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On *Colania kwangsiana* LEE

by

M. MINATO and S. HONJO

The fusulinid genus *Colania* established by J. S. LEE in 1934 has been long ignored by most palaeontologists up to the recent. As a matter of fact, the present genus was viewed by C. O. DUNBAR and J. SKINNER (1937) and C. O. DUNBAR and L. HENBEST (1942) to be synonymous with *Yabeina*, while M. L. THOMPSON (1948) regarded it to be synonymous with *Lepidolina* with slight doubt, based on somewhat insufficient information on the type species of the present genus, to which we once tentatively followed (M. MINATO & S. HONJO, 1959). Since then, most specialists in this field except for MC-MACLAY (1963) seem to have paid little attention on the existence of the present genus.

In 1963, J. C. SHENG, however, re-described the type species of the genus *Colania* in detail and assignend it into the genus *Neoschwagerina*. Thus, he denied the validity of the genus *Colania*.

Thanks to his study, an important morphology of skeletal elements and shell structure of the type species became however more elucidated in many points, which could be otherwise not correctly known for us, merely based on the former description given by LEE in 1934. Further, we learned something more on this species through an observation on the photographs of the plesiotype specimen of this species, which were kindly sent to us by Prof. SHENG.

As a result, we now became to hold a different view on the genus *Colania* from Prof. SHENG. The validity of its generic status may be after all doubtless in our opinion. Before going into the problem of generic status, however, new information on the type species will be briefly outlined below.

1) Shell form. An outer configuration of shell of fusulinid fossils is generally more or less variable from species to species even in a single genus. It may be accordingly not easy to definitely state to which genus the type species of *Colania* is most resembled in this concern. However, *Colania kwangsiana* LEE seems to be most nearly akin to the genus *Gifuella* HONJO 1959 in the outer form of shell.

2) Size of proloculus. The proloculus may be also variable nature, especially in size. Yet, the size of proloculus of the type species of the genus *Colania* may be comparable to that of either *Gifuella* or *Neoschwagerina*, but definitely larger than that of *Yabeina* and smaller than *Lepidolina*.

3) Distribution of secondary transverse septula. The secondary transverse septula first appear in the third volution in the type species of *Colania*. However, the septula now in concern, are anyhow extremely rare throughout the entire ontogenetic stage until the final volution. In this regard, the present species may be assignable either into the genus *Gifuella* or *Neoschwagerina* but must be definitely excluded from both *Yabeina* and *Lepidolina*.

4) Form of transverse septula. SHENG figured the present species on his plate 31 (1963). The transverse septula in axial section illustrated by him strongly remind us those of *Gifuella*, because all seem to be as narrow as that of *Gifuella*, instead of *Neoschwagerina*.

In the meantime, the photograph (magnification 40 times, fig. 1 of this paper) kindly sent us by SHENG shows somewhat different in respect to the shape of transverse septula, although it was taken from the same plesiotype specimen and was reproduced by SHENG as fig.1 on plate 31 (magnification 10 times).

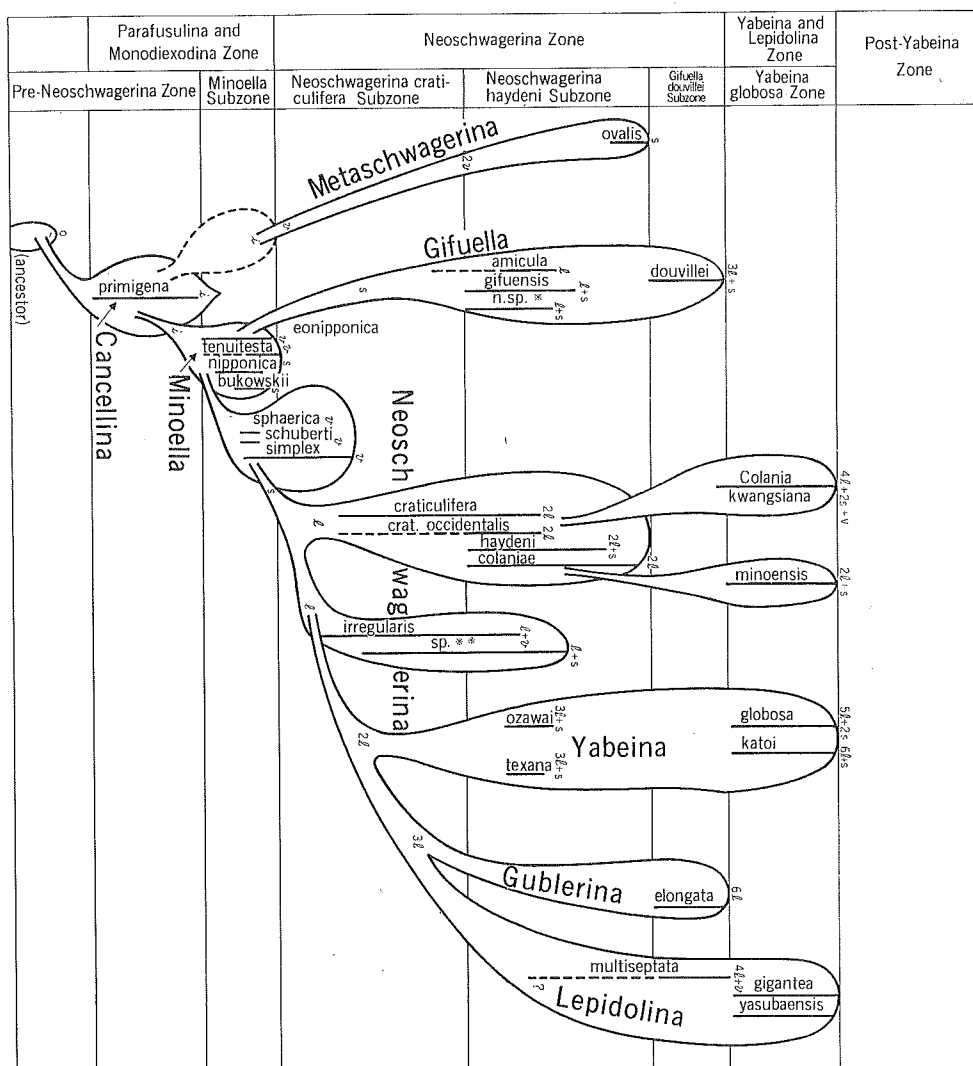
Namely, the plesiotype specimen now in consideration shows to have transverse septula with rather broader base like *Neoschwagerina craticulifera* or *Neoschwagerina haydeni* in the early stage, which suddenly tend to be as narrow as that of *Gifuella* from the eighth volution.

This feature may be not fully observable from the figures illustrated by SHENG on his monograph. Further, SHENG did not state in detail on the changing nature of transverse septula in shape through ontogeny in the present species. But, the matter is definitely so, as above stated.

5) Spirotheca. From thickness of spirotheca and coarseness of keriothecal structure, the present species may be more akin to the genus *Lepidolina* than *Gifuella*. Namely in the mature stage, spirotheca is very thin, with fine keriothecal structure. However, in the early stage of ontogeny, it is rather thick like *Neoschwagerina*.

6) Axial septula. Basing on the observation of the photograph sent by SHENG to us, which is illustrated as figure 2 in this paper (magnification 40 times), the plesiotype specimen may be concluded to have rather specialized axial septula. Namely, it has s-type in the first volution, 2s in the fourth volution, while l type of axial septula begin to appear from the seventh volution in this species. The most specialized form of axial septula observed in that specimen is 4l+2s+v type in the 13th volution. This means, that the plesiotype specimen is far specialized than any other known species of *Neoschwagerina* or *Gifuella* in respect to axial septula. Yet, it is slightly primitive than highly advanced forms of *Yabeina* or *Lepidolina*.

Now, a specific identification between the holotype specimen of *Colania kwangsiana* LEE (1935) and the plesiotype, newly described by SHENG in 1963 under the name of *Neoschwagerina* seems to be almost doubtless. Based on this assumption, the type species of the genus *Colania* may be concluded to be most nearly resembled the genus *Gifuella* from many reasons described in the foregoing



Text-fig. 1

Phylogeny of Neschwagerininae. This text-figure is cited from the Jubilee volume of 70th anniversary of birth of Prof. M. RAUSER-CHERNOSOVA which will be published soon. In the RAUSER-CHERNOSOVA issue, phylogenetic situation of *Colania* will not be presented, since the nature of the genus had not been clarified during the preparation. Readers may refer to the jubilee volume text for detail explanation.

lines. In other words, the validity of the genus *Gifuella* became a problem for us.

We once (1959) regarded the genus *Gifuella* to be a descendant form from rather primitive *Neoschwagerina*. Namely, the genus *Minoella* may be the form to have evolved from *Cancellina*. While *Neoschwagerina* was concluded to have been the direct descendant from *Minoella*. Further, we inferred that advanced forms of *Neoschwagerina* and *Gifuella* may have branched from the common ancestor, presumably a certain primitive form of *Neoschwagerina*.

However, in our recent study, on the phylogeny of Neoschwagerininae (MINATO and HONJO* in press) we finally became to conclude that *Gifuella* may be a form directly evolved from *Minoella*, but not through *Neoschwagerina*, since the early stage of *Gifuella* does not show any sign to justify such a course, either in shell form or any other skeletal elements including transverse septula.

On the contrary, the type species of *Colania* definitely shows to have evolved through *Neoschwagerina* stage in early ontogeny, as above stated.

Accordingly, the similarity between *Gifuella* and *Colania kwangsiana* in the mature stage may be only superficial but they are actually different in generic position.

No doubt, *Minoella* is quite distinct from *Colania* from either size of shell or nature of axial septula. From the reason above described, genus *Colania* can be by no means congeneric with *Lepidolina*. As a matter of fact *Colania* may be viewed to show an intermediate nature between *Neoschwagerina* and *Yabeina*, as once held a view by J. S. LEE in 1934. More exactly to say, *Colania* may be a direct descendant form evolved from rather advanced form of *Neoschwagerina* like *Neoschwagerina craticulifera*, while *Yabeina* may represent the another branch, branching from different species of *Neoschwagerina* like *Neoschwagerina irregularis*. Stratigraphical occurrence of *Colania* seems to justify such a conclusion: it is the *Yabeina globosa* zone.

In conclusion, the genus *Colania* is still valid, although it is somewhat resembled *Neoschwagerina*.

Finally, we wish to offer our hearty thanks to Prof. J. C. SHENG, who kindly assisted us in various ways in the preparation of this note.

* M. MINATO and S. HONJO: Phylogeny of Neoschwagerininae, Jubilee volume of 70th anniversary of birth of Prof. D. M. RAUSER-CHERNOUSOVA, in press.

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PLATE AND EXPLANATION

Explanation of plate 1

Colania kwangsiana LEE

Fig. 1 : A portion of axial section of plate 31, fig. 1 in SHENG'S (1963) monograph ($\times 40$)

Fig. 2 : Sagittal section (fig. 4 on plate 31, SHENG'S monograph), $\times 40.0$

