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ΠΡΟΕΔΡΙΑ ΛΟΥΚΑ ΜΟΥΣΟΥΛΟΥ

ΚΥΤΤΑΡΟΛΟΓΙΑ.— **The Ultrastructure of carposporogenesis in *Gigartina teedii* (Roth) Lamour (Gigartinales, Rhodophyceae): Carpospores**, By *I. Tsekos* and *B. E. Diannelidis**, (Botanical Institute, University of Thessaloniki, Greece), δια του Ἀκαδημαϊκοῦ κ. Ἰωάννου Παπαδάκη.

ABSTRACT

Mucilage vesicles appearing to be derived from dilating endoplasmic reticulum and containing fibrillar material as well as electron dense cores, contribute to musilage production during carposporogenesis in *Gigartina teedii*.

INTRODUCTION

The fine structure of carposporogenesis in the marine red alga *Gigartina teedii* has been studied extensively (Tsekos, 1981, 1983, Tsekos and Schnepf, 1983). In this paper a new type of vesicles is described.

MATERIALS AND METHODS

Cystocarpic plants of *Gigartina teedii* were collected at Micron Emvolon (Gulf of Thessaloniki). Material for transmission electron microscopy was fixed immediately in situ or within 1 h of collection in the laboratory according to procedures described previously (Tsekos, 1981). Sections were examined and photographed with a Zeiss EM 9S-2 electron microscope.

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RESULTS AND DISCUSSION

In the nearly mature carpospores endoplasmic reticulum is closely associated with the nuclear membrane and often runs parallel to it (Fig. 1). Connected to the ER-cisternae mucilage vesicles having a characteristic appearance can be seen throughout the cytoplasm (Figs. 1 - 4). They appear to form by ER dilation and contain fibrillar material as well as electron dense cores (Figs. 1 - 4). These mucilage vesicles occur singly or in contact with other vesicles in central as well as in peripheral cytoplasmic regions (Figs. 1, 2, 4). Hypertrophied dictyosomes are straight in profile and seem to be in close contact with the mucilage vesicles (Figs. 2, 3). Dilating ER-cisternae just transformed to mucilage vesicles (Fig. 3) seem to be associated with the forming face of the dictyosomes. This ER seems to contribute to the formation of the first Golgi cisterna. Similar mucilage vesicles occur in tetrasporangia of *Ceramium* (Chamberlain and Evans, 1973) and *Palmaria palmata* (Pueschel, 1979), and in carpospores of *Gracilaria verrucosa* (Delivopoulos and Tsekos 1985). The production of different types of vesicles and large amounts of mucilage is well established in red algal carposporogenesis. Carpospore wall formation is usually initiated during the early stage of carpospore differentiation and ends with the commencement of the production of cored vesicles.

In *Gigartina teedii* the formation of the fibrillar network of the carpospore wall is contained within inflated Golgi derived fibrillar vesicles (Tsekos, 1981). Additionally lysosome-like formations and dilating ER form mucilage sacs and seem to be the site of primary mucilage synthesis (Tsekos, 1981, 1983).

It seems likely that the primary mucilage (mucilage sacs) serves in spore liberation and a second mucilage originating from the contents of the fibrillar vacuoles and the cored vesicles present in nature carpospores is responsible for attachment (Tsekos, 1983). The proteinaceous dense core of the cored vesicles seems to originate from the ER and the carbohydrates by dictyosome activity. The mucilage vesicles appear in the cytoplasm after the mucilage sacs have released their content in the carpospore wall (Tsekos, 1981) and prior to cored vesicles formation. Their fibrillar as well as cored content seems to contribute to mucilage production.

Abbreviations used in Figures :

er, endoplasmic reticulum; fv, fibrous vacuoles; m, mitochondrion; mv, mucilage vesicle; n, nucleus; p, plastid; s, starch grain; w, cell wall.

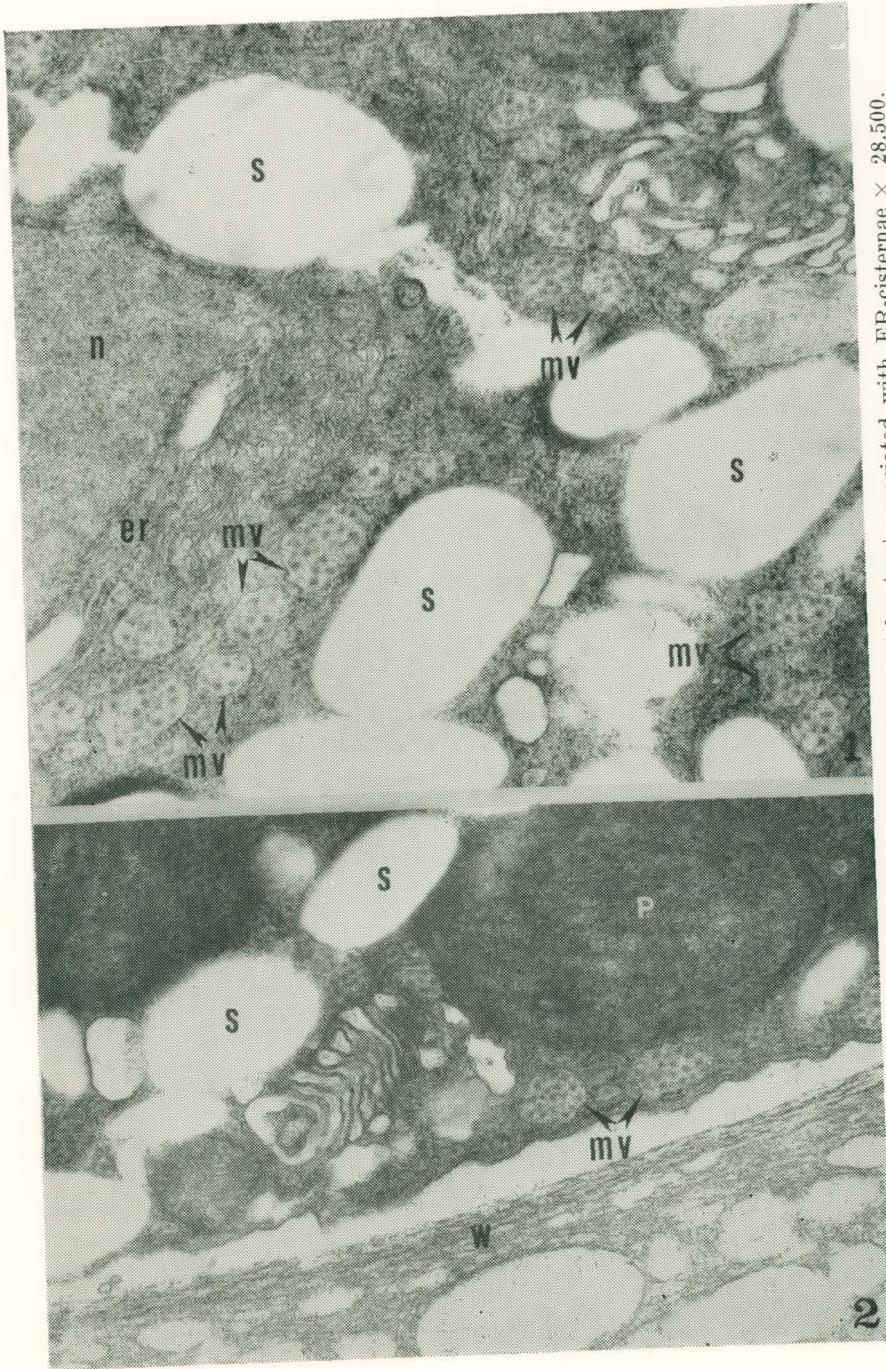


Fig. 1. Part of nearly mature carpospore. Mucilage vesicles (mv) associated with ER-cisternae $\times 28,500$.

Fig. 2. Mucilage vesicles scattered throughout the cytoplasm. $\times 26,500$.

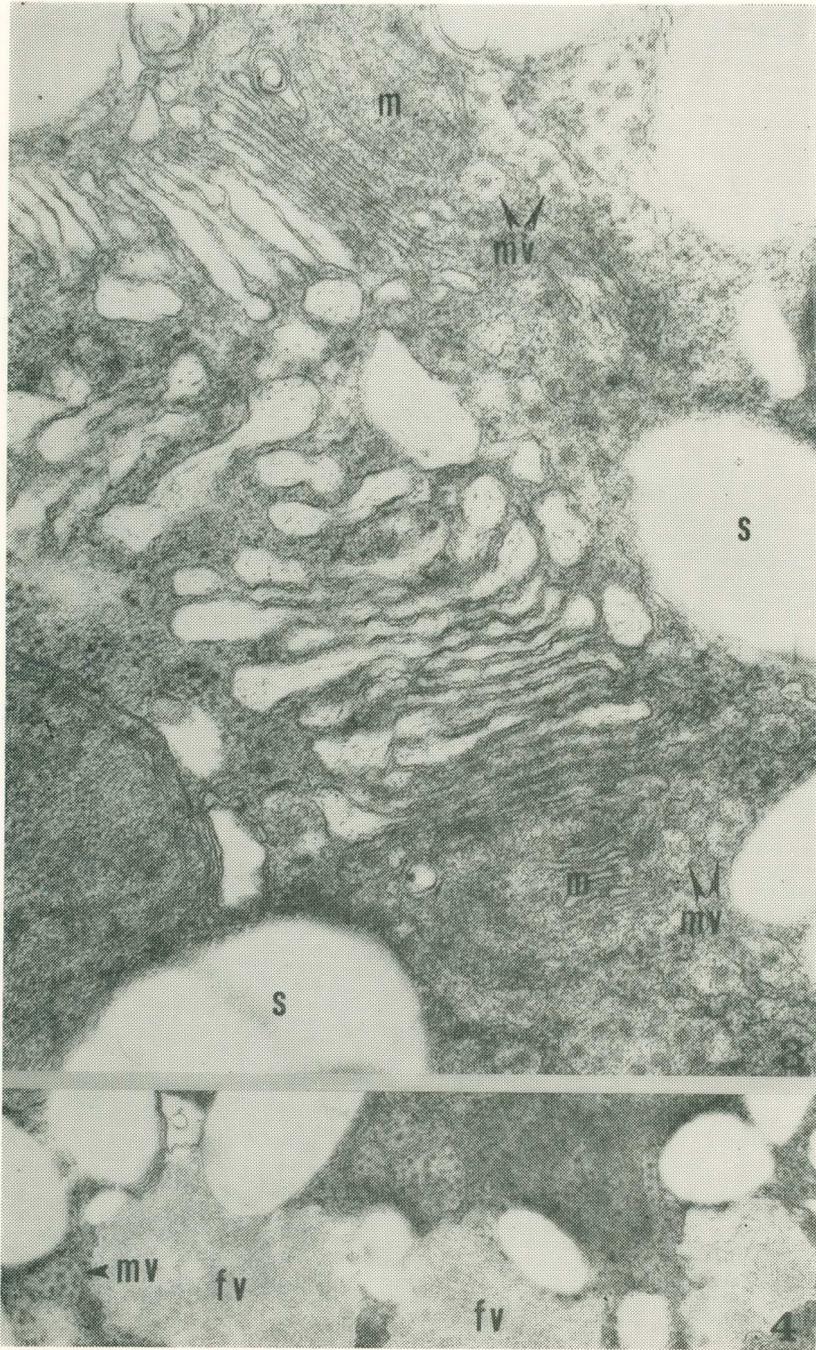


Fig. 3. Hypertrophied dictyosomes at the forming face possible association with mucilage vesicles. $\times 64,600$.

Fig. 4. Mucilage vesicles in contact with fibrous vacuoles. $\times 26,500$.

Π Ε Ρ Ι Λ Η Ψ Η

Στὸ ροδοφύκος *Gigartina teedi* περιγράφεται ἕνας νέος τύπος Βλενωδῶν κυστιδίων. Αὐτὰ φαίνεται ὅτι σχηματίζονται κατὰ τὴν καρποσποριογένεση ἀπὸ διευρυνόμενο ἐνδοπλασματικὸ δίκτυο, περιέχουν δὲ ἰνώδες ὕλικὸ καὶ ἠλεκτρονικῶς πυκνὰ κοκκία, τὰ ὁποῖα συμμετέχουν στὴν παραγωγὴ βλέννης.

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