The First Forests

During the Palaeozoic Era, in the period known as the Carboniferous, the region of present-day Czechia lay in the Southern Hemisphere near the Equator and experienced a warm and humid climate.

This period, lasting approximately 100 million years, was accompanied by many important changes. The supercontinent Pangaea was forming and oxygen levels in the atmosphere were rising. Oxygen made up around 35% of the air at that time, compared to just 21% today, while carbon dioxide levels were similar to those of the present day. These conditions allowed arthropods such as centipedes and various insects to grow to enormous sizes.

Around 353 million years ago, the region of present-day Czechia was covered by dense wetland forests. These were made up of tree lycophytes, horsetails, ferns, progymnosperms and gymnosperms. In the damp environment, layers of dead plant material gradually formed coal, which was mined in this region for many decades.

Palaeozoic lycophytes of the genus *Lepidodendron*, growing in swampy peat soils, reached heights of up to 30 metres. Today, their small relatives are rare in the wild, represented by species such as common clubmoss (*Lycopodium clavatum*) and *Lycopodium annotinum*.

Although modern tropical forests still contain tree ferns several metres tall, these are much smaller than their Palaeozoic ancestors. Present-day ferns and horsetails in Czechia are far smaller, although the giant horsetail (*Equisetum telmateia*) may still grow up to 1.5 metres high.

Distribution of continents on Earth 353 million years ago (Carboniferous Period, Palaeozoic Era)

Timeline

Beginning of the Palaeozoic Era – Cambrian	538 million years ago
Ordovician	485 million years ago
Silurian	443 million years ago
Cooksonia barrandei	432 million years ago
First lycophyte plant – *Baragwanathia brevifolioides*	422 million years ago
Devonian	419 million years ago
Carboniferous	358 million years ago
Lepidodendron lycophyte	353 million years ago

Permian	298 million years ago
Beginning of the Mesozoic Era – Triassic	251 million years ago
Beginning of the Tertiary – Palaeocene	66 million years ago
Beginning of the Quaternary – Pleistocene	2.6 million years ago

Lepidodendron aculeatum

A giant plant reaching heights of up to 30 metres, with a trunk up to one metre in diameter.

Its name derives from the Greek words *lepis* = scale and *dendron* = tree.

Grew very rapidly.

The most common fossils are bark impressions of lycophytes.

The trunk contained very little wood. Support was provided by several layers of bark, enabling the tree to grow to great heights.

Arborescent lycophytes and other fossil plants are rarely found intact. Because assigning isolated fragments to a single species is extremely difficult, different parts of the same plant were historically given separate names.

Stigmaria – root-like structures that served a similar function to the roots of modern plants, although they were anatomically different.

Small narrow leaves with a single vein emerged from leaf cushions, creating the characteristic bark pattern.

Why did leaves evolve? To increase the surface area available for photosynthesis.

Reproductive organs were arranged in cones at the ends of the branches.

Grew in swampy peatlands.

Formed rich deposits of coal. Approximately four metres of plant material were needed to create 30 cm of coal.

They became extinct at the end of the Palaeozoic Era. Only a few species of lycophytes survive today, all of them herbaceous plants.