

# Chapter#3

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a 27-05-2017 sajan  
gali abbottabad dr jan

[Literature](#)



### Chapter#3 MATERIALS AND METHODS3.

1 Literature Survey In advance to research relevant literature about the topic was studied. For that reason different material sources were used i. e. books, floras, research papers and articles. Unfortunately bryophytes are neglected and there is no authentic flora of bryophytes of Pakistan. Because of this different floras of world were followed i. e.

flora of China, Flora of North America, British Bryological Field Guide and other related floras, book i. e. Diversity of Microbe and Cryptogams (Asthana, 2006). 3. 2 Field Study and Collection of Plant Material During field work various materials were used along the field survey i. e., Camera (21 Mega Pixel, 24X) GPS, Polythene bags, Ball Point and permanent marker, Field notebook, map of research area, and news paper. Many field trips were organized in different seasons of 2017.

Field trips were conducted both in summer and winter. About 25-30 trips were arranged and total 370 specimens were collected. During collection, a separate collection number was given to every specimen and tagged were attached to polythene bags. Photographs were also taken on the spot and especially focused the following characters i. e. Habit, Habitat, Substrate, Gametophyte and sporophyte stage.

Table 1. visited localities during field's surveys Dated Locality District

Collectors 16-03-2017 Thandiani Abbottabad Ehsan, Zoona 16-03-2017

Nawan shehr Abbottabad Ehsan, Zoona 16-03-2017 Ilyasi Mosque

Abbottabad Ehsan, Zoona 19-03-2017 Mirpur Abbottabad Ehtesham, Enam,

Zoona 19-03-2017 Kala Pull Abbottabad Ehtesham, Enam, Zoona 23-03-2017

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Salamkot Abbottabad Ehtesham, Enam, Zoona 23-03-2017 Neelay Pair  
Abbottabad Ehtesham, Enam, Zoona 23-03-2017 Mangal Abbottabad  
Ehtesham, Enam, Zoona 25-03-2017 Salhad Abbottabad Ehtesham, Enam,  
Zoona 25-03-2017 Havelian Abbottabad Ehtesham, Enam, Zoona 09-04-2017  
Katha Dobathar Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona  
09-04-2017 Paswal Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham,  
Zoona 09-04-2017 Sando Bala Abbottabad Dr Jan Alam, Dr Abdul Majid,  
Ehtesham, Zoona 09-04-2017 Habib Abad Abbottabad Dr Jan Alam, Dr Abdul  
Majid, Ehtesham, Zoona 15-04-2017 On way to Sherwan Abbottabad Dr Jan  
Alam, Dr Abdul Majid, Ehtesham, Zoona 15-04-2017 Sherwan Abbottabad Dr  
Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 15-04-2017 Takia Sheikal  
Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 26-05-2017 Ghari  
Phulgran Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 26-05-  
2017 Kiala Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 26-05-  
2017 Sajikot Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 26-  
05-2017 Sajikot Natural waterfall Abbottabad Dr Jan Alam, Dr Abdul Majid,  
Ehtesham, Zoona 26-05-2017 Kalabagh Abbottabad Dr Jan Alam, Dr Abdul  
Majid, Ehtesham, Zoona 27-05-2017 Nagri Bala Abbottabad Dr Jan Alam, Dr  
Abdul Majid, Ehtesham, Zoona 27-05-2017 Sajan Gali Abbottabad Dr Jan  
Alam, Dr Abdul Majid, Ehtesham, Zoona 27-05-2017 Keri Riki Abbottabad Dr  
Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 27-05-2017 Jhansa Abbottabad  
Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 27-05-2017 Mochidara  
Abbottabad Dr Jan Alam, Dr Abdul Majid, Ehtesham, Zoona 27-05-2017  
Donga Gali Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 03-06-  
2017 Kundla Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 03-

06-2017 Toheed Abad Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 03-06-2017 Changla Gali Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 03-06-2017 Khanus Pur Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 08-07-2017 On way to Namli Maira Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 08-07-2017 Namli Maira Stop 1 Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 08-07-2017 Khurd Bandiala Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 08-07-2017 Namli Maira Abshar Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 30-07-2017 Bagan Road Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 30-07-2017 Nathia Gali Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 30-07-2017 Khaira Gali Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham 30-07-2017 Changla Gali Abbottabad Dr Jan Alam, Dr Abdul Majid, Zoona, Ehtesham, 12-08-2017 Koza Gali Abbottabad Dr Abdul Majid, Zoona, Ehtesham, Enam 12-08-2017 Chowk Ayaubi Abbottabad Dr Abdul Majid, Zoona, Ehtesham, Enam 12-08-2017 Doonga Gali Abbottabad Dr Abdul Majid, Zoona, Ehtesham, Enam 12-08-2017 Bara Gali Campus Abbottabad Dr Abdul Majid, Zoona, Ehtesham, Enam 12-08-2017 Galliat Abbottabad Dr Abdul Majid, Zoona, Ehtesham, Enam 3. 3

Washing, Packing and labeling of specimens After collection, these specimens were put in polyethene bags.

Further these specimens were immediately washed with water and transferred to newspapers for drying. When specimens were dried, these were transferred to their packets, which were labeled; the size of packet was 6cm x4cm. 3.

4 Laboratory work Collected specimens were studied in laboratory, anatomical and morphological characteristics were examined, Plant length, plant width, size of leaf length, size of leaf width, capsule length size and capsule width, seta color and length, and calyx tris size were also examined. For examining in the collected specimens for morphology stereoscope is used before that desired specimen should be kept in water for 15-20 minutes. Different characters were studied plant length, gametophyte sporophyte and seta length should be taken. Then leaves size, shape and hair tip is noted it may be present or absent if present it may be percurrent or excurrent. Leaves should be separated carefully because the leaves are too tender and can be broken easily..

All the character details were noted with the help of microscope. Leaves were further examined through a microscope at a cellular level; the small leaves were examined. Apical cells, marginal cells, medial cells, basal cells, and Alar cells were examined. .

All these characters were examined with used of stereoscope, size were taken in centimeter and millimeter (mm). For anatomical features T. S of leaves were taken . 3. 5 Identification and Documentation After the laboratory work, for identification purpose different Floras was consulted based already noted all characteristics.

These specimens were identified by following keys at different taxonomic level. Further description of each species was given after identification process by following their rule, which were given in different Flora of world. 3.

6 Deposition of Specimens After the identification of plants the identified specimens were deposited in Cryptogamic lab, Department of Botany, Hazara University.