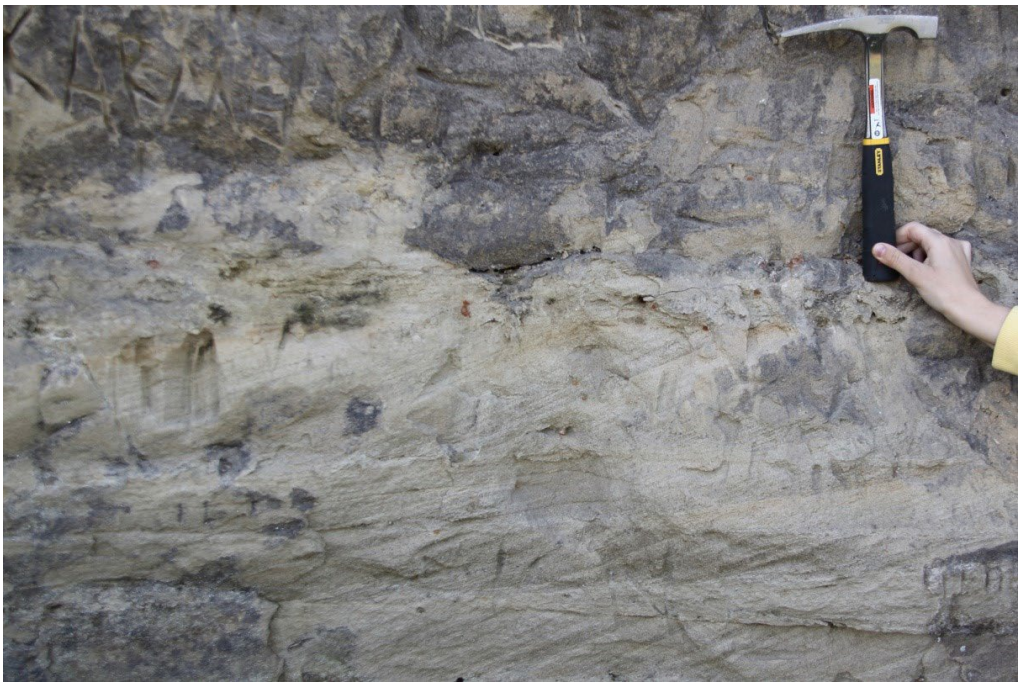

Fig. 18.4. Cross-bedded sandstone in the lower part of the Tori Member. Photo: Tõnu Meidla.

Fig. 18.5. Clay pebbles in sandstone of the Tori Member. Photo: Tõnu Meidla.

Description of the section

Fig. 18.3; from the top, after Kleesment (1991):

0.75 m – Tamme Member. Light grey horizontally thin-bedded silty mica-rich sandstone. Small spherical gyrgogonites of charophyte algae (*Trochiliscus*) occur.

7.5 m – Tori Member. Greyish-white and yellowish cross-bedded sandstone (Fig. 18.4). In the lower part, the sandstone is medium-grained, and in the uppermost 5 m fine-grained. The rock contains small Fe-hydroxide pigmented silty clay pebbles, 1–5 cm in diameter; in the lower part, the pebbles are of greenish-grey colour (Fig. 18.5). Fragments of early plants and fossil fishes occur.

Fossils

The outcrop is considered one of the most important localities of Devonian plants in Estonia. They were originally (Thomson 1940) attributed to the psilophyte genus *Aulacophycus* Eichwald, but the group of psilophytes is considered obsolete today. The majority of the fragments found at the site are today tentatively attributed to the pteridophyte genus *Hostinella* Barr ex Stur (class Cladoxylopsida; Kalamees 1988). The presence of two horizons containing plant remains in this section was mentioned already by Orviku (1930).

Another important group of fossils in the sandstones at Tori are vertebrates. Together with the zonal species *Guerichosteus heterolepis* (Preobrazhensky), several other agnathans have been recorded such as *Psammolepis toriensis* (Mark-Kurik), *Afanassiaspis porata* Otto & Laurin, and *Tartuosteus*? sp. (eMaapõu 2024). The list of acanthodian species contains the zonal species *Laiacanthus singularis* Karatajute-Talimaa, accompanied by *Archaeacanthus quadrisulcatus* Kade, *Diplacanthus kleesmentae* Valiukevičius, *Ectopacanthus flabellatus* Valiukevičius (Valiukevičius & Karatajūtė-Talimaa 1986; Glinskiy & Pinakhina 2018). Placoderms (*Actinolepis tuberculata* Agassiz, *Byssacanthus dilatatus* (Eichwald), *Homostius* sp.) and osteichthyes (*Porolepis* sp., *Glyptolepis* spp.) are also recorded (Glinskiy & Pinakhina 2018).

The outcrop was cleaned in 2005, but the material at its base was only partially removed, leaving the most fossiliferous interval buried.

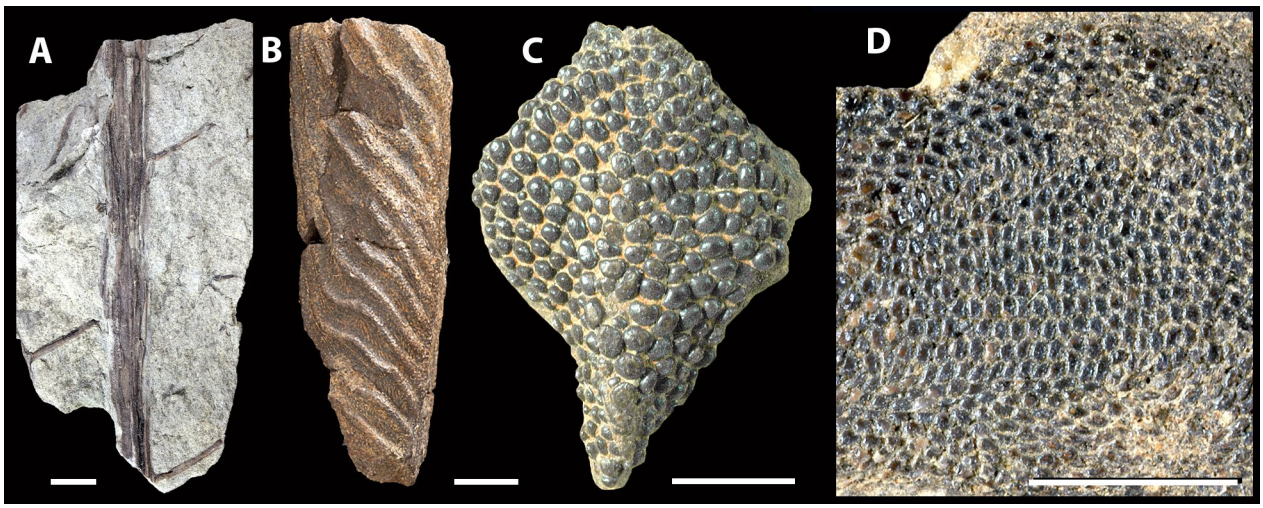

Fig. 18.6. Selected fossils from the Tori Põrgu outcrop, Pärnu Regional Stage. Scale bars A – 1 cm; B–D – 5 mm. **A** – plant remains, GIT 236-19. B–D vertebrates; **B** – fragment of placoderm Homostius sp., GIT 99-42; C, D psammosteids; **C** – tessera of Guerichosteus heterolepis (Preobrazhensky), GIT 116-5; **D** – close-up of Psammolepis toriensis (Mark-Kurik), GIT 116-23.

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