Carnets Geol. 19 (20)

E-ISSN 1634-0744
DOI 10.4267/2042/70638

Discussion on some previous records of *Involutina hungarica* (SIDÓ, 1952). Revision of the Jesse Harlan JOHNSON Collection. Part 6

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Abstract: *Involutina hungarica* (SIDÓ, 1952) is reported from Albian strata of Texas (U.S.A.). Earlier records in the scientific literature, where this foraminifer commonly appears under the label "*Hensonina lenticularis* (HENSON, 1947)", are reevaluated. Although it is mostly cited from Albian strata, its first occurrence could be Aptian.

Key-words:

- Cretaceous;
- Albian;
- Texas;
- Abu Dhabi;
- Alicante;
- foraminifers;
- Involutinidae;
- "*Hensonina*"

Citation: GRANIER B. (2019).- Discussion on some previous records of *Involutina hungarica* (SIDÓ, 1952). Revision of the Jesse Harlan JOHNSON Collection. Part 6.- *Carnets Geol.*, Madrid, vol. 19, no. 20, p. 445-455.

Résumé : *Discussion sur quelques signalements antérieurs d'*Involutina hungarica *(SIDÓ, 1952). Révision de la collection Jesse Harlan JOHNSON. 6e partie.-* *Involutina hungarica* (SIDÓ, 1952) est signalée dans des couches albiennes au Texas (États-Unis). Des signalements plus anciens, où ce foraminifère apparaît couramment sous l'appellation "*Hensonina lenticularis* (HENSON, 1947)", sont réexaminés. Bien qu'il soit principalement cité dans les séries albiennes, sa première occurrence pourrait être dès l'Aptien.

Mots-clefs :

- Crétacé ;
- Albien ;
- Texas ;
- Abou Dhabi ;
- Alicante ;
- foraminifères ;
- Involutinidae ;
- "*Hensonina*"

1. Introduction

On the occasion of the revision of the Jesse Harlan JOHNSON Collection (GRANIER *et al.*, 2013, 2017a, 2017b; GRANIER & DIAS-BRITO, 2016; BASSO & GRANIER, 2018), the present author got the chance to find foraminifers previously unreported from the Americas (*e.g.*, *Montseciella glanensis* (FOURY, 1968), see GRANIER *et al.*, 2017a: Fig. 15.M-S,T pars). This new publication deals with the identification of *Involutina hungarica* (SIDÓ, 1952) in Albian strata from Texas. This collateral find was previously reported in CONSORTI *et al.* (2014) as a personal communication of the present author but it did not come with illustrations to support it. This short contribution also offers the present author the opportunity to better document some other records as "*Hensonina lenticularis* (HENSON, 1947)" and even in some cases to correct previous misidentifications.

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Published online in final form (pdf) on December 27, 2019
[Editor: Michel MOULLADE; language editor: Phil SALVADOR; technical editor: Bruno GRANIER]

2. Texas, the United States of America

The specimens documented here (Pl. 1, figs. A-W) come from a single thin section BFP-6513, USNM 42765, which includes the holotype of *Permocalculus walnutense* JOHNSON, 1968. According to JOHNSON (1968), the rock sample was collected in the "Uppermost lime grainstone ledge of Keys Valley Member of Walnut Formation rimming stock tank on northeast side of Texas Highway 16, 2.1 miles north-northwest of Priddy, Mills County, Texas", *i.e.*, *ca.* GPS coordinates 31°42' 13.6"N 98°31'17.5"W. Note that the texture is not that of a grainstone as stated by that author, but that of a bioclastic wackestone. The structure of these specimens is rather well preserved, *i.e.*, in such a way that pores of the umbilical region are visible. The largest specimen reaches *ca.* 650 µm in diameter. With more than 20 random sections from a single thin section, *Involutina hungarica* (SIDÓ, 1952) is very abundant in this facies. However, to date that remains the unique record for the Americas.

3. Abu Dhabi, the United Arab Emirates

Specimens from the subsurface of the offshore field 'A', from the uppermost Lekhwair (Pl. 1, figs. Y-AA; Pl. 2, figs. A-F) and the Hawar (Pl. 1, fig. X; Pl. 2, fig. G) formations, that were initially ascribed by the present author to "*Hensonina lenticularis* (HENSON, 1947)", respectively come from the lower Barremian and from the Bedoulian, *i.e.*, "lower Aptian" (GRANIER & BUSNARDO, 2013). The younger specimens, those from the Hawar Formation, are slightly ornamented and could be referred to *Involutina hungarica* (SIDÓ, 1952). Accordingly, except for the possibly poorly age-constrained original find of SIDÓ (1952) in Hungary according to CONSORTI *et al.* (2014), it could be the earliest occurrence of the species. In contrast the older specimens, those from the Lekhwair Formation, lack ornamentation and thus could be referred to a discrete species of Involutinidae: cf. *Globospirillina neocomiana* (MOULLADE, 1961) or cf. *Aulotortus* sp. The largest specimen is 750 µm in diameter. They are quite similar to those found in the Jezzinian (uppermost Barremian - lower Bedoulian) of Lebanon documented by MAKSOUD *et al.* (2014: Pl. 4, figs. S-T) and MAKSOUD (2015: Pl. 45, figs. A-K) as "*Involutina hungarica* (SIDÓ, 1952)" with a maximum diameter reaching 1 mm.

4. Alicante, Spain

At Sierra Helada it was erroneously identified in the "Oolithes à Cylindroporelles et Biolithites de Madréporaires" (*Cylindroporella* oolites and coral boundstones), a stratigraphic unit that is given an early Albian age based on the occurrence of *Favusella washitensis* (CARSEY) (Pl. 3, figs. I-K), *Orbitolina (Mesorbitolina) subconcava* (LEYMERIE) and *Pseudochoffatella cuvillieri* DELOFFRE. The section ("Coupe du Relais") was logged from the top of the marine cliff (*ca.* 200 m) up to the electrical substation, "L'Albir Radar Állomás" (435 m). However, when revising the corresponding set of thin sections, the species studied proves to be missing. It looks like the specimens erroneously ascribed to this taxon probably refer to Epistominids (Pl. 3, figs. A-H), *i.e.*, to another aragonitic foraminiferal genus with a trochospiral plurilocular test, not with a planispiral bilocular test (or sometimes formerly reported as a "monolocular" test, *e.g.*, NEUMANN, 1967; BIGNOT, 1982).

At Puig Campana, "*Hensonina lenticularis*" occurs in both 1) the "Calcaires à Simplorbitolines" (*Simplorbitolina* limestones) on the Realet d'Alt section (Pl. 2, figs. H-AB; Pl. 3, figs. A-AH), in uppermost Aptian to lower Albian strata with *Simplorbitolina manasi* CIRY & RAT, and 2) the "Calcarénites à Hensonines" ("*Hensonina* calcarenites") in the Rafel section (Pl. 3, figs. AI-AJ; Pl. 4, figs. A-V), in association with *Neorbitolinopsis conulus* (DOUVILLÉ) in middle to upper Albian calciturbidites. In the wackestone facies of the *Simplorbitolina* limestones, most specimens are less than 500 µm in diameter; very few are larger than 600 µm; the structure of the test was lost due to the full leaching of the aragonitic test. In contrast, in the grainstone facies of the "*Hensonina* calcarenites", there is a mix of small and large specimens with a diameter up to *ca.* 1050 µm; the structure of test is better preserved and pores are still visible. In this last rock sample, one can raise the question of whether these reworked specimens correspond to a single species with discrete forms or to discrete species.

5. Conclusions

Paleogeographically, in addition to the countries listed by CONSORTI *et al.* (2014) with, from East to West: Iran, Hungary, Austria, France, Spain, and Portugal, the new Texan record of *Involutina hungarica* represents its westernmost Tethysian find. The Qatari occurrence based on "*Trocholina lenticularis* HENSON, 1947" was excluded from the list by these authors (CONSORTI *et al.*, 2014) who quite rightly consider that it is a discrete taxon (see BRÖNNIMANN & KOEHN-ZANINETTI, 1969; SCHLAGINTWEIT & PILLER, 1990; SCHLAGINTWEIT *et al.*, 2015). To our knowledge, there is only one more record of "*Trocholina lenticularis* HENSON" outside Qatar, *i.e.*, from lower Cenomanian strata in Portugal (BERTHOU, 1973: Pl. 2, figs. 2, 2a).

Stratigraphically, the youngest occurrence of *Involutina hungarica* could be early Aptian (Bedoulian) in age as documented here from Abu Dhabi (Pl. 2, fig. G) but there is not enough material available to definitely validate this option. An Aptian age was originally ascribed to SIDÓ's (1952) original material and to the topotypes of BRÖNNIMANN and KOEHN-ZANINETTI (1969). The latest Aptian dating as suggested by the finds in the Realet d'Alt section at Puig Campana (Spain) requires further consolidation because these stra-

ta were originally ascribed to the lower Albian merely on the basis of first occurrence of "*Hensonina lenticularis* (HENSON, 1947)" (GRANIER, 1987) and today they should be regarded as undifferentiated uppermost Aptian to lower Albian strata. Upper Barremian occurrences in Lebanon (MAKSOUD *et al.*, 2014; MAKSOUD, 2015) and the United Arab Emirates (GRANIER *et al.*, 2003; GRANIER & BUSNARDO, 2013) do not refer to that species but to a planispiral bilocular taxon that lacks ornamentation: cf. *Globospirillina neocomiana* (MOULLADE, 1961) or cf. *Aulotortus* sp.

Acknowledgements

In 2012, the author benefited from a Smithsonian Fellowship allowing him to investigate the J. Harlan JOHNSON Collection stored in the premises of the Smithsonian Institution. He would like to thank the staff of the Department of Paleobiology at the Smithsonian National Museum of Natural History and particularly William A. DIMICHELE and Jonathan G. WINGERATH for their hospitality and having facilitated his work there. This research was also partly sponsored by the Foundation "Carnets de Géologie". This manuscript benefited from the constructive reviews of Sylvain RIGAUD and Felix SCHLAGINTWEIT. Last but not least, the author is very grateful to Phil SALVADOR who kindly agreed to check the English text.

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Plate 1:

Figs. A-W: *Involutina hungarica* (SIDÓ, 1952), Keys Valley Member, Walnut Formation, middle Albian, BFP-6513, USNM 42765, Mills County (Texas, USA).

Fig. X: cf. *Involutina hungarica* (SIDÓ, 1952), Hawar regional Stage, Bedoulian ("lower Aptian"), 7188.9', well 14, field 'A' (offshore Abu Dhabi).

Figs. Y-AA: cf. *Globospirillina neocomiana* (MOULLADE, 1961), Lekhwair regional Stage, Upper Barremian, 7529', well 14, field 'A' (offshore Abu Dhabi).

All photos: graphical scale bar = 250 µm.

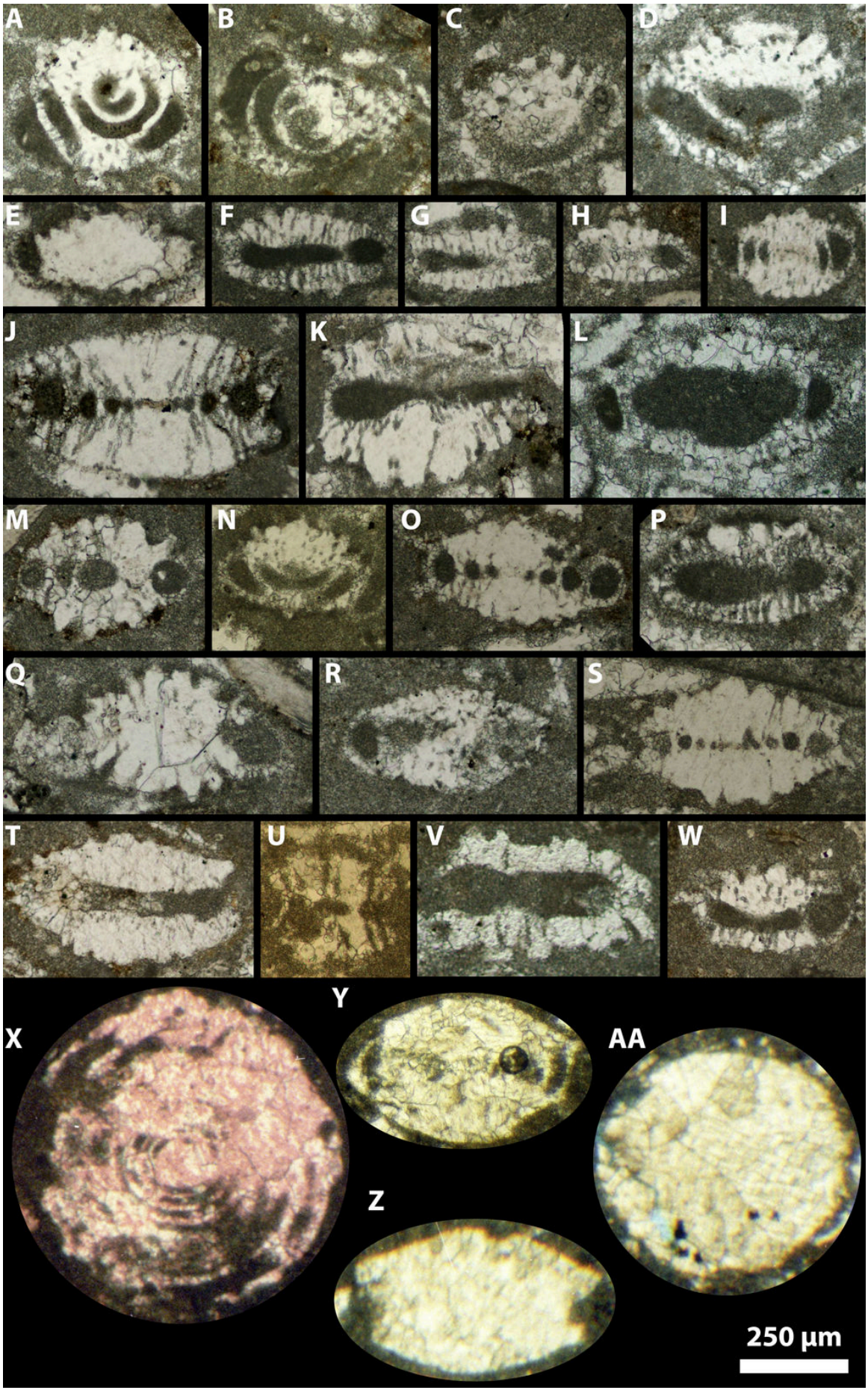
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Plate 2:

Figs. A-F: cf. *Globospirillina neocomiana* (MOULLADE, 1961), Lekhwair regional Stage, Upper Barremian, 6910.2', well 19, field 'A' (offshore Abu Dhabi).

Fig. G: cf. *Involutina hungarica* (SIDÓ, 1952), Hawar regional Stage, Bedoulian ("lower Aptian"), 7188.9', well 14, field 'A' (offshore Abu Dhabi).

Figs. H-AB: *Involutina hungarica* (SIDÓ, 1952), *Simplorbitolina* limestones, upper Aptian-lower Albian, Realet d'Alt section, Puig Campana, Alicante (Spain), figs. H-K: no. 15, 19366(a); figs. L-O: no. 15, 19366(b); fig. P: no. 14, 19367; figs. Q-R, T-U, W-AB: PC87.1bis(a); fig. S: PC87.1bis(a) = Pl. 8, fig. i in GRANIER, 1987; fig. V: no. 15, 19366(a) = Pl. 8, fig. g in GRANIER, 1987.

All photos: graphical scale bar = 250 µm.

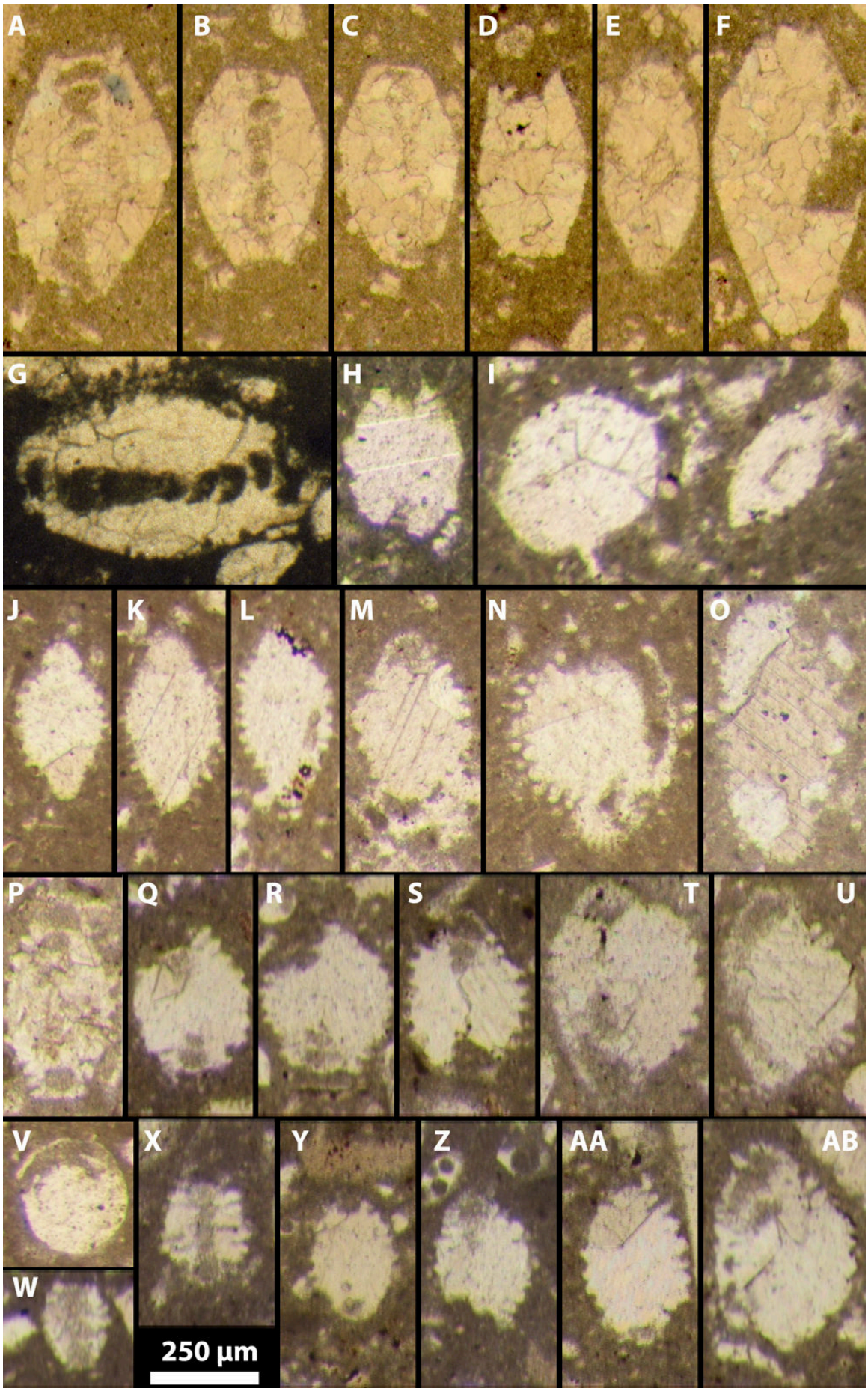
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Plate 3:

Figs. A-H: Epistominids, *Cylindroporella* oolites and coral boundstones, lower Albian, Sierra Helada, Alicante (Spain), figs. A, C-D, G: Relais no. 10, HL712; fig. B: Relais no. 12, HL722; fig. E: Relais no. 14, HL726(a); fig. F: Relais no. 14, HL726(b); fig. H: HL702.

Figs. I-K: *Favusella washitensis* (CARSEY), *Cylindroporella* oolites and coral boundstones, lower Albian, Sierra Helada, Alicante (Spain), fig. I: HL702; figs. J-K: Relais no. 10, HL712.

Figs. L-AH: *Involutina hungarica* (SIDÓ, 1952), *Simplorbitolina* limestones, upper Aptian-lower Albian, Realet d'Alt section, Puig Campana, Alicante (Spain), figs. L-N: PC87.1bis(c); figs. O, T, AB-AC: PC87.1(b); figs. P, X-Y, AG-AH: PC87.1(c); figs. Q-R, Z-AB: PC87.1bis(b); fig. S: PC87.1bis(d); figs. U-W: PC87.1(a); fig. AF: PC87.1(c) = Pl. 8, fig. h in GRANIER, 1987.

Figs. AI-AJ: *Involutina hungarica* (SIDÓ, 1952), "*Hensonina* calcarenites", middle-upper Albian, Rafel section, Puig Campana, Alicante (Spain), fig. AI: MC194.99(a); fig. AJ: MC194.99(b).

All photos: graphical scale bar = 250 µm.

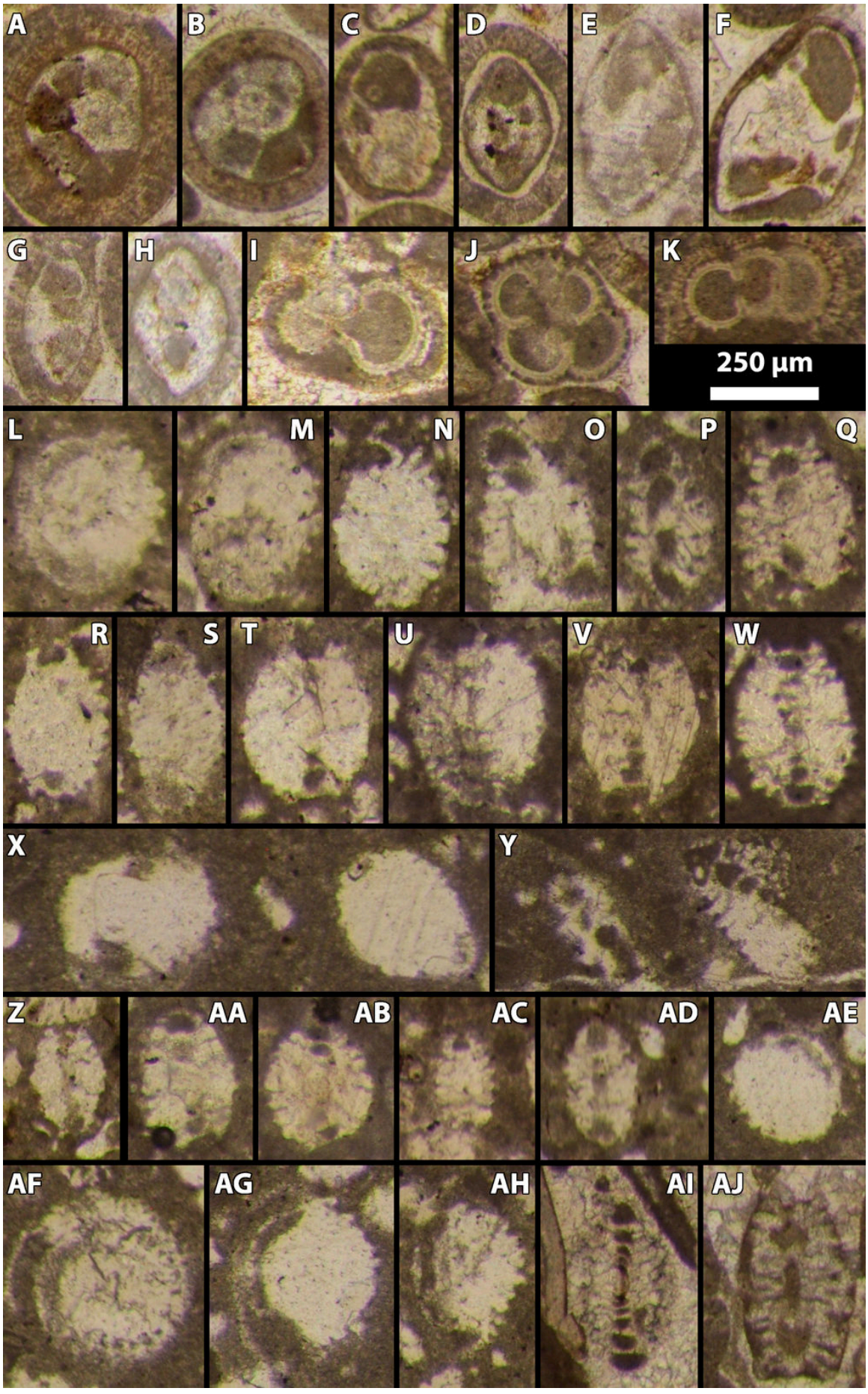
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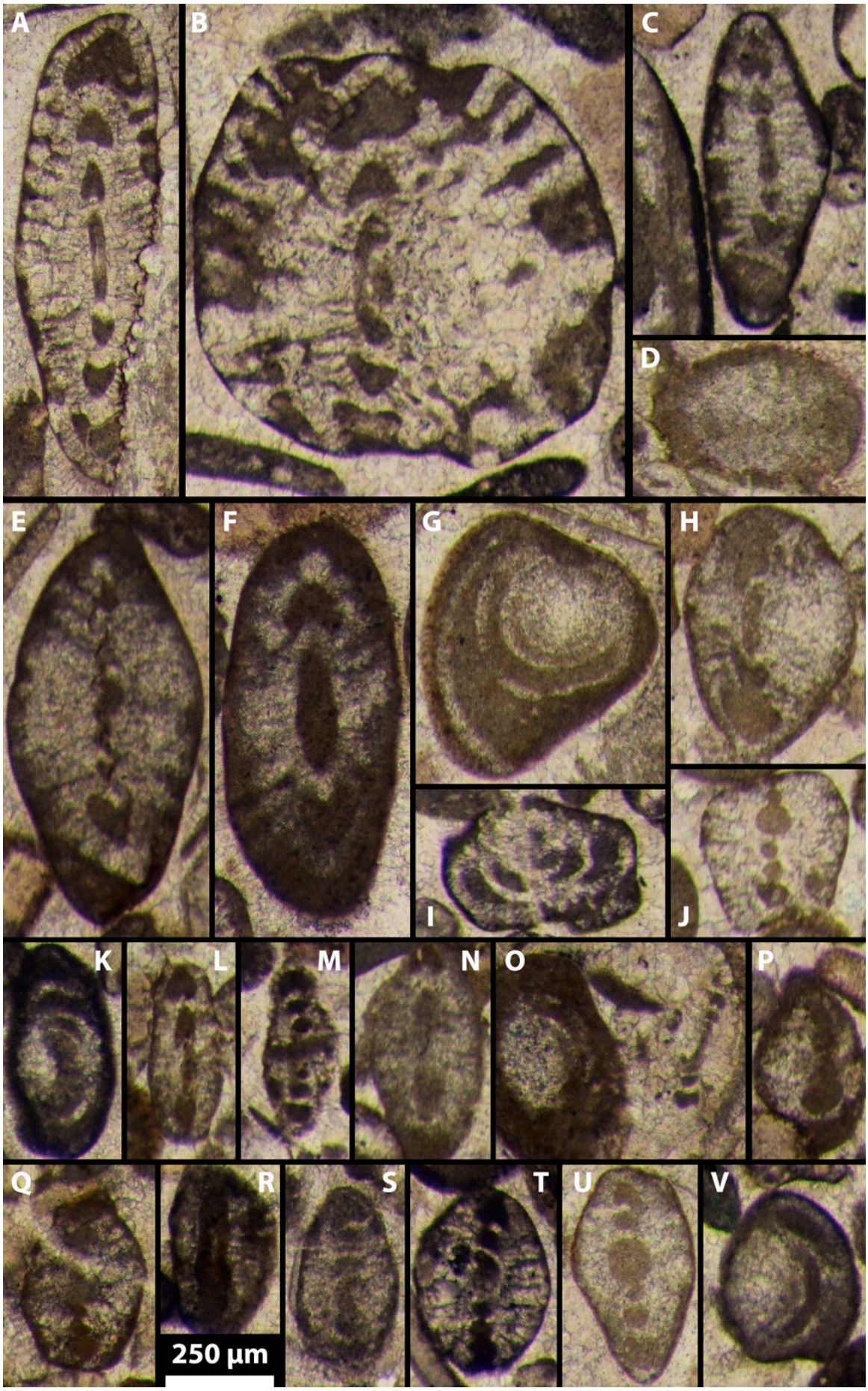
Plate 4:

Figs. A-V: *Involutina hungarica* (SIDÓ, 1952), "*Hensonina* calcarenites", middle-upper Albian, Rafel section, Puig Campana, Alicante (Spain), fig. A: MC194.99(a) = Pl. 10, fig. a in GRANIER, 1987; fig. B: MC194.99(c) = Pl. 10, fig. b in GRANIER, 1987; fig. C: MC194.99(b) = Pl. 10, fig. e in GRANIER, 1987; figs. D, G-J: MC194.99(b); figs. E-F, K, M-P, R, T: MC194.99(a); figs. L, Q, S, U-V: MC194.99(c).

All photos: graphical scale bar = 250 µm.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