**The earliest evolution of vascular plants – New insights from the Rhynie chert**

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In this communication, we describe the water-conducting cells of four Early Devonian plants from the Rhynie chert (Aberdeenshire, Scotland) present in the slide collections of the Natural History Museum of Lille (France). Those plants are key taxa in the earliest evolution of vascular plants, namely the protracheophytes (considered non-vascular) *Aglaophyton* and *Horneophyton*, the paratracheophyte *Rhynia* and the eutracheophyte *Asteroxylon*. Our study confirms previous interpretations of the water-conducting cells of *Aglaophyton*, *Rhynia* and *Asteroxylon*, but most importantly, it shows that *Horneophyton* has indeed a particular type of tracheid characterized by irregular, annular to spiral wall thickenings, and hence that it cannot be considered a protracheophyte anymore. Accordingly, our new plant phylogeny resolves *Horneophyton* within tracheophytes, but as sister to eutracheophytes in a larger clade called supereutracheophytes. Results further suggest that the horneophytophytes can be interpreted as an intermediate clade between the paratracheophytes and the eutracheophytes, and therefore, as the precursor lineage of all living vascular plant biodiversity. This view points to a sequential acquisition of the characters of water-conducting cells, which appears more parsimonious than previous scenarios of the earliest evolution of vascular plants.

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