A NEW COPROPHILOUS SPECIES OF CALONEMA (MYXOMYCETES)

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At present, the genus *Calonema* is monotypic, the single species being *C. aureum* Morgan. It is very similar to the genus *Oligonema*. The only difference between the two genera is that in *Oligonema* the capillitium is composed of short, free elaters, while in *Calonema* it consists of long threads more or less united into a net. Some authors, like Lister (1925) and Hagelstein (1944), believed that *C. aureum* was nothing more than a form of *Oligonema flavidum* Peck. They both retained *Calonema* in their monographs, however, but only for the sake of convenience.

The species to be described below is common on cow dung throughout the Sacramento Valley, wherever natural forage is present. It fruits abundantly in cavities embedded in the dung or on the lower surface in contact with the soil. Since both of these niches are characterized by a high relative humidity, almost all of the collections consist of perfectly matured sporangia.

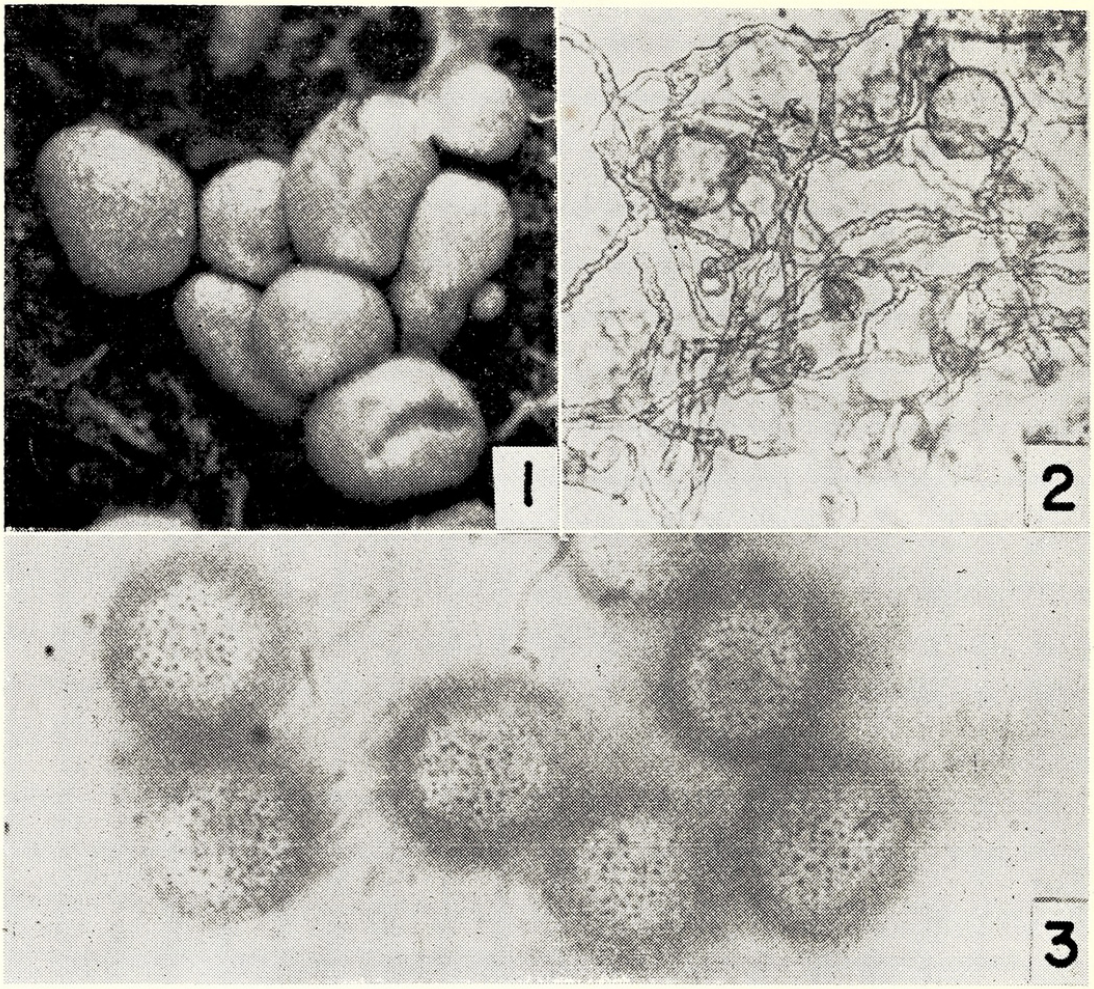
Calonema luteolum Kowalski, sp. nov. Sporangiis dissipatis, gregariis vel agglomeratis, sessilibus, globosis vel subglobosis, 0.1–0.5 mm diam; peridio simplici, membranaceo, luteo, iridescenti; capillitio luteo, filamentis ramosis et anastomosis formandis reticulum, laevigatus, tubularis, 2.0 μ crassis; sporis globosis, spinulosis, luteis, 12–13 μ diam; plamodio ignoto.

Type. Near intersection of Butte Creek and U.S. Highway 99E, 2 miles south of Chico, Butte Co., California, April 22, 1967, *D. T. Kowalski 5998* (IA-holotype, MICH, TEX.).

Collections examined: *Kowalski 2554, 5362, 5393, 5400, 5407, 5420, 5508, 5514, 5521, 5526, 5529, 5536, 5540, 5544, 5549, 5552, 5613, 5614, 5620, 5623, 5625, 5636, 5639, 5992, 5993, 5994, 5995, 5996, 5997, 5998.*

This species is known from the Sacramento Valley of California, where it is found only on cow dung.

Sporangia (fig. 1) scattered, clustered, to often heaped, sessile, irregularly shaped, globose or subglobose, occasionally slightly elongated, 0.1–0.5 mm in diameter; peridium single, thin, membranous, transparent, spores clearly visible through the peridium, iridescent, smooth, entirely lacking any distinctive markings, brilliant yellow; hypothallus lacking; capillitium (fig. 2) composed of branching and anastomosing tubular threads, forming a distinct net, threads of uniform thickness, averaging about 2.0 μ thick, weakly attached to the peridium over the entire surface, surface of threads smooth or minutely ornamented, but completely lacking any sign of spiral ornamentation, internal thickenings present, dividing up the threads into numerous chambers 1–4 μ in diameter, yellow, few free ends, but when free ends present, not noticeably in-



FIGS. 1–3. *Calonema luteolum:* 1, sporangia, × 33; 2, capillitium, × 670; 3, spores, × 1440.

flated; spores (fig. 3) globose, spinulose, yellow in mass, bright yellow by transmitted light, 12–13 μ in diameter; plasmodium unknown.

This species is easy to identify in the field. The restricted nature of the substrate and the fact that the sporangia are bright yellow and form in small heaped clusters is distinctive. The major microscopic characteristics are the smooth capillitium, forming a distinct reticulum, and the spinulose spores, 12–13 microns in diameter. It can easily be separated from *C. aureum* on these features. *Calonema aureum* also has a reticulate capillitium, but its surface bears rings or fragmentary spirals. In none of the 30 collections listed above, did I observe any rings or spirals on the capillitium of *C. luteolum*. The major difference, however, is that *C. aureum* has spores which are 13–15 microns in diameter and they bear a distinct, coarse reticulum.

Whether or not *C. luteolum* belongs in the genus *Calonema* is debatable. While it has characteristics resembling *Calonema,* in other ways it is similar to the genus *Perichaena.* It resembles *Perichaena* in regards to the capillitium and spores. The capillitium of *Perichaena* is also reticulate and lacks rings or spirals and the spores of this genus are never

reticulate, being either minutely warted or spinulose. Species of *Perichaena,* however, have a two-layered peridium and the sporangia, while they may be clustered, are never heaped. *Calonema luteolum* is similar to the genera *Calonema* and *Oligonema* in that in both of these genera the peridium is single, membranous and often iridescent and the sporangia can be heaped. It differs from these genera, however, in that their capillitium often has spiral markings and the spores are reticulate, while *C. luteolum* has a smooth capillitium and spinulose spores.

The problem arises in deciding which characteristics are the most important taxonomically, or, which characteristics are the most important in showing phylogenetic relationships, I believe the presence of a single peridium and heaped sporangia indicate that the affinities of *C. luteolum* are with *Calonema* and *Oligonema* even though the capillitial and spore characteristics are reminiscent of the genus *Perichaena.* Perhaps this is one area in which cultural studies can be of immense importance in determining evolutionary relationships.

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A NEW CAMPANULA FROM NORTHERN CALIFORNIA

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An undescribed *Campanula* has turned up in area where one would not have expected to find a new species of flowering plants—Castle Crags, the spectacular and conspicuous mass of spires and domes which rises 4,000 ft. above the Sacramento River southwest of Dunsmuir. A trail in Castle Crags State Park leads up to and among the granitic pinnacles where the *Campanula* grows fairly abundantly in the crevices of sloping and even vertical walls. The plant was first collected in 1948 by the late Freed Hoffman whose private herbarium was given to the University of California. The specimen, identified as *C. scabrella,* came to my attention in connection with a review of the genus *Campanula* in California. I am pleased to name this plant for Stanwyn G. Shetler of the Smithsonian Institution, Washington, D.C., student of *Campanula* and author of a useful conspectus of the genus in North America.

Campanula shetleri Heckard, sp. nov. Fig. 1. Herba perennis rosulata dense caespitosa tota scabro-hispidula; folia breve spathulata paribus dentium oppositorum duobus instructa; caules floriferi 2–5 cm alti,