

An extreme case of sexual dimorphism in ammonites

Bonnot, A., Neigre, P., Tarkowski, R., & Marchand, D. 1995. *Mirosphinctes* Schindewolf et *Euaspidoceras* Spath du niveau vert de Zalas [Pologne] (Oxfordien Inférieur, Zone à Cordatum): dimorphes sexuels? *Bulletin of the Polish Academy of Sciences Earth Sciences* 42 (1994), 3, 181–205, 12 text-figures, 1 plate.

Evolute aspidoceratids are among the largest Jurassic ammonites, reportedly reaching 0.8 m in conch diameter. Such large specimens apparently represent females. Rather surprisingly, adult conchs interpreted as belonging to their male mates (Myczyński 1976) are very small in size, as for ammonites of this geological age.

The authors of the reviewed paper discuss the evidence for such an interpretation of the aspidoceratid sexual dimorphism provided by a new material collected in the classic locality Zalas near Cracow. A bed of argillaceous limestone, dated as the earliest *Cardioceras cordatum* Zone yielded 680 ammonoid specimens, among them 53 specimens representing proposed males and 27 females of the aspidoceratids. Up to a diameter of about 20 mm these two morphs are morphologically indistinguishable, being ornamented with ventrolateral parabolic nodes. Later on, the males decreased their whorl expansion rate, ceased to produce nodes, developed apertural lappets and terminated growth at diameters ranging from 23 to 39 mm (in the collection; neither mean nor standard deviation has been calculated by the authors). The females continued their growth without such changes but, instead, the tubercles were transformed into prominent spines. No complete mature female specimen is known from Zalas but, judging from whorl fragments from this and other localities in the area, they reached more than 40 cm in diameter.

Identification of sexual dimorphism in the Aspidoceratidae is of great phylogenetic importance. If the interpretation proposed in the reviewed paper is correct, the ancestry of the lineage is not in the peltoceratines but rather in the perisphinctids with parabolic nodes (*Grossowria*), as already suggested by some other authors. In fact, Page (1991: pl. 20: 10) attributed male conchs closely similar to those from Zalas to *Grossowria*, but this alternative interpretation has not been considered by the authors. The males of coeval aspidoceratid, as proposed by Page (1991: pl. 22: 8, 9), are somewhat differently ornamented. His specimens from the earliest Oxfordien *Cardioceras mariae* Zone, classified in *Euaspidoceras babeanum* (d'Orbigny), fit the size range of the Zalas sample despite proposedly older age. This is not the case, however, with specimens proposedly coeval and conspecific with those from Zalas, classified in *E. douvillei* (Collot). Those males reach 60–70 mm in diameter and are morphologically quite different, being ornamented similarly to the associated females.

Irrespectively whether Page (1991) or Bonnot *et al.* matching of the dimorphic pairs is correct, a profound dimorphism of the perisphinctid type has to be accepted in the aspidoceratids. The evolutionary outcome is more or less the same — *Grossowria* was the probable ancestor. This may help in resolving another enigma in the late Jurassic ammonite phylogeny, the affinity of Kimmeridgian *Sutneria*. These ornate male conchs have not yet been convincingly connected with any co-occurring females. They are morphologically rather similar to male conchs of the early aspidoceratids, which alone is not enough to propose any relationship, because similar ornamentation could

potentially be developed by a slight modification from another branch of the late Jurassic ammonites, the oppeliids. However, Frickhinger (1994) illustrated a small lapped conch of 25 mm diameter, classified as '*Sutneria apora*', with the lower jaw in situ. The calcitic cover of the jaw is of 'laevaptychus' morphology, typical for the aspidoceratids. Female conchs of a few aspidoceratid species occur in the same strata and this finding strongly suggests that at least some of them can be matched with this small, prominently lapped male, possibly related to the Tithonian *Simocosmoceras* male conchs, co-occurring in Tethyan localities with the aspidoceratids, among them *Aspidoceras rogoznicense* (Zejszner), the type species of its genus and family.

Whether *Perisphinctes mirus* Bukowski 1887 is the male of the same species to which belong the co-occurring female conchs of *Grossouvria* classified in *P. claromontanus* Bukowski 1887 or *P. mazuricus* Bukowski 1887, or rather those of *Euaspidoceras*, as proposed in the reviewed paper, is of much nomenclatorial importance. In the latter case *Mirosphinctes* Schindewolf 1926, *P. mirus* being its type species, would become the senior synonym of *Euaspidoceras* Spath 1930. Unfortunately, the evidence presented by the authors is not completely convincing and is in conflict with the proposals of Page (1991). Perhaps a more strict populational approach to the material would help in resolving the problem.

References

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