

VIVEKANANDA COLLEGE
THAKURPUKUR
KOLKATA 700063

NAAC Accredited Grade—A



Topic: Economic Importance of Bryophytes

Course Title: BSc Botany Honours (CBCS)

Paper: Core Course 4 (Theoretical) Archæogoniate (Bryophytes)

Unit: 4.3

Semester: 2

Name of the Teacher: Kuntal Narayan Chaudhuri

Name of the Department: Botany

ECONOMIC IMPORTANCE OF BRYOPHYTES

A general **lack of commercial value, small size, and inconspicuous occurrence** in the ecosystem have made the bryophytes appear to be of no use to most people. However, like any other plant group, bryophytes do have some economic importance, although this is restricted to only a few **liverworts** and **mosses** among which *Sphagnum* holds the most prominent position. Bryophytes have limited use as the source of (1) **fuel**, (2) **chemicals**, (3) **medicine**, (4) **horticultural materials**, (5) **clothing** (6) **food** and (7) **fodder**.

Fuel

Bogs or **boglands**^a that harbour the **peat-forming aquatic mosses** *Sphagnum*—which is commonly called **peat moss** or **bog moss**—are also called **peat bogs**. The moss releases **acidic substances** to lowers the **water pH** (4.0) which in turn **inhibits** the **growth** of **microbial decomposers**. The **dead organic remains** of the moss therefore undergo continuous **accumulation, compression** and **coalification** under water to form layers of soft, dark, carbonaceous matter called **peat**. This represents the **first stage** of **coal formation**. Peat is of limited economic importance. It is cut into **blocks** and used as a cheap, local **fossil fuel** in Ireland, Scotland and northern Europe. However, its **calorific value** is half of that of **coal** but more than twice of that of **wood**. Only half the world's peat production is used as fuel, with peat resources estimated worldwide to be equivalent to 100–200 million tons of oil, or nearly half the known global oil reserves.

Chemicals

Like **coal**, the distillation of **peat** yields several **industrial chemicals** such as **alcohols, peat tar, paraffin, sulphates, nitrates, dyes, tanning agents**, etc.

Medicine

The use of **bryophytes** in **herbal medicine** has been common in **China, India**, and among the **Native Americans** since ancient times. Numerous compounds, including **oligosaccharides, polysaccharides, sugar alcohols, amino acids, fatty acids, aliphatic compounds, aromatics** and **phenols** occur in bryophytes. In the **Himalayas**, a mixture of **moss ashes** with **fat** and **honey** is used as a soothing and healing **ointment** for cuts, burns, and wounds. **Tea** prepared from the **moss** *Polytrichum commune* is used to dissolve **kidney** and **gall bladder stones**. Early in the twentieth century, the **aquatic moss** *Sphagnum* was widely used in **surgical dressing** due to its remarkable **absorptive** and **antiseptic** properties, which saved precious cotton during **World War I**. After this war, the **Chinese** continued using it for the same purpose. *Sphagnum* as a **dressings material** is superior to cotton as it absorbs three to four times as much liquid at a rate about three times as fast, necessitating less frequent changes. It is also cooler, softer, less irritating and economical. In **China**, **dried** *Sphagnum* is used to treat **hemorrhages** and its **decoction** is used for **eye diseases**. **Medical soap** containing **sphagnol** extracted from **peat tar** is used to treat **skin diseases**. Many bryophytes such as *Conocephalum conicum*, *Dumortiera hirsuta* and *Sphagnum strictum* have strong **antiseptic** properties. Similarly **anti-tumour** properties have been reported from bryophytes such as *Marchantia polymorpha*, *Porella japonica* and *Polytrichum juniperinum*.

^a Wetland ecosystems found in temperate high altitudes and latitudes.

Horticultural Materials

Horticulture enjoys a long tradition involving bryophytes as **bedding, covering** and **packing materials** and even for **ornamental** purposes. **Nurseries** use wet *Sphagnum* due to its remarkable ability to **absorb** and **hold water** for **packing live plant** material such as bulbs, tubers, cuttings, cut flowers, fruits and seedlings for shipment. In India, *Sphagnum* is frequently used for **packing** perishable horticultural produce such as apples in the Himalayas. For the same reason it is also used in making substratum in **plant propagation** in the form of **seedling beds** and **cutting beds**. It is also used for making **support sticks** of **climbing plants** and as **litter beds** in **plant pots**. Its **decorative** horticultural uses include covering **flower pots** and **plant containers** for **floral** and **plant arrangements**. A lesser known use of *Sphagnum* in horticulture is the practice of **burning** it to produce a **smoke** as a measure against **frosting**. **Peat** is mixed with **clay soil** to improve its **drainage**, and with **sandy soil** to increase its **water retention**.

Clothing

In Germany, *Sphagnum* is used for **lining hiking boots** where it **absorbs** unpleasant **moisture** and **odour**. This plant has been traditionally used in northern Europe for **lining diapers** because of its remarkable **absorptive** and **antiseptic** properties.

Food

The Chinese consider mosses to be **famine food**. The only known **direct use** of bryophytes for **human food** is the use of *Sphagnum* by the Laplanders^b as a traditional ingredient in preparing **bread dough**.

Fodder

In northern Europe, hog farms take advantage of the unique properties of *Sphagnum* as a **binder** for **iron** and **vitamins** and **piglets** are often fed with the **milled** moss.

Further Reading

Gangulee, HC & AK Kar (2010) *College Botany* (Vol. 2). New Central Book Agency, Kolkata.

Srivastava, HN (2016) *Bryophyta* (Vol. 1). Pradeep Publications, Jalandhar.

Glime, JM (2007) Economic and Ethnic Uses of Bryophytes. *Flora of North America* 27: 14-41.

^b Indigenous inhabitants of Scandinavia.