

HONEYCOMB COLONIES OF *PLUMATELLA CASMIANA* OKA (ECTOPROCTA: PHYLACTOLAEMATA)

JOHN H. BUSHNELL and TIMOTHY S. WOOD

Department of Biology, Division of Environmental Biology,
University of Colorado, Boulder, Colorado 80304

BUSHNELL, J. H. & WOOD, T. S. 1971. Honeycomb colonies of *Plumatella casmiana* Oka (Ectoprocta: Phylactolaemata). *Trans. Amer. Micros. Soc.*, 90: 229-231. Honeycomb colonies of *Plumatella casmiana* Oka are reported from Colorado. This is only the second species of fresh-water ectoproct known to form such colonies (the other being *Plumatella fungosa*). Peculiar adherent qualities of the zoecia are emphasized. Numerous leptoblasts, unique to *P. casmiana*, were the only statoblasts associated with these unusual colonies.

The complete adherence of the zoecia (throughout their length) within an ectoproct colony is common to numbers of marine gymnolaematous species, particularly the calcareous cheilostomatous forms. Among the non-calcareous fresh-water Phylactolaemata, only one species, *Plumatella fungosa*, has been distinguished by the formation of dense cushion-like colonies with completely agglutinated zoecia. The physical integrity of these massive colonies is dictated primarily by the unique adherent quality of the zoecial tubes (Bushnell, 1968). All adjacent tubes in the colonial mass remain cemented to one another as they grow and bud. In effect there is a surface fusion of all colonial zoecial tubes. Luxuriant growth, associated with optimal environmental conditions, enhances the formation of these fungoid colonial masses by insuring that newly budded zoecia remain in close proximity, and densely entangled, as they grow.

The early growth of such colonies results in a narrow zone of agglutinated horizontal tubes. Later all zoecia change their direction of growth and budding by essentially 90° and grow up and away from the substratum as a wider zone of hundreds and thousands of parallel fused zoecia. An old colony viewed from the surface has a remarkable honeycomb appearance. Allman (1856), in the first definitive ectoproct monograph, provides excellent descriptive and illustrative information about *P. fungosa* (then *Alcyonella fungosa*).

The authors found honeycomb-type colonies of another species of fresh-water ectoproct, *Plumatella casmiana*, in Swede Lake, Boulder County, Colorado. The Swede Lake colonies have an architecture distinct from previous collections of *P. casmiana*. They are essentially identical with (but considerably smaller than) the typical compact zoarial masses of *P. fungosa*. As in the latter, there is a thin zone of horizontally oriented zoecia against the substratum and then the wide outer zone of fused vertical zoecia. All zoecia appear to share a common wall with adjacent zoecia. In some cases the hundreds of fused tubes are not completely vertical but project upward at an angle of 40°-60° with respect to the substratum. The colonies all appear as small cushion-like masses on floating logs. Old colonies viewed from the surface are shown in Figure 1. The maximal thickness of the colonial cushions of *P. casmiana* is 2.0 mm. The thickness of *P. fungosa* colonies from Colorado is nearly 2 cm. The largest compound colonial masses of *P. casmiana* were 6 cm in diameter, although colonies are often elongated. The agglutinated tubes in the honeycomb colonies do not possess the slight zoecial keel and hyaline furrow of the more characteristic open or dense horizontal colonial growths. The color of the zoecial tubes varies from a light yellow at the surface to a deep golden brown for the older zoarial tubes near the substratum.

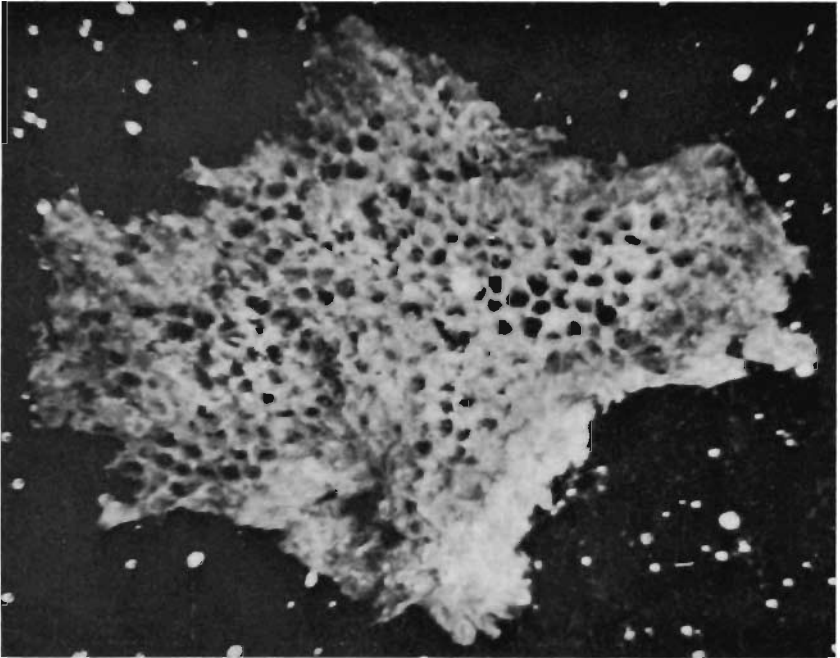


FIG. 1. Surface view of honeycomb colony of *Plumatella casmiana*. $\times 14$

Previous collections of *P. casmiana* range from a widely open branching pattern to extremely compact intertwining colonial growth (Oka, 1907; Toriumi, 1955; Lacourt, 1968; Vigano, 1968; Bushnell, 1968). The most compact moss-like colonies from previous descriptions, however, never assume the honeycomb architecture. One author, Toriumi (1955), does indicate the tendency for zoecia of luxuriant colonies to agglutinate or fuse. Both he and Vigano (1968) illustrate unusually compact and luxuriant colonies.

When the Colorado specimens were first collected, 8 November 1969, polypides had already disintegrated and only the empty ectocyst remained. However, the valves of many leptoblasts (fragile statoblasts unique to *P. casmiana*) were found within the colony. Numbers of single valves or loosely attached valve pairs were present in the terminal portions of the upright zoecial tubes, but several complete leptoblasts were dissected from deep within the colony. Leptoblasts measured 0.34 mm to 0.43 mm in length and 0.16 mm to 0.22 mm in width. None of the other kinds of statoblasts produced by this species were found. One must assume that the simultaneous germination of these leptoblasts within disintegrating parent colonies contributed in part to the honeycomb zoaria.

Bushnell (1968) has questioned the species status of *P. fungosa*, suggesting that it may be merely a particularly robust form of *P. repens*. This idea is strengthened by the large size (and similar design) of *P. fungosa* statoblasts relative to those of *P. repens*. An analogous situation does not appear in *P. casmiana*, because the size of the leptoblasts for the fungoid honeycomb colonies correspond well with measurements for Michigan species (Bushnell, 1965) and are even slightly smaller in average length than leptoblasts from one of the nearby Sawhill ponds in Colorado. Further, the uniqueness of the leptoblast, found in both honeycomb and more characteristic colonies of *P. casmiana* (and

the agreement in design and tentacle count for recently found colonies from both habitats), makes it doubtful that characteristic and honeycomb-type colonies of *P. casmiana* are anything but conspecific.

LITERATURE CITED

- ALLMAN, G. J. 1856. *A Monograph of Fresh-Water Polyzoa*. Ray Society, London. 119 pp.
- BUSHNELL, J. H. 1965. On the taxonomy of freshwater Ectoprocta in Michigan III. *Trans. Amer. Micros. Soc.*, 84: 529-548.
1968. Aspects of architecture, ecology, and zoogeography of freshwater Ectoprocta. *Atti Soc. Ital. Sci. Nat. Museo Civ. St. Nat. Milano*, 108: 129-151.
- LACOURT, A. W. 1968. A monograph of the freshwater Bryozoa-Phylactolaemata. *Zool. Verhand.*, No. 93, Leiden: 1-159.
- OKA, A. 1907. Zur Kenntnis der Süsswasser-Bryozoenfauna von Japan. *Annot. Zool. Jap.*, 6: 117-123.
- TORIUMI, M. 1955. Taxonomical study on fresh-water Bryozoa X. *Plumatella casmiana* Oka. *Sci. Rep. Tohoku Univ.*, 21: 67-77.
- VIGANO, A. 1968. Note su *Plumatella casmiana* Oka (Bryozoa). *Riv. Idrobiol.*, 7: 421-468.