13 Stromatolites from the Zechstein Limestone (Upper Permian) of Poland

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13.1 Introduction

Stromatolites were found on the Fore-Sudetic area and Łeba elevation area in the upper part of the Zechstein Limestone (Upper Permian), a carbonate member that underlies the evaporites of the Werra cycle (Fig. 1). According to the paleogeography and facies analysis stromatolites occur both in the nearshore and basinal areas, in the supratidal, intertidal, and subtidal zones as indicated by the fossil content and associated sedimentary structures. The aim of this paper is the comparison of stromatolites coming from these different environments.

Fig. 1 A–C. Location of study area (A, B) and schematic profile of the Zechstein Limestone in northern Poland (C). 1: studied boreholes; 2: height of columnar forms from the upper subtidal stromatolitic horizon.
13.2 Subtidal Stromatolites

13.2.1 Distribution

Widespread subtidal stromatolites were found in northern Poland where they form two horizons that can be traced on the area of more than 15,000 km² (Fig. 1). The thickness of the lower stromatolitic horizon ranges between 5 and 25 cm, while the thickness of the upper one is between 2 and 20 cm (Fig. 1B). In the lower stromatolitic horizon small irregular stromatolitic forms of height not exceeding 4 cm and width 3 cm occur (Fig. 2), that are as a rule isolated and always grow on multilayered delicate oncoids whose diameter sometimes exceeds 1 cm. In the upper stromatolitic horizon large columnar forms, in height up to 17 cm and in width up to 15 cm, occur (Fig. 3, 4, 5), the dimensions decreasing in the north-western direction (Fig. 1B, 5). The columnar forms are very often distinctly asymmetrical in growth, both in vertical and horizontal section (Fig. 6). Because the directions of asymmetry vary during growth (Fig. 6) they may correspond with changes of current directions; unfortunately the studied cores were unoriented and therefore it is impossible to see any regional current pattern. Columnar forms are developed on oncoids (Fig. 5), more seldom on bigger skeletal grains (Fig. 4). At the beginning of growth they are small, later they merge, thus forming a massive body, and after this the partitioning of that body takes place (Fig. 5). It should be stressed that the described columnar forms eastwards from Chałupy occur also in the lower stromatolitic horizon, being associated with small irregular stromatolitic forms.