6. TEM STUDY OF ULTRATHIN SECTIONS OF THE PARTIALLY DEGRADED WALL OF THE SCLEREIDS OF ARMENIACA VULGARIS LAM.

Short communication

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It was previously emphasized (KEDVES 1991a, b) that our research program about the biopolymer organization of the plant cell wall is not restricted only to the resistant wall of the spores and pollen grains. All kinds of the plant cell wall are to be included in this research program. The extremely thickened cell wall of the sclereids of *Armeniaca vulgaris* LAM. are also considered. As regards the methods of investigations it is necessary to emphasize the following.

1. The dried endocarp of *Armeniaca vulgaris* LAM. was broken in a porcelain mortar. The granules of the endocarp were partially degraded with two kinds of solvents: merkapto-ethanol and diethylamin. Temperature: 30 °C, length of time vary from 1 day up to 5 days.

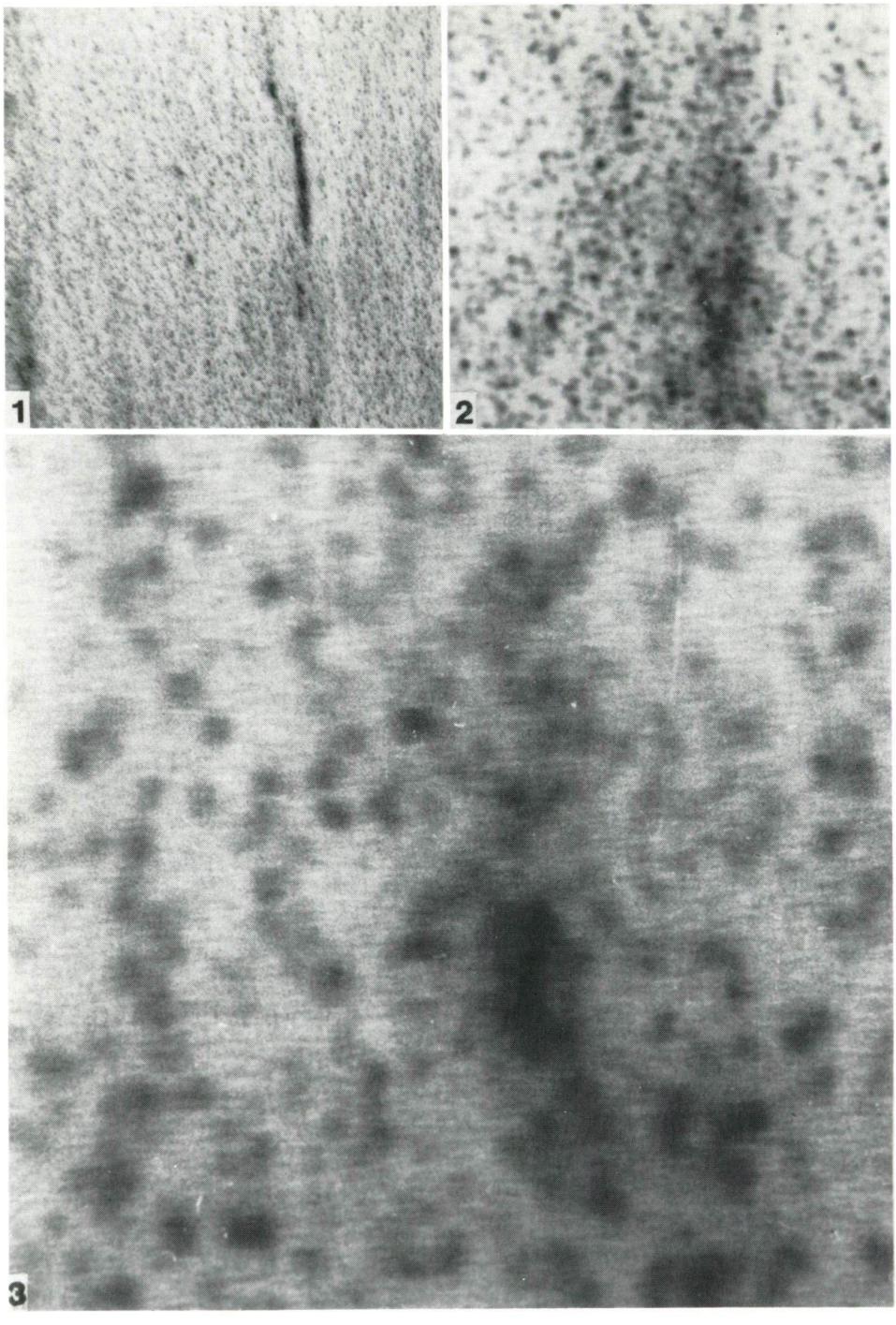
2. For all kinds of the partially degraded cell wall two further methods were used.

2.1. The solvated sclereids were fragmented in a magnetic stirrer for half an hour. The residue was mounted on collodium protected grids, and investigated with transmission electron microscope. A preliminary report on the first results was published; KEDVES and ROJIK (1991). Regular pentagons as basic units, Penrose-like highly organized biopolymer structures were observed. Moreover interesting information was obtained about the stabilizing system of the quasi-crystalloid skeleton, with a peculiar molecular torsion.

2.2. To get complete information from all kinds of partially degraded sclereids, ultrathin sections were also made and investigated with the TEM instrument of the Biological Research Center of the Hungarian Academy of Sciences (OPTON 902),

Plate 6.1. ▶

1–3. *Armeniaca vulgaris* LAM., sclereids.
Experiment No: 954, TEM pictures from the ultrathin sections of the partially degraded secondary wall.
1. Negative no: 1347, 100.000x.
2. Negative no: 1348, 250.000x.
3. Negative no: 1349, Magnification 1 million.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resolution 2.5—3.5 Å. Among the first results the following are presented herein. Taking into consideration the novelty of this kind of researches this paper is "pro parte" a little methodological. For example the results of two experiments are described and discussed in this paper. Experiment No: 954 (Plate 6.1., 1—3) (10 mg fragmented sclereids of endocarp+1 ml merkapto-ethanol, temperature 30 °C, length of time 2 days, washing with distilled water) Experiment No: 962 (Plate 6.2., 1—4) (10 mg fragmented sclereids of endocarp+1 ml merkapto-ethanol, temperature 30 °C, length of time 4 days, washing with distilled water). The residues were fixed with OsO_4 aq. dil., embedded in Araldite (Durcupan, Fluka). The ultrathin sections were made on a Porter Blum ultramicrotome with glass knives.

On Plate 6.1., fig. 1., the finely lamellar system of the cell wall of the sclereids is well illustrated. The biopolymer structure is oriented, forming a fibrillar and/or lamellar system. In the higher magnified pictures (Plate 6.1., fig. 2,3) this orientation is not so characteristic. From another point of view, concerning to fig. 3, Plate 6.1., at magnification 1 million we can emphasize the following.

There are globular units of 4—8 Å in diameter. Their arrangement is more or less linear or irregular. This globular system is embedded in a fine network-like matrix. The meshes of this biopolymer structure is 2.5—4 Å. In fig. 3. it is well shown that the partial degradation is not in an advanced phase. In this respect the solvatation during 4 days (experiment No: 962) with the same solvent is extremely clear. The molecular system of the "matrix" is very characteristic. The larger globular units of 4—8 Å in diameter are also much more characteristic than at the previous experiment. Moreover at this experiment it is well shown that these larger units are composed of smaller ones. Taking into consideration "some possible structures of polycondensed aromatic molecules" published by OBERLIN, BOULMIER, and VILLEY (In: DURAND, ed., 1980), p. 216, particularly the formula "m", Fig. 7.20., it is probable that these biopolymer structures are the components of the aromatic stabilizing system. Following the above mentioned formula the size of three alternate benzine ring is 7.1 Å, one benzine ring is encircled with six further ones. As regards the low magnified pictures (Plate 6.2., figs. 1—3) the fine lamellar ultrastructure of the cell wall is well shown at the lowest magnification, at 25.000x. The complete "monographic elaboration" of the full experimental data will be the subject of further publication.

Acknowledgements

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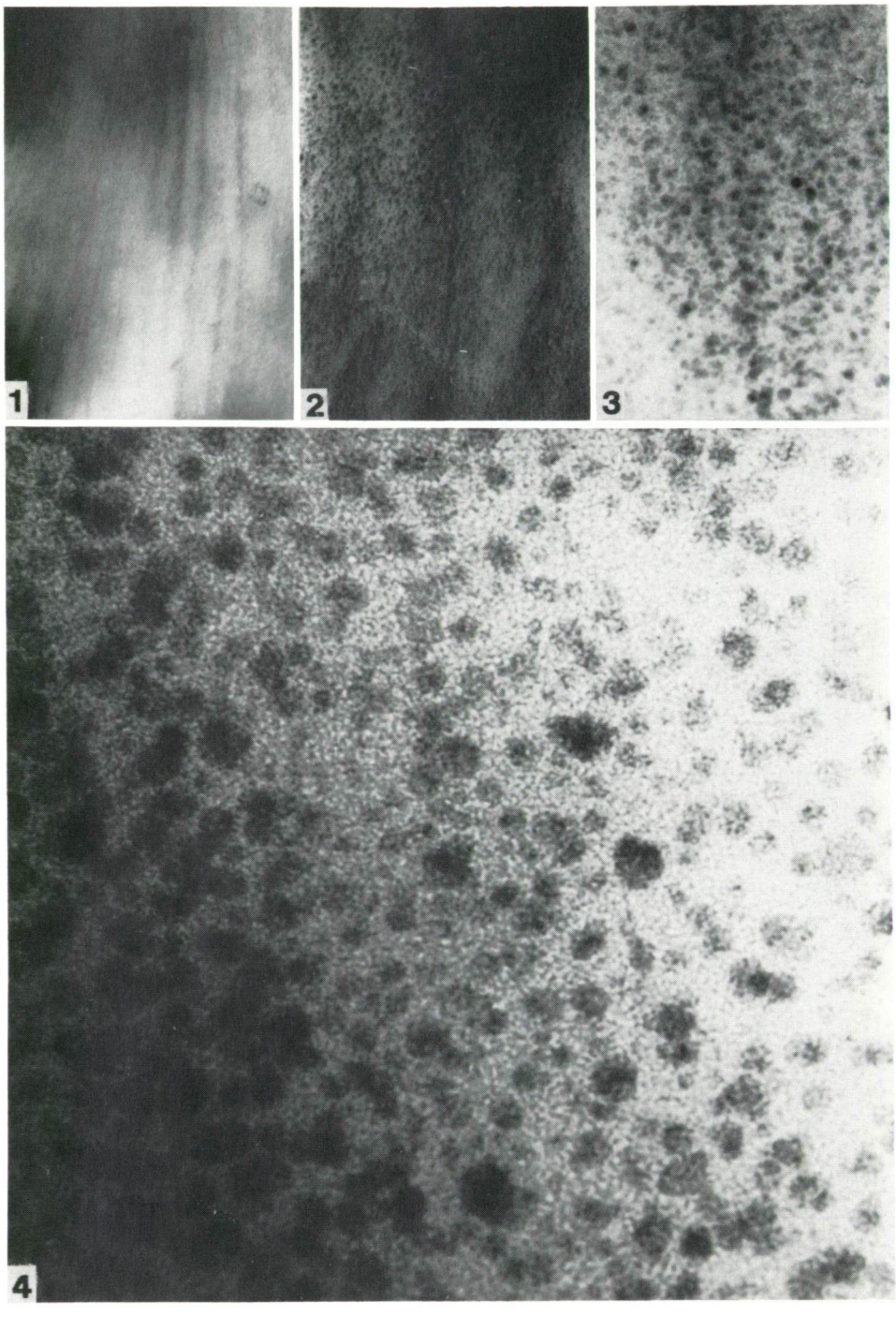
Plate 6.2. ▶

1—4. *Armeniaca vulgaris* LAM., sclereids.
Experiment No: 962, TEM pictures from the ultrathin sections of the partially degraded secondary wall.
1. Negative no: 1373, 25.000x.
2. Negative no: 1374, 100.000x.
3. Negative no: 1375, 250.000x.
4. Negative no: 1376, Magnification 1 million.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References

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KEDVES, M. (1991b): Quasi-crystalloid biopolymer structures from plant cell walls (In Hungarian). – 100 éves a MBT Bot. Szakoszt, Bio Tár VII, 3.

KEDVES, M. and ROJIK, I. (1991): Quasi-crystalloid biopolymer organization from the sclereids of *Armeniaca vulgaris* LAM. In: Plant Cell Biology and Development *2*, ed.: M. KEDVES. 59–62, Szeged.

OBERLIN, A., BOULMIER, J. L. and VILLEY, M. (1980): Electron microscopic study of kerogen microtexture. Selected criteria for determining the evolution path and evolution stage of kerogen. In: Kerogen insoluble organic matter from sedimentary rocks, ed.: DURAND, B., Éditions Téchnip., Paris, 191–241.

Chronicle

Visiting scientists

Dr. M. T. FERNANDEZ MARRÓN (U.E.I. of Paleontology, Institut of Economic Geology, C.S.I.C.–U.C.M., Madrid, Spain).

During her stay in Szeged (11. 6. 1991–21. 6. 1991) the 2nd contribution of this number was completed. Outside of our laboratory she visited the EM Laboratory of the Institute of Biophysics (Hungarian Academy of Science) and continued discussions about the problems of the TEM methods with Dr. Á. PÁRDUTZ.

Dr. B. JELEN (Geological Survey of Ljubljana, Ljubljana, Republic of Slovenia).

(15. 12. 1991–18. 12. 1991) A remarkable number of slides containing fossil palynomorphs from Tertiary sediments of Slovenia were investigated by the LM method. Among the spore-pollen assemblages from different localities the so-called "Dorog type" middle Eocene one was also identified. Scientific co-operation was planned and organized. Dr. B. JELEN continued fruitfull discussions with Prof. Dr. T. SZEDERKÉNYI (Department of Mineralogy, Geochemistry and Petrology of the J. A. University).

International laboratory activity

On the XII[e] Symposium APLF; Biogeographie et Palynologie (Caen, 23–27 September 1991) Dr. M. KEDVES presented his lecture as follows: "Les modeles à trois dimension de l'organisation biopolymère du sporoderme". Visiting scientist during two weeks in Spain (8. 10. 1991–22. 10. 1991) fruitful discussions were continued with the professors and researchers of the following institutions: Dr. J. CIVIS LLOVERA, Dr. F. VALLE HERNÁNDEZ, Dr. M. R. RIVAS CARBALLO, Dr. J. ABEL FLORES (Departamento de Geologia, Facultad de Ciencias, Universidad de Salamanca), Dr. J. DE PORTA, Dr. N. SOLÉ DE PORTA, Dr. JORDI MARTINELL, Dr. C. MARTIN CLOSAS, Dr. R. DOMENECH (Universitat de Barcelona, Departament de Geologia Dinamica, Geofisica i Paleontologia, Facultad de Geologia, Zona Universitaria de Pedralbes), Dr. J. A. SEAONE-CAMBA, Dr. M. SUAREZ-CERVERA, J.