A new genus and species, Slovenitriacanthus saksidai, from southwestern Slovenia, of the Upper Cretaceous basal tetraodontiform fish family Cretatriacanthidae (Plectocretacicoidea)

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Abstract

A 15.9 mm SL specimen from the Lipica Formation of Upper Santonian-Lower Campanian age (about 82−84 MYA) at Šepulje, near Tomaj, about 14 km southeast of Komen, in southwestern Slovenia, is described as Slovenitriacanthus saksidai, new genus and species. It is the second known taxon of the Upper Cretaceous basal tetraodontiform fish family Cretatriacanthidae, which was previously represented only by the holotype of Cretatriacanthus guidottii Tyler and Sorbini 1996 from the Upper Campanian-Lower Maastrichtian of Nardò (Puglia), southeastern Italy (about 70 MYA). The diminutive size of Slovenitriacanthus saksidai and its well-ossified and presumably adult body are similar to those of all of the other known specimens of the three Upper Cretaceous families that comprise the superfamily Plectocretacicoidea, supporting the proposal that a reduced size of 25 mm SL or less is a synapomorphy of the superfamily.

Key words: Tetraodontiform, Cretatriacanthidae, Slovenitriacanthus n.gen, Slovenitriachntus saksidai n. sp., Slovenia

Introduction

The Order Tetraodontiformes has ten extant families of about 350 species that mostly occur in temperate to tropical marine continental waters, although some are found in the freshwaters of Asia, Africa, and South America. It has a relatively well-known fossil record because of many significant discoveries during the last few decades. The fossil and extant higher category taxa of the order have been cladistically analyzed, documenting a phylogenetically basal superfamily of three families in the Upper Cretaceous (Tyler and Sorbini, 1996). During the Eocene, there was a great flourishing of morphologically diverse genera (especially as known from Monte Bolca, Italy, and the north Caucasus, Russia), representing both extant and exclusively fossil families and subfamilies of the order (reviewed with reconstructions of all taxa by Tyler and Santini, 2002, with relationships analyzed by Santini and Tyler, 2003).

The three families comprising the basal clade Plectocretacicoidea have each been known from single species. One of the species, Cretatriacanthus guidottii Tyler and Sorbini 1996 (Upper Campanian-Lower Maastrichtian of Nardò, Apulia, southeastern Italy, about 70 MYA), Cretatriacanthidae, is known from a single specimen. The other two species are known from slightly fewer than ten specimens each: Plectocretacus clarae Sorbini 1979 (Lower Cenomanian of Hakel, Lebanon, about 95 MYA), Plectocretacidae; and Protriacanthus gortani D’Erasmo 1946 (Upper Cenomanian-Lower Turonian of Komen, Slovenia, about 90 MYA), Protriacanthidae.

A fossil recently collected by Mr. Viktor Saksida at Šepulje, near Tomaj, about 14 km southeast of Komen, in southwestern Slovenia, clearly represents a second taxon of the family Cretatriacanthidae. The new genus and species, Slovenitriacanthus saksidai, differs most obviously from Cretatriacanthus guidottii by having only one long strong dorsal-fin spine (versus at least two
long dorsal spines), fewer vertebrae (18 versus 21), and a differentially enlarged postcleithrum (versus uniformly broadened), among many other differences. The new taxon from Slovenia is about 12−14 million years older than Cretatricanthus from southern Italy.

Like all of the specimens of the three previously known members of the Plectocretacicoidea, which are 25 mm SL and less in size, the specimen of the new genus and species is a diminutive, but well-ossified, apparent adult of only 15.9 mm SL, offering firm support for small size to be considered a synapomorphy of the superfamily, as proposed by Tyler and Sorbini (1996).

**Materials and Methods**

The specimen was photographed using many techniques that enhanced the visibility of its features, including both normal camera and lighting regimes and those of Reflectance Transformation Imaging, which is based upon a synthesis of multiple digital images of the subject in a fixed position taken with a fixed camera position and multiple lighting positions (for further information, see www.si.edu/mci/ImagingStudio).

**Abbreviations.** Anatomical: SL – standard length, snout to caudal-fin base; TL – total length, including caudal fin. Institutional: MCSNV – Museo Civico di Storia Naturale di Verona; PMS – Prirodoslovni Muzej Slovenije (Slovenian Museum of Natural History; VS – Viktor Saksida fossil collection housed at PMS. Miscellaneous: Fm – formation; MYA – millions of years ago; RTI – reflectance transformation imaging.

**Sistematic descriptions**

Order Tetraodontiformes
Superfamily Plectocretacicoidea
Family Cretatricanidae
Genus *Slovenitriacanthus* gen. nov.

**Diagnosis**

*Slovenitriacanthus* differs from *Cretatriacanthus*, the only other member of the family, most conspicuously by having the following: only one long prominent dorsal-fin spine (versus at least two long dorsal-fin spines in *Cretatriacanthus*); fewer vertebrae (8+10=18 versus 9+12=21); fewer principal caudal-fin rays (10 versus 12) and no procurrent caudal-fin rays (versus one or two procurrent rays above and below); the supracleithrum enlarged and extended posteriorly more prominently in the ventral region than more dorsally (versus broadly and evenly extended posteriorly along most of its length); the mouth oriented only slightly obliquely upward (versus distinctly upward); and rugosities and spiny processes present on the large dorsal-fin spine and pelvic-fin spine (versus surfaces of these large spines smooth).

Even though the single specimen representing the new genus is less than well preserved, it clearly possesses one of the most critical synapomorphies that define the Cretatricanidae: there is a large posterior extension of the postcleithrum over the lateral surface of the abdominal cavity. Moreover, it has two additional features that characterize the Cretatricanidae as distinctive among the Plectocretacicoidea: the prominent dorsal-fin spine is placed anteriorly; and the body is not covered by a carapace of large interdigitated hexagonal scale plates.

**Type Species**

*Slovenitriacanthus saksidai* gen. et sp. nov., by monotypy and designation herein.

**Etymology**

The genus is named for the country of origin of the
holotype, Slovenia, in combination with Triacanthus, the type genus of the family Triacanthidae, which is the longest-known member of one of the two most basal extant clades of Tetraodontiformes, so that the new generic name is harmonious with that of the other genus of the family, Cretatriacanthus.

**Composition**
The type species only.

*Slovenitriacanthus saksidai* sp. nov.
(Figs. 1–3)

**Diagnosis**
That of the genus.

**Etymology**
The species is named in honor of Mr. Viktor Saksida, an avid and experienced fossil collector and archeological explorer in and around his home town of Sežana. His exceptional discoveries have already resulted in an archeological site, “Viktorjev spodmol,” being dedicated to him, and his collections of fossil fishes include many fine specimens. He generously donated the holotype of the new fossil described herein to the Slovenian Museum of Natural History.

**Holotype**
PMS, VS-001, 15.9 mm SL (19.8 mm TL), single plate, head to right; presently the only known specimen of the new species.

**Type Locality and Horizon**
Šepulje, 1 km east of Tomaj (Sežana Municipality), about 14 km southeast of Komen, in southwestern Slovenia (see Fig. 5 for location charts); Upper Santonian-
Lower Campanian, Lipica Formation, Tomaj Limestone member, about 82–84 MYA.

**Description**

The body is oblong, with its greatest depth contained slightly less than two times in the SL, and the dorsal- and pelvic-fin spines are long and sturdy.

- **Head.** The bones of the head are not individually well preserved, but a thickened region with an oblique slight indentation in the lower snout indicates the division between the upper and lower jaws in a mouth of moderately large size. The posterior edge of the skull is at the level of a vertical fracture in the matrix, which is just in front of the origin of the large dorsal-fin spine. The circular orbit is clearly indicated, and a thicker bony arch along the lower edge of the orbit indicates an infraorbital series of bones whose individuality cannot be determined. There is a prominent bony mass in the lower orbit just above the upper edge of the middle region of the infraorbital arch that appears to represent a broad infraorbital shelf, but preservation is such that we cannot determine which infraorbitals contribute to it. Other details of the head are too poorly preserved for description.

- **Axial skeleton.** The more posterior abdominal and most of the caudal vertebrae are relatively well preserved and are clearly indicated by a combination of their centra and neural and haemal spines. We consider the first caudal vertebra to be that to which the upper end of the large first anal-fin basal pterygiophore is most closely associated, as in other tetraodontiform fishes. In the case of the new species, the haemal process of the first caudal vertebra is not prominently longer than the haemal process of what we herein consider to be the last abdominal vertebra. Including this first caudal vertebra (with a relatively well-preserved centrum, neural spine, and haemal spine), there are eight more caudal vertebral segments with relatively distinct neural and haemal spines anterior to the region of the short caudal peduncle, which is less well preserved. Between the last clearly indicated caudal vertebra (the eighth) and the base of the caudal fin we estimate that there is one additional, poorly indicated caudal peduncle vertebra and a terminal urostyle vertebra. Thus, we are confident that there are a total of ten caudal vertebrae, and not more than that.

- **Pectoral fin and girdle.** The pectoral fin is not preserved and none of the individual bones of the pectoral girdle are discernable; however, the girdle is evident as a large mass of bone extending posteriorly from the level of the vertical fracture at the rear of the skull and head. We interpret a thickened bar of bone positioned vertically just below the first two abdominal vertebrae and behind the fracture at the rear of the skull as the shaft of the supracleithrum. Extending posteriorly from the shaft of the supracleithrum is a broad plate of bone that is relatively less wide dorsally (a little less than the diameter of the orbit) than it is ventrally in the region above the posterior process of the pelvic bone and behind the level of the origin of the pelvic-fin spine. We cannot distinguish a separation of this plate into a dorsal postcleithrum (presumably the upper region of the large plate) and a ventral postcleithrum (presumably the lower region of the plate, including the broadly tapering posterior flange that extends almost to the level of the posterior end of the posterior process of the pelvic bone). It is evident (especially using oblique lighting) that the surface of the posterior flange of the ventral postcleithrum region curves gently inward toward the midline from its more laterally positioned upper edge, which continues upward to the narrower dorsal postcleithrum region.

Fig. 3 - Photographic details (with oblique lighting to heighten contrast) of the holotype of *Slovenitriacanthus saksidai*, PMS, VS-001, 15.9 mm SL: A, of the abdominal region to show the prominent posterior expansion of the postcleithrum, especially more ventrally, and the long shaft of the first anal-fin basal pterygiophore; and B, of the dorsal-fin spine to show its rugose surface.
- Pelvic fin and girdle. The large stout pelvic-fin spine from both sides of the body is well preserved, but preservation around the bases of the pelvic-fin spines is insufficient to determine if pelvic-fin rays may have been present. The spine has a rugose surface, with irregular linear humps and spiny processes that seem to be part of the substance of the spine rather than from adherent scales. Just above the base of the pelvic spine is a somewhat rounded mass of bony material that is denser than the bone of the ventral postcleithrum region, and we interpret this to be the remains of a guard-scale complex. Extending posteriorly from the region of the base of the pelvic spine is a long stout shaft of bone that is clearly the posterior process of the pelvis; it is in close contact with the ventral edge of the posterior flange of the ventral postcleithrum region.

- Dorsal fin. There is a single large stout dorsal-fin spine just behind the back of the head; given that both pelvic-fin spines are fully preserved and there is no evidence of impressions of any other large dorsal-fin spines, we are confident that there is only one large dorsal spine present. The spine has a strongly roughened surface, with humps and spiny processes that are even more noticeable than those on the rugose pelvic spines. We have examined the region just in front of the base of the dorsal spine to try to ascertain whether a small rudimentary spine may have been present, but preservation is insufficient for this to be determined.

Dorsal-fin rays are not preserved, but there are striations in the matrix in the region between the neural spines of the vertebrae and the dorsal edge of the body that probably are the faint remains of basal pterygiophores.

- Anal fin. There is no anal-fin spine, and anal-fin rays are not preserved; as with the dorsal fin, faint striations in the matrix below the haemal spines of the caudal vertebrae probably represent the remains of basal pterygiophores.

- Caudal fin and skeleton. Eight caudal-fin rays are relatively well indicated (seven of them are especially clear in certain lighting conditions; one is less completely so but is in the appropriate spatial series with the others). The rays are lightly preserved, with only superficial substance, but their distinct color differences from that of the matrix help to delineate them; the rays are relatively broad distally, and we presume they are the remains of branched rays. The uppermost element and the lowermost element are thicker than the others, especially toward the basal regions. The lowermost element appears to be composed of an upper, thicker ray and a lower, marginal, thinner ray, especially as seen in various RTI lightening conditions. We believe that this lowermost element represents the lowermost branched ray, and that along the outside of the branched ray is a more slender unbranched ray; this is the typical tetradontiform condition (except for tetraodontids, which have two lower unbranched rays). We presume that the uppermost thick element also is composed of both an uppermost branched ray and, to the outside, a more slender marginal unbranched ray (as in all tetradontiforms, without exception). Thus, we are confident that the caudal fin consists of ten rays, an uppermost and a lowermost unbranched ray and eight branched rays. Irrespective of our interpretation concerning uppermost and lowermost unbranched rays, we are sure that there are no more than ten principal caudal-fin rays. Preservation is insufficient to determine if there were any procurrent rays at the upper and lower base of the principal rays, but there is no obvious broadening of the caudal-fin base above and below that would indicate the presence of procurrent rays (if present, they were surely not numerous).

- Squamation. No scales are evident on the body, except for the rounded thickened bone just above the base of the pelvic-fin spine that we interpret as the remains of a guard-scale complex. We have carefully examined the thick bony material at the upper rear of the skull just in front of the dorsal-spine origin for the presence of scales, but in this mass of bone we cannot determine if it comprises the remains of bones, or enlarged scales, or the combination of both.

- Measurements. The following measurements are given as a percent of the 15.9 mm SL holotype.
  - Greatest body depth: 51.2
  - Head length: 38.1
  - Orbit diameter: 13.6
  - Snout length: 11.4
  - Least depth of fleshy caudal peduncle: 14.3
  - Dorsal-fin spine length: 57.0
  - Pelvic-fin spine length: 46.6
  - Length of posterior process of pelvis (behind base of pelvic spine): 25.0
  - Caudal-fin length: 24.4

**Comparisons with Cretatriacanthus guidottii (fig. 4)**

*Slovenitriacanthus saksidai* shares with *Cretatriacanthus guidottii* a sufficient number of features to assure its proper placement in the Cretatriacanthidae, even though the bony features of the holotype of *S. saksidai* are considerably less well preserved than those of the holotype and only known specimen of *C. guidottii*. Most
importantly, *S. saksidai* has the postcleithrum much expanded into a flange posteriorly along its length; such an expansion is one of the more important derived features that distinguish the family. Both taxa of the family also share the anterior placement of the spiny dorsal fin and the body without a carapace (versus in the other two families of the superfamily Plectocretacicoidea, the spiny dorsal fin is placed posteriorly or is absent, and the body is encased by very large, sutured, hexagonal scale plates).

There are numerous diagnostic differences between *S. saksidai* and *C. guidottii*. In *S. saksidai* the posterior expansion of the postcleithrum is much greater in its lower region than more dorsally, whereas in *C. guidottii* the postcleithrum is evenly expanded posteriorly along its entire length. In both species the postcleithrum seems to be composed of a single element, without division into separate dorsal and ventral pieces. The posterior expansion of the ventral region of the postcleithrum in *S. saksidai* extends almost to the level of the posterior end of the posterior process of the pelvis, whereas the posteroverentral end of the postcleithrum in *C. guidottii* is at a level well short of the posterior end of its posterior pelvic process.

In *S. saksidai* there is only one long, well developed, dorsal-fin spine and there is no indication in the matrix of any other prominent dorsal spine having been present; we are confident that there is a single large, stout, highly rugose, dorsal spine in *S. saksidai*. By contrast, in *C. guidottii* there are two long dorsal-fin spines, which are smooth and less stout than in *S. saksidai*, and these two dorsal spines seem to be preceded by a small rudimentary dorsal spine just in front of the base of the first of the two long spines; therefore, it is probable that the two long dorsal spines are the second and third of the series. Preservation is insufficient in *S. saksidai* to determine if there may have been a rudimentary dorsal-fin spine present in front of the single large spine.

Fig. 4 - Reconstruction of the holotype of *Cretatriacanthus guidottii* Tyler and Sorbini 1996, MCSNV 1377, 24.5 mm SL, from Nardò, Region Apulia, southeastern Italy; Upper Campanian-Lower Maastrichtian (Upper Cretaceous), about 70 MYA; from Tyler and Sorbini (1996, fig. 2).
In *S. saksidai* there are no more than ten principal caudal-fin rays and no procurent caudal-fin rays, with eight of the principal rays relatively well delineated and presumably branched. Because the lowermost of these elements has indications of being composed of two separate rays, and because both the uppermost and the lowermost of these eight rays are broader than the others, we suppose that they each represent an inner branched ray and a more slender outer unbranched element, as is the case in other tetraodontiform fishes. Thus, it is only by supposition that we assign as many as ten principal caudal-fin rays to *S. saksidai*. By contrast, there are 12 principal caudal-fin rays and one or two procurent caudal-fin rays above and below in *C. guidottii*.

*Slovenitriacanthus saksidai* has 8+10=18 vertebrae, whereas *C. guidottii* has 9+12=21; although a less likely interpretation is that *C. guidottii* has 10+12=22, as discussed by Tyler and Sorbini, 1996:14.

The bones of the mouth in *S. saksidai* are not individually distinct, but a slight linear indentation in the bones of the jaw region indicates the oblique position of the interface between the upper and lower jaws; by contrast, the position of the gap is much steeper, approaching vertical, in *C. guidottii*. This difference is reflected in the very short snout length in *C. guidottii* of 6.1% SL, versus the longer length in *S. saksidai* of 11.4% SL.

The long stout pelvic-fin spine in *S. saksidai* is robust, whereas that of *C. guidottii* is smooth and more slender.

**Emended diagnosis of the Cretatriacanthidae**

With the inclusion of a second taxon in the Cretatriacanthidae, the diagnosis of the family given by Tyler and Sorbini (1996) requires emendation, as follows:

Plectocretacioids with prominent, anteriorly positioned spiny dorsal fin having an indeterminate number of spines (but probably up to 6), at least 1 or 2 spines very long (50–57% SL), long spines either smooth or rugose and with spiny processes; about 10 dorsal-fin rays; number of anal-fin rays unknown; pelvic fin with a stout spine of great length (46–47% SL) and 2 rudimentary rays; pelvic fin positioned thoracically below pectoral-fin base alongside middle region of pelvis; pelvic-fin spine without a basal-flange locking mechanism; posterior process of pelvis long and shaft-like, not much expanded anteriorly between pelvic-fin spines; 10–12 principal caudal-fin rays, and procurent caudal-fin rays present or absent; probably only 1 epural; 18 to 21 vertebrae; neural and haemal spines of posterior caudal vertebrae relatively well developed; premaxilla with a long ascending process, without serrations along outer edge at angle of ascending and alveolar processes; maxilla long, with a prominent posterodorsally oriented process articulating with ascending process of premaxilla; subocular shelf formed by second through fourth infraorbitals, with most of shelf formed from second infraorbital; postcleithrum enormously expanded, either about equally along its length or with ventral region more prolonged posteriorly than dorsally; body scaleless except for a few slightly enlarged hexagonal scale plates on top of rear of head, and those in the guard-scale complex at the base of the pelvic-fin spines; head bones without tubercles.

**Geological setting (fig. 5)**

The first reports of fossil fish from around Komen in southwestern Slovenia began in the first half of the 19th century. Some of the Upper Cretaceous fishes from Komen, as well as from Nova Gorica (about 28 km to the north, along the border with Italy), were illustrated and described in detail by Gorjanović-Kramberger (1895). Other paleontologists and geologists also reported fossil fishes, reptiles, and invertebrates from these regions (Heckel, 1856; Steindachner, 1860; Kner, 1863; Basani, 1880). One of the most detailed paleontological studies of the Upper Cretaceous ichthyofauna of the Trieste-Komen plateau was made by D’Erasmo (1946), and included such localities from around Komen as Kobjeglava, Križ, Mali Dol, Gabrovica, Jablanec, Ribje, Škrbina, Sveto, Tomačevica, and Volčji Grad. Recent studies on fossil fishes and the stratigraphy around Komen and Tomaj (about 14 km to the southeast of Komen) were made by Calligaris (1992), Jurkovšek & Jurkovšek-Kolar (1995), Cavin et al. (2000), and Palci et al. (2008).

Stratigraphic investigations of the Trieste-Komen Plateau have been carried out for many decades, and early conclusions concerning the stratigraphy of the “Komen shales” were discussed by Plenčar (1960). More detailed investigations were made for the Geological Map of the Trieste-Komen Plateau by Jurkovšek et al. (1996) in the scale of 1:50,000 and by Jurkovšek (2010) in the scale of 1:25,000. These more recent geological investigations reported that there are four horizons of dark platy and laminated limestones with chert from several different formations ranging from Cenomanian to Lower Campanian. These horizons (beds) are, according to Jurkovšek (2010), as follows: Komen
limestone (Povir Fm., Cenomanian age); Komen pelagic limestone (Repen Fm., Cenomanian–Turonian age); Komen limestone (Sežana Fm., Coniacian and Santonian age; two different horizons); and Tomaj limestone (Lipica Fm., Upper Santonian–Lower Campanian age).

The geologically youngest horizon of these dark gray platy and laminated bituminous limestones with chert that bears a rich fossil fauna and flora, is the Tomaj limestone from the Santonian–Campanian Lipica Formation. The 82–84 MYA age of the Tomaj limestone and its stratigraphic position are indicated by the presence of the foraminifera *Murgella lata* (Luperto-Sini) in the underlying strata and by the occurrence of *Calveziconus localicazae* Caus and Cornella in the overlying layers (Srčar, 1995; Jurkovšek, 2010). Some interesting fossil materials have already been reported from the Tomaj limestone: the feather of a bird or dinosaur (Buffetaut et al., 2002); ammonites associated with apticychi (Summesberger et al., 1996); and an abundant macroflora (Dobruskina et al., 1999). The Tomaj limestone occurs in the territory between Dutovlje, Kazlje, Križ, and Storje in Sežana Municipality, forming packages (layers of identical lithology) of varying thickness, but not more than about ten meters thick. Only in the area around Dutovlje and Tomaj are the packages very thick (up to 40 meters) and especially rich in fossils.

Other noteworthy and lithologically similar localities from Cretaceous rocks have been studied near Monfalcone, Italy, at Polazzo (Dalla Vecchia and Ten-tor, 2004), with a Coniacian–Santonian fossil fauna and flora. In Slovenia, another Cretaceous fish fauna locality is known as Mrzlek near Solkan (north of Nova Gorica), which was studied originally by Gorjanović-Kramberger (1895) and more recently by Križnar et al. (2008) and Križnar (2010). The age and stratigraphic interpretation of the Mrzlek location is still problematic, but the fish fauna known to date indicates an Upper Albian or Lower Cenomanian age.

**Paleoecology and ichthyofaunal associations of the Tomaj limestone (Lipica Formation)**

The lithology and fossils of the Tomaj limestone indicate that there was sedimentation in deep water environments and a good connection to the open sea. Deep water and occasional connections with open marine environments are indicated by pelagic organisms, such as calcispheres, pithonellas, and shells of ammonites associated with apticychi (Summesberger et al., 1996).

The ichthyofauna of the Tomaj limestone is very rich (Cavin et al., 2000) and usually very well preserved, sometimes excellently. The good preservation was possible because of the rapid burial of fish bodies in fine carbonate mud that was anoxic in the lowermost layers of the water column, the bottom environments probably lacked significant currents (Cavin et al., 2000), and also probably because of the absence of predators and scavengers. In some levels of the Tomaj limestone there were mass mortalities of fishes, mostly of small euteleosts and teleosts. Mass mortality probably occurred during mixing of the otherwise well-stratified waters, which caused unfavorable living conditions for fishes and other organisms. The anoxic basins, which are rich in vertebrate fossils in the southern part of the Caledonian Alps (Italy, Slovenia), are known from the Middle Triassic (Tintori, 1992; Hitij et al., 2010) to the end of the Cretaceous (Dalla Vecchia, 2008) at the time of the Adriatic-Dinaric Carbonate Platform.

The fish associations of the Upper Santonian to Lower Campanian Tomaj limestone were studied by Cavin et al. (2000). They showed that the remains of enchodontids (*Enchodus* sp.) from the Tomaj limestone are more abundant than those from the Komen limestone (Cenomanian–Turonian age). Ichthyodectids are represented throughout the entire section of the Cenomanian Komen limestone to the Tomaj limestone, but with different species (and higher taxonomic levels) found in the various strata. Among acanthomorphs, only a few specimens have been reported, especially of *Hoplopteryx stachi* (Gorjanović-Kramberger). Among lower fishes, Cavin et al. (2000) recorded the remains of *Rynchopterus* sp., pycnodontiforms, and indeteminate small euteleostei and teleostei. Most of the fossils known from the Tomaj limestone are stored in the private Jurkovšek palaeontological collection (Cavin et al., 2000), and approximately one hundred currently undetermined specimens are in the fossil collection of Viktor Saksida, which is housed in the Slovenian Museum of Natural History.

**Conclusions**

The new taxon, *Slovenitriacanthus saksidai*, allows for an expansion of the defining characteristics of the family Cretatriacanthidae. The age and geographic range of the family is extended from that of its only previously known member, *Cretatriacanthus guidottii*, from Nardò in southern Italy 70 MYA to that of its newest member, from Šepulje in southwestern Slovenia 82–84 MYA. Like all previous specimens of the species of the three families that comprise the basal Upper Cretaceous clade Plectocretacioida of the
A new genus and species, Slovenitriacanthus saksidai, from southwestern Slovenia.

Fig. 5 – Charts to show locations: A, of the Trieste-Komen Plateau of southwestern Slovenia showing some of the localities from which Cretaceous fishes have been found; and B, of the Šepulje fish locality (at fish symbol to right of city), with outcrops of the Tomaj limestone (in gray shading) of the Lipica Formation, Upper Santonian-Lower Campanian, near Dutovlje, Tomaj, and Križ.

Order Tetraodontiformes, the single specimen of *S. saksidai* is small (15.9 mm SL) but well ossified and apparently adult, supporting the hypothesis advanced by Tyler and Sorbini (1996) that diminutive size is a synapomorphy of this most phylogenetically basal group of tetraodontiforms, all of whose specimens are less than 25 mm SL.

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