

SOME REMARKS AND EMENDATION OF THE FAMILY ARIONOCERATIDAE DZIK 1984 (CEPHALOPODA, NAUTILOIDEA)

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ABSTRACT

This paper discusses the newly proposed family Arionoceratidae Dzik 1984 at the familial, generic, and specific levels. An emendation of this family is proposed that clarifies some of this family's more characteristic features. Evidence for possible sexual dimorphism in *Arionoceras submoniliforme* ([Meneghini 1857](#)) is also discussed.

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INTRODUCTION

[Serpagli & Gnoli \(1977\)](#) studied representatives of the genus *Arionoceras* [Barskov 1966](#) and concluded that this generic designation was valid. While originally placed in the Michelinoceratidae, [Serpagli & Gnoli \(1977\)](#) attributed *Arionoceras* to the Geisonoceratidae Zhuravleva (1959) on the basis of the (admittedly irregular) occurrence of a lining-like endosiphuncular deposit. Furthermore, these authors considered *Orthoceras arion* Barrande (type-species of the genus *Arionoceras*) a junior synonym of Meneghini's 1857 species *O. affine*. This revision would imply a change in the latter as the type species of *Arionoceras*. [Serpagli & Gnoli's \(1977\)](#) taxonomic emendation was based on comparative analyses of the inner and outer features of the original types of both authors (the Meneghini specimen stored at the University of Pisa collection and the Barrande's type stored at the National Museum in Prague).

In 1984 Dzik erected the family Arionoceratidae, including Barskov's genus *Arionoceras* with the following diagnosis: Relatively short shell, straight to slightly curved (most commonly endogastrically) with circular cross section, and narrow, cylindrical, central siphuncle. When Dzik (1984) proposed the family Arionoceratidae it embraced the genera *Arionoceras* [Barskov 1966](#), *Psilorthoceras* [Ristedt 1968](#) and *Caliceras* [Kolebaba 1975](#) considered as synonyms, *Vericeras* [Kolebaba 1977](#) and *Parakionoceras* [Foerste 1928](#). Later Engeser (<http://www.imgp.gwdg.de/tengese/nautiloidea/nautiloideafamilies/arionoceratdzik1984.htm>); last change: 13 July 1997) attributed the genera *Akrosphaerorthoceras* [Ristedt 1968](#), and *Temperoceras* [Barskov 1960](#) to Dzik's family, but considered *Caliceras* and

Psilorthoceras as valid genera. Given these recent revisions, the taxonomic identification of Dzik's family Arionoceratidae seems to be in need of revision; especially concerning which taxa do and do not belong to it.

REMARKS AND FAMILY REVISION

Arionoceras arion ([Barrande 1868](#)), *A. affine* ([Meneghini 1857](#)), *A. canonicum* ([Meneghini 1857](#)), *A. densiseptum* Kobayashi 1983, *A. submoniliforme* ([Meneghini 1857](#)) = (*Psilorthoceras procerum* [Ristedt 1968](#), *P. crassum* [Ristedt 1968](#), *P. subcrassum* [Ristedt 1968](#)), *A. capillosum* ([Barrande 1868](#)), *A. repetitum* ([Barrande 1870](#)) *A. septentrionale* [Zhuravleva 1978](#), *A. severum* ([Barrande 1866](#)), *A. simplex* (Desnoy in [Meneghini 1857](#), *A. canonicum* (Meneghini) synonymous with *A. affine*) and *A. valens* ([Barrande 1868](#)) are considered to belong in the family Arionoceratidae [Dzik 1984](#). The genera *Caliceras* Kolebaba and *Psilorthoceras* Ristedt represent synonyms of *Arionoceras* Barskov. Small, but detectable differences in the protoconch dimensions, angle of expansion, and a diverse septal spacing between Meneghini's 1857 species *A. affine* and *A. submoniliforme* could, perhaps, be interpreted as sexually dimorphic characters of *A. submoniliforme*. If the morphological variation in this ancient nautiloid species is interpreted in light of patterns present in modern *Nautilus* (the sexual dimorphism of which is due to the broader aperture of the males than that of the females) we must consider as the male's features those of *A. submoniliforme* and those of *A. affine* as the female (see also [Stenzel 1964](#), [Tanabe and Tsukahara 1987](#), [Saunders & Ward 1987](#), and [Hayasaka et al. \(1987\)](#). [Stridsberg \(1988\)](#) also argued for size variation as indicator of sexual dimorphism in the trimeroceratid *Torquatoceras undulatum* [Stridsberg 1988](#), though this conclusion is currently accepted as a working hypothesis only.

The genus *Akrosphaerorthoceras* [Ristedt 1868](#) bears a very little protoconch, which is a characteristic of the Family Arionoceratidae. The genus *Temperoceras* [Barskov 1960](#) lacks recent studies of its apex; especially as concerns its protoconch. The arguments considered by Dzik regarding placement of the genus *Parakionoceras* [Foerste 1928](#) mainly concern features of its suborthochoanitic siphuncle. On the other hand Foerste's genus seems sufficiently peculiar in characters relating to its outer ornamentation-structure to isolate *Parakionoceras* from the other genera. It is the opinion of the writer that the typical features of arionoceratids, besides those reported by Dzik, primarily consist of the suborthochoanitic, terminally very acuminate, and short septal necks, connecting rings slightly expanding within chambers and a big protoconch usually more than two mm in length, ogive-like in shape crossed by long caecum linked apicad to the beginning of the conch by a short prosiphon (see [Serpagli & Gnoli 1977](#), p. 183, text-figs. 10, 11, pl. 6, figs. 2a-7, 9a-b, pl. 8, figs. 1-3, and here [Fig. 1](#)). As far as *O. affine* Meneghini 1857 (previously *O. affine* [Portlock 1843](#)), is concerned, as reported in the Engeser's Internet page, it must be noted that [Histon \(1997\)](#) and [Histon & Sevastopulo \(1993\)](#) taxonomically revised this Irish Lower Carboniferous species as *Mitorthoceras affine* (Portlock).

To conclude, it is the opinion of this writer that at present the family Arionoceratidae

[Dzik 1984](#) embraces only the genus *Arionoceras* Barskov. Additional work in this area may include (1) further taxonomic study to increase the number of diagnostic features attributable to this genus and (2) to consider *Arionoceras* Barskov as belonging in Zhuravleva's Family Geisonoceratidae as already proposed by [Serpagli & Gnoli \(1977\)](#) or [Gnoli \(1990, 1998, in press\)](#). Finally, it is worth noting that this writer has recently had the opportunity to examine representatives of the Arionoceratidae in all the terranes or microplates [at least in: Tinduf Basin, Anti-Atlas, Mid-North Armorican Domain (*bona fide* [Babin et al., 1979](#)), Montagne Noire, SW Sardinia, Carnic Alps and Central Bohemia ([Paris & Robardet, 1990](#); [Robardet et al, 1994](#) and [Gnoli in preparation](#))] that together constitute the northern belt of Gondwana during Silurian time.

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Figure 1. **A.** Longitudinal, schematically cross-section of *Arionoceras submoniliforme* ([Meneghini 1857](#)), **B.** The same as above of *Arionoceras affine* ([Meneghini 1857](#)), **C.** Particular enlarged of the characteristic septal neck (see text).

