

NEW MEGASPORES OBSERVED IN THE AMASRA PRODUCTIVE CARBONIFEROUS BASIN

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INTRODUCTION

In recent years the palynological¹ studies of caustobiolith strata have registered some important progress. These studies were applied to apparently unfossiliferous rocks, to the correlation of coal seams, as well as to the oil shales, and obtained very useful results. In this respect the palynological investigations have been carried out by the M.T.A. Institute in the Amasra Carboniferous Basin. The Carboniferous strata of this district consist of sandstones,² conglomerates, siltstones, gray or dark-gray shales and ferruginous siltstones. The coal seams are irregularly deposited in the Westphalian D - C and A measures, their vertical distances (between the two coal seams) as well as their thicknesses are very variable.

MATERIAL AND METHODS

All coal samples of this study (with few exceptions) were prepared from the coal borings executed by the M.T.A. Institute in the Amasra Carboniferous Basin during the year 1960-1961.

As a result of this palynological study, six new species of Megaspores have been found and they are stratigraphically and systematically described below. For the maceration of coal samples Schulze and Zetzsche methods were used.

SYSTEMATIC DESCRIPTION

*Knoxisporites tokayi*³ sp. n.

P1. I, Fig. 1

Generic diagnosis (emended)⁴. — The equatorial outline of the trilete micro- and megaspores is circular or poligoual. Interray muri may be located in

¹ Palynology, a term coined by Hyde and Williams (Hyde, 1944), means pollen and spore science.

² Calcareous sandstones are included in Permian and Stephanian series. The Rotliegendes series (Permian + Stephanian) do not contain fossils or coal seams.

³ This species is named in honor of Dr. Melih Tokay, Director, the Economic Geology Division, M.T.A. Institute, who has contributed important studies in the Carboniferous Basin of Turkey.

⁴ See also ;R. Potonie and G. Kremp, 1955, p. 114.

distal (in species *instarrotulae*, *hageni*) or proximal surface (in species *tokayi*) of the spore body. In some cases these structural elements have been surrounded with equatorial folds, which have built in some types (in species *trinodis*) three lobes on the proximal side. Moreover, another differentiation is seen in + circular or + polygonal unthickened centrifugal area on the distal pole (as apparent in species *hageni* and *polygonalis*).

Description of the new species. — Trilete interray muri are strongly developed and nearly reaching to the equator; triradiate ridges (200 microns long, about 8-10 microns high and 15 microns wide), though not as developed as interradial muri, are however clearly distinguishable. Spore body flattened in optic direction. The holotype dimensions are 875-1000 microns long; interray muri (375 microns long, 30 microns high and 60-70 microns wide) join each other on the pole of the proximal surface and extend radially towards the equator. Arcuate ridges, contact areas and equatorial fold not observed. Extrema lineamenta and surface of the spore coat are laevigate. The proximal surface of the spore body has a structure (inter-ray muri), while in the distal surface such structural figures are not observed. Exine black, 35-40 microns thick.

Locality. — Amasra, Boring No. 41, 280 meters in depth.

Occurrence. — Westphalian C; only one specimen has been encountered in the Taşlı coal seam.

Tuberculatoisporites diversus sp. n.

Pl. I, Figs. 2-5; P. II, Fig. 8, Holotype Fig. 2

Description. — Trilete, irregularly oval-shaped in transverse plane, roundly oval in meridional plane, compressed in dorso-ventral and slightly oblique direction. The spore body of the holotype measures 875-1050 microns in length. Triradiate ridges (250 microns long, 15-20 microns wide and as much as 85-100 microns high) conspicuous, slightly wavy. Body of the spore, except the contact faces, very densely covered with obconical papillae (25-40 microns long and 30-50 microns wide) that seem to touch each other. Arcuate ridges well developed and wavy. Contact areas loosely ornamented with small, in some cases bright, and spherical projections (20-30 microns long). Spore body black and about 40-50 microns thick.

Comparison. — This species most resembles *Tuberculatoisporites (Triletes) eregliensis* (Dijkstra S. J.) Pierart P. However, *Tuberculatoisporites diversus* differs from *Tuberculatoisporites eregliensis* in having wavy structure of arcuate ridges as well as of triradiate ridges.

Locality. — Amasra Boring No. 41, 280 and 623 meters in depth.

Occurrence. — Westphalian D-C; 10 specimens were found.

*Colisporites pekmezçileri*⁵ sp. n.

Pl. II, Figs. 12-17; Holotype Fig. 13

Description. — The shape of the megaspores is circular or roundly-triangular, trilete, and compressed in vertical or oblique direction. The holotype

⁵ The name *pekmezçileri* was given to this new species in honor of Sadettin Pekmezçiler, Mining Engineer, who has done valuable studies in the Carboniferous and lignite areas.

dimension is 500 microns. Triradiate ridges [225 microns long (approximately as broad as high, in central part), near the apex they are raised into a vestibule], towards the periphery of the spore more or less swollen. Contact faces sparsely ornamented, with spherical or hemi-spherical, bright black-colored papillae, which are 8-10 microns in diameter. Spore body, except contact faces, ornamented with closely arranged coni, 30-35 microns in length. Arcuate ridges not present, exine dark-brown colored, 35-40 microns thick.

Comparison.—In some respects *Colisporitespekmezçileri* resembles *Colisporites olgae* Pot. and Kr., but differs from it by the vestibule formation of the triradiate ridges.

Locality.—Amasra and Kabalaklar village (Beycuma).

Occurrence. — Westphalian B-A; 20 specimens were found.

Bacuiriletes pilosus sp. n.

P1. III, Fig. 18

Description. — Trilete, circular in equatorial plane, compressed in dorso-ventral or slightly oblique direction. The holotype measures 300-350 microns. Triradiate ridges (75-100 microns long) provided with pila (oid) bodies. Arcuate ridges indistinguishable. Whole spore body, excluding the contact area, is very densely covered with pila, which appear as a tuberculate layer in optic view. Each pilum has a head (8-10 microns in diameter) and baculum (20-25 microns in length). Spore body about 20-25 microns thick and black-colored.

Locality. — Amasra, Boring No. 47; 713 meters in depth.

Occurrence. — Lower Westphalian C; two specimens were found.

Trileites externus sp. n.

P1. III, Fig. 19

Description. — Spore is radial, trilete, body roundly triangular in outline, margin of the spore wall between radii convex in transverse plane, corners opposite radii slightly beaked and optically flattened. Triradiate ridges (450 microns long, as broad as high) reaching to the equator, approximately 10-15 microns overlap. On the distal surface of the spore body, between the corners, are located three more or less ellipse-shaped characteristic folds which are not cylindrical. Extrema lineamenta and the surface of the spore coat are levigate; sculptural elements are totally lacking. Exine shiny, black-colored and about 30-35 microns thick.

Locality. — Amasra, Boring No. 35; 735 meters in depth.

Occurrence. — Westphalian C; only one specimen was found, but its conservation is excellent.

***Trileites tenuitates* sp. n.**

PL III, Figs. 20, 21; Holotype Fig. 21

Description. — Spores are roundly triangular with broadly rounded angles in transverse plane. Flattened in dorso-ventral direction. The holotype dimensions are 350-430 microns in length. Triradiate ridges as broad as high, and nearly reaching to the equator. Arcuate ridges not visible and there where they meet triradiate ridges slightly curved inwards of spore body. Proximal area is slightly more elevated than the rest of the equator. Inside the spore is seen a central body, round in shape, measuring 325 microns in diameter. Ornamentation is very finely-granulose, each granule about 5-7 microns long, granulation very closely spaced and clearly seen. Exine reddish-dark brown colored and 15-18 microns thick.

Locality. — Amasra, Boring No. 35; 603 meters in depth.

Occurrence. — Upper Westphalian C; only two specimens were observed.

Comparison. — *Trileites tenuitates* sp. n. resembles *Triletes rotundus* Prem Singh in general shape and in having a central body, but the endospore-like body in *T. rotundus* is spherical and bigger, moreover its arcuate ridges are visible, and, finally, its triradiate ridges are broad.

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EXPLANATION OF PLATES

PLATE I

- Fig. 1 — *Knoxisporites tokayi* sp. n. X 50
Figs. 2-5 — *Tuberculatoisporites diversus* sp. n. X 50
Figs. 6-7 — *Tuberculatoisporites eregliensis* (Dijkstra) Pierart

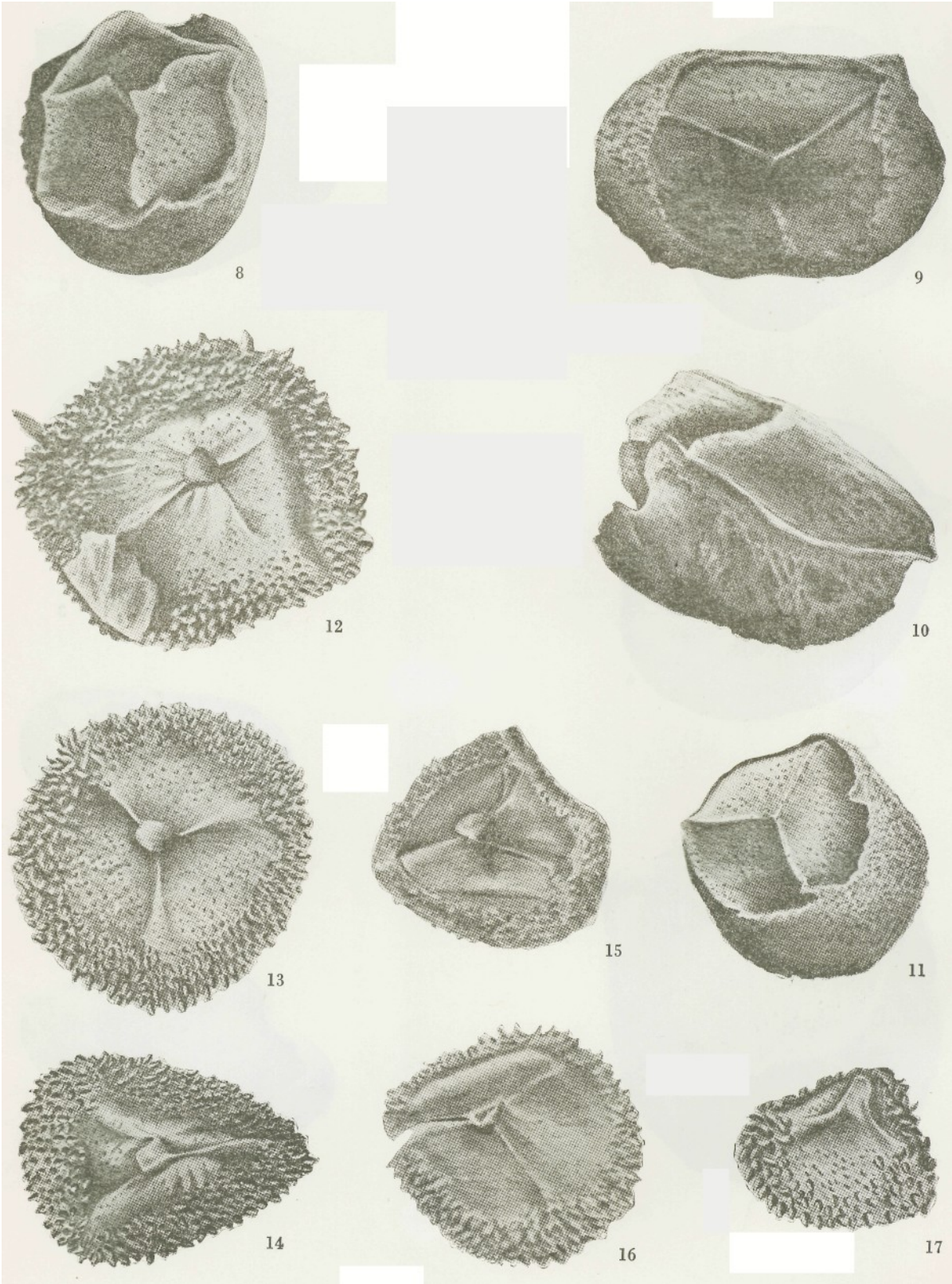
PLATE II

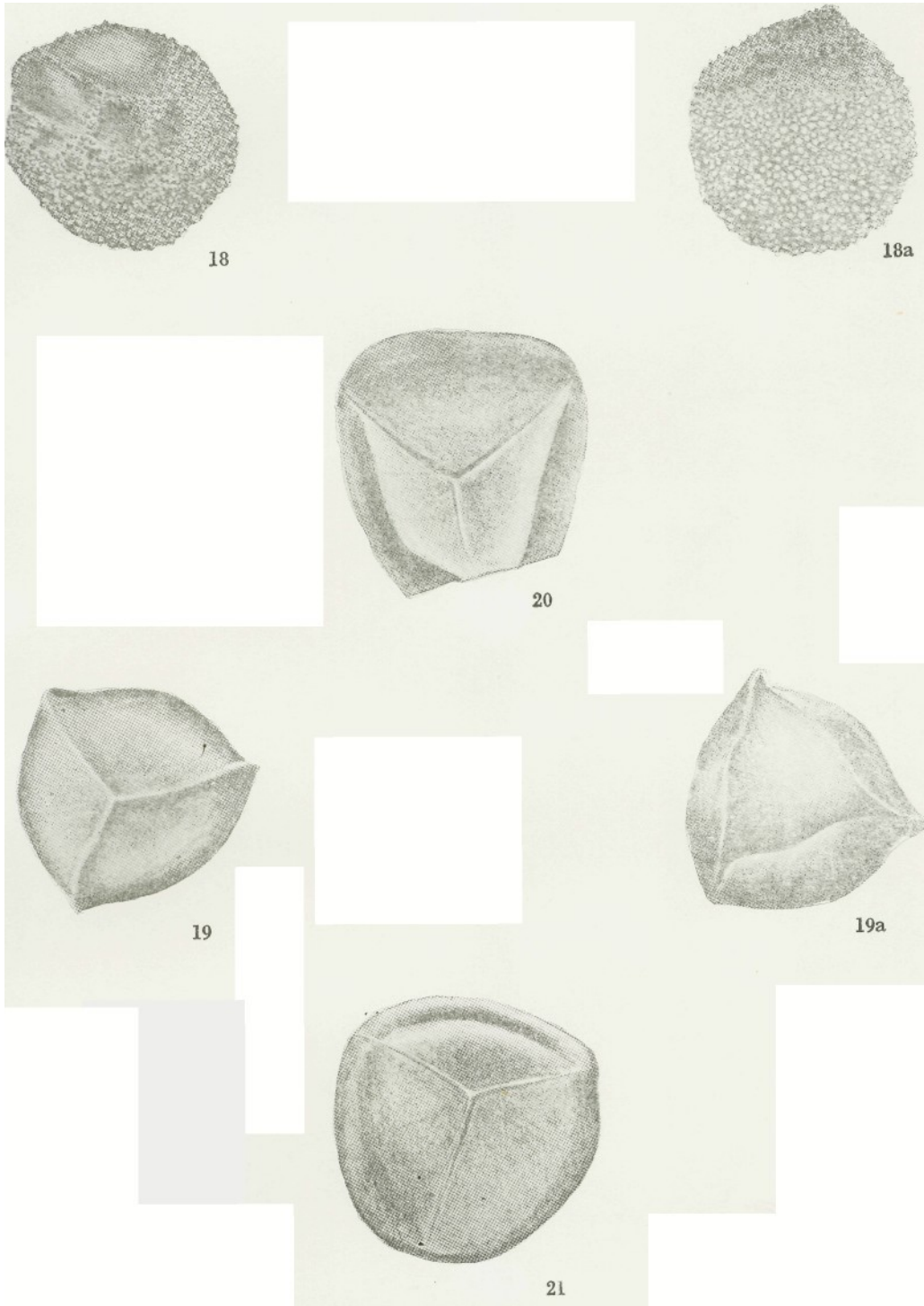
- Fig. 8 — *Tuberculatoisporites diversus* sp. n. X 50
Figs. 9-11 — *Tuberculatoisporites eregliensis* (Dijkstra) Pierart
Figs. 12-17 — *Colisporites pekmezçileri* sp. n. X 70

PLATE III

- Fig. 18** — *Bacutriteles pilosus* sp. n. X 50
Fig. 18a — *Bacutriteles pilosus* (distal)
Fig. 19 — *Trileites externus* sp. n. X 70
Fig. 19a — *Trileites externus* (distal)
Figs. 20, 21 — *Trileites tenuitates* sp. n. X 70







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