

CONTRIBUTIONS TO THE EUROPEAN POLLEN DATABASE

Peat bog Beliya Kanton (Western Rhodopes Mountains, South Bulgaria)

MARIA LAZAROVA¹, SPASSIMIR TONKOV^{2*}, ELENA MARINOVA³, DIMITER
IVANOV¹ & ELISSAVETA BOZILOVA²

¹*Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences,
Sofia-1113, Bulgaria*

^{2*}*Laboratory of Palynology, Department of Botany, Faculty of Biology, Sofia
University "St. Kliment Ohridski", Sofia-1164, Bulgaria*

³ *CAS, Katholieke Universiteit Leuven, Celestijnenlaan 200E, 3001-Leuven, Belgium*

* *Correspondence: Prof. Spassimir Tonkov, Laboratory of Palynology, Department of
Botany, Faculty of Biology, Sofia University "St. Kliment Ohridski", 8 Dragan Tzankov
blvd., Sofia-1164, Bulgaria; e-mail: stonkov@abv.bg; phone 359-2-8167314; fax: 359-2-
8656641*

Site details

The peat bog Beliya Kanton (N 41° 44' 0.77", E 24° 08' 22.9"; 1547 m a.s.l.) is located in the coniferous belt of the central part of the Western Rhodopes Mountains. It is formed in a depression and has almost a rectangular shape, about 380 m long and 250 m wide, crossed by a meandering stream. The site is surrounded by *Pinus sylvestris-Picea abies* forest and *Nardus stricta*, *Agrostis capillaris*, *Eriophorum angustifolium*, *Deschampsia caespitosa*, *Carex* spp., *Sphagnum* spp. grow on the bog. (Panovska, Bozilova, 1994). In the Western Rhodopes above the *Quercus* vegetation belt, *Fagus* forests mixed with *Acer pseudoplatanus*, *Populus tremula*, *Abies alba* are found on north-facing slopes. In the coniferous belt single dominant forests of *Pinus sylvestris* and *Picea abies* are widely distributed, on some places with an admixture of *Abies alba*, *Fagus sylvatica*, *Betula pendula* and *Pinus peuce* (Bondev, 2002). The present-day vegetation composition has been influenced by anthropogenic impact, including cattle-breeding, timber production and construction of reservoirs on the sites of former bogs and fens. The climate in the area is montane with a mean annual temperature of 5⁰C - 10⁰C and a mean annual precipitation of 600-800 mm with a maximum in May-June. The basic soil types are brown forest (60%), humic-carbonate and cinnamomic-forest.

Sediment description

The profile BK-2C is 105 cm deep and was collected with a Russian corer from the central part of the peat bog. The sediments are:

0-47 cm – slightly decomposed Cyperaceae peat; 47-52 cm – gyttja; 52-57 cm – light grey-yellow clay; 57-78 cm – gyttja; 78-105 cm – grey clay with sand.

Dating

The radiocarbon age of terrestrial plant macrofossils and charcoal concentrated from four bulk sediment samples was determined in the Radiocarbon Dating Laboratory at the University of Lund, Sweden. The calibration (95.4% probability) was performed with the OxCal v3.10 program (Bronk Ramsey, 2005). Results are:

a. Lab. № LuS 8983: depth 21-23.5 cm (*Carex rostrata* fruits), 405 ± 50 B.P. (1640 to -1420 A.D.)

b. Lab. № LuS 8984: depth 42.5-45 cm (*Carex rostrata* fruits), 1445 ± 50 B.P. (670 to -460 A.D.)

c. Lab. № LuS 8985: depth 57.5-60 cm (charcoal) 7015 ± 60 B.P. (6010 to -5750 B.C.)

d. Lab. № LuS 8986: depth 65-67.5 cm (charcoal) 8020 ± 60 B.P. (7080 to -6690 B.C.)

Interpretation

The pollen sum (100%) includes all pollen grains except those of Cyperaceae, aquatics, spores of mosses and pteridophytes. Selected pollen percentages are shown on Figure 1. Four pollen assemblage zones are recognized:

PAZ Rd-1, 105-77 cm: At the beginning of the Holocene the flat mountain ridges were covered by sparse *Pinus* forests with stands of *Betula*, *Juniperus* and shrubland of *Ephedra* among herb communities dominated by Poaceae, Cichoriaceae, *Achillea/Aster*, Brassicaceae, Ranunculaceae species. At lower elevation were distributed groups of broad-leaved tree vegetation composed of *Quercus*, *Tilia*, *Ulmus*, *Carpinus orientalis/Ostrya carpinifolia*. In habitats with more favorable microclimatic and edaphic conditions grew groups of *Fagus*, *Abies* and *Picea* while *Alnus* was distributed along streams and brooks. The early presence of *Juglans*, which continues throughout the entire profile is notable. A local expansion of ferns is also recorded.

PAZ Rd-2, 77-56 cm: Around 6800 B.C. changes in the forest composition took place as the broad-leaved tree vegetation dominated by *Quercus* expanded and reached its maximum

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3 distribution. Synchronously, at higher altitudes *Pinus* forests and the groups of *Betula*
4 enlarged their area mainly at the expense of the herb vegetation.
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7 PAZ Rd-3, 56-37 cm: Important changes in the tree cover occurred. The coniferous belt in
8 the Western Rhodopes dominated by *Pinus* was shaped. *Picea* and *Fagus* communities, mixed
9 with *Pinus* and *Abies* on some places, invaded the region. The broad-leaved tree vegetation
10 declined, particularly its components *Tilia* and *Ulmus*, and was restricted to its present-day
11 distribution range. After 5900 B.C. a significant change in the local hydrological conditions
12 has probably occurred. The exceptionally low pollen concentrations recorded in the grey-
13 yellow clay interval suggest that the stream could have eroded material from the site causing a
14 hiatus. Sedimentation eventually re-started, after the stream changed its course again, with
15 clayish gyttja and peat. The bog began to be overgrown by various *Carex* species and mosses.
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23 PAZ Rd-4, 37-0 cm: For the last 1200-1000 years the general trend in the vegetation
24 development comprised a further enlargement of *Pinus-Picea* forests shaping the upper tree-
25 line, particularly during the last centuries, together with a wider distribution of *Fagus*
26 communities, predominantly on northern slopes. The diverse herbaceous communities were
27 composed of Poaceae, Ranunculaceae, Brassicaceae, Caryophyllaceae and Asteraceae
28 species. Human presence and activities are indicated by continuous pollen curves of
29 *Juniperus*, *Carpinus orientalis/Ostrya* and *Rumex*. Tree felling and fire clearance on flat
30 ground were practised to obtain pastures for seasonal cattle-breeding.
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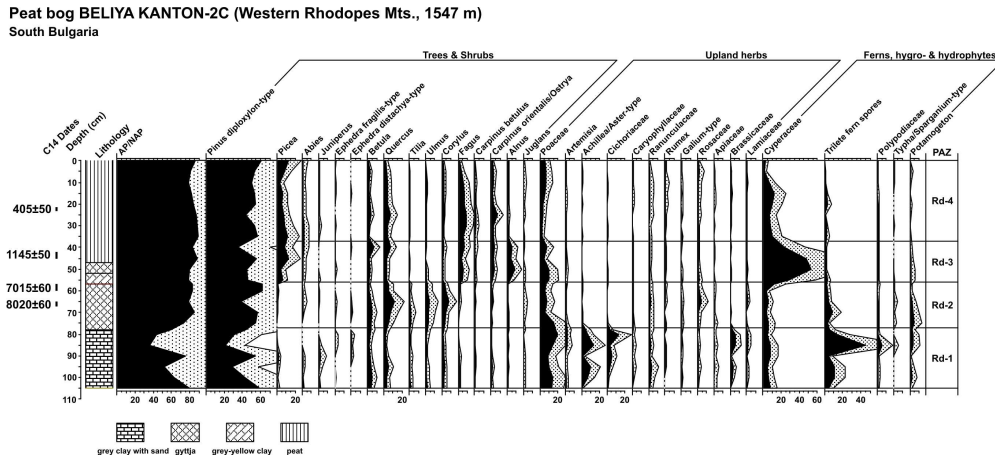
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10 **Figure caption:**

11 **Figure 1.** Pollen diagram from peat bog Beliya Kanton-2C.
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For Peer Review Only



Pollen diagram from peat bog Beliya Kanton-2C
230x103mm (300 x 300 DPI)

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