3. NEW DATA CONCERNING THE SOLUBILITY OF THE POLLEN GRAINS OF THE GENUS QUERCUS L.

Short communication

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A long time ago, it was established, that the solubility and the resistance of the different components of the sporopollenin is the base of investigation of the organization and symmetry of the different levels of the biopolymer structures (cf. SOUTHWORTH, 1986, ROWLEY and PRIJANTO, 1977, etc.). In our laboratory several kinds of partial degradation experiments were carried out. Different solvents and/or different oxidizing agents were used for the partial degradation. The investigations were made with the LM and the TEM method. During our experiment series (KEDVES and GÁSPÁR, 1994) we investigated the solubility of the sporoderm of the species as follows: *Ustilago maydis, Equisetum arvense, Encephalartos ferox, Pinus griffithii, Quercus robur* and *Juglans major.* Two solvents (diethylamine and merkaptoethanol) were used. Among the first results the most surprising one was the unexpected solubility of the exines of the pollen grains of *Quercus robur.* Diethylamine after 30 days dissolved near entirely the external part of the pollen wall. In contrast to this, the peculiar, strong resistance of the exine of *Juglans major* may be pointed out. It was self evident, that in the case of the genus *Quercus* it is necessary or near obligatory to accomplish controlling experiments. These investigations were made during this spring (1995). The experimental material was collected by I. GÁSPÁR. Pollen grains of *Quercus robur* were collected from four localities: F–1, F–2, from the Botanical Garden of the J. A. University, U–1, U–2, from the Park of Ujszeged. Further species *(Q. libani, Q. pubescens, Q. cerris)* from the Botanical Garden of the J. A. University.

The data of the collections and the experiments are the following:

Q. robur F–1, collected on 24.04.1995, experiments No: 1/7 – 97 (diethylamine), 1/7 - 98 (merkaptoethanol), F-2, collected on 24.04.1995, experiments No: 1/7 - 100 (diethylamine), 1/7 – 101 (merkaptoethanol), U-l, collected on 27.04.1995, experiments No: 1/7 – 103 (diethylamine), 1/7 – 104 (merkaptoethanol), U–2, collected on 27. 04. 1995, experiments No: 1/7 – 106 (diethylamine), 1/7 – 107 (merkaptoethanol).

Q. libani, collected on 26. 04. 1995, experiments No: 1/7 – 94 (diethylamine), 1/7 – 95 (merkaptoethanol).

Q. pubescens, collected on 26. 04. 1995, experiments No: 1/7 – 109 (diethylamine), 1/7 - 110 (merkaptoethanol).

Q. cerris, collected on 24. 04. 1995, experiments No: 1/7 – 112 (diethylamine), 1/7 – 113 (merkaptoethanol).

Temperature: 30 °C, length of time 30 days, from 28. 04. 1995. 5 mg pollen material + 5 ml H_2O + 0.2 ml solvent.

Results

Quercus robur L. (Plate 3.1., figs. 1-12, plate 3.2., figs. 1,2).

Experiment No: 1/7 – 97 (Plate 3.2., figs. 1,2). – The external part of the exine was not completely dissolved, the protoplasm is separated from the ectexine.

Experiment No: 1/7 – 98 (Plate 3.2., figs. 3,4). – Different kinds of alterations were observed, in consequence of the different degrees of the contraction of the protoplasm. The exine is not completely dissolved.

Experiment No: 1/7 – 100 (Plate 3.1., figs. 5,6). – So-called "hiatus forms" were also observed, the protoplasm is secondarily granular.

Experiment No: 1/7 – 101 (Plate 3.1., fig. 7). – The alteration is similar as the type illustrated in fig. 4, Plate 3.1.

Experiment No: 1/7 – 103 (Plate 3.1., figs. 8,9). – The alteration is essentially identical to the experiment No: 1/7 – 100.

Experiment No: 1/7 – 104, (Plate 3.1., fig. 10). – This result is identical to the previous one; figs. 4,7, Plate 3.1.

Experiment No: 1/7 – 106 (Plate 3.1., figs. 11,12). – This result is identical to the first one, illustrated in figs. 1,2, Plate 3.1.

Experiment No: 1/7 – 107 (Plate 3.2., figs. 1,2). – The alteration is similar as the experiment 1/7 – 98 illustrated in Plate 3.1., fig. 3.

Quercus libani OLIVER

Experiment No: 1/7 – 94 (Plate 3.2., figs. 3,4). – The result is more or less identical to the first one, cf. figs. 1,2, in Plate 3.1.

Experiment No: 1/7 – 95 (Plate 3.2., figs. 5,6). – The result is identical to those illustrated in the Plate 3.2., figs. 1,2.

Quercus pubescens MILLD.

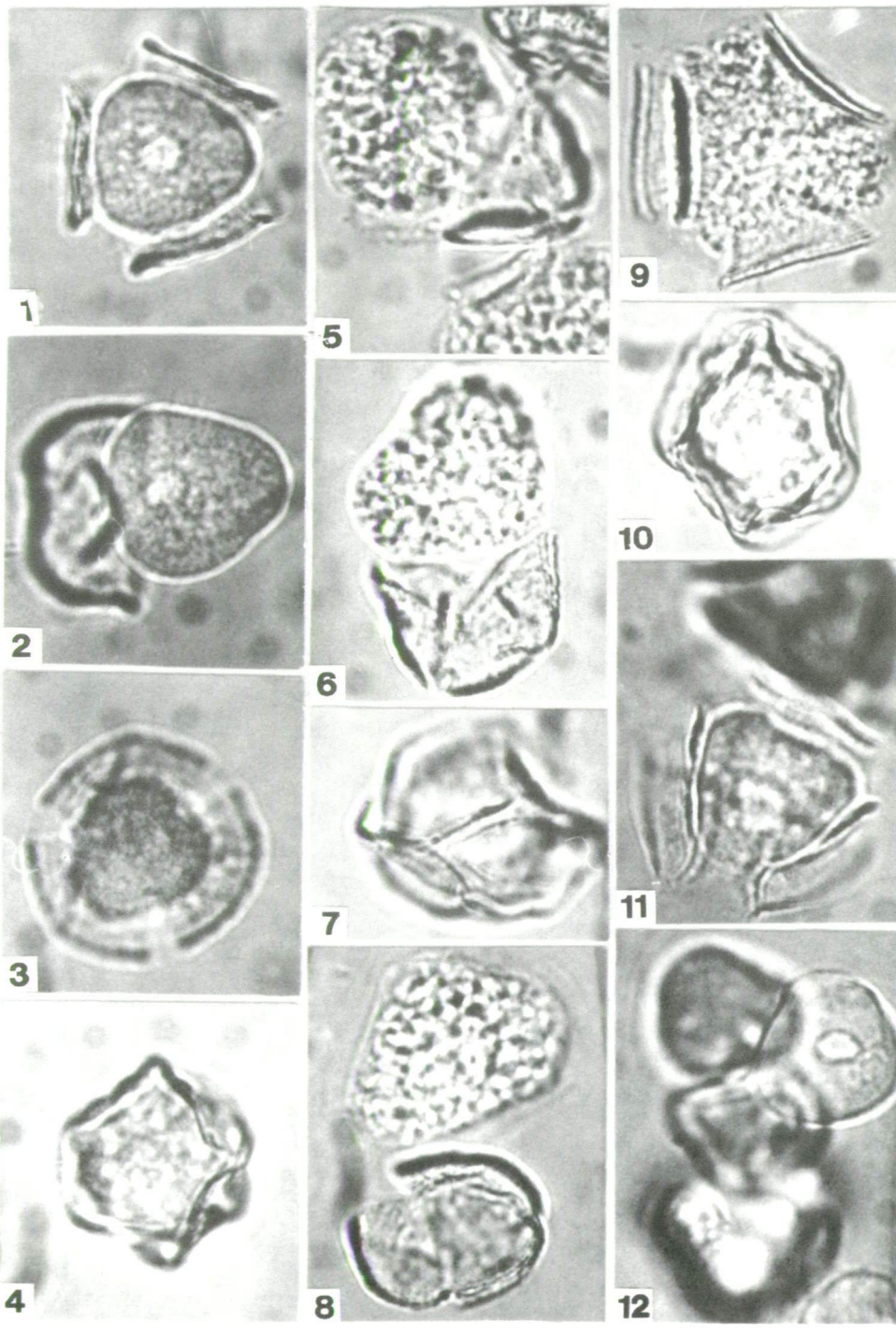
Experiment No: 1/7 – 109 (Plate 3.2., figs. 7-9). – The two kinds of alterations were observed as at the experiment No: 1/7 – 98 (Plate 3.1., figs. 3,4).

Experiment No: 1/7 – 110 (Plate 3.2., fig. 10). – The solvent effect is identical to the specimen illustrated in fig. 4, Plate 3.1.

Quercus cerris L.

Experiment No: 1/7 – 112 (Plate 3.2., fig. 11). – The solvent effect is identical to those of *Q. libani* (Plate 3.2., fig. 3).

Experiment No: 1/7 – 113 (Plate 3.2., fig. 12). – The result of this experiment is identical to those illustrated in fig. 4, Plate 3.1.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On the basis of the present day results, we can conclud the following:

1. The peculiar weak resistance of the exine of the genus *Quercus* was demonstrated by the repeated experiments.
2. Regarding the details, the dissolution of the ectexine with diethylamine was not so complete as during our first, and published experiments (cf. KEDVES and GÁSPÁR, 1994).
3. Differences were observed in the fine details of the measure of the dissolution of diethylamine within the species (*Q. robur*), specimens collected from different localities.
4. Similarities and differences were observed between the different species of the genus *Quercus*.
5. The dissolution of the exines with merkaptoethanol was relatively unanimous.
6. Finally, these new data verifyed again the extreme complexity and multifactorial character of the sporopollenin.

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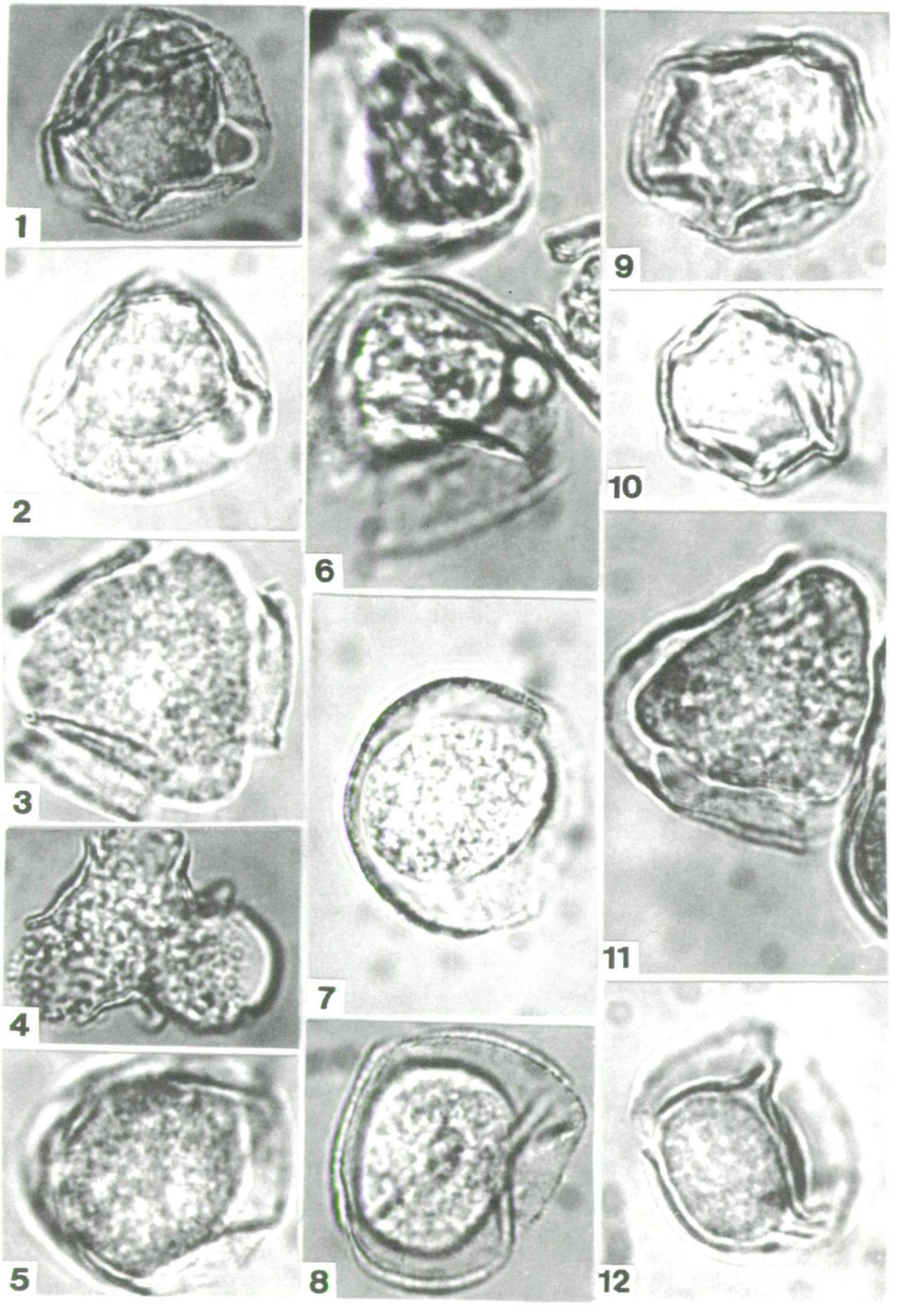
◂ Plate 3.1.

1–12. *Quercus robur* L., Recent.
1–4. Locality: F–1.
1,2. Experiment No: 1/7–97.
3,4. Experiment No: 1/7–98.
5–7. Locality: F–2.
5,6. Experiment No: 1/7–100.
7. Experiment No: 1/7–101.
8–10. Locality: U–1.
8,9. Experiment No: 1/7–103.
10. Experiment No: 1/7–104.
11,12. Locality: U–2, Experiment No: 1/7–106.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◂ Plate 3.2.

1,2. *Quercus robur* L., Recent., locality: U–2, Experiment No: 1/7–107.
3–6. *Quercus libani* OLIVER, Recent.
3,4. Experiment No: 1/7–94.
5,6. Experiment No: 1/7–95.
7–10. *Quercus pubescens* MILLD., Recent.
7–9. Experiment No: 1/7–109.
10. Experiment No: 1/7–110.
11,12. *Quercus cerris* L., Recent.
11. Experiment No: 1/7–112.
12. Experiment No: 1/7–113.