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Krasnorost *Phragmonema sordidum* w Grocie Sybilli koło Neapolu — The red-alga *Phragmonema sordidum* in the Sibyl Cave nearby Naples

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During my stay at the Zoological Station in Naples* I collected, on October 29. 1961, in the mythical Sybilla Cave, lying nearby in Cumae, a rather rare red-alga, *Phragmonema sordidum* Zopf.

This species was hitherto known from six stands only, in Europe and in Asia Minor. Zopf (1882) described it from the Berlin botanic garden, where it formed, as an epiphyte stains of a muddy brown colour on the leaves of *Ficus barbata*, growing in a hot-house Geitler (1942) found it in the hot-house of the botanic garden of the university of Vienna on walls on which *Trentepohlia lagenifera* was growing. Geitler found it also in Austria in the Schönbrunn park (1942/43) on damp broken fragments of stones, lying in the shade, at the base of mucilagenous thalli, of *Ruttnera spectabilis* and in the grotts Mansrodlhöhle in Lunz am See (after Friedmann 1956). Recently, Friedmann (1956) collected it often in two Israel caves: in the prehistorical cave of Beth Guwrin (where *Phragmonema* appeared in nearly unialgal layers, several milimetres thick, blackish-brown, mucilagenous, covering a relatively large surface, and in Jerusalem in the Sanhendriya crypt cave (where this alga formed microscopic nests among the mucilage of other algae, mostly chroococcous blue-green algae). When investigating the morphology and the consequences of the consecutive stages, Friedmann compared them with stages previously described, collecting material, as far as possible, from European stands already noted.

In the Sibyl Cave this alga grew on very shady and damp parts of the walls that had been cut in volcanic tuff, forming vast, blackish-

* The authoress was sent there by the Polish Academy of Sciences and worked on the „table” paid by the Rockefeller Foundation on the grant of A. and R. Dohrn Foundation.

-green, slippery and slimy coverings about 2 mm thick. Agglomerations of cells of the blue-green alga *Synechococcus (elongatus?)* (Fig. 8) accompanied it in considerable numbers and multiplied still more in the material kept in vitro.

When seen under the microscope the spherical cells were of a greyish-green colour, while the filamentose cells were greyish-mauve. Chromatophores, in the shape of plates or bands, and a nucleus placed parietally surrounded a smaller or larger central vacuole. Small grains of starch, staining red with iodine, were dispersed in the interior of the cells, around the vacuole. The dimensions of cells were usually in accordance with those given by other authors.

Of the stages characterised by Friedmann, in which *P. sordidum* appeared, unpolarised palmelloidal and pseudoautosporogenous stages prevailed in the Sibyl Cave. Of polarised stages, filamentose and coccoidal stages appeared rather often, pseudo parenchymatous stages were more rarely seen, while the dendroidal stage has not been noticed.

In the palmelloidal stage (*status palmelloideus*), cells of 5—10 (15) μ in diameter appearing separately or in colonies of 2—4 cells, were surrounded by layers of mucilage (Fig. 1, 2); they sometimes formed compact groups (Fig. 3).

In the pseudosporogenous stage (*status pseudoautosporogenous*) the cells have usually a diameter of 5—10 μ . They distend the thin membrane of the mother-cell, attaining in consecutive divisions not only the stage of 4 and 8 cells (Fig. 4, 5), but often that of 16 or even more cells. Split membranes with spilling pseudoautosporous were very often noticed.

Cells in the filamentous stage (*status filamentosus*) (Fig. 7), were dispersed among cells of different types (Fig. 8), sometimes several of them assembled together. The cells, mostly cylindrical, 5—10 μ broad and 5—20 μ long, concentrate and form filaments up to 70 μ long, surrounded by a thin layer of mucilage.

The decomposition of filamentose stages into cocci and the transformation of cocci into filaments has not been noticed, this being probably the result of a too scarce investigation on fresh material. In material brought to Poland and kept for a series of months in Petri dishes the filamentose stages disappeared after a certain time.

In the *status coccoides* (Fig. 6), spherical or cylindrical cells had a diameter of 3—5 μ .

The pseudoparenchymatous stages (*status pseudoparenchymatosus*) were, in accordance with Friedmann's description, very seldom seen.

The mass appearance and differentiation of stages in the Sibyl Cave near Naples, and especially abundant appearance of pseudoautosporous and palmelloidal stages, demonstrate a distinct resemblance with the manner of appearance of this alga in the caves of Israel, and especially

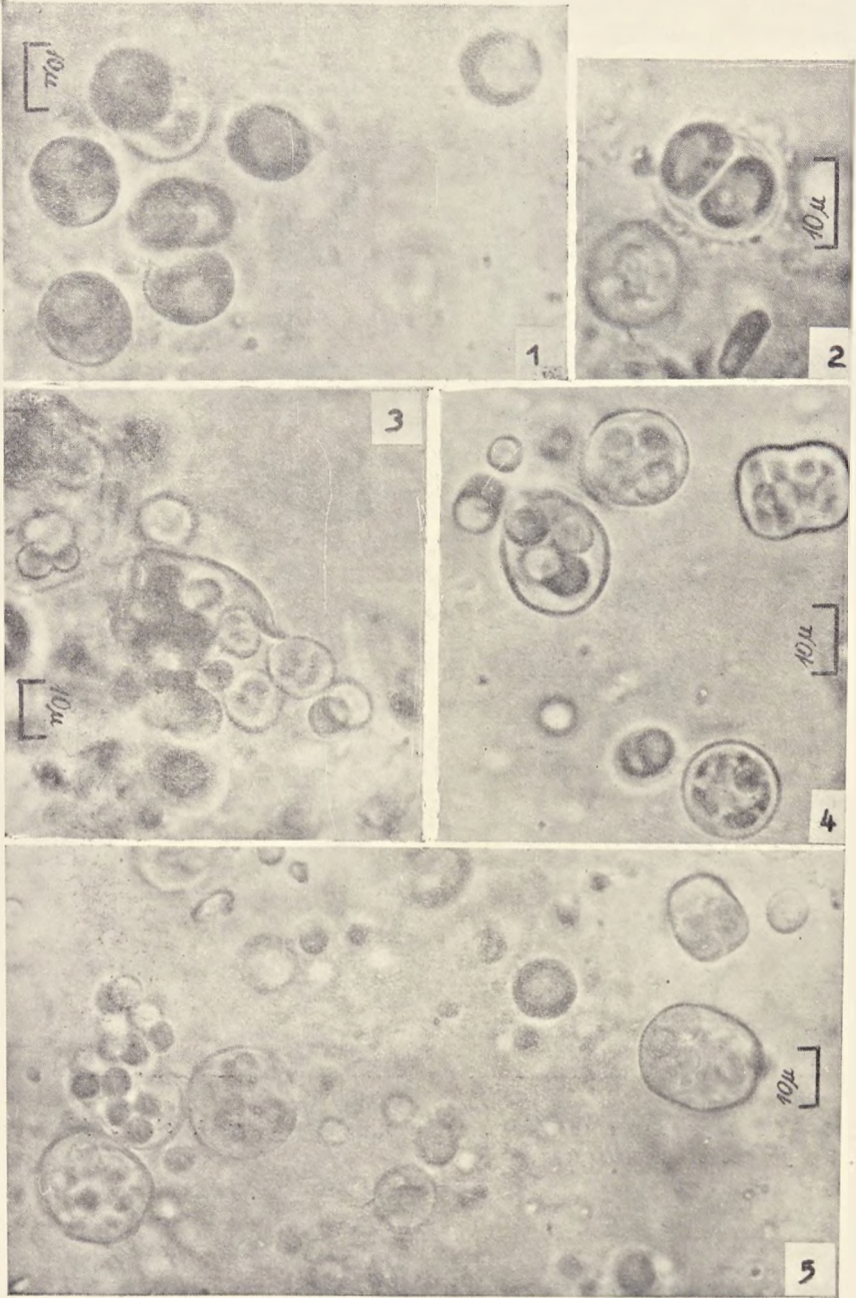


Fig. 1—5. *Phragmonema sordidum*; 1—3 status palmelloideus; 4—5 status autosporegens

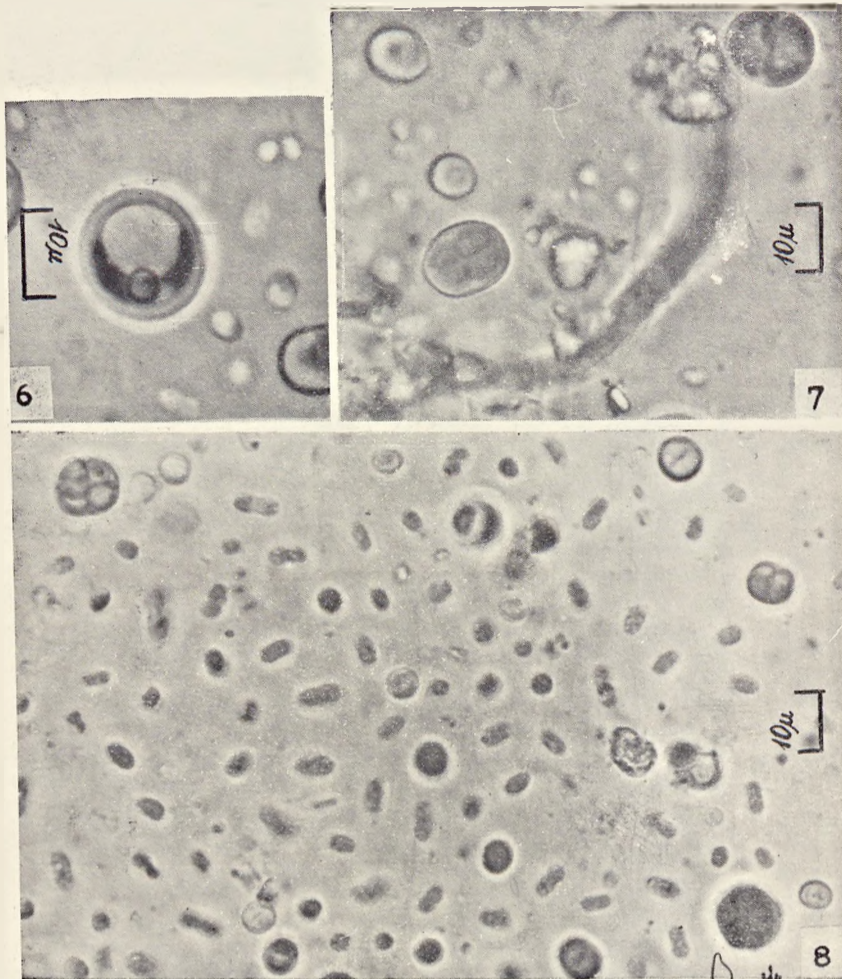


Fig. 6—7. *Phragmonema sordidum*: 6 status coccoides; 7. status filamentosus
Fig. 8. *Synechococcus* (*elongatus*?)

in the cave of Beth Guwrin. It is quite probable that this alga shall prove to be characteristic for damp, very shady and warm caves and other similar places in the region of the Mediterranean. Habitats in botanic gardens are of a secondary character, while on other hitherto known stands in the open air this alga does not form any dense and multiform agglomerations.

STRESZCZENIE

W czasie pobytu w Stacji Zoologicznej w Neapolu autorka zebrała 29 października 1961 r. w pobliskiej Grocie Sybilli w Kumach, rzadki krasnorost *Phragmonema sordidum* Zopf występujący tu wraz ze skupieniami komórek sinicy *Synechococcus (elongatus?)* (Fig. 8).

Spośród podawanych przez poszczególnych autorów, a szczegółowo scharakteryzowanych przez Friedmanna (1956) stadiów występowania przeważały stadia niespolaryzowane: *status palmelloideus* (Fig. 1—3) i *status pseudoautosporogenous* (Fig. 4—5). Ze stadiów spolaryzowanych dość często spotykano *status filamentosus* (Fig. 7) i *status coccoideus* (Fig. 6) i rzadko *status pseudoparenchymatosus*, natomiast nie zauważono *status dendroideus*.

Masowe występowanie *P. sordidum* w Grocie Sybilli i podobne zróżnicowanie stadiów jak w wilgotnych grotach w Izraelu (Friedmann 1956), a w szczególności w Grocie w Beth Guwrin wskazuje, że jest bardzo prawdopodobne, iż glon ten (ewentualnie w zespole z chrookokowymi sinicami) okaże się charakterystyczny dla wilgotnych i silnie ocienionych a ciepłych grot i innych podobnych miejsc w rejonie Morza Śródziemnego. Siedliska w ogrodach botanicznych (Zopf 1882, Geitler 1942) mają charakter wtórny, a na innych znanych dotąd siedliskach na wolnym powietrzu (Geitler 1942, Geitler cyt. wg Friedmanna 1956) nie tworzy zwartych, wielopostaciowych skupień.

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