

TEXTILARIA AMERICANA EHRENBERG: TYPE SPECIES OF HETEROHELIX*

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ABSTRACT

Textilaria americana Ehrenberg is the type species of *Heterohelix*, not *Spiroplecta americana* Ehrenberg. Specimens of *T. americana* have been found in the late Cretaceous Niobrara Formation of southeastern South

Dakota. This paper designates and illustrates plesiotypes of *T. americana* and is the first report of this species since Ehrenberg's original description.

During a biostratigraphic study of the Niobrara Formation in southeastern South Dakota near the Nebraska border, specimens referable to *Heterohelix americana* (Ehrenberg) were found by the authors. This is the first report of this species since Ehrenberg's original work. The following taxonomic report is a product of the identification of *H. americana*.

The genus *Heterohelix* Ehrenberg (1843) is one of the most abundant and widespread of Cretaceous planktonic foraminiferal genera. Ehrenberg did not refer a species to *Heterohelix* when he described the genus and it remained unused and without a type species until 1927 when Cushman (1927b) designated *Spiroplecta americana* Ehrenberg as the genotype of *Heterohelix*. Ellis and Messina (1940), however, indicated that *Textilaria americana* Ehrenberg was the type species. *Spiroplecta americana* has subsequently been accepted as the type species following the discussion of Loeblich (1951).

Spiroplecta americana, however, is a junior secondary homonym of *Textilaria americana* Ehrenberg, 1843. According to the International Code of Zoological Nomenclature (1964), Article 59(b) junior secondary homonyms must be rejected. Therefore *T. americana* is the type species as indicated by Ellis and Messina (1940). The taxonomic considerations are discussed in the following paragraphs.

The original description of *T. americana* was published by Ehrenberg in 1843.

"*T. (Textilaria) americana, parva, saepius micros., celerius dilatata laevis, cellulis primis globosis ($\frac{1}{300}$ lineael.), dein ovatis, summis in papillam superiorem externam productis subaculeatis.*"

This is translated as follows: *T. americana*, small, more often microscopic, rapidly expanding, smooth, proloculous globular ($\frac{1}{300}$ of a unit), chambers ovate, final chambers produced into a spine.

In the same publication Ehrenberg defined *Heterohelix* as an addendum to *T. americana* as follows:

"*Cellulae primae nonnullis spirales. Tales formae forsitan proprio generi addicendae sunt: Heterohelix.*"

This is translated as follows: In some specimens the early chambers are coiled in a spiral. Such forms, perhaps, should be assigned to a new genus: *Heterohelix*.

Loeblich (1951) thoroughly discussed the taxonomic position of *Heterohelix* and *Textilaria americana* and concluded that *T. americana* was not referable to *Heterohelix*. We quote from his work:

"Ehrenberg evidently considered two different generic forms in the above description, *Textilaria americana* (= *Guembelina americana*) and *Heterohelix*, which was defined without naming a species. A year later (1844, p. 75) Ehrenberg abandoned the name *Heterohelix* and proposed *Spiroplecta* naming

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the first species *S. americana*, a form with a spiral early portion and later biserial stage, stating that it was related to *Textilaria americana*. *Spiroplecta* is thus a junior synonym of *Heterohelix*. These forms were later figured by Ehrenberg (1854, pl. 32, I, figs. 13–14, II, fig. 25) and designated as *Spiroplecta americana* with the added note in parenthesis (*Heterohelix* 1843, S. 429). In addition *Textilaria americana* (1843, S. 398, 429) was also figured (pl. 32, I, fig. 4a) thus showing definitely that in 1843 Ehrenberg was concerned with two genera in his original description and that the correct genotype designation should be *Spiroplecta americana*, the first and only species assigned to the genus, and not *Textilaria americana*, which is not conspecific and was not so considered by Ehrenberg."

Loeblich, in 1951, considered *Guembelina* and *Heterohelix* to be distinct. *Guembelina*, however, is now considered to be a junior synonym of *Heterohelix* (Gallitelli, 1955; Loeblich and Tappan, 1964) and the form referred to *Guembelina americana* (Ehrenberg) (= *T. americana*) by Loeblich should be referred to *Heterohelix*. Consequently *S. americana* becomes a junior secondary homonym of *T. americana* and *T. americana* the first species illustrated by Ehrenberg which is referable to *Heterohelix* is the type species. The holotype of *H. americana* is fig. 4a, pl. 32, part I in Ehrenberg's "Mikrogeologie" (1854), the only figure illustrated by Ehrenberg which he referred to *T. americana*. Microspheric forms of *H. americana* were illustrated as *S. americana* (Ehrenberg, 1854, pl. 32, figs. 13, 14). These specimens definitely were not conspecific with the lectotype of *S. americana*, but were considered distinct from *T. americana* by Ehrenberg because they had an early planispiral coil.

Although Ehrenberg does not define a type locality he does state that *H. americana* is from a chalk on the upper Missouri River. The Niobrara Formation is

undoubtedly the stratigraphic unit from which the figured specimens of Ehrenberg were collected. The geographic area is harder to define, but southeastern South Dakota is a distinct possibility.

SYSTEMATIC PALEONTOLOGY

Family HETEROHELICIDAE

Subfamily HETEROHELICINAE

Genus *Heterohelix* Ehrenberg, 1843

Heterohelix americana (Ehrenberg)

Pl. 1, Figs. 1–11

Textilaria americana EHRENBURG, 1843, p. 366, 398, 429. EHRENBURG, 1854, pl. 32, pt. 1, fig. 4a (not fig. 7). CUSHMAN, 1927a, p. 215, pl. 34, fig. 4a. CUSHMAN, 1938, p. 5, pl. 1, fig. 10 (not fig. 20).

Spiroplecta americana EHRENBURG, 1854, pl. 32, figs. 13, 14 (not fig. 25). CUSHMAN, 1927a, p. 215, pl. 34, figs. 13, 14.

Textilaria missouriensis EHRENBURG, 1854, p. 24, pl. 32 (group 1), fig. 5. CUSHMAN, 1927a, p. 215, pl. 34, fig. 5. CUSHMAN, 1938, p. 6, pl. 1, fig. 21.

not *Heterohelix americana* (Ehrenberg). CUSHMAN, 1927a, p. 190. WICKENDEN, 1945, p. 42.

Planoglobulina? glabrata (Cushman). FRERICHS and others, 1975, p. 302, pl. 1, figs. 9, 10.

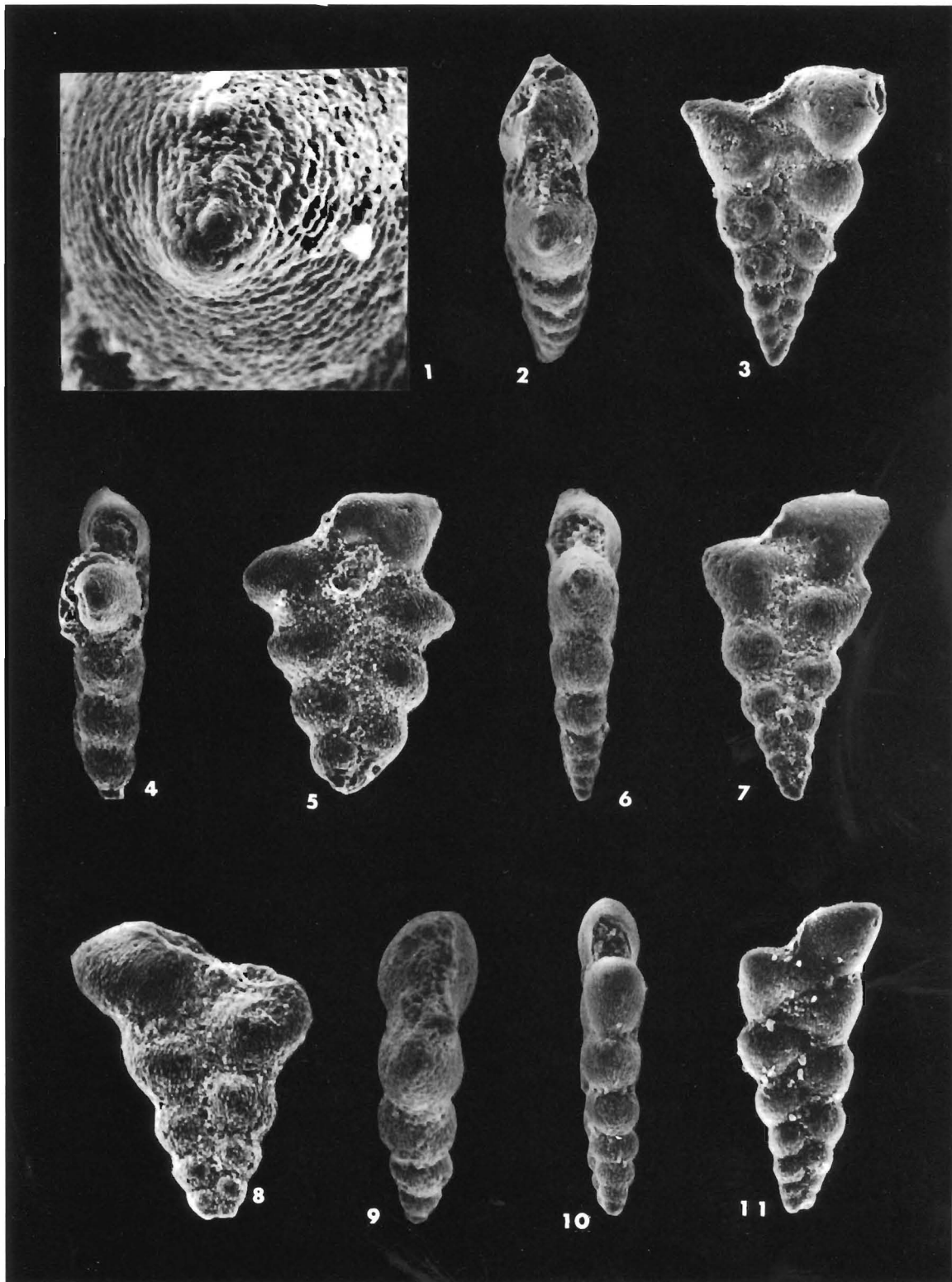
Description. Test small to moderately large, coiled in biserial manner, early planispiral portion not observed. Wall calcareous, perforate, ornamented with numerous fine costae, not continuous across chambers. Chambers compressed, increasing gradually in size, final one to three pairs of chambers triangular in shape with the apex at the outer margin directed upward, final one or two chambers, rarely as many as four, may have a spine at the apex of the triangular chambers. Sutures depressed, medial suture forming a zigzag pattern. Aperture a high narrow arch at the base of the last chamber, bordered by a prominent flap.

Remarks. Specimens with spines represent a decided minority of the population and occur through only a part of the total range. Typical specimens do not have

PLATE 1

Heterohelix americana (Ehrenberg).

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| 1–3 | 1. Enlargement of spine, $\times 680$. 2. Apertural view same specimen, $\times 130$. 3. Side view same specimen, $\times 130$. Dimensions: height = .37 mm, width = .26 mm, thickness = .12 mm. | $\times 130$. Dimensions: height = .37 mm, width = .24 mm, thickness = .09 mm. |
| 4, 5 | 4. Apertural view, $\times 115$. 5. Side view same specimen, $\times 115$. Dimensions: height = .41 mm, width = .30 mm, thickness = .09 mm. | 8, 9 8. Side view, $\times 140$. 9. Apertural view same specimen, $\times 140$. Dimensions: height = .32 mm, width = .28 mm, thickness = .12 mm. |
| 6, 7 | 6. Apertural view, $\times 130$. 7. Side view same specimen, | 10, 11 10. Apertural view, $\times 130$. 11. Side view same specimen, $\times 130$. Dimensions: height = .44 mm, width = .21 mm, thickness = .08 mm. |



spines, but have flaring triangular chambers (Pl. 1, Figs. 8, 11). Normally no more than the last one or two chambers will be flaring.

Stratigraphic level. The plesiotypes are from the Niobrara Formation of southeastern South Dakota. Specifically, they are from a core drilled at the site of Fort Randall Dam on the Missouri River. The species is best developed 67 feet above the base of the Niobrara Formation and this is the horizon of the illustrated specimens.

The associated planktonic foraminifera include *Archaeoglobigerina bosquensis*, Pessagno, *Hedbergella* sp., *Hastigerinoides watersi* (Cushman), *Globigerinelloides prairiehillensis* Pessagno, *Heterohelix pulchra* (Brotzen) and *Heterohelix reussi* (Cushman). The range of the species is Santonian to Campanian as the oldest occurrence of *H. americana* in the core is above the oldest occurrence of *Hastigerinoides* and the youngest occurrence is above the oldest occurrence of *Rugoglobigerina*. A more precise range will be established when work on the faunas from the core is completed.

Depository. The plesiotypes are deposited in the micropaleontology collections of the Geology Department at the University of Wyoming, Laramie, Wyoming.

REFERENCES

- CUSHMAN, J. A., 1927a, The American Cretaceous foraminifera figured by Ehrenberg: Jour. Paleontology, v. 1, p. 213-218.
- , 1927b, The designation of some genotypes in the foraminifera: Cushman Lab. Foram. Research Contr., v. 3, p. 188-190.
- , 1938, Cretaceous species of *Guembelina* and related genera: Cushman Lab. Foram. Research Contr., v. 14, p. 2-28.
- ELLIS, B. F., and MESSINA, A. R., 1940, Catalogue of Foraminifera: Am. Mus. Nat. History, 30 vols. plus supplements.
- EHRENBURG, C. G., 1843, Verbreitung und Einfluss des mikroskopischen Lebens in Süd- und Nord-Amerika: K. Preuss. Akad. Wiss. Berlin, Abh. (1841), pt. 1, p. 291-446.
- , 1844, Eine Mittheilung über 2 neue Lager von Gebirgsmassen aus Infusorien als Meeres-Absatz in Nord-Amerika und eine Vergleichung derselben mit den organischen Kreide-Gebilden in Europa und Afrika: K. Preuss. Akad. Wiss. Berlin, Ber., p. 57-98.
- , 1854, Mikrogeologie: Leipzig, L. Voss, 374 p.
- FRERICHS, W. E., ATHERTON, C. A., and SHIVE, P. N., 1975, Planktonic foraminifera from the chalky members of the Niobrara Formation, Centennial Valley, Wyoming: Jour. Foram. Research, v. 5, p. 294-312.
- GALLITELLI, E. M., 1955, A revision of the foraminiferal family Heterohelidae, in Loeblich, A. R., Jr., and others, Studies in Foraminifera: U.S. Natl. Mus. Bull. 215, p. 133-154.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE, 1964, International Code of Zoological Nomenclature (Stoll, N. R., chairman): Richard Clay and Co., Ltd., 176 p.
- LOEBLICH, A. R., JR., 1951, Coiling in the Heterohelidae: Cushman Found. Foram. Research Contr., v. 2, p. 106-110.
- and TAPPAN, H., 1964, Sarcodina, chiefly "Thecamoebians" and Foraminiferida, in Moore, R. C., ed., Treatise on Invertebrate Paleontology, Protista 2, pt. c: Kansas Univ. Press, 900 p.
- WICKENDEN, R. T. D., 1945, Mesozoic stratigraphy of the eastern plains, Manitoba and Saskatchewan: Geol. Survey Canada Mem. 239, p. 1-87.

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