

The first *Cooksonia* species were described by William Henry Lang in 1937 and named in honor of Isabel Cookson, with whom he had collaborated and who collected specimens of *Cooksonia pertoni* in Perton Quarry, Wales, in 1934.^[4] There were originally two species, *Cooksonia pertoni* and *C. hemisphaerica*.^[4] The genus was defined as having narrow leafless stems (axes), which branched dichotomously, with terminal sporangia that were "short and wide". There was a central vascular cylinder consisting of annular tracheids (water-conducting cells with thickened walls). Six other species were later added to the genus: *C. crassiparietilis*, *C. caledonica*, *C. cambrensis*, *C. bohémica*, *C. paranensis* and *C. banksii*. A review in 2010 concluded that the delineation of the genus was inaccurate and that some species needed to be removed; in particular those in which sporangia were not more-or-less trumpet-shaped. As amended by Gonez and Gerrienne, *Cooksonia* has the following species:

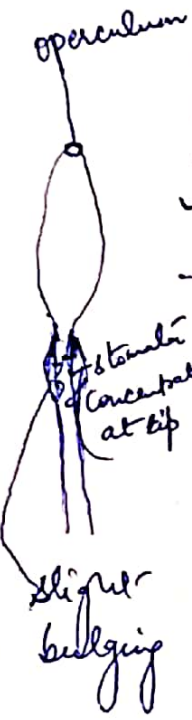
- *Cooksonia pertoni* – the type species designated by Gonez & Gerrienne
- *Cooksonia paranensis*
- *Cooksonia banksii*

Three further species are considered doubtful because of the poor preservation of the specimens, but are left in the genus:

- *Cooksonia hemisphaerica*
- *Cooksonia cambrensis*
- *Cooksonia bohémica*

Two species are excluded from the genus: *C. caledonica* (which was later moved to a new genus *Aberlemnia*^[7]) and the less well-preserved *C. crassiparietilis*. These have sporangia which are composed of two 'valves', splitting to release their spores along a line opposite to where they are attached to the stem (i.e. distally)

Cooksonia is an extinct grouping of primitive land plants. The earliest *Cooksonia* date from the middle of the Silurian (the Wenlock epoch);^[1] the group continued to be an important component of the flora until the end of the Early Devonian, a total time span of 433 to 393 million years ago. While *Cooksonia* fossils are distributed globally, most type specimens come from Britain, where they were first discovered in 1937.^[4] Cooksonia includes the oldest known plant to have a stem with vascular tissue and is thus a transitional form between the primitive non-vascular bryophytes and the vascular plants.



Only the sporophyte phase of Cooksonia is currently known (i.e. the phase which produces spores rather than gametes). Individuals were small, a few centimetres tall, and had a simple structure. They lacked leaves, flowers and roots — although it has been speculated that they grew from an unpreserved rhizome.^[2] They had a simple stalk that branched dichotomously a few times (Each branch ended in a sporangium or spore-bearing capsule. In his original description of the genus (Lang^[4] described the sporangia as flattened, "with terminal sporangia that are short and wide") and in the species *Cooksonia pertoni* "considerably wider than high". A 2010 review of the genus by Gonez and Gerrienne produced a tighter definition, which requires (the sporangia to be more-or-less trumpet-shaped (as in the illustration), with a 'lid' or operculum which disintegrates to release the spores.^[3]



Specimens of one species of *Cooksonia* have a dark stripe in the centre of their stalks, which has been interpreted as the earliest remains of water carrying tissue.^[6] Other *Cooksonia* species lacked such conducting tissue.

Cooksonia specimens occur in a range of sizes, and vary in stem width from about 0.03 mm to 3 mm.^[2] Specimens of different sizes were probably different species, not fragments of larger organisms: fossils occur in consistent size groupings, and sporangia and spore details are different in organisms of different sizes.^[2] The organisms probably exhibited determinate growth (i.e. stems did not grow further after producing sporangia).^[2]

Some *Cooksonia* species bore stomata, which had a role in gas exchange; this was probably to assist in transpiration-driven transport of dissolved materials in the xylem, rather than primarily in photosynthesis, as suggested by their concentration at the tips of the axes.^[2] These clusterings of stomata are typically associated with a bulging in the axis at the neck of the sporangium, which may have contained photosynthetic tissue, reminiscent of some mosses.^[2]

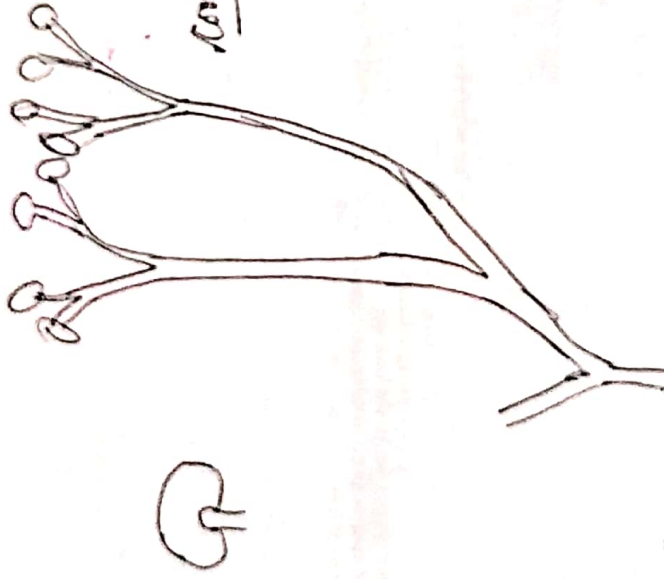
As the genus is circumscribed by Gonez and Gerrienne, there are six possible species. *C. pertoni*,^[Note 1] *C. paranensis* and *C. banksii* are all relatively similar with flat-topped, trumpet-shaped sporangia; stems are somewhat narrower in C. paranensis than in C. pertoni. Only one specimen of *C. bohémica* is known. It has stouter, more branched stems; the original shape of the sporangia is unclear because of poor preservation. *C. hemisphaerica*, described from the same locality as *C. pertoni*, differs in having sporangia of which the tops, at least as preserved, are hemispherical rather than flat. *C. cambrensis* also has spherical sporangia, but without the gradual widening at the base characteristic of the other species. Preservation of the sporangia is again poor.^[3]

Loeksonia - described by Seng 1937
from the lower Peruvian

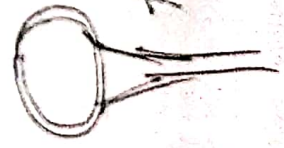
→ It shows four orders of branching in the dichotomous system.

Sporangia are reniform (Kidney-shaped), short & wide.

Spores - smooth, isoporous



Loeksonia calandonica



trumpet-shaped

Loeksonia pertense apiculispore