Citations: Goremykin, V. V. & Hellwig, F. H. (2005). "Evidence for the most basal split in land plants dividing bryophyte and tracheophyte lineages". Plant Systematics and Evolution. 254 (1–2): 93–103/ Konrat, M.; Shaw, A.J.; Renzaglia, K.S. (2010). "A special issue of Phytotaxadedicated to Bryophytes: The closest living relatives of early land plants". Phytotaxa. 9: 5–10/ Troitsky, A.V.; Ignatov, M.S.; Bobrova, V.K.; Milyutina, I.A. (December 2007). Contribution of genosystematics to current concepts of phylogeny and classification of bryophytes. Biochemistry Mosc. 72 (12): 1368–1376/ Knoop, Volker (2010). "Looking for sense in the nonsense: a short review of non-coding organellar DNA elucidating the phylogeny of bryophytes". Tropical Bryology. 31: 51–60/ Archived from the original on 2009-04-02. Retrieved 2009-03-26/ Qiu, Y.L.; Li, L.; Wang, B.; et al. (October 2006). The deepest divergences in land plants inferred from phylogenomic evidence. Proceedings of the National Academy of Sciences. 103 (42): 15511–15516.

CLASSIFICATION OF BRYOPHYTES

Traditionally, all living land plants without vascular tissues were classified in a single taxonomic group, often a division (or phylum). More recently, phylogenetic research has questioned whether the bryophytes form a monophyletic group and thus whether they should form a single taxon. Although a 2005 study supported the traditional view that the bryophytes form a monophyletic group, by 2010 a broad consensus had emerged among systematists that bryophytes as a whole are not a natural group, although each of the three extant (living) groups is monophyletic.

The three bryophyte clades are the Marchantiophyta (liverworts), Bryophyta (mosses) and Anthocerotophyta (hornworts). The vascular plants or tracheophytes form a fourth, unranked clade of land plants called the "Polysporangiophyta". In this analysis, hornworts are sister to vascular plants and liverworts are sister to all other land plants, including the hornworts and mosses, Phylogenetic studies continue to produce conflicting results. In particular those based on gene sequences suggest the bryophytes are paraphyletic, whereas those based on the amino acid translations of the same genes suggest they are monophyletic.

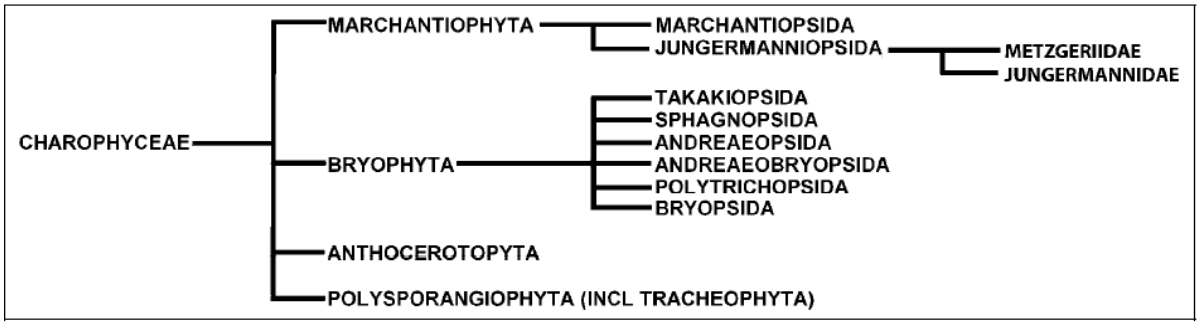

Figure1. The evolutionary relationship in the plant kingdom, together with the divisions and classes of the Bryobiotina sub-kingdom.

Table 1. Comparison of morphological characteristics of the gametophytes of the three groups of bryophyteX	**Liverworts**	**Mosses**	**Hornworts**
Structure	Thalloid or foliose	Foliose	Thalloid
Symmetry	Dorsiventral or radial	Radial	Dorsiventral
Rhizoids	Unicellular	Pluricellular	Unicellular
Chloroplasts/cell	Many	Many	One
Protonemata	Reduced	Present	Absent
Gametangia	Superficial	Superficial	Immersed

Table 1. Comparison of the morphological characteristics of the sporophytes of the three groups of bryophytes

	Liverworts	**Mosses**	**Hornworts**
Stomata	Absent	Present	Present
Persistence	Ephemeral	Persistent	Persistent
Growth	Defined	Defined	Continuous
Seta	Present	Present	Absent
Capsule form	Simple	Differentiated	Elongated
Maturation of spores	Simultaneous	Simultaneous	Graduate
Dispersion of spores	Elaters	Peristome teeth	Pseudo-elaters
Columella	Absent	Present	Present

Dehiscence	Longitudinal or irregular	Transverse	Longitudinal

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