

How much do we already know about biodiversity of the Austrian Paleozoic?

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The research history of the alpine Paleozoic looks back on an amazingly long period of more than 150 years. Although all systems of the Paleozoic erathem had been defined and established to end of the first half of the 19th century, it might be considered as a special „stratigraphical highlight“ that FRANZ UNGER, a paleobotanist at the Joanneum in Graz, recognized in the year 1843 strata in the vicinity of Graz containing characteristic petrified organisms which he considered to be Devonian (- only four years after establishment of the system!) in age! A few years later, particularly during comprehensive geological mapping of the Alpine region by the Austrian Geological Survey Silurian successions were recognized by FRANZ HAUER in 1847, Permian rocks containing fusulinids by GUIDO STACHE in 1872 and Ordovician strata - likewise by STACHE – in 1884. The Carboniferous (“age of carbonaceous limestone”) was for a long time well-known in alpine geology, however for several decades this system remained a vast bin for unidentified Paleozoic rocks.

The completion of the first geological land survey and the first establishment of a (bio)stratigraphical frame for Austria’s geological units gave birth to the wish to a more finely subdivision. Evaluating the literature reporting on some of the results obtained up to the beginning of World War II, one cannot avoid the impression that “the wish was father to the thought”: even from geological units which suffered from high metamorphosis remains of graptolites and trilobites were described and a Cambrian age of the strata postulated! Furthermore, reference specimens are frequently missing although their names are cited in the geologic literature.

To illustrate the variety of genera and/or species of the Paleozoic of Austria trustworthily would mean to subject nearly all groups of organisms to a revision. The attempt to display the biodiversity deduced from evaluated literature data results in the following compilation:

	Algae	Foraminifers	Sponges	Corals	Gastropods	Bivalves	Cephalopods
Permian	73	324	2	58	184	294	66
Carboniferous	34	322	18	122	100	129	43
Devonian	11	71	138	411	331	82	22
Silurian	-	27	4	23	107	245	227
Ordovician	-	-	2	1	5	-	-

	Trilobites	Bryozoans	Brachiopods	Echinoderms	Conodonts	Land plants	others
Permian	10	-	631	11	-	131	104
Carboniferous	56	83	450	5	748	410	429
Devonian	168	7	675	17	2305	-	217
Silurian	142	-	178	2	655	-	594
Ordovician	17	69	161	-	232	-	94

A more detailed analysis of these “raw data“ reveal interesting trends. For instance, rugose as well as tabulate corals show steeply rising diversity gradients up to the middle Devonian, followed by a rapid decline during the Mississippian and an anew rise in the Pennsylvanian and a minor drop in the lower Permian. This pattern is correlated with the global diversity trend but also reflects the general changes of the depositional environment in the alpine realm: increasing diversity from the Silurian to middle Devonian corresponds with the establishment of wide-ranging carbonate platforms during that time. Drowning of shallow marine areas during the upper Devonian and the beginning of the Variscan flysch sedimentation during lower Carboniferous strongly affected the corals. Post-Variscan shallow marine habitats of the Carnic Alps (Auernig) and Eastern Greywackezone were re-colonized by a diverse rugose fauna (Fig. 1).

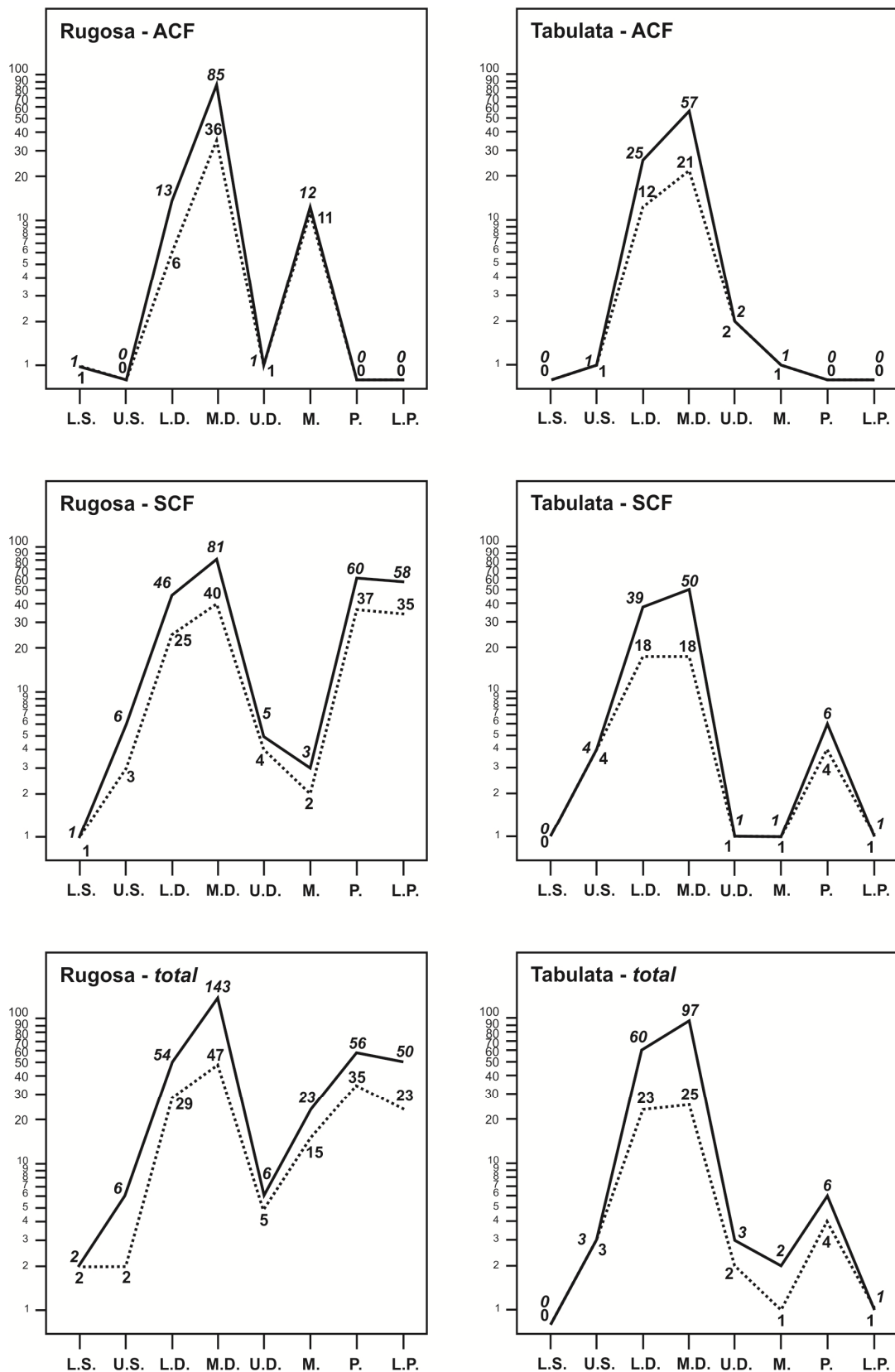


Fig. 1: "Diversity-curve" of Alpine Paleozoic corals. ACF: Austroalpine Coral Fauna; SCF: Southalpine Coral Fauna; Ordinate: number of entities; Abscissa: period/epoch (L.S. = Lower Silurian, U.S. = Upper Silurian, L.D. = Lower Devonian, M.D. = Middle Devonian, U.D. = Upper Devonian, M. = Mississippian, P. = Pennsylvanian, L.P. = Lower Permian); numbers indicate genera (normal type) and species (italic type); continuous line: diversity on species level; dotted line: diversity on genus level.

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Generally two major regions of Paleozoic developments may be distinguished, that are separated by the Periadriatic Line, the most prominent alpine fault system: the Upper Austroalpine Variscan sequences (i.e. the Greywacke Zone of Tyrol, Salzburg, Styria and Lower Austria, the Nötsch Carboniferous, the Gurktal Nappe, the Graz Paleozoic and some isolated outcrops in South Styria and Burgenland) and the Southern Alpine sequences (i.e. the Carnic Alps and the Karawanken Alps). Corresponding with this subdivision of Paleozoic remnants in Austria differing corals faunas are distinguishable: the „Austroalpine Coral Fauna“ (ACF) and the „Southalpine Coral Fauna“ (SCF).

A review of more than 200 articles, that taxonomically deal with or cite Paleozoic corals in Austria (including coral sites near the border in Italy and Slovenia), lists 220 rugose and 113 tabulate taxa known (or even cited in the literature) from this region (see HUBMANN 2002).

A data base of Paleozoic corals from Austria (FLÜGEL & HUBMANN 1994, HUBMANN 1995, HUBMANN *et al.* 2003) registers 125 taxa (81 Rugosa, 33 Tabulates and 11 Heliolitids) on species level and 16 taxa on subspecies level (12 Rugosa, 4 Tabulates) which were described for the first time.

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