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SHORT COMMUNICATION

EFFECT OF THE HIGH TEMPERATURE ON THE MORPHOLOGICAL CHARACTERISTIC FEATURES OF THE SPOROMORPHS I

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The effect of high temperature on the sporopollenin during fossilization was first recognized by KIRCHHEIMER (1933a, b, 1935). Several results of experimental studies on this subject were published later; e. g.: SENGUPTA and ROWLEY (1974), PIÉRART (1978), ROWLEY et al. (1981). In our researches on the partial degradation of the plant cell wall high temperature as one experimental factor was also used. These experiments are in connection with the colour changes of the sporomorphs, which are useful indicators in the reconstruction of the paleoenvironment during sedimentation. Cf.: WILSON (1971), MCINTYRE (1972), GRAY and BOUCOT (1975), MANUM et al. (1977). Our investigation material was frozen at —20 °C after collection. Pollen grains of *Betula verrucosa* L., (Fig. 1—12), *Corylus avellana* L. (Fig. 13—24), *Carpinus betulus* L. (Fig. 25—32) and *Juglans nigra* L. (Fig. 33—39) were the subjects of our first experiments. From each species investigated 5 mg pollen material were measured five times. Temperature: +200 °C, lenght of time: 1, 2, 3, 4, 5, hours. The slides for light microscope investigations were prepared in glycerine-jelly hydrated of 39.6 per cent. Among the first results changes in the taxonomically important morphological characteristic features are summarized as follows:

1. The effect of +200 °C temperature may essentially change the basic morphological characteristic features of the pollen grains. This phenomenon was first observed at the triaperturate angiosperm pollen grains, as *Betula verrucosa* L. (Fig. 3—12) and *Corylus avellana* L. (Fig. 15—24). It is to be seen that the secondary morphological characteristic features are similar or identical to those of the early brevaxonate pollen grains of the European Upper Cretaceous (= *Normapolles* Group). Not so characteristic changes were observed at the pollen grains of *Carpinus betulus* L. (Fig. 27—32). Fig. 30 may be emphasized in this respect. It is interesting that no qualitative change at the pollen grains of *Juglans nigra* L. were observed (Fig. 34—39).

2. The morphological characteristics which appeared in consequence of high temperature are useful to solve phylogenetical and taxonomical problems. In this respect the pollen grains of *Betula* and *Corylus* may de derived from early brevaxonate early angiosperm of Upper Cretaceous type.

Detailed elaboration of these data is in progress, similarly further experiments on subsequent taxa.

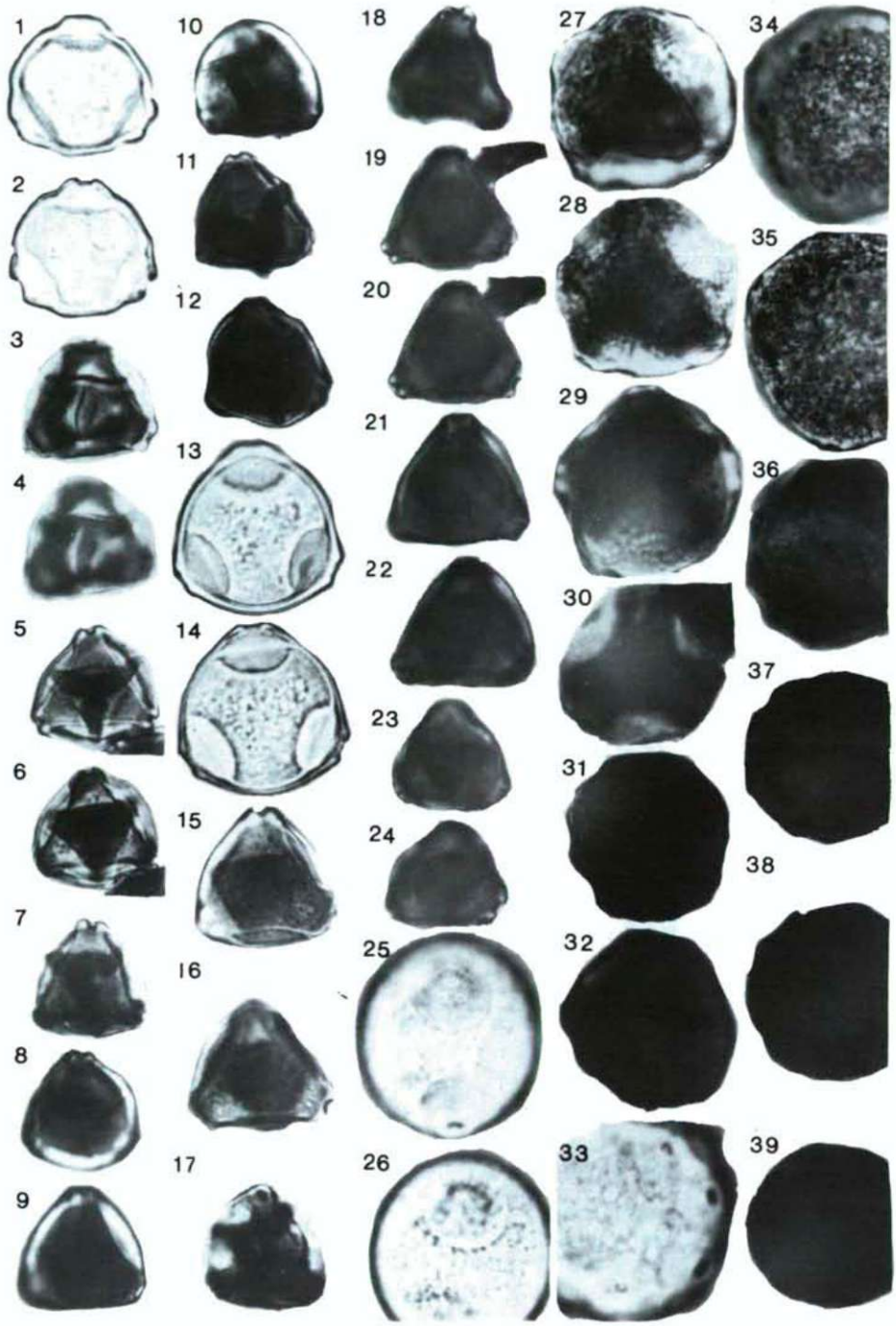
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Fig. 1—12. *Betula verrucosa* L.

1,2. Pollen grain without preparation or experiment, 3—12. Pollen grains after heating at +200 °C, 3,4. Length of time: 1 hour, 5,6. Lenght of time: 2 hours, 7,8. Lenght of time: 3 hours, 9,10. Length of time: 4 hours, 11,12. Length of time: 5 hours.

Fig. 13—24. *Corylus avellana* L.

13,14. Pollen grain without preparation or experiment, 15—24. Pollen grains after heating at +200 °C, 15,16. Length of time: 1 hour, 17,18. Length of time: 2 hours, 19,20. Length of time: 3 hours, 21,22. Length of time: 4 hours, 23,24. Length of time: 5 hours.

Fig. 25—32. *Carpinus betulus* L.

25,26. Pollen grain without preparation or experiment, 27—32. Pollen grains after heating at +200 °C, 27,28. Length of time: 1 hour, 29. Length of time: 2 hours, 30. Length of time: 3 hours, 31. Length of time: 4 hours, 32. Length of time: 5 hours.

Fig. 33—39. *Juglans nigra* L.

33. Pollen grain without preparation or experiment, 34—39. Pollen grains after heating at +200 °C, 34,35. Length of time: 1 hour, 36. Length of time: 2 hours, 37. Length of time: 3 hours, 38. Length of time: 4 hours, 39. Length of time: 5 hours.