

# CALCAREOUS MICROFOSSILS FROM THE TRIASSIC OF THE SOUTHWESTERN UNITED STATES

KENNETH KIETZKE

New Mexico Museum of Natural History, P.O. Box 7010, Albuquerque,  
New Mexico 87194

**Abstract**-Calcareous microfossils from Triassic strata in the American Southwest are charophytes, spirorbid worms and otracods. Three stratigraphically controlled assemblages can be recognized: Moenkopi, lower Chinle and upper Chinle. The Triassic microfossils also indicate the presence of permanent water bodies with high electrolyte values, especially of calcium carbonate.

## INTRODUCTION

This is a progress report of the ongoing study of the Triassic calcareous microfossils found in the southwestern United States (Fig. 1). Because the systematics are beyond the

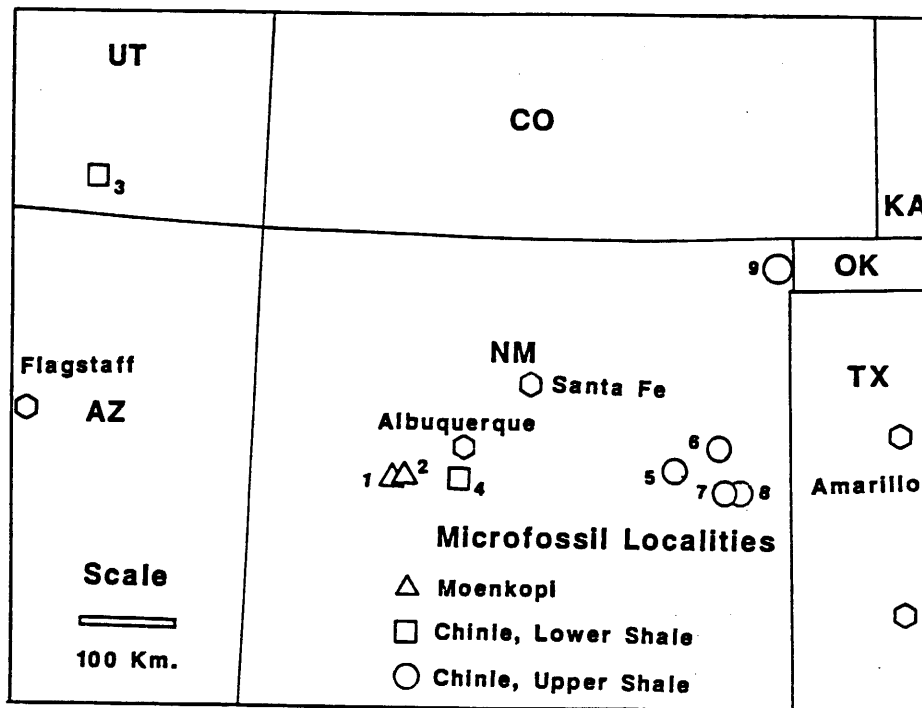


FIGURE 1. Microfossil localities. Locality numbers correspond to locality numbers in Appendix 1.

scope of this report, emphasis will not be placed in that area, and open nomenclature will be used. However, the illustration of the fauna and flora as presently understood will be emphasized to allow other workers some use of the presently known data in their own studies.

TABLE 1. Stratigraphic/geographic distribution of the Triassic microfossils of the southwestern United States.

	1	2	3	4	5	6	7
Charophyta							
<u>Porochara</u> sp. A	X						
<u>Porochara</u> sp. B	X						
<u>Altochara</u> sp.	?				X		
<u>Stellatochara</u> sp.					X		X
Spirorbidae							
<u>Spirorbis</u> ? <u>aberrans</u>	X						
<u>Spirorbis</u> sp.				X	X	X	
Ostracoda							
<u>Darwinuloides</u> sp. A	X						
<u>Darwinuloides</u> sp. B	X						
<u>Darwinula</u> sp. A	X	X	X	X	X	X	X
<u>Darwinula</u> sp. B	X						
<u>Darwinula</u> sp. C		X	X				
<u>Darwinula</u> sp. D		X					
<u>Gerdalia</u> sp. A	X						
<u>Gerdalia</u> sp. B		X	X	X	X	?	X
<u>Gerdalia</u> sp. C							X
? <u>Lutkevichinella</u> sp.				X		X	

Numbers: 1 Moenkopi, 2 Ojo Huelos, 3 Monitor Butte, 4 Bull Canyon, 5 Revuelto, 6 Redonda, 7 Sloan Canyon.

The microfossils reported in this study (Table 1) were collected as an adjunct to stratigraphic and microvertebrate screenwashing activities. The New Mexico Museum of Natural History routinely processes mudstone samples following stratigraphic and sedimentologic characterization. The usual samples from this source are about half a standard sandwich bag. This is usually enough for preliminary evaluation of the unit for microfossils. The samples are broken down using a kerosene presoak for about 24 hours followed by a water and detergent soak for another 24 hours. For the vast majority of Triassic mudstone samples, this is enough to release the microfossils from the matrix. The more indurated samples are tumbled in a rotary tumbler for one to four hours and then processed further. The broken-down samples are then wet sieved through a series of sieves ranging from 710-62.5 microns. The residues are then dried and sorted. Most ostracods and charophytes are found in the 710-100 micron range.

When microvertebrate screenwashing material is processed, the sieve size is particularly important because often the sieves used are too coarse to recover calcareous microfossils. Usually only a small portion of the tons of material processed for microvertebrates is sieved for calcareous microfossils. The New Mexico Museum of Natural History has found that many minute microvertebrates are also recovered in this process.

Once the residues are dried, they are sorted by morphotype,

identified, characterized and catalogued into the museum collections. Later, selected individuals are SEM photographed, further characterized, and eventually described in formal taxonomic literature. For most of the collections described in this paper we are rapidly approaching the later steps.

#### HISTORY OF INVESTIGATION

Microfossil records from the Triassic of North America are relatively few and sporadic in nature. Charophyte records are restricted to Stellatochara prolata Peck and Eyer, 1963 from the Moenkopi Formation and the illustration and description of species of Stellatochara and Altochara from the Chinle Formation of eastern New Mexico by Kietzke (1985). Kietzke (1988) also reported, but did not illustrate, two species of Porochara and one species of ?Altochara from the Moenkopi of central New Mexico.

Ostracods were first reported from the Triassic of the Southwest by Reiche (1949) who noted unornamented ostracods from a small Triassic outlier near Ojo Huelos in Torrance County, New Mexico. A collection from this locality confirms this occurrence and is part of the basis for this report. A few other reports of ostracods from the Chinle can be found in the literature (Stewart et al., 1972; Breed, 1972; Dubiel, 1987). None of these ostracods have been illustrated, and only Dubiel (1987) indicated the genus Darwinula is present in samples from the Monitor Butte Member of the Chinle in Utah. Samples furnished by Dubiel confirm this identification and indicate a close resemblance to the fauna from Ojo Huelos. This fauna is likewise illustrated here for the first time. Kietzke (1988) reported on a Moenkopi microfossil collection from central New Mexico that included Darwinuloides, Darwinula and Gerdalia. Kietzke (1985) also illustrated species of Darwinula and an unidentified genus (probably Lutkevichinella) from the Bull Canyon Formation and from the Sloan Canyon Formation of eastern New Mexico.

The oldest report of a Triassic species of Spirorbis from North America is Spirorbis inexpectus Wanner, 1921 from the rift valleys of the eastern seaboard of the United States. Kietzke (1985) illustrated and described a species of Spirorbis from the Bull Canyon Formation of eastern New Mexico. Kietzke (1988) also reported the species Spirorbis ?abarrans Hohenstein, 1913 from the Moenkopi Formation of central New Mexico. These Spirorbis species are illustrated in this report.

#### BIOSTRATIGRAPHY

Calcareous microfossils have been used extensively for biostratigraphic zonation in the Triassic of Europe and particularly in the USSR. They have also received some attention in China. The utility of charophytes and ostracods for this purpose has received scant attention in the United States, despite early records from the rift valleys of the eastern United States (Jones, 1862) and a relatively recent review of these faunas (Swain and Brown, 1972). The current studies in the

southwestern United States are encouraging in this regard since assemblages are more common than the literature would indicate and more diverse than anticipated.

Three, apparently stratigraphically controlled, assemblages (Figs. 2 and 3) have thus far been recognized in the Triassic of

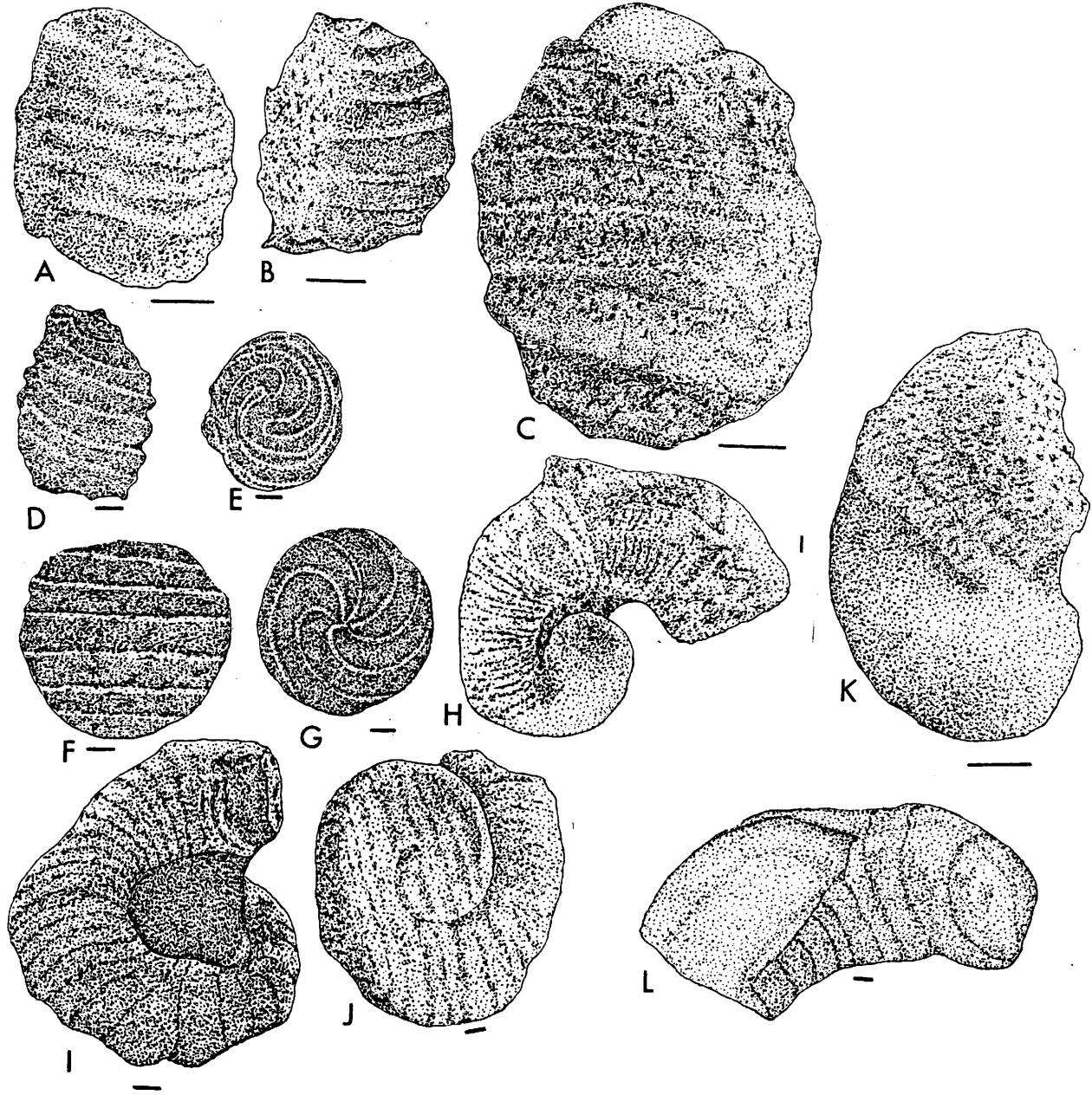


FIGURE 2. Charophytes and Spirorbis from the Triassic of the southwestern United States. A. Porochara sp. A, lateral view, Mesa Gallina locality, Moenkopi Formation; B. Porochara sp. B, lateral view, Mesa Gallina locality, Moenkopi Formation; C. ?Altochara sp., lateral view, Mesa Gallina locality, Moenkopi Formation; D, E, Stellatochara sp., lateral view (D), apical view (E), Revuelto Creek locality, Bull Canyon Formation; F, G, Altochara sp., lateral view (F), apical view (G), Revuelto Creek locality, Bull Canyon Formation; H, Spirorbis sp., top view (H),