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Cytoplasmic inclusions in yellowing parsley leaves

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Abstract

Inclusions in cytoplasm of intact yellowing parsley leaves similar to those described in other plant species infected with viruses were observed.

INTRODUCTION

In some plant species infected with virus, various kinds of cytoplasmic inclusions were observed (E d w a r d s o n, 1968).

In this short communication, cytoplasmic inclusions are described which appeared during leaf yellowing process of parsley grown in field conditions.

MATERIAL AND METHODS

Leaf pieces from yellowing intact parsley leaves (*Petroselinum sativum* L. cv. Berlińska) were fixed in 5% gluteraldehyde in 0,1 M phosphate buffer of pH 7.0 for 12 hours at 4 C and then in 2% OsO_4 in the same buffer for 2 hours at room temperature. After washing, the material was dehydrated in ethanol and propylene oxide, then embedded in Epon 812, cut with a Reichert or Tesla ultramicrotome and stained with uranyl acetate and lead citrate (R e y n o l d s, 1963). The electron micrographs were made by a JEM 7A electron microscope.

RESULTS AND DISCUSSION

In the cytoplasm of some yellowing parsley leaves various types of inclusions in form of pinwheels and bundles were observed (Plates I — III). They were similar to those which have been observed in many plants

infected with tulip mosaic virus (Yamaguchi at al., 1963), turnip mosaic virus (Hayashi, 1965), tobacco etch virus (Matsui and Yamaguchi, 1964; Rubio-Huertos and Hidalgo, 1964; Edwardson, 1968), wheat streak mosaic virus (Lee, 1965) and been yellow mosaic virus (Weintraub and Ragetli, 1966).

Presumably, the reason of the yellowing process of presented parsley leaves under investigation was a virus infection. In early stage of leaf yellowing the cytoplasm was rich in ribosomes (Plate I), but later, with a progress of yellowing, ribosomes were difficult to be distinguished both in cytoplasm and chloroplasts (Plates II and III). The ultrastructure of these leaves was similar to that described erlier for parsley leaves detached and yellowing in darkness (Młodzianowski and Ponitka, 1973). Only the chloroplast envelopes in the virus infected leaves were less resistant than those in detached leaves (Plate III). The plastoglobules released from broken chloroplasts were in close contact with some virus-induced inclusions (Plate II), which as was pointed out by Edwardson (1968) and Wrischer (1968) represent threedimensional cylinrical forms.

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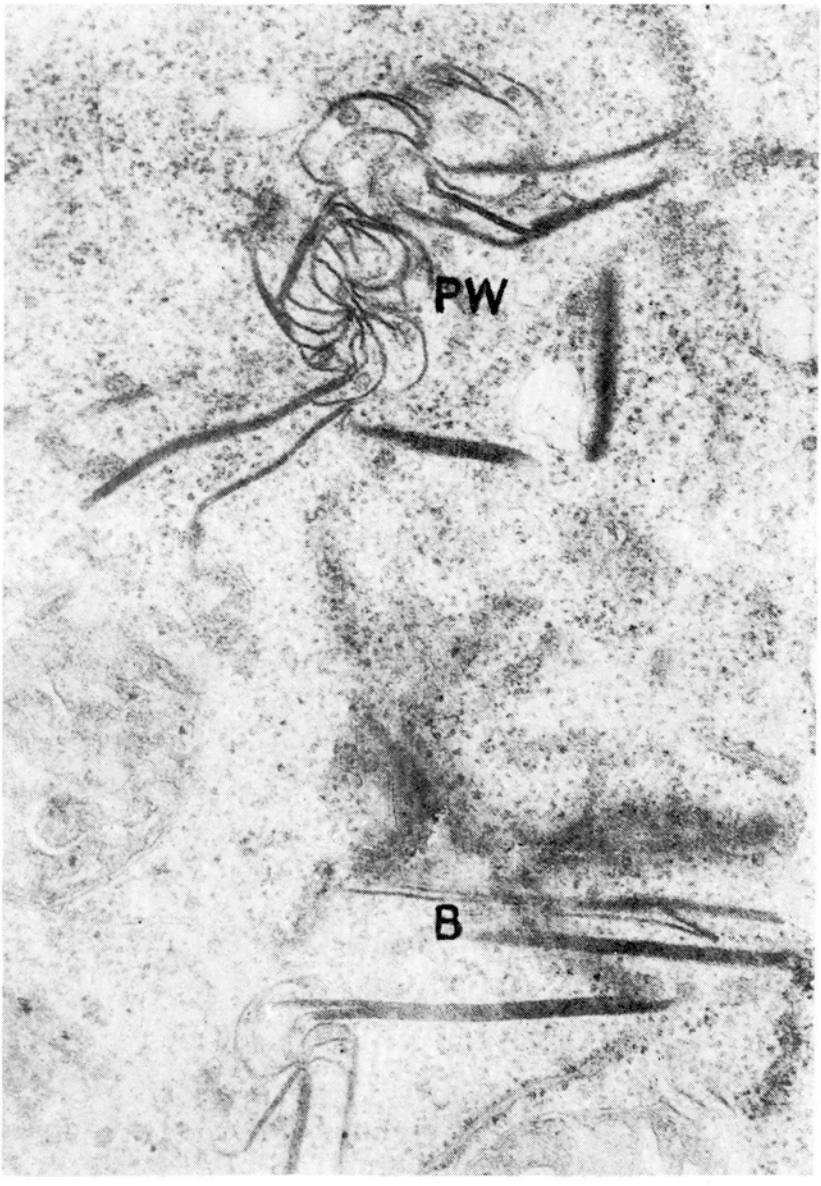
Inkluzje cytoplazmatyczne w żółknących liściach pietruszki

Streszczenie

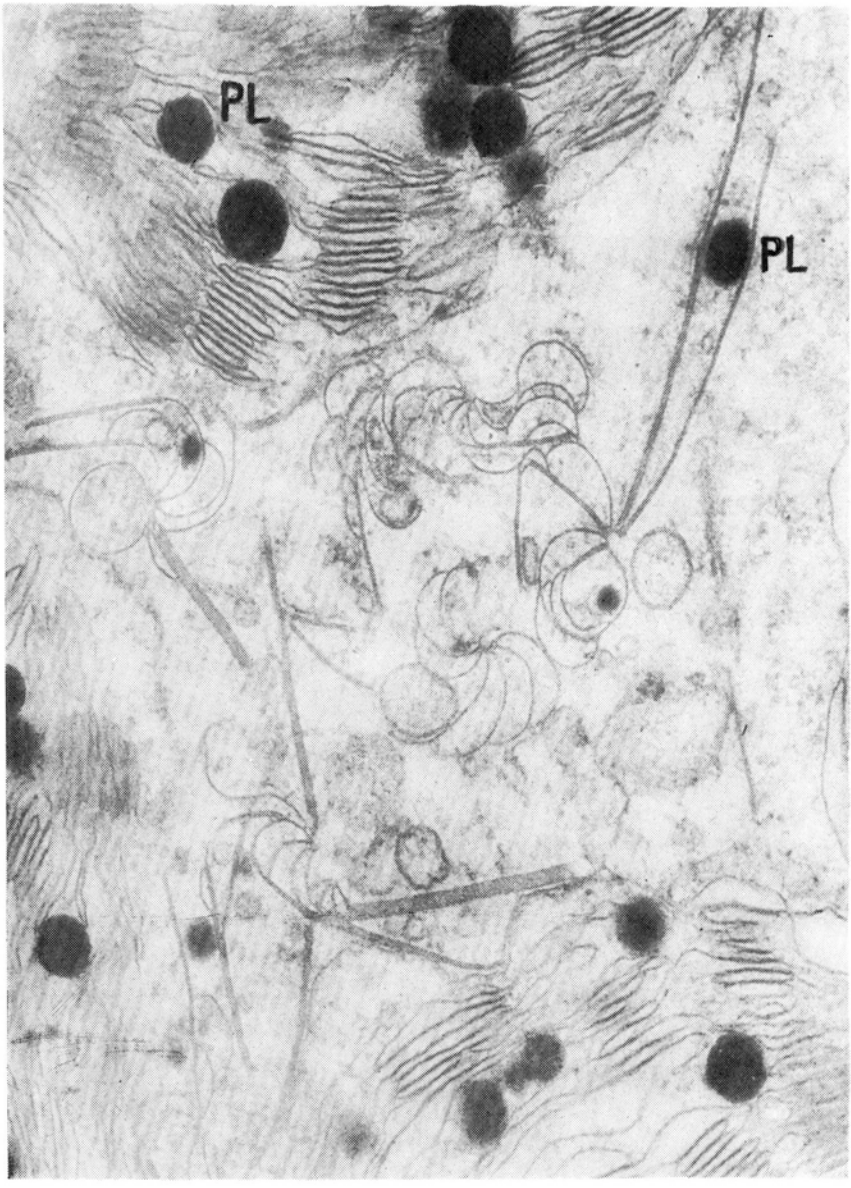
Opisano inkluzje cytoplazmatyczne w żółknących liściach pietruszki podobne do inkluzji występujących u innych gatunków w warunkach porażenia wirusem.

Plate I



A fragment of ctoplasm in ligth green parsley leaf with pinwheel (PW) and bundle (B) inclusions. The cytoplasmic ribosomes are still visible × 40 000

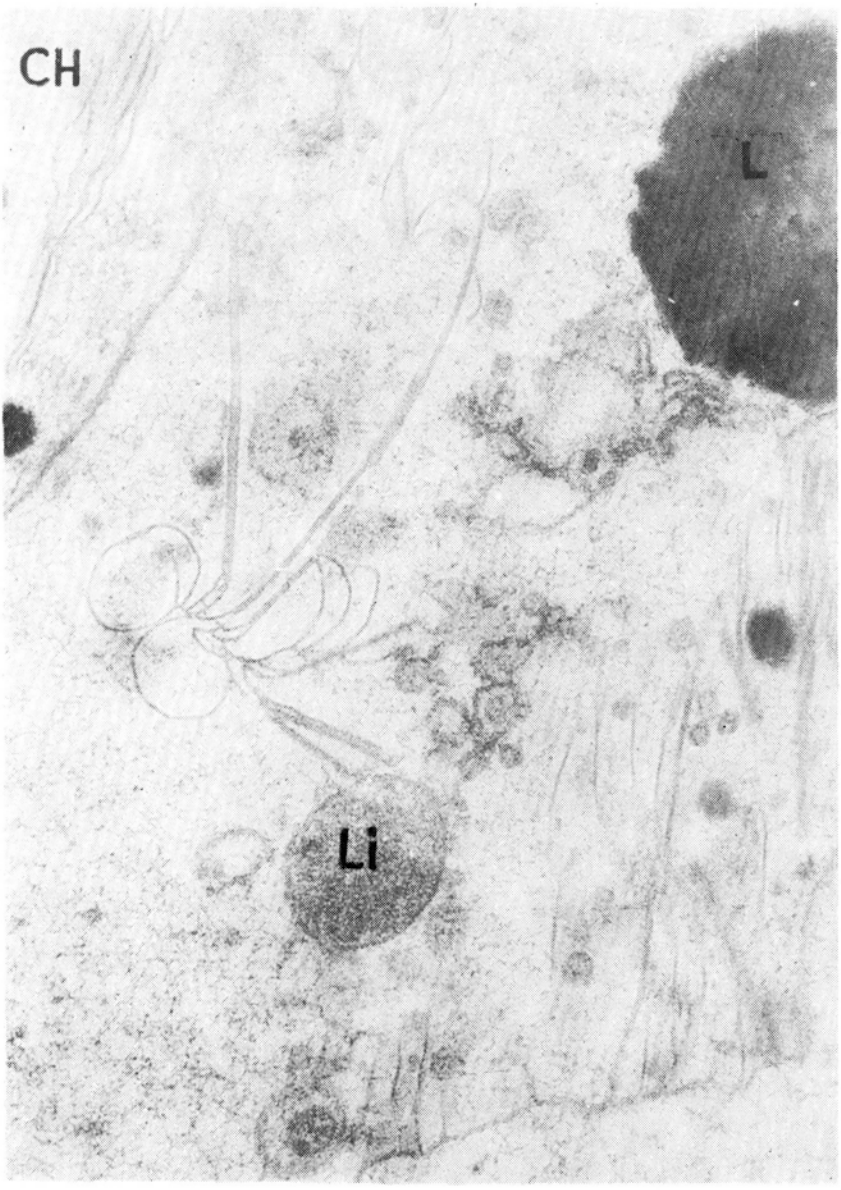
Plate II



A fragment of cytoplasm in yellow parsley leaf. Disintegrated chloroplasts and **plastoglobules** (PL) in close contact with cytoplasmic inclusions. Only remnants of chloroplast and cytplasmic ribosomes were observed

× 45 000

Plate III



Late stage of cytoplasm degeneration in parsley leaf. Lipids (L), remnants of chloroplants (CH), lisosome — like body (Li) and different kind of cytoplasmic inclusions characteristic for virus infection were observed. In this stage of degeneration ribosomes were not observed

× 45 000