

# První suchozemské rostliny z českého siluru

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Chronostratigraphy

Biostratigraphy

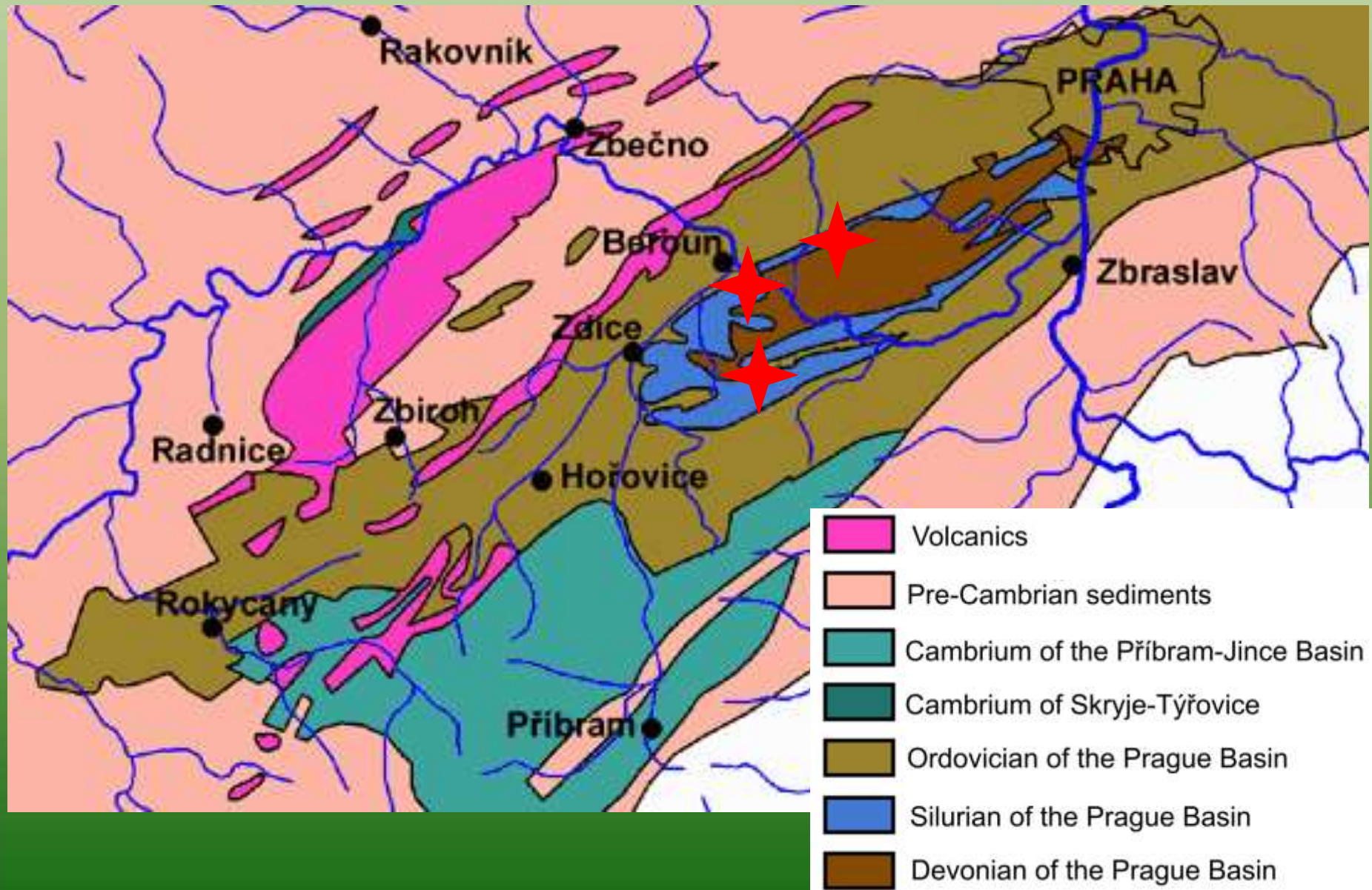
Litostratigraphy

Lithology

Chronostratigraphy	Biostratigraphy	Litostratigraphy	Lithology			
PŘÍDOLÍ	<i>M. transgrediens</i>	Požáry Formation				
	<i>M. perneri</i>					
	poloha s <i>M. beatus</i>					
	<i>M. bouceki</i>					
	<i>M. lochkovenski</i>					
	poloha s <i>M. pridoliensis</i>					
	<i>M. ultimus</i>					
	<i>M. parultimus</i>					
	<i>M. fragmentalis</i>					
	LUDLOW			<i>B. bohemicus</i> s.l.	Kopanina Formation	
				<i>M. fritschi linearis</i>		
				<i>L. scanicus</i>		
<i>L. progenitor</i>						
<i>N. nilssoni</i>						
WENLOCK	<i>P. ludensis</i>	Motol Formation				
	poloha s <i>G. nassa</i>					
	<i>T. testis</i>					
	<i>C. radians</i>					
	<i>C. perneri</i>					
	<i>C. ramosus</i>					
	<i>M. flexilis</i>					
	<i>C. rigidus</i>					
	<i>R. dubius</i>					
	<i>M. riccartonensis</i>					
	<i>C. murchisoni</i>					
	<i>C. centrifugus</i>					
TELYCHIAN	<i>C. insectus</i>	Litohlavy Formation				
	<i>S. grandis</i>					
	<i>O. spiralis</i>					
	<i>M. crenulata</i>					
	<i>M. griestoniensis</i>					
	<i>P. crispus</i>					
AEROSIAN	<i>S. turriculatus</i>	Želkovice Formation				
	<i>R. linnaei</i>					
	<i>M. sedgwickii</i>					
	<i>D. convolutus</i>					
	<i>D. pribyli</i>					
BRUGGANIAN	<i>D. pectinatus</i>	Želkovice Formation				
	<i>D. triangulatus</i>					
	<i>C. cyphus</i>					
	<i>C. vesiculosus</i>					
	<i>P. acuminatus</i>					
	<i>A. ascensus</i>					



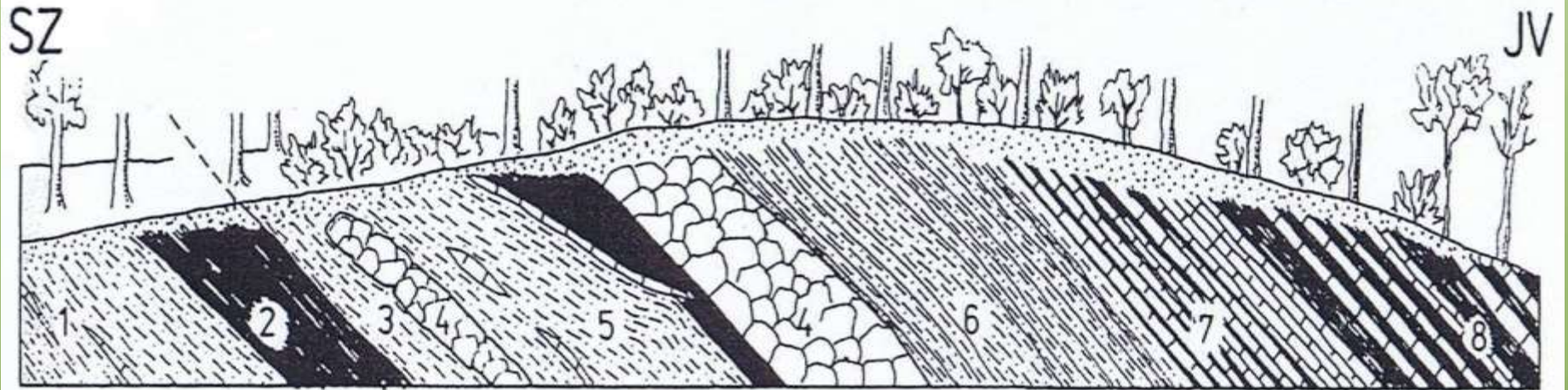
# ***Nálezy rostlin Cooksonia***





# Loděnice – Černidla locality

odkryv A - zatáčka blíže k obci Loděnice





**Graptolitová zóna - *Monograptus belophorus* s trilobitami  
*Miraspis mira*, indexová fosília**



# Materiál



Barrandova sbírka - 12 kusů  
Boučkova sbírka – 23 kusů

Nově získaný materiál asi 20 kusů

Pozorování:

- mikroskop: Olympus SZX 12
- fluorescenční mikroskop Olympus BX51
- elektronový mikroskop ESM – Hitachi S – 3700N

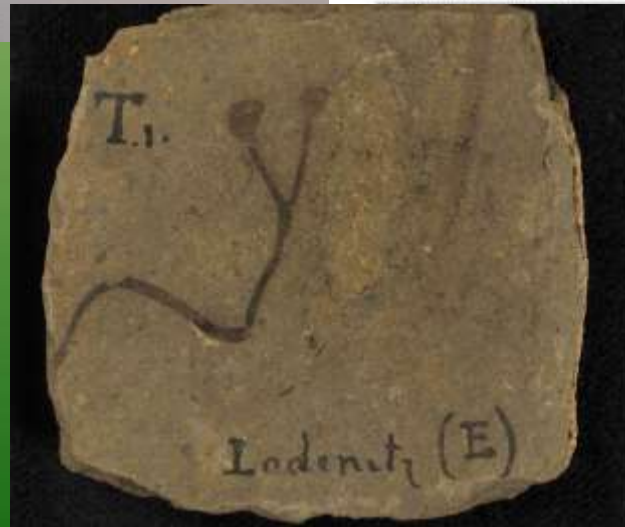


# Cooksonia barrandei

## Wenlock, motolské souvrství



432 mil let



### Sporophytes of polysporangiate land plants from the early Silurian period may have been photosynthetically autonomous

Milan Libartín<sup>1</sup>, Jiří Kvaček<sup>2\*</sup>, Jiří Bejík<sup>1</sup>, Viktor Zárský<sup>2\*</sup> and Petr Storch<sup>2</sup>

The colonisation of land by vascular plants is an extremely important phase in Earth's life history. This key evolutionary process is thought to have begun during the Middle Cambrian period and culminated in the Silurian/Early Devonian period (around 430–390-million years ago (Ma)), and is documented primarily by microfossils (that is, by dispersed spores, phytoliths including fragments of algae, bryozoa, sponges and corals), tubes and rare megafossils. A newly recognised fossil cooksoniid plant with in situ spores from the Barrandian area, Czech Republic, is of the highest importance because it represents extremely ancient megafossil evidence of land plant diploid generation: sporophytes (432 Ma). The robust size of this plant places it among the largest known early polysporangiate land plants and it is probable that it attained adequate size for both aeration and effective photosynthetic development. This would mean not only that sporophytes were photosynthetically autonomous but also that they might have been able to sustain a relatively gametophyte-independent existence.

The earliest dispersed spores attributable to terrestrial plants, often termed triletes, are known from the mid-Ordovician–Frasnian (spanning interval<sup>1</sup>). The leading hypothesis argues cryp- tospore production (cryptospores) with triletes-like plants<sup>2,3</sup>, but recently cryptospores were interpreted as a diverse group of mostly extant plants, whose precise abilities to living spores remain unclear<sup>4</sup>. Until now, the earliest direct megafossil evidence of polysporangiate land plants was from the lower Silurian (427-million years ago (Ma)) of Ireland. Trilete sporangiate megafossils of this age are not known (Supplementary Table 1). Three early land plant species, referred to as cooksoniids (see ref. 5), are characterised by very small size, and this particular feature led to the hypothesis that their life cycle was similar to that of modern bryophytes<sup>6</sup>—that is, sporophytes were mainly dependent on the gametophytes, with triletes mainly a subspore, due to the contrast of the small sporophyte axis diameter to those with features related to effective photosynthesis.

The genus *Cooksonia* is generally accepted as the oldest polysporangiate land plant<sup>7</sup>, with an affinity to vascular plants, and with a broad distribution in the Late Silurian and Early Devonian periods, including North America<sup>8</sup>, North Africa<sup>9</sup>, Europe, Asia<sup>10</sup> and South America<sup>11</sup>. The plants were megasporangiate (that is, produced only one kind of spore) and of small size, some only a few millimetres high. Its dichotomously branched axes terminate in divaricate sporangia. Many conical spores

were analysed comparatively and dated by cladistic analyses to several early land plant lineages. The most important characters in these considerations are the presence or absence of conducting tissues. Specimens described as *Cooksonia persea* (Long from the Lochkovian of England<sup>12</sup>) have conducting tissues, whereas *Cooksonia longisporea* (Long from the Lochkovian of England<sup>13</sup>), conducting tissues were not found. *Mercuria andersonii* (Edwards) (Gower and Gertman (formerly Gower) (Cooksonia)) from the Devonian of Newfoundland<sup>14</sup>, may even represent a case of lycophytes<sup>15</sup>. Thus, it was concluded<sup>16</sup> that cooksoniids are probably autotrophic representing a highly artificial group of plants... that may include forms that are ancestral to other trilete or monolete plants, or possibly both<sup>17</sup>. This concept is coming under greater consideration with recent advances in our understanding of basal land plant phylogeny (that is, the basal portion of lycophytes, their possible sister position to vascular plants and possible bryophyte monophyly<sup>18,19</sup>).

New findings from the Barrandian area (Prague Basin, Czech Republic, locality Lodenitz, Spáček 1976–Barandian Unit, reported here (see Supplementary Data, Supplementary Figs. 1–4 and Supplementary Table 1) are of the highest importance for discussions on polysporangiate land plant origins because they represent the earliest unambiguous megafossil record of terrestrial sporophytes (432 Ma) bearing spores on the plant.

Using the size and shape of subtending axes and spores in situ the plant fossil is described as a new species, *Cooksonia barrandei*.

*Cooksonia barrandei* Libartín, J. Kvaček, Bejík, Zárský & Storch, new

holotype: D 5524b, National Museum, Prague (Fig. 1).  
**Description of the name.** Honouring Jiří Barrand, a famous Czech palaeontologist who lived in Prague and the author of the monograph *Sporenske silurické fauny do Alžbětky*.  
**Type locality.** Lodenitz, Spáček 1976–Barandian Unit, Czech Republic; see Supplementary Fig. 5.

**Type horizon.** Mercuria longisporea (Gower, 1864) Horowitz, Middle Devonian–late, Frasnian, Spáček 1976–Barandian Unit (5).  
**Diagnosis.** Axes are robust, smooth, dichotomously branched, widening considerably in the terminal part with terminal bearing lobed-shaped sporangia. Subtending axes are broadly funnel-shaped, with a prominent rim that slightly exceeds the width of the subtending axis. In situ spores are trilete, circular and cross-walled, with a microsculptured sculpture, and the areolae are large.

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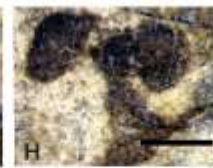
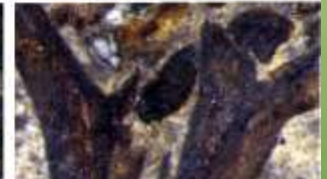
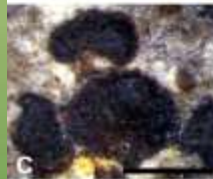
\*equal contributors  
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***Cooksonia hemisphaerica* – Kosov, požárské souvrství, 420 mil. let**

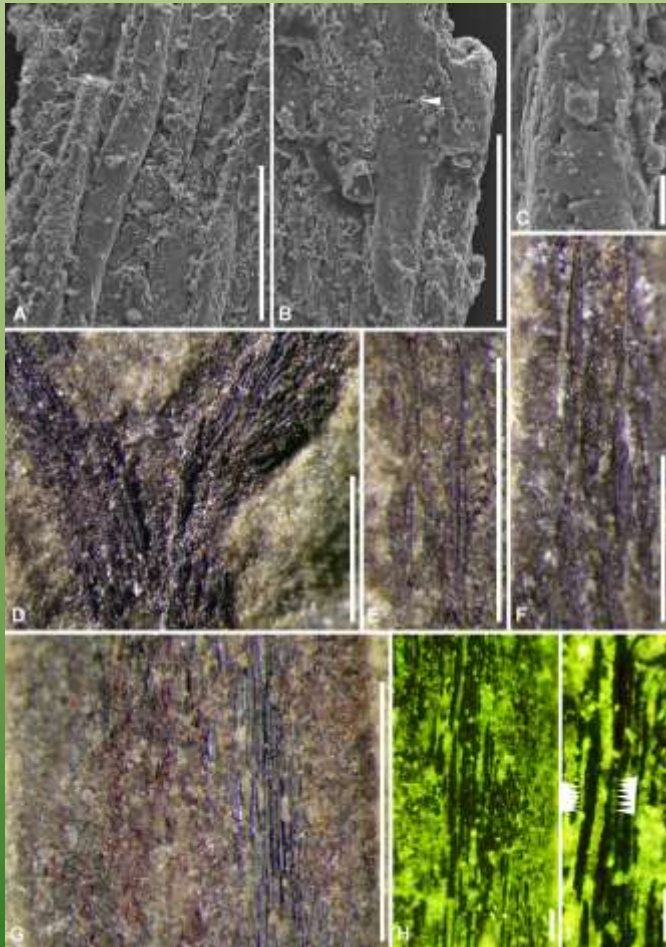




# ***Cooksonia bohemica* – Kosov, požárské souvrství, 420 mil. let**



# ***Cooksonia bohemica* – Kosov, požárské souvrství, 420 mil. let**





**Plány:**  
**projekty GAČR**  
**další materiál z požárského i**  
**kopaninského souvrství**  
**studium spór**  
**studium paleoprostředí**

**Děkuji za pozornost**