



***Hedbergella yezoana* is a valid species name:**
Comments on the case 3620 and decision (opinion 2362)
by the International Commission of Zoological Nomenclature

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Abstract: International Commission of Zoological Nomenclature decided in September 2015 on case 3620 submitted by A. ANDO (United States National Museum, Smithsonian Institution, Washington, D.C.), which regards the status of the species *Ticinella primula* LUTERBACHER *in* RENZ *et al.*, 1963, and *Hedbergella trocoidea yezoana* TAKAYANAGI & IWAMOTO, 1962. Decision was to place the former on the Official List of Specific Names in Zoology and the latter on the Official Index of Rejected and Invalid Specific Names in Zoology (ICZN, 2015, p. 227). The scientific fundamentals in the presentation of case 3620 are weak and do not support such a decision by the International Commission. Moreover, they create a significant disturbance of nomenclatural stability in the Linnaean classification of the Cretaceous planktonic foraminifera.

Key-words:

- planktonic foraminifera;
- Cretaceous;
- nomenclature

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Résumé : *Hedbergella yezoana est un nom d'espèce valide : Remarques sur le cas 3620 et la décision (avis n° 2362) formulée par la Commission Internationale de Nomenclature Zoologique.*- La Commission Internationale de Nomenclature Zoologique a statué en Septembre 2015 sur la cas 3620 soumis par A. ANDO (Museum National des États-Unis, Smithsonian Institution, Washington, D.C.) concernant le statut des espèces de foraminifères planctoniques *Ticinella primula* LUTERBACHER *in* RENZ *et al.*, 1963, et *Hedbergella trocoidea yezoana* TAKAYANAGI & IWAMOTO, 1962. La décision de la Commission fut de placer la première espèce sur la Liste Officielle des Noms Spécifiques en Zoologie et la seconde dans l'Index Officiel des Noms Spécifiques Rejetés et Invalides en Zoologie (ICZN, 2015, p. 227). Les arguments scientifiques fondamentaux fournis dans la présentation du cas 3620 sont faibles et n'étaient pas une telle décision de la Commission Internationale. De plus, ils créent une perturbation significative de la stabilité nomenclaturale dans la classification linnéenne des foraminifères planctoniques crétacés.

Mots-clefs :

- foraminifères planctoniques ;
- Crétacé ;
- nomenclature

1. Case and decision history

TAKAYANAGI and IWAMOTO (1962) described a hedbergellid planktonic foraminifer from rocks of late Albian age from Hokkaido, Japan: *Hedbergella trocoidea yezoana*. It is a low trochospiral taxon with classical hedbergellid appearance and smooth chamber surface; notably, two specimens were illustrated, the holotype (*op. cit.*, Pl. 28, fig. 2) and one paratype (*op. cit.*, Pl. 28, fig. 1). The species was rarely cited until the opening of case

3620 in 2013. However, it is not the purpose of this note to review thoroughly this species, so only a few citations considered of relevance are presented herein.

An accurate presentation of the general test morphology and similarities with other taxa was given by PLAYFORD *et al.* (1975) in an article in which this species was left in open nomenclature: *Hedbergella* sp. A; notably, one of the illustrated specimens (*op. cit.*, Fig. 2: 10-11) is almost identical with the paratype figured in the original re-

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port of *H. trocoidea yezoana*. MILES and ORR (1980) seemingly put little emphasis on the wall ultrastructure in their identification of *Hedbergella yezoana* and their specimens are assignable to *Ticinella primula* LUTERBACHER in RENZ *et al.*, 1963 (ANDO, 2012). Two subsequent reports by HAIG (1992) and HAIG and LYNCH (1993) contributed significantly to understanding species morphological variability. It was also noted the resemblances between *H. yezoana* and *T. primula*, which were considered differentiated by the lack of accessory apertures in the former species according to the original description. All these reports were made in the classical Linnaean classification and during a period in which little emphasis was put on the test wall ultrastructure, ornamentation and porosity features. A more detailed description of *Hedbergella trocoidea yezoana* was given by GEORGESCU (2009) in an article which, due to the use of lineage as unit immediate above species level, marks the beginning of the development of evolutionary classification in the coiled Cretaceous planktonic foraminifera. This is the first work in which species were grouped into lineages rather than genera as in Linnaean classification, and the lineage was conferred a formal status. In this classification, the species in question was recognized as the earliest one of the lineage *Clavihedbergella* as *C. yezoana*. Such a conceptual advance was possible primarily by high detail observations on the wall ultrastructure, chamber ornamentation, porosity and low-magnitude morphological features of the test, especially peripheral structures.

Ticinella primula was described from the Central Apennines in Switzerland by LUTERBACHER in RENZ *et al.* (1963). One specimen was illustrated as drawing in one text figure and it shows clearly the accessory apertures on the umbilical side, but the chamber ornamentation was omitted. The species was generally accepted by the different authors in subsequent studies. *Ticinella primula* is a name still in use and can be considered one of the best examples of nomenclatural stability in the Linnaean classification. The name was changed only when a nomenclature system associated to the evolutionary classification was developed for the rotaliporid group (GEORGESCU, 2016); in this classification, it is the initiating stage of morphological relative stability of the directional lineage *Retilongate*.

Data used in building the case 3620 are from ANDO (2012). In this article the holotype and paratype illustrated previously as drawings by TAKAYANAGI and IWAMOTO (1962) were illustrated using uncoated SEM technique. These were supported by a large number of specimens from the type locality of *Hedbergella trocoidea yezoana*. ANDO (2012) reaches the conclusion that *H. trocoidea yezoana* and *Ticinella primula* are synonyms and questions whether the priority of the

former species over the latter should be recognized. The fact that *T. primula* was a frequently used taxon, whereas *H. trocoidea yezoana* was less cited and poorly understood species was paramount from the perspective of this author. In addition, the question is raised whether a ruling from the ICZN would not be necessary for settling this nomenclatural problem. Most interesting is the mention in the opening of the Acknowledgements section of the warm support by Dr. Y. TAKAYANAGI for the taxonomical solution advocated by A. ANDO. But the idea of the synonymy between *Hedbergella trocoidea yezoana* and *Ticinella primula* was hardly a novelty; it occurs in an earlier article of HUBER and LECKIE (2011) on planktonic foraminifera of Aptian-Albian age. This article marks a return to the classical typological species concept after the road-opening article of GEORGESCU (2009) in which *Clavihedbergella yezoana* status was validated. HUBER and LECKIE (2011) questioned the validity of *H. trocoidea yezoana* and admitted that additional material is necessary to clarify its taxonomic status; the species was referred in this article as "*Ticinella yezoana*". There is a clear convergence in the interpretations between HUBER and LECKIE (2011) and ANDO (2012), and therefore, it is herein considered that these two articles form a succession paving the road to case 3620.

2. Case and decision

This case is the article of ANDO (2013); it was published in June 2013, eight months after ANDO (2012) and per its author the case is based only on this article. There are six itemized reasons in the text of this case and they are summarized herein:

- (1) *Hedbergella trocoidea yezoana* was rarely used;
- (2) *Ticinella primula* was reported many times and included as index species in biostratigraphical zonations;
- (3) priority of ANDO (2012) in the restudy of the type material and additional specimens from the type locality by using the scanning electron microscopy and this led to the conclusion that the holotype of *Hedbergella trocoidea yezoana* and *Ticinella primula* are synonyms;
- (4) based on this synonymy the conservation of the *T. primula* name is desirable since the fossilization limitations will probably not allow the collection of significantly better preserved topotype specimens;
- (5) *T. primula* was sufficiently cited and by many authors to fulfill the requirements of the international code and form an uninterrupted record of citations from the mid-1960s to the present day; and
- (6) even when cited and illustrated the number of chambers in *Hedbergella trocoidea yezoana* is smaller when compared to that of the holotype



and illustrated paratype by TAKAYANAGI and IWAMOTO (1962) and ANDO (2012).

Based on these arguments the International Commission of Zoological Nomenclature was asked by the case author to:

- (1) suppress the name *yezoana* as in the trinomen *Hedbergella trocoidea yezoana*;
- (2) include the species name *primula* LUTERBACHER, 1963, in the Official List of Specific Names in Zoology; and
- (3) include the name the name *yezoana* TAKAYANAGI & IWAMOTO, 1962, as in the trinomen *Hedbergella trocoidea yezoana* in the Official Index of Rejected and Invalid Specific Names in Zoology.

The decision on this case was published in September 2015 in the Bulletin of Zoological Nomenclature as opinion 2362. All three components of the case received an affirmative solution from the International Commission of Zoological Nomenclature with a wide margin in the voting process: 13 positive votes and four negatives. Therefore, starting September 2015 the taxon *Hedbergella trocoidea yezoana* TAKAYANAGI & IWAMOTO, 1962, should cease to exist according to the International Commission of Zoological Nomenclature. I would detail this aspect: The name is on the List of Rejected and Invalid Specific Names in Zoology in what is usually referred to as Linnaean or typological classification only. In the practical classification associated with evolutionary classification provided for the Late Cretaceous planktonic foraminifera by GEORGESCU (2015), which was published three months after the decision in case 3620, namely in the last trimester of December 2015, the species *Hedbergella yezoana* TAKAYANAGI & IWAMOTO, 1962, is considered valid.

3. Objections to the case and decision

Cretaceous planktonic foraminiferal taxonomy and principles of classification changed dramatically over the last ten years. Extensive studies using the scanning electron microscope on large numbers of specimens collected from throughout the stratigraphical ranges of different taxonomic units led to a completely new perspective on group evolution and classification. This data input, which is circumscribed to the evolutionary classification, assures today next to 100% of the high-resolution data collected from the representatives of this group. What is extremely important is that such data are not usable only in evolutionary classification: They can be used in Linnaean or Aristotelian classification as well and are part of our common scientific patrimony. From my experience, I can tell that many of the data collected and interpreted by specialists that use Linnaean classification found their place in evolu-

tionary classification. Because of such studies our knowledge on Cretaceous planktonics increased at a high rate, which was not experienced before in this specialty; the definition of evolutionary classification as methodology in organism grouping changed completely the settings and I can only think that a typologist taxonomist would experience a lot of difficulties in understanding this new working system. I have made this introduction to understand better the context in which the case 3620 was defined and decision on it taken.

Now there are presented some objections to case 3620 and opinion 2362. The two can be considered unified by the full acceptance of the decisions required by the author's case. In this section *Hedbergella trocoidea yezoana* is given as *H. yezoana* according to its nomenclature in the practical classification associated with the evolutionary classification.

Separating the holotype and paratype of *H. yezoana* into different genera cannot be accepted. The differences in test architecture claimed by ANDO (2012, 2013) are trivial and due to the different ontogenetic stages of the holotype and paratype. The fact that the specimens have most of the wall ultrastructure affected by diagenesis is evident but the case author did not bring any compelling evidence to support his perspective, namely that they belong to different taxonomic entities. Material from the type locality was lavishly illustrated but can be used only to show that hedbergellid and ticinellid taxa co-occur and the data they provide cannot be extrapolated on the ultrastructures of the holotype and paratype. The argument brought in the case that "(...) after processing large quantities of unweathered type-locality samples, that preservational limitation would not allow for collection of much better preserved topotypes of *T. yezoana*" (ANDO, 2013, p. 72) is a not well-founded guess knowing that preservation within one layer can vary significantly.

Another serious error of the case is that its author focused most of the attention on the type material and passed over several convergent high resolution data on *Hedbergella yezoana*. The smooth nature of the chamber surface was documented by several authors with the aid of the scanning electron microscope: PLAYFORD *et al.* (1975), HAIG (1992), HAIG and LYNCH (1993) and GEORGESCU (2009). The morphological features of the tests published by these authors match and improve the original description of *Hedbergella yezoana*. This is one case in which subsequent studies improved our knowledge on one species and contributed to the species documentation and stability.



The reports of well-preserved specimens assigned by different authors to *Hedbergella yezoana* were dismissed by ANDO (2012) by means of a quite variable morphological feature, namely the number of chambers in the final whorl. Of crucial importance at this point is the study of MOULLADE *et al.* (2002) who mentioned the morphological resemblances of the species in discussion and *Hedbergella rischi* MOULLADE, 1974, noting also that the two differ merely in the number of chambers in the final whorl: 7-8 in *H. yezoana* and 5-6 in *H. rischi*. Most likely there is an evolutionary relationship between *H. rischi* and *H. yezoana* and the transition is gradual. However, ANDO (2012, p. 281) made a rather curious presentation of this feature. First, the reports of HAIG (1992) and HAIG and LYNCH (1993) that illustrated specimens with five chambers in the final whorl were combined with that by HUBER and LECKIE (2011) who gave a range of 5½-6 chambers and were considered "fewer-chambered morphotypes". They were compared with the type specimens of *H. yezoana* that have seven to eight chambers in the final whorl (many-chambered morphotype ?), mentioning the necessity of additional studies to establish if they are truly conspecific. The report by GEORGESCU (2009) was discussed in the next paragraph mentioning that the three illustrated specimens show 6-6½ chambers in the final whorl; GEORGESCU (2009, p. 266) noted that there are "6-7 chambers, commonly 6-6½, in the last whorl." This citation would have filled the gap and what I suspect is ANDO (2012) recounted the number of chambers in the final whorl of the specimens I illustrated but on the umbilical side, where indeed there are 6-6½. The specimen illustrated by PLAYFORD *et al.* (1975, Fig. 2: 10-11) also presents seven chambers in the final whorl on the spiral side (and six on the umbilical one). An evaluation of the number of chambers in the final whorl can only show that there is a gradual transition between *H. rischi* and *H. yezoana* and a separation between the two species should take in consideration other morphological features too.

Probably the biggest deficiency of the case by ANDO (2012, 2013) is that there is no explanation on how the ticinellid wall could be transformed through diagenesis into a wall with smooth appearance. The magnitude of this issue can be realized by comparing two well-preserved specimens of *Ticinella primula* and *Hedbergella yezoana* (Fig. 1). The in-relief appearance of the ticinellid wall simply cannot be transformed through diagenesis into a wall with smooth appearance such as that of the latter species. Even a quick examination of the re-illustrated holotype

and paratype (ANDO, 2012, Fig. 3: 3-4) is relevant in indicating that such a transformation never happened. These converge with identifications of *H. yezoana* by PLAYFORD *et al.* (1975), HAIG (1992), HAIG and LYNCH (1993) and GEORGESCU (2009), and show their validity.

There is no indication that accessory apertures ever existed in the umbilical area of the type specimens of *Hedbergella trocoidea yezoana*. The case author did not demonstrate how such apparent structures as the accessory apertures could have been destroyed through fossilization without a major destruction of the nearby test wall.

All these data indicate that *H. yezoana* and *T. primula* are two distinct species that cannot be considered synonyms.

The case was based on incomplete documentation and lacks at least one major component. While ANDO (2012) documented *Ticinella primula*, there is not a full documentation of *Hedbergella yezoana*. This missing part is very important for the status of *H. yezoana* was in question in the same measure as that of *T. primula*. The opinions on some specimens of *H. yezoana* previously reported by some authors (ANDO, 2012, p. 281) cannot account for such documentation. Moreover, the synonymy list of *T. primula* includes only articles and works in which this species was reported under this name; therefore, even the documentation for *T. primula* is incomplete.

The case record shows that it was not commented by any specialist. No scientist is obliged to comment on a case after publication on the www.iczn.org website and in Bulletin of Zoological Nomenclature. The case reveals its weaknesses at a glance to a specialist with relevant knowledge and experience. The question I raise is why different specialists were not asked by the International Commission for specific feedback on the case? This could have been most helpful. By the published record it is evident that during the International Commission deliberations some members considered the possibility that *H. yezoana* and *T. primula* to be proven in the future valid and independent species. Yet, in such a situation the species name *yezoana* remains lost and in this case the decision of the International Commission is wrong. There was no mention in the published material pertaining of this decision that the International Commission can nullify it to preserve the species name *yezoana*. Ultimately, TAKAYANAGI and IWAMOTO (1962) were correct in describing it as a distinct taxon and their merit cannot and should not be stripped off by any committee.

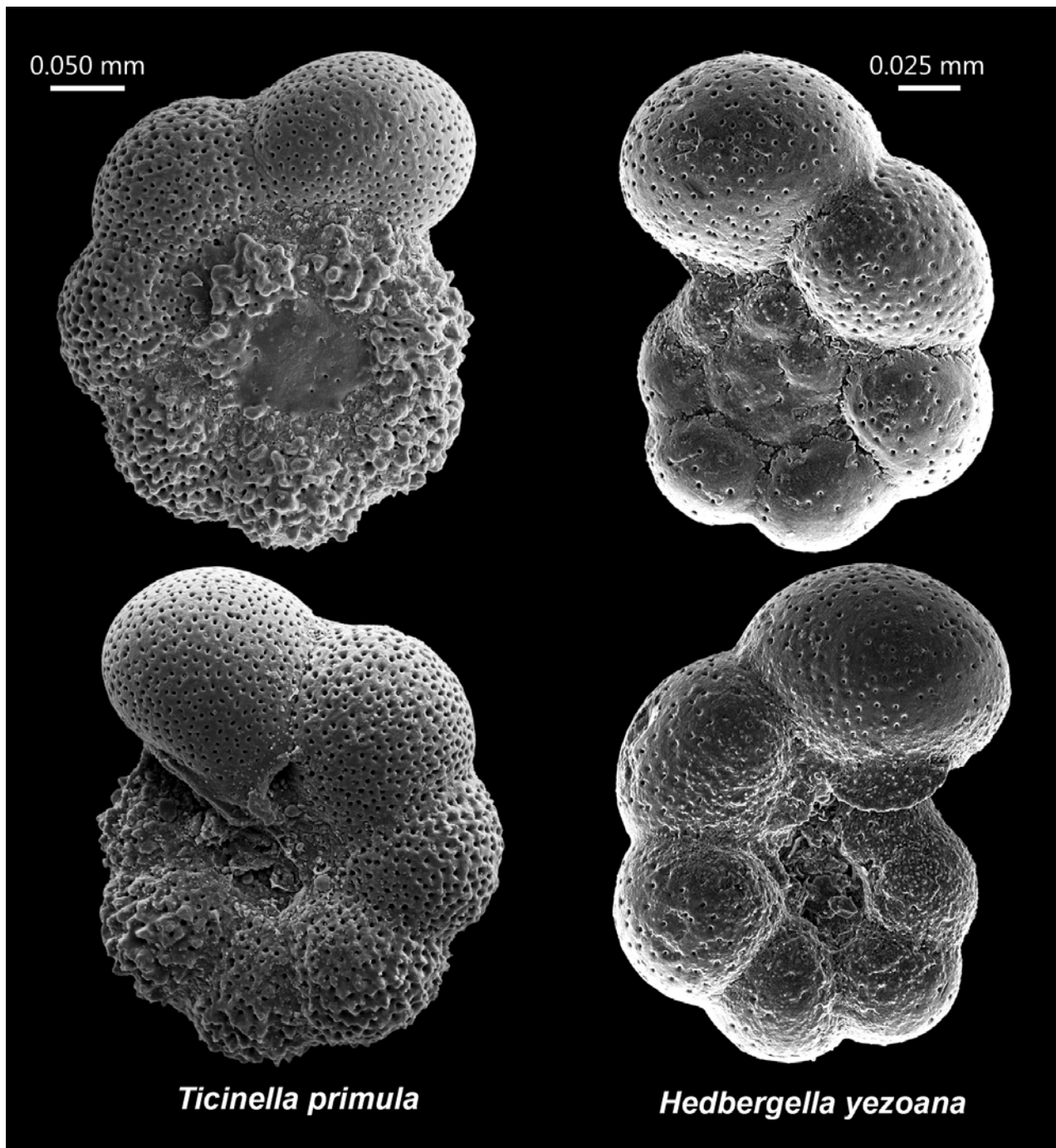


Figure 1: Two well preserved specimens of *Ticinella primula* (Sample 47-398-67-2, 50-52 cm) and *Hedbergella yezoana* (Sample 171B-1050C-31-1, 81-85 cm) collected from upper Albian sediments, showing the general aspect of the test wall on the spiral and umbilical sides (above and below respectively). The specimen of *Ticinella primula* was previously illustrated by GEORGESCU (2016, Pl. 5, figs. 1-3), and that of *Hedbergella yezoana* by GEORGESCU (2009, Pl. 1, fig. 1). Samples are labelled according to the Deep Sea Drilling Program/Ocean Drilling Project standards as follows: Leg-site or hole-core-section, sample depth in centimeters.

4. Actual and possible effects on ruling on case 3620

The decision to validate the case 3620 by the International Commission raises questions on its actual and possible effects. Each of them should be considered one reason to nullify both the case

and decision and analyze thoroughly the series of errors that led to acceptance of case 3620 and favourable decision (opinion 2362).

They created the precedent to remove species names that resulted from good science based on a simple claim or bad science. The case of *Hedbergella yezoana* is a clear example on how the



merit and contribution to taxonomy and classification of some specialists in one field can be eliminated. I do not think it is necessary to describe the consequences derived from this act, but one should be mentioned: International Commission did not provide nomenclatural stability in the Linnaean nomenclature. One might think that this is only an isolated case and the International Commission will be more aware of the nature of their decisions in the future; it is hard to believe that this can happen with the decision on case 3620 still in place. The case and decision created the distinct possibility to have renamed correctly identified and named species by new scientists, not necessary specialists or with relevant knowledge in a certain domain of biological or paleontological disciplines. Renaming one species whose name was included in the Official Index of Rejected and Invalid Specific Names in Zoology is extremely difficult for it implies an act some specialists might consider unethical as the original author's contribution is correct.

5. Conclusion

Case 3620 is based on no reliable scientific arguments and the decision based on it cannot be followed by the scientists careful with the quality of their science. The International Commission is asked herein to use its plenipotentiary power to abandon the decision as published in opinion 2362 and reinstate the name *Hedbergella trocoidea yezoana* in the Linnaean nomenclature.

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Appendix

The taxonomic status of *Hedbergella trocoidea yezoana* in the three classifications in use today is given herein. In the evolutionary classification it is included within the Directional lineage *Clavihedbergella* BANNER & BLOW according to the emendation by GEORGESCU (2009). In the practical

classification associated with the evolutionary classification it is formalized as *Hedbergella yezoana* according to GEORGESCU (2015). In the classical Linnaean classification it belongs to the genus *Clavihedbergella* according to the emendation by GEORGESCU (2009). This is one case in which one directional lineage defined in evolutionary classification can be considered a genus in the Linnaean classification without loss of information (GEORGESCU, 2011).