

BRIEF COMMUNICATION

**Cell Wall Disintegration Consistently Found in Tissues
of Reversion Diseased Red Currant cv. Heinemann's Rote Spätlesse**

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Abstract. Black currant reversion disease causes serious problems in some cultivars of black and red currant. Investigating ultrathin sections prepared from overground parts of diseased red currant plants cv. Heinemann's rote spätlesse, we observed consistently local cell wall disintegration of tracheids in vascular bundles. We have observed these changes in red currant plants showing reversion symptoms during the vegetation period from March to June. The observed phenomenon *i.e.* cell wall disintegration of tracheids might be utilized as an auxiliary diagnostic criterion in identification of red currant reversion disease in the cultivar Heinemann.

Black currant reversion presents economically the most serious currant disease which was already described at the beginning of this century. Most attention and experimental work has been devoted to this disorder in Britain. The disease is not mechanically transmissible and can be transmitted by grafting. The vector is the gall mite *Cecidiophyopsis ribis* (WESTW.) (AMOS *et al.* 1927, MASSE 1952, THRESH 1966). THRESH (1967) also found an increased susceptibility of reverted black currant bushes to the vector of this disease. In spite of intense study of the disease, till now the demonstration of the causal infectious agent has failed and THRESH *et al.* (1978) noted recently that the aetiology of black currant reversion remains uncertain. The finding of mycoplasma-like organisms (MLO) in reverted black currant bushes published by SILVERE (1970) and PROTSENKO and SURGUCHEVA (1974) were not confirmed by other authors and SILVERE *et al.* (1971) themselves quote that currant reversion is an atypical mycoplasmal disease. Characteristic MLOs in currant plants cv. Houghton Castle with yellows alterations in flowers were described by RAKÚS *et al.* (1974). These authors distinguish

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distinctly black currant yellows from the reversion disease in agreement with the opinion of the British authors (*e.g.* CROPLEY *et al.* 1964).

Considering that currant reversion disease infects red currant too and that this disease is becoming a serious problem in Czechoslovakia, especially in the cultivar Heinemann's rote spätlesse, we tried again to carry out a thorough electron microscopic investigation of reverted red currant bushes endeavouring to find a precise diagnosis.

The experiments were carried out with young red currant bushes cv. Heinemann with distinct reversion symptoms: nettleheaded leaves, reduction in leaf blade lobe number, diminishing of the angle of newly growing sprouts sometimes broomed, and dropping off flowers and immature fruits. The material for electron microscopic investigation was detached from various plant parts at different terms. Samples from soft young un lignified roots and of buds from apical parts (petioles, veins and flowerstalks) and roots of plants grown in the glasshouse were taken for investigation in March. The same parts of plant material were processed in May and June. The samples from apparently healthy red currant plants were embedded simultaneously. All specimens were fixed with 6.25% phosphate-buffered glutaraldehyde at pH 7.0 for 1.5 h, post-fixed with 1% OsO₄ for 1 h and washed with phosphate buffer for 1.5 h. Tissues were dehydrated in an ethanol-propylene oxide series and embedded into Epon. Thin sections were prepared with an ultramicrotome Reichert OM-U2 and stained with uranyl acetate and lead citrate. Examinations were made with a Tesla BS 500 electron microscope.

Investigating ultrathin sections prepared from overground parts of diseased red currant plants cv. Heinemann's rote spätlesse we observed consistently local cell wall disintegration of tracheids in vascular tissues of leaf petioles and midribs (Figs. 1–4). The structure of disintegrating cell walls of young xylem elements can be seen very distinctly on the electron micrographs. The cell wall disintegration in reverted currant plants was observed in all samples processed from March to June, but was never found in healthy currant bushes. It is difficult to say on the basis of our observations whether the cause of cell wall disintegration is a growth disproportion or some physiological factor. We suppose that the phenomenon observed, *i.e.* cell wall disintegration of tracheids in reverted currant bushes might be utilized as an auxiliary diagnostic criterion in the identification of red currant reversion disease in the cultivar Heinemann's rote spätlesse with regard to its regular and relatively frequent occurrence.

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Figures at the end of the issue.

BOOK REVIEW

ROTH, I.: STRATIFICATION OF TROPICAL FORESTS AS SEEN IN LEAF STRUCTURE (Tasks for Vegetation Science Vol. 6). — Dr W. Junk Publ., The Hague—Boston—Lancaster 1984. VIII + 522 pp. Dfl. 300,—. US \$ 115.00. £ 54.00

Die in diesem Bande beschriebenen Untersuchungen sind ein Beitrag zur Klärung der Blatt-xeromorphie der Vegetation feuchter Tropenwälder. Blattanatomie und -morphologie wurden an Pflanzen aus feuchten Tropenwäldern aus dem venezolanischen Guayana untersucht. Die untersuchte Fläche betrug 155,5 ha und enthielt 67 777 Bäume und Sträucher, die 230 Pflanzenarten repräsentierten, der Jahresniederschlag betrug 2000 mm, zwischen Jänner und April trat eine Trockenperiode auf.

Den Hauptteil des Buches (320 Seiten) bilden Tabellen mit Angaben über die Blattanatomie der untersuchten Arten. Die Tabellen enthalten Angaben über Blattdicke, Ausmasse der Epidermal- und Mesophyllzellen, Anzahl und Grösse der Stomata, Trichomenverbreitung, Leitbündelart, Gewebetypen, Idioblasten, usw. Die Tabellen enthalten weiter eine Klassifizierung des Blatttyps, der Adaptationsstufe, Angaben über die Anzahl der untersuchten Pflanzen und besondere Bemerkungen. Es werden Blätter von jungen und alten Pflanzen verglichen. Die Angaben der Tabellen werden durch 99 Abbildungen in einem Bildteil illustriert.

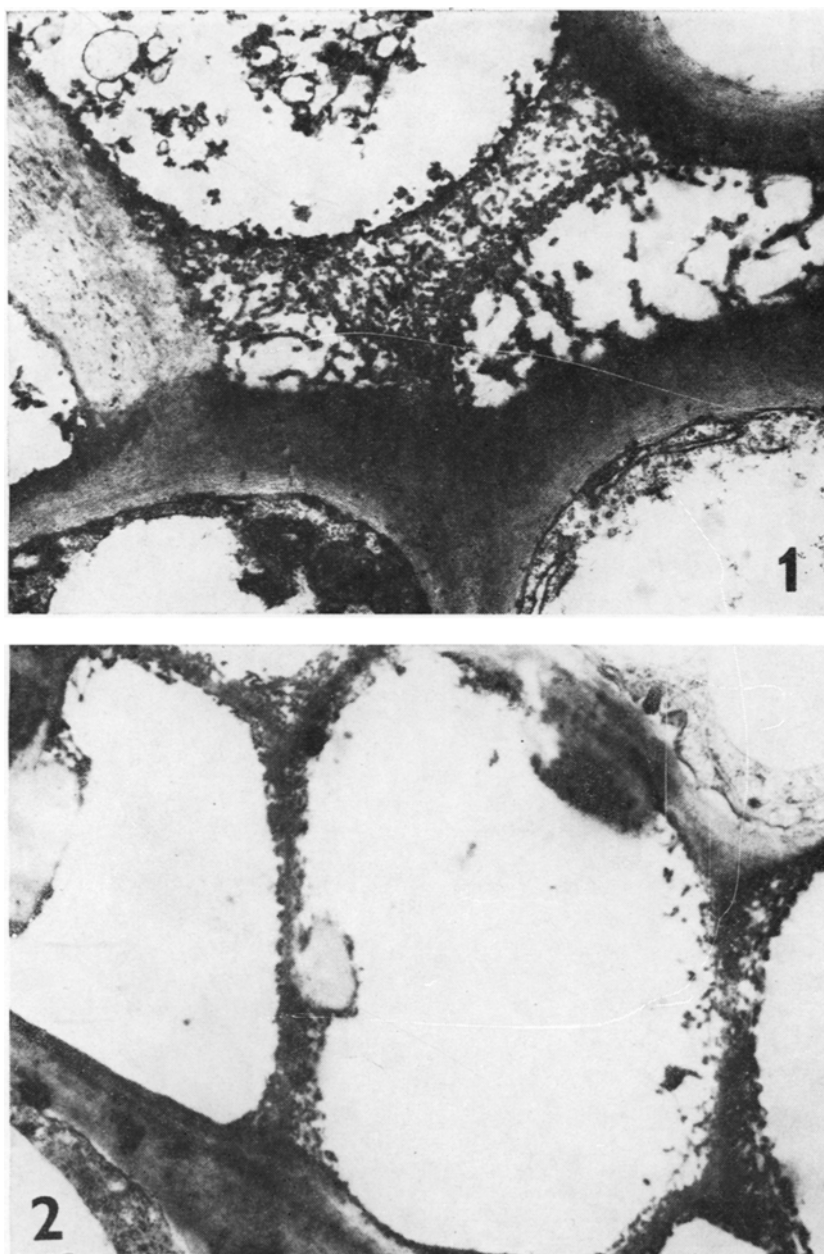
In den nachfolgenden Kapiteln werden die anatomischen Strukturen der Blätter einzelner Arten und Familien nochmals zusammenfassend ausgewertet. Es werden entwicklungsgeschichtliche, ökologische (Xeromorphie, Sukkulenz, Hygromorphie, Sonnen- und Schattenblätter, Lederblatt, usw.), taxonomische und phylogenetische Aspekte behandelt. Die wichtigsten, aus den Untersuchungen hervorgehenden Resultate, werden nochmals zusammengefasst und diskutiert. Das Buch schliesst mit einem Literaturverzeichnis und einem Pflanzen- und Sachregister.

Die Verfasserin stellt in diesem Band eine grosse Menge von sehr zeitraubenden anatomischen Untersuchungen dar. Diese Fülle an sorgfältig zusammengestelltem Material ermöglicht fundierte, komplette, in diesem Masse einmalige Schlussfolgerungen zu ziehen. Auf Grund der Analyse der einzelnen Vegetationsschichten konnte gezeigt werden, dass es im Laufe des Bäumehöhenwachstums zur Transformation eines hygromorphen Schattenblattes in ein xeromorphes Sonnenblatt kommt, was natürlich nicht nur in Veränderungen der Blattgrösse und -form, aber auch der inneren Blattstruktur zum Ausdruck kommt. Verschiedene Pflanzenarten meistern dieses Problem auf verschiedene Art und Weise. Diese Anpassungen an starke Einstrahlung und schlechtere Wasserversorgung, ja sogar Trockenperioden, werden eingehend im Kapitel „Ökologische Aspekte“ behandelt, welches ich als besonders gelungen finde.

Der Wert des Buches liegt hauptsächlich darin, dass es ein umfangreiches Datenbuch über ein noch wenig bekanntes Gebiet ist, das Vergleiche verschiedenster Art ermöglicht. Es füllt erfolgreich eine Erkenntnislücke auf dem Gebiet der Blattstruktur feuchter Tropenwälder.

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Figs. 1–4. Ultrathin sections prepared from leaf petioles and midribs of reverted red currant plants cv. Heinemann's rote spätlesse. Cell wall disintegration of tracheids in vascular elements was consistently observed. (1 – 25 000 $\times$; 2 – 22 200 $\times$; 3 – 44 000 $\times$; 4 – 60 000 $\times$).

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