= Buxbaumia =

Buxbaumia (Bug moss , Bug @-@ on @-@ a @-@ stick , Humpbacked elves , or Elf @-@ cap moss) is a genus of twelve species of moss (Bryophyta) . It was first named in 1742 by Albrecht von Haller and later brought into modern botanical nomenclature in 1801 by Johann Hedwig to commemorate Johann Christian Buxbaum , a German physician and botanist who discovered the moss in 1712 at the mouth of the Volga River . The moss is microscopic for most of its existence , and plants are noticeable only after they begin to produce their reproductive structures . The asymmetrical spore capsule has a distinctive shape and structure , some features of which appear to be transitional from those in primitive mosses to most modern mosses .

= = Description = =

Plants of Buxbaumia have a much reduced gametophyte , bearing a sporophyte that is enormous by comparison . In most mosses , the gametophyte stage of the life cycle is both green and leafy , and is substantially larger than the spore @-@ producing stage . Unlike these other mosses , the gametophyte of Buxbaumia is microscopic , colorless , stemless , and nearly leafless . It consists exclusively of thread @-@ like protonemata for most of its existence , resembling a thin green @-@ black felt on the surface where it grows . The plants are dioicous , with separate plants producing the male and female organs . Male plants develop only one microscopic leaf around each antheridium , and female plants produce just three or four tiny colorless leaves around each archegonium .

Because of its small size , the gametophyte stage is not generally noticed until the stalked sporangium develops , and is locatable principally because the sporangium grows upon and above the tiny gametophyte . The extremely reduced state of Buxbaumia plants raises the question of how it makes or obtains sufficient nutrition for survival . In contrast to most mosses , Buxbaumia does not produce abundant chlorophyll and is saprophytic . It is possible that some of its nutritional needs are met by fungi that grow within the plant .

The sporophyte at maturity is between 4 and 11 mm tall . The spore capsule is attached at the top of the stalk and is distinctive , being asymmetric in shape and oblique in attachment . As with most other Bryopsida , the opening through which the spores are released is surrounded by a double peristome (diplolepidious) formed from the cell walls of disintegrated cells . The exostome (outer row) consists of 16 short articulated " teeth " . Unlike most other mosses , the endostome (inner row) does not divide into teeth , but rather is a continuous pleated membrane around the capsule opening . Only the genus Diphyscium has a similar peristome structure , although that genus has only 16 pleats in its endostome , in contrast to the 32 pleats in Buxbaumia . Diphyscium shares with Buxbaumia one other oddity of the sporophyte ; the foot (stalk base) ramifies as a result of outgrowths , so much so that they may be mistaken for rhizoids .

= = Distribution and ecology = =

Species of Buxbaumia may be found across much of the temperate to subarctic regions of the Northern Hemisphere , as well as cooler regions of Australia and New Zealand .

The moss is an annual or biennial plant and grows in disturbed habitats or as a pioneer species . The plants grow on decaying wood , rock outcrops , or directly on the soil . They do not grow regularly or reliably at given locations , and frequently disappear from places where they have previously been found . Sporophyte stages begin their development in the autumn , and are green through the winter months . Spores are mature and ready for dispersal by the late spring or early summer . The spores are ejected from the capsule in puffs when raindrops fall upon the capsule 's flattened top .

The asymmetric sporophytes of Buxbaumia aphylla develop so that the opening is oriented towards the strongest source of light , usually towards the south . The species often grows together with the diminutive liverwort Cephaloziella , which forms a blackish crust that is easier to spot than

Buxbaumia itself .

= = Classification = =

Buxbaumia is the only genus in the family Buxbaumiaceae , the order Buxbaumiales , and the subclass Buxbaumiidae . It is the sister group to all other members of class Bryopsida . Some older classifications included the Diphysciaceae within the Buxbaumiales (or as part of the Buxbaumiaceae) because of similarities in the peristome structure , or placed the Buxbaumiaceae in the Tetraphidales . Most recent cladistic studies using DNA sequences are not conclusive regarding the relationship between Buxbaumia and Diphyscium , but evidence suggests they are separate lines of a paraphyletic group . No recent studies favor a placement with the Tetraphidales .

The genus Buxbaumia includes twelve species :

Because of the simplicity of its structure , Goebel interpreted Buxbaumia as a primitive moss , transitional between the algae and mosses , but subsequent research suggests that it is a secondarily reduced form . The unusual peristome in Buxbaumia is now thought to be a transitional form between the nematodontous (cellular teeth) peristome of the Polytrichopsida and the arthrodontous (cell wall teeth) peristome of the Bryopsida .