

CHAPTER-VI



RESULTS AND DISCUSSION

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6.1 RESULTS

The present work is the outcome of the study made during the period from 2014-2017. An attempt has been made to make an inventory of the monocot flora of Udalguri district and to analyse the diversity of ethnobotanical plants has been enumerated. The study has been made based on personal observation in the field and also study of the literature so as to enable to record the number of monocot plant species available with their ethnobotany of the Bodos and Rabhas in the area. The impact of diversity of plant resources in socio-cultural life of Bodo and Rabha community of the area has been studied.

The thesis is an original contribution of the monocot flora based on the plant materials collected by the investigator along with a critical study of earlier collections found in different Herbaria of North East Region, India, particularly in Kanjilal Herbarium, BSI, ERC, Shillong, Meghalaya, India.

6.1.1 FINDINGS OF PRESENT FLORISTIC SURVEY

- As many as 228 species belonging to 133 genera included in 30 families have been enumerated from the Udalguri district. These monocot flora has been compared with the Assam's Flora by Chowdhury *et al* (2005) are provided in [Table 10].

Table 10: Family wise distribution of Monocotyledons species with comparison to Assam's Flora, 2005

Sl. No.	Name of the family	Monocot flora of Udalguri district (MfUd)		Assam's flora, 2005 (Ass. Fl.) by Chowdhury <i>et al.</i> 2005 (Assam's Fr.)		% of Spp. Representation (MfUd to Ass. Fl)
		No. of	No. of	No. of	No. of	

		genera	Spp. + infraspec ific taxa	genera	Spp. + infra spec ific taxa	
1.	Hydrocharitaceae	4	4	6	8	50%
2.	Orchidaceae	6	8	72	289	2.76%
3.	Zingiberaceae	7	15	14	46	32.60%
4.	Strelitziaceae	2	2	2	2	100%
5.	Musaceae	1	9	2	13	69.23%
6.	Costaceae	1	1	1	1	100%
7.	Cannaceae	1	4	1	5	80%
8.	Marantaceae	1	3	3	7	42.85%
9.	Bromeliaceae	1	1	1	1	100%
10.	Iridaceae	2	2	1	1	200%
11.	Amarylidaceae	1	2	5	10	20%
12.	Agavaceae	3	3	7	16	18.75%
13.	Hypoxidaceae	1	1	1	2	50%
14.	Dioscoreaceae	1	8	8	24	33.33%
15.	Liliaceae	3	4	11	15	26.66%
16.	Asparagaceae	1	1	1	3	33.33%
17.	Smilacaceae	1	1	2	8	12.5%
18.	Pontederiaceae	2	3	2	4	75%
19.	Commelinaceae	4	6	13	35	17.14%
20.	Arecaceae	9	10	18	33	30.30%
21.	Pandanaceae	1	2	1	5	40%
22.	Juncaceae	1	1	1	1	100%
23.	Araceae	10	13	24	47	27.65%
24.	Typhaceae	1	1	1	2	50%
25.	Lemnaceae	3	4	3	4	100%
26.	Alismataceae	1	2	2	3	66.66%

27.	Najadaceae	1	1	1	1	100%
28.	Eriocaulaceae	1	1	1	1	100%
29.	Cyperaceae	12	37	15	140	27.14%
30.	Poaceae	50	78	105	303	25.74%

Primary source

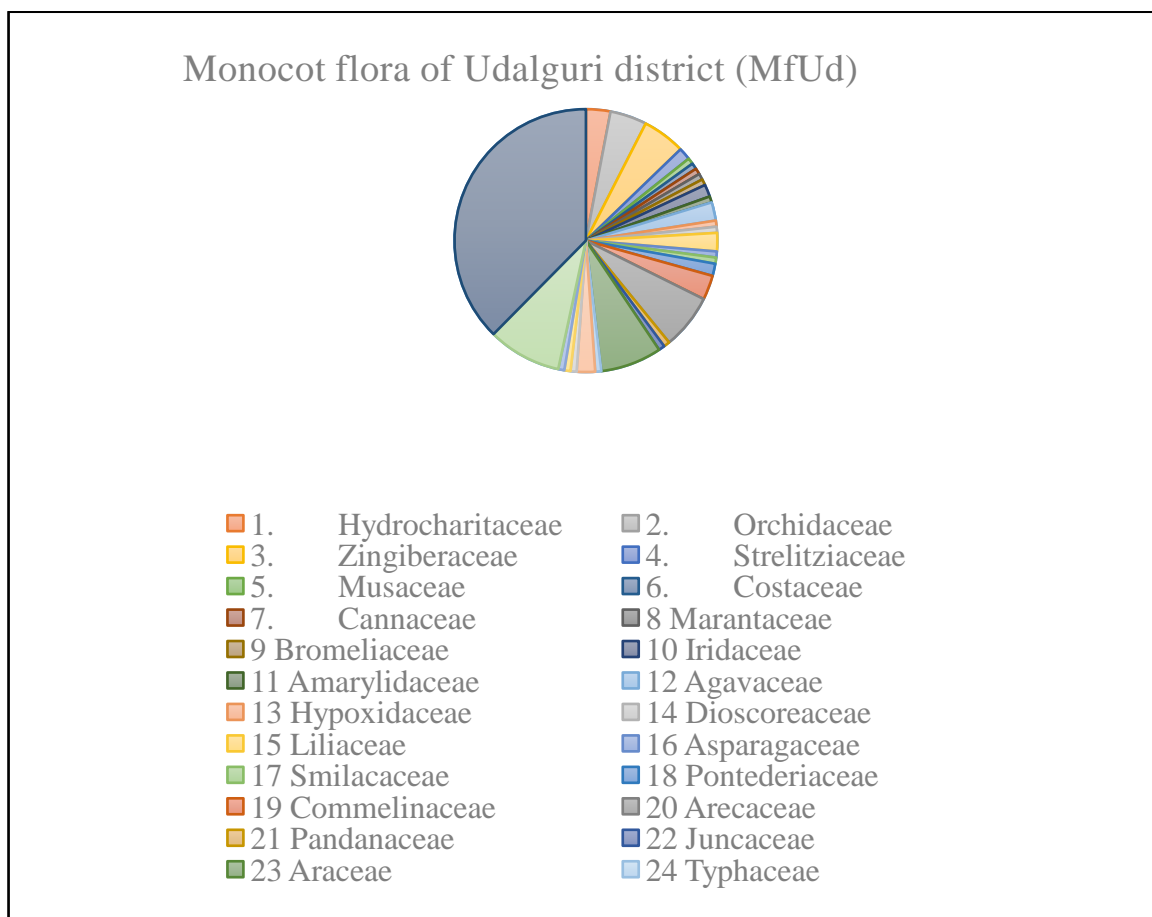


Figure 5: Family wise analysis of Monocotyledon plants with % of *spp.* representation of Udalguri district

- **Dominant Families:** Out of 30 families, Poaceae (Gramineae) is found to be dominant. Five dominant families in order of sequence are on the basis of their total number of genera and species under each family of the study area according to their strength in the number of species are recorded in [Table 11: and Figure 6a: genera and Figure 6b: species].

Table 11: Five dominant Monocot families of Udalguri district on the basis of genera and species

Sl.No.	Based on number of genera	Based on number of species
1.	Poaceae (50)	Poaceae (70)
2.	Cyperaceae (12)	Cyperaceae (38)
3.	Zingiberaceae (7)	Zingiberaceae (15)
4.	Araceae (10)	Araceae (15)
5.	Arecaceae (9)	Arecaceae (10)

Primary source

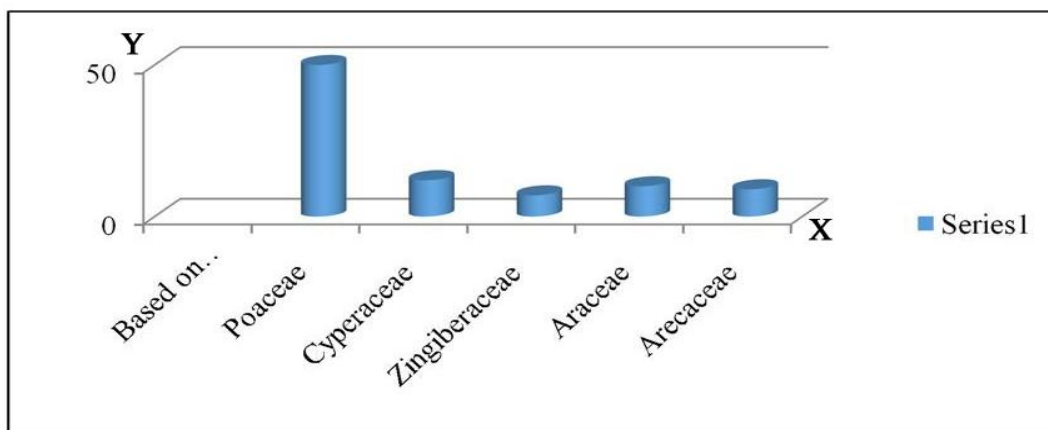


Figure 6a: Dominant Monocot families on the basis of genera of Udalguri district

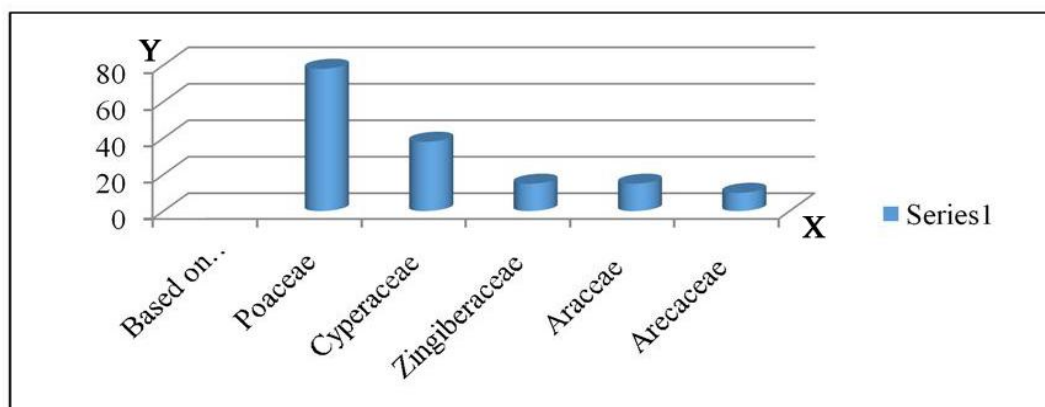


Figure 6b: Dominant Monocot families on the basis of species of Udalguri district

➤ **Following are the Habit analysis of Monocot flora of Udalguri district:**

Table 12: Habit analysis

Sl.No.	Habit	No. of species	% of the species
1.	Herbs	201	88.10%
2.	Shrubs	10	4.40%
3.	Under shrubs	2	0.88%
4.	Trees	15	6.60%

Primary source

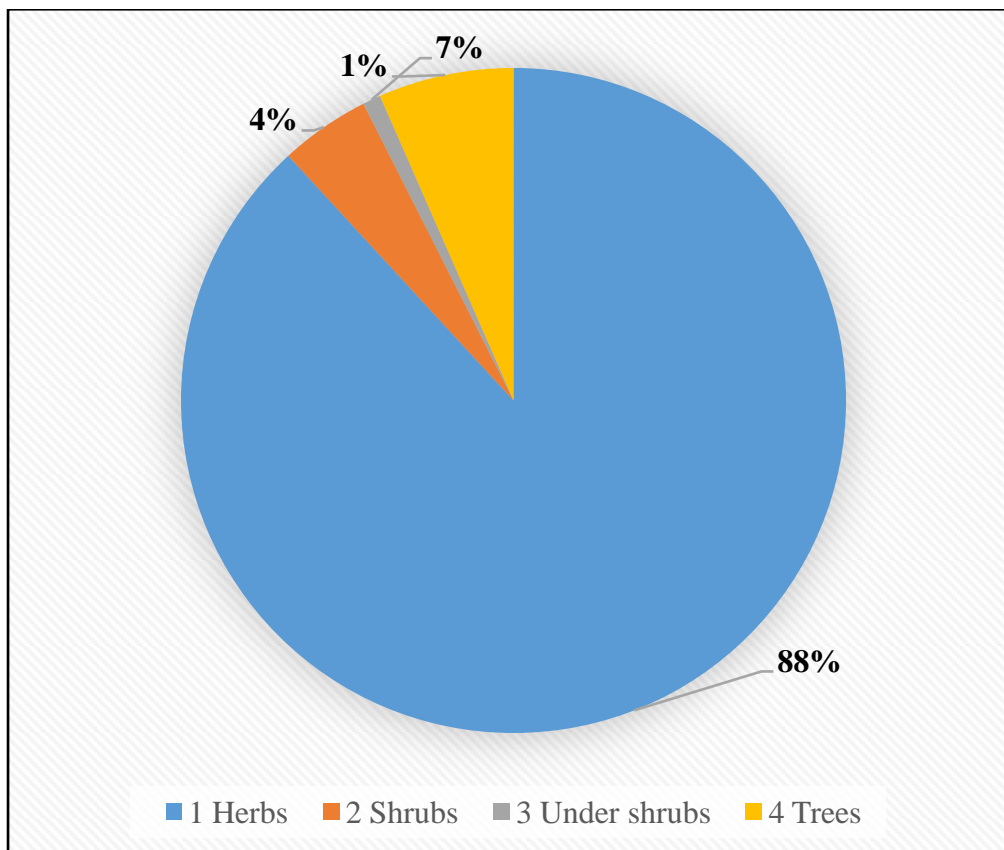


Figure 7: Distribution of different habits in (%)

➤ Following are the Habitat analysis of Monocot flora of Udalguri district:

Table 13: Habitat analysis

Sl. No.	Habitat	No. of species	% of the species
1.	Terrestrial	134	58.59%
2.	Aquatic	15	6.60%
3.	Marshy areas	50	22.02%
4.	Climbers	12	5.28%
5.	Creepers	10	4.40%
6.	Epiphytic	07	3.08%

Primary source

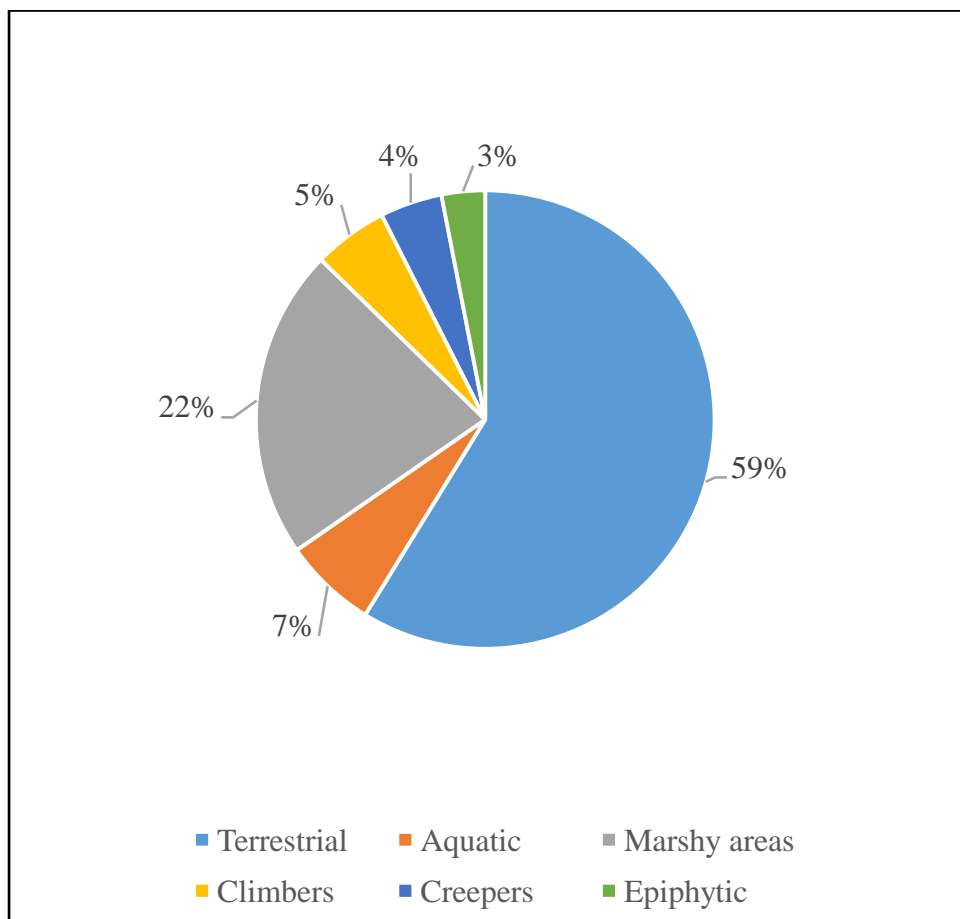


Figure 8: Habitat analysis in (%)

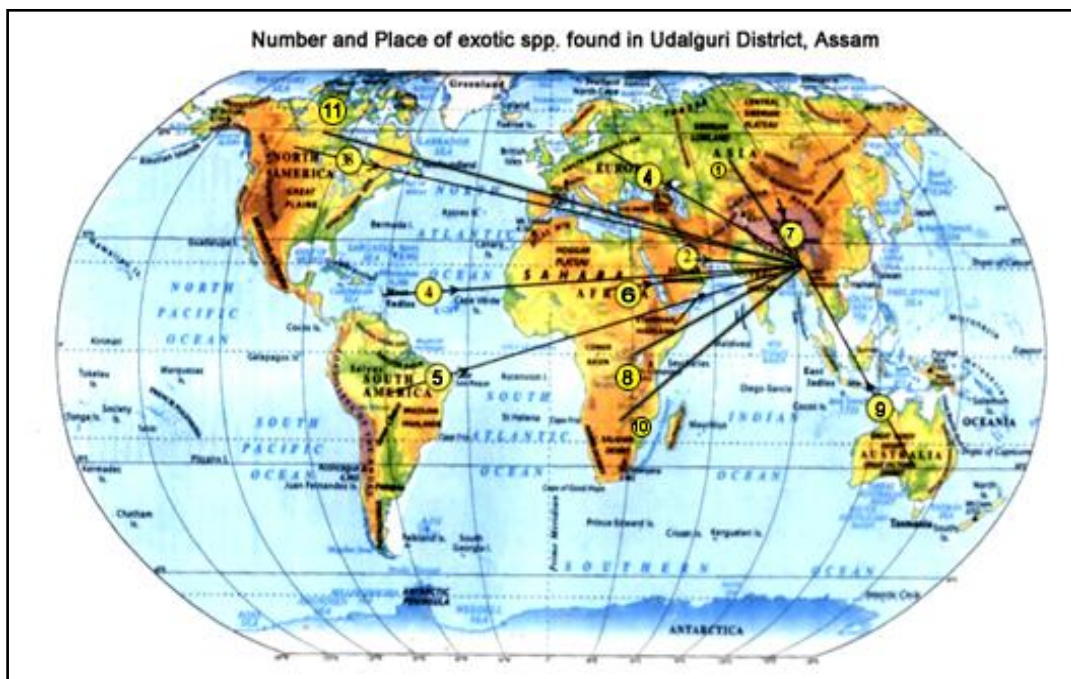
6.1.2 EXOTIC SPECIES RECORDED IN THE STUDY AREA

The following, 11 species of Monocot plants are recorded as exotic species in the study area being 4.84% of the total recorded species are provided in [Table 14: and Figure 9:].

Table 14: Exotic species of Udalguri district

Sl.No.	Name of monocot species	Family	Place of origin
1.	<i>Allium cepa</i> L.	Liliaceae	South West Asia
2.	<i>Agave americana</i> L.	Agavaceae	Tropical America
3.	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Tropical America
4.	<i>Cyperus rotundus</i> L.	Cyperaceae	Eurasia
5.	<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae	Tropical South America (Brazil)
6.	<i>Eragrostis tenella</i> (L.) P. Beauv.	Poaceae	Africa
7.	<i>Panicum miliaceum</i> L.	Poaceae	China
8.	<i>Ravenala madagascariensis</i> J. F. Gamble.	Strelitziaceae	South Africa
9.	<i>Sporobolus diander</i> (Retz.) Beauv.	Poaceae	Australia
10.	<i>Strelitzia reginae</i> Banks ex Aiton	Strelitziaceae	South Africa
11.	<i>Zea mays</i> L.	Poaceae	Mexico, Central and South Western USA

Primary Source



Source: Bora (2008)

Figure 9: Number and places of origin of exotic *spp.* found in Udalguri district

6.1.3 ETHNOBOTANICAL MONOCOT PLANTS USED BY BODO AND RABHA COMMUNITY OF UDALGURI DISTRICT

The 44 Ethnomedicinal Monocot species documented of Bodo and Rabha community is compared in [Table 15: and Figure 10:].

Table 15: Comparison of medicinal Monocot plants used by Bodo and Rabha community of Udalguri district (+ve' and '-ve' indicates presence and absence of species respectively)

Sl.No.	Name of medicinal Monocot species	No. of species used by Bodo	No. of species used by Rabha
1.	<i>Acorus calamus</i> L.	+	+
2.	<i>Alocasia indica</i> (Lour.) Koch.	+	-
3.	<i>Aloe vera</i> (L.) Burm. f.	+	+
4.	<i>Allium cepa</i> L.	+	+

5.	<i>Allium sativum</i> L.	+	+
6.	<i>Alpinia nigra</i> (Gartn.) Burtt.	+	+
7.	<i>Ananas comosus</i> (L.) Merr.	+	+
8.	<i>Asparagus racemosus</i> Willd.	+	+
9.	<i>Axonopus compresus</i> (Sw.) P. Beauv.	+	-
10.	<i>Bambusa assamica</i> Bar. & Borth.	-	+
11.	<i>Belamcanda chinensis</i> (L.) DC.	+	-
12.	<i>Canna indica</i> L.	-	+
13.	<i>Colocasia esculata</i> (L.) Schott.	+	+
14.	<i>Commelina benghalensis</i> L.	+	+
15.	<i>Costus speciosus</i> (Koen.) Smith.	+	+
16.	<i>Curcuma amada</i> Roxb.	+	-
17.	<i>Curcuma aromatica</i> Salisb.	+	-
18.	<i>Curcuma domestica</i> Valet.	+	-
19.	<i>Crinum asiaticum</i> L.	+	+
20.	<i>Crinum defixum</i> Ker-Gawl.	+	-
21.	<i>Curculigo orchioides</i> Gaertn.	+	-
22.	<i>Chrysopogon aciculatus</i> (Retz.) Trin.	+	-
23.	<i>Cynodon dactylon</i> (L.) Pers.	+	+
24.	<i>Cymbogon nardas</i> (L.) Rendle	+	-
25.	<i>Cyperus rotundus</i> L.	+	-
26.	<i>Dedrobium aphyllum</i> (Roxb.) Fischer.	+	-
27.	<i>Eleutherine balbosa</i> (Mill.) Urb.	+	-
28.	<i>Homalomena aromatica</i> (Spreng.) Schott	+	-
29.	<i>Imperata cylindrica</i> (L.) P. Beauv.	+	-
30.	<i>Kaempferia galanga</i> L.	+	+
31.	<i>Kaempferia rotunda</i> L.	+	+
32.	<i>Lasia spinosa</i> Thw.	+	-

33.	<i>Monochoria hastata</i> (L.) Solms.	+	+
34.	<i>Musa balbisiana</i> Colla.	+	-
35.	<i>Oryza sativa</i> L.	-	+
36.	<i>Ottelia alismoides</i> (L.) Pers.	+	+
37.	<i>Pistia stratiotes</i> L.	-	+
38.	<i>Saccharum officinarum</i> L.	+	+
39.	<i>Saccharum spontaneum</i> L.	+	-
40.	<i>Sansevieria roxburghiana</i> Schult.	-	+
41.	<i>Typha angustata</i> Bory & Chaub.	+	-
42.	<i>Typhonium trilobatum</i> (L.) Schott	+	-
43.	<i>Vallisneria spiralis</i> L.	+	-
44.	<i>Zingiber officinale</i> Roscoe	+	+
	Total = 44	39	13

Primary source

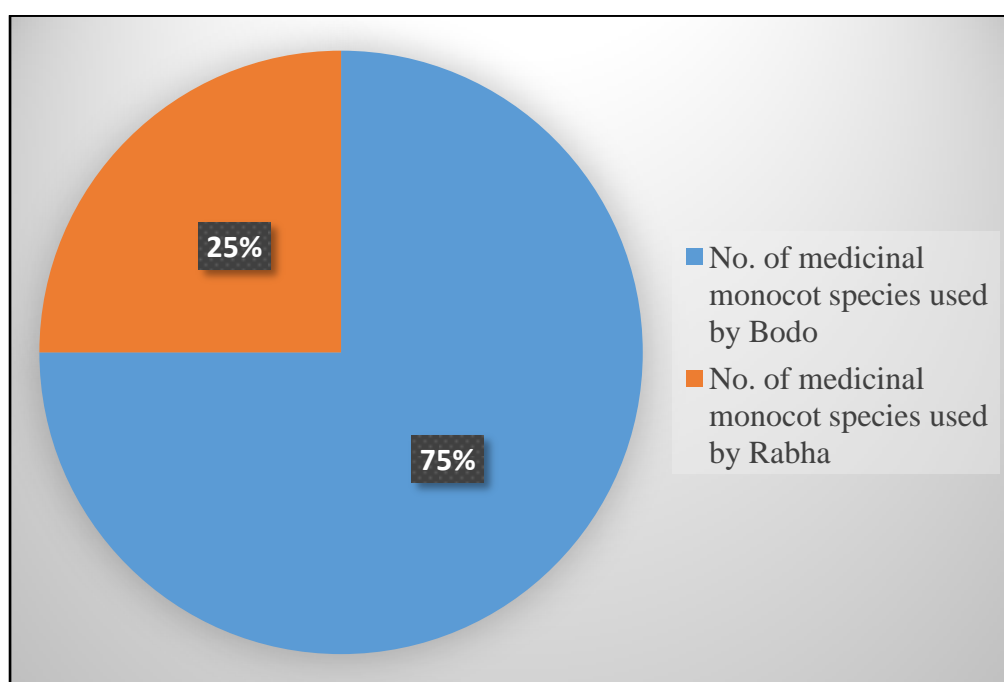


Figure 10: Comparison of medicinal Monocot plants used by Bodo and Rabha community of Udalguri district.

6.1.4 MONOCOT PLANT PARTS USED BY BODO AND RABHA COMMUNITY OF UDALGURI DISTRICT

The Monocot plant parts used for medicinal preparation were leaf, stem, root, flower, seed, fruit and underground parts. There were instances of whole plant being used also. The most frequently used plant parts are given [Table 16: and Figure 11:].

Table 16: Monocotplant parts used by Bodo and Rabha community

Sl. No.	Plant parts used	No. of species used by		No. of species used	
		Bodo		by Rabha	
1.	Leaves, shoot	15	34%	11	25%
2.	Rhizome, stem	12	27.3%	4	9%
3.	Roots, bulb, tuber.	14	31.8%	5	11.38%
4.	Fruits, seeds, flowers	2	4.6%	3	6.8%
5.	Whole plant	4	9%	3	6.8%

Primary source

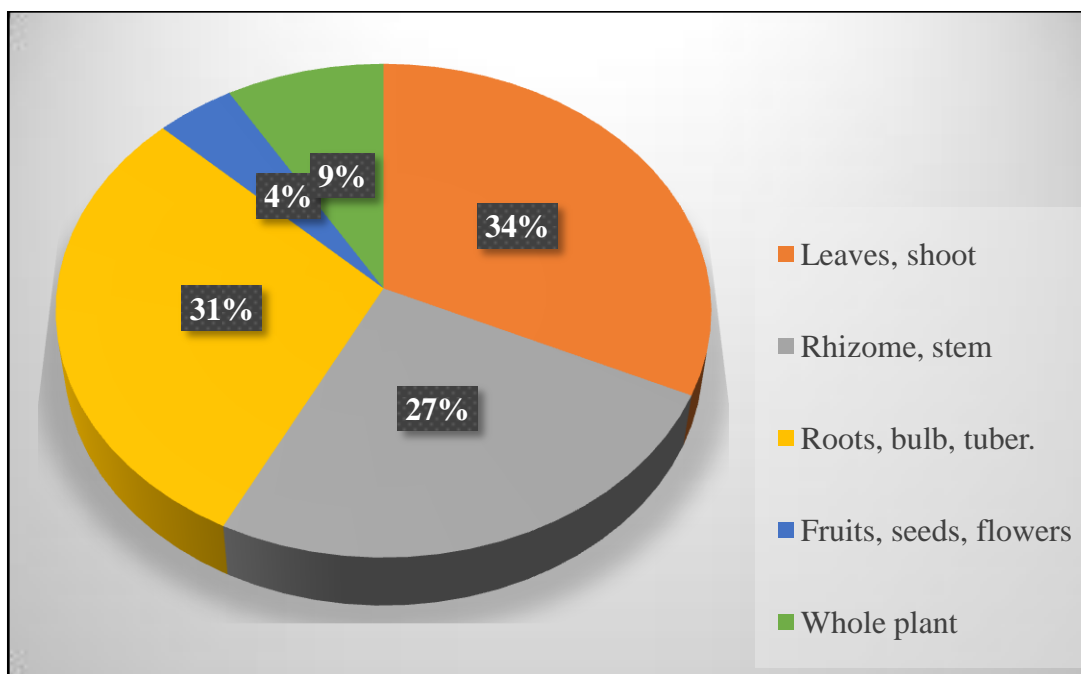


Figure 11a: Monocot plant parts used and the number of species used by Bodo community

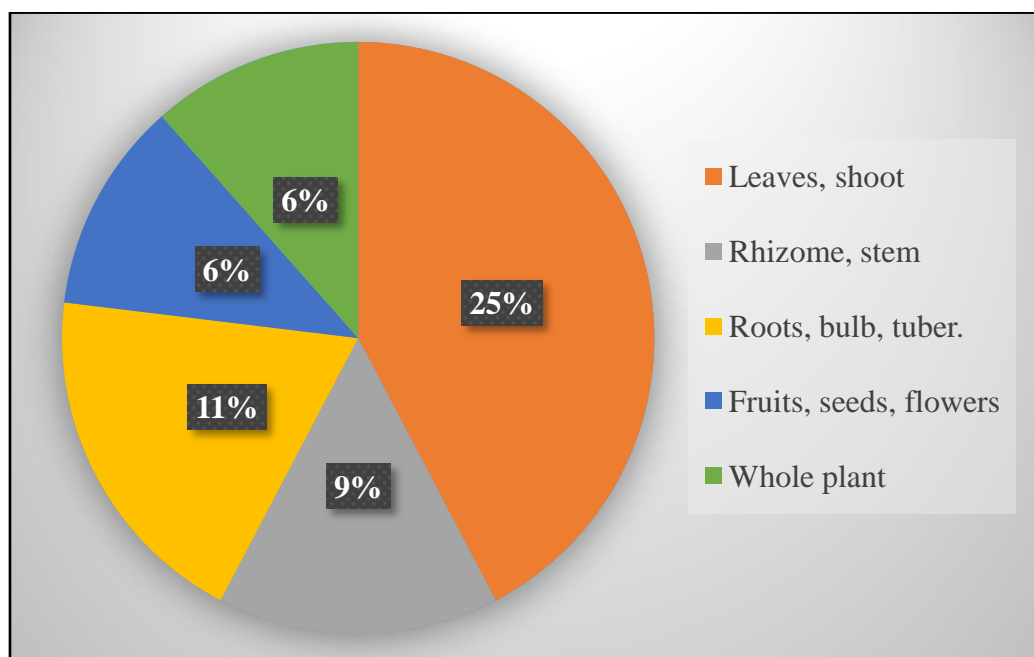


Figure 11b: Monocotplant parts used and the number of species used by Rabha community

6.1.5 MODE OF UTILISATION OF MONOCOT PLANTS IN THE UDALGURI DISTRICT BY BODO AND RABHA COMMUNITY

The Monocot species enumerated have been categorised based on the mode of utilisation of plants and plant parts were recorded of locally used by Bodo and Rabha community of Udalguri district are given bellow in [Table 17: and Figure 12:].

Table 17: Showing the different modes of utilisation of Monocot plants by Bodo and Rabha people

Sl. No.	Mode of uses	No. of plant species	% of species
1.	Medicinal uses of Bodo and Rabha	52	22.9%
2.	Ritual activities of Bodo and Rabha	11	4.8%
3.	Ethno-veterinary plants	8	3.5%
4.	Edible plants	28	12.3%

5.	Dye yielding plants	1	0.5%
6.	Narcotics and masticatories	1	0.5%
7.	Fire woods	10	4.4%
8.	Aromatic plants	4	1.8%
9.	Species and condiments	6	2.7%
10.	Green manure producing plants	4	1.8%
11.	Fodder plants	5	2.2%
12.	Household uses	12	5.3%
13.	Oil yielding plant	2	0.9%
14.	Rope making plants	3	1.4%

Primary source

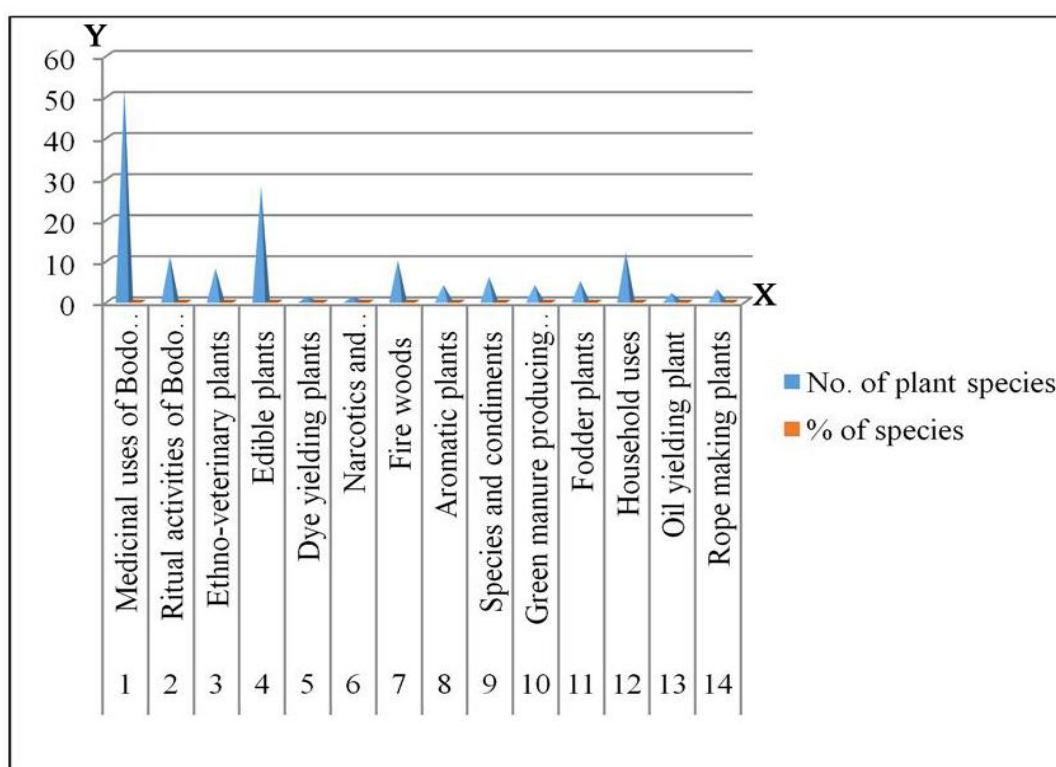


Figure12: Utilisation of Monocot plants by Bodo and Rabha people in no. of plant species and in (%) of species

6.1.6 SIGNIFICANT FINDINGS

❖ Endemic monocot taxa recorded in the present study

As many as 102 endemic species belonging to 75 genera have been recorded for Assam (Nayar, 1980). The present study recorded 07 Monocot species endemic to Assam, North East India and India are given bellow: [Table 18].

Table 18: Endemic Monocot taxa recorded during the present study

Sl. No.	Name of the taxa	Region	Reference
1.	<i>Bambusa balcooa</i> Roxb.	Assam and West Bengal	Nair and Thomas, 2001
2.	<i>Bambusa pallida</i> Munro.	North East and Sikkim	Nair and Thomas 2001
3.	<i>Dioscorea pentaphylla</i> L.	Assam	Baishya, 1999
4.	<i>Homalomena aromatica</i> (Spreng.) Schott.	N. E. India	Choudhury and Murti, 2000
5.	<i>Hymenachne assamica</i> (J. D. Hook.) Hitchcock	N. E. India	Choudhury and Murti, 2000
6.	<i>Livistona jenkinsiana</i> Griff.	N. E. India	Choudhury and Murti, 2000; Nayar, 1996
7.	<i>Musa velutina</i> H.Wendl. & Drude	N. E. India and Sikkim	Choudhury and Murti, 2000; Nayar, 1996

Primary source

❖ RET-Monocot plants recorded during the present study

Baishya (1999) provided a list of 60 rare, endangered and threatened species from Assam. The present study recorded a total of 19 RET-Monocot taxa in the area

are given in the following table. According to data source (Nayar and Sastry, 1987, 1988, 1999; CITES, 2000; IUCN, 2011 and 2017) and also data source collected from Chowdhury, 2005 [Table 19].

Table 19: RET-Monocot plants recorded in Udalguri district

Sl.No.	Botanical name	Ecological status	References
1.	<i>Acorus calamus</i> L.	V	Choudhury and Murti 2000 (CITES); Chowdhury, 2005
2.	<i>Aerides odorata</i> Lour.	E	Choudhury and Murti, 2000 (CITES)
3.	<i>Arudina graminifolia</i> (D. Don) Horch.	E	Choudhury and Murti, 2000 (CITES)
4.	<i>Asparagus racemosus</i> Wild.	V	Choudhury <i>et al</i> , 2002.
5.	<i>Costus speciosus</i> (Koen.) Smith.	V	Chowdhury, 2005
6.	<i>Cymbidium aloifolium</i> (L.) Swartz	E	Choudhury and Murti 2000 (CITES)
7.	<i>Dendrobium aphyllum</i> (Roxb.) C. E. C. Fisch.	E	Choudhury <i>et al</i> , 2002.
8.	<i>Dioscorea alata</i> L.	E	Choudhury <i>et al</i> , 2002.
9.	<i>Dioscorea bulbifera</i> L.	E	Choudhury <i>et al</i> , 2002
10.	<i>Gloriosa superba</i> L.	V	Chowdhury, 2005
11.	<i>Hedychium coronarium</i> Koen.	E	Chowdhury, 2005
12.	<i>Kaempferia galanga</i> L.	E	Chowdhury, 2005
13.	<i>Livistona jenkinsiana</i> Griff.	E	Chowdhury, 2005
14.	<i>Najas minor</i> All.	CE	Chowdhury, 2005
15.	<i>Oryza officinalis</i> Wall. <i>ex</i> Watt.	T	IUCN, 2017

16.	<i>Papilionanthe teres</i> (Roxb.) Schltr.	E	Choudhury and Murti 2000 (CITES)
17.	<i>Rhynchosstylis retusa</i> (L.) Blume	E	Choudhury and Murti 2000 (CITES)
18.	<i>Urochloa ramosa</i> (L.) T. Q. Nguyen.	T	IUCN, 2011
19.	<i>Zingiber zerumbet</i> (L.) Roscoe <i>ex</i> Smith.	E	Chowdhury, 2005

Primary source

Note: R-rare; E-endangered; T-threatened; CE-critically endangered; V-vulnerable

IUCN-International Union for Conservation of Nature and Natural Resources.

CITES-Convention on International Trade in Endangered Species (Wild Flora).

- ❖ Ethnobotanical uses of Monocot plants by Bodo and Rabha community is done for the first time in Udalguri district, where earlier there was not work done in this area.
- ❖ **Monocot plants are not recorded in the Flora of Assam (Kanjilal *et al*, 1934-40) except Poaceae:** Family Cyperaceae of the north east region of India (Old Assam) was the incomplete in Flora of Assam, Kanjilal *et al* (1934-40).
- ❖ **New addition to the Monocot flora of Assam:** The present study recorded one Monocot species viz. *Eleutherine balbosa* (Mill.) Urb. (Iridaceae) which was not recorded in Assam's Floraby Chowdhury *et al* (2005).

6.2 DISCUSSION

The present study area, Udalguri district, BTAD, Assam, India, indicate a rich flora, possibly due to richness and fertility of regions physiography of plain area and tropical to sub-tropical climate. Botanical province of Assam is very rich in vegetation and covers valley of Brahmaputra river. The present study area, Udalguri district falls in the floristic province of Assam. As we know phytogeography or botanical geography is the branch of botany that deals with the

geographical distribution of plant species and their influence on the earth's surface. Assam has been treated as distinct phytogeographical area because of its distinctive flora by various workers mainly, Chatterjee (1939, 1940, 1962); Hooker (1906); Jain (1990). Many plant taxonomists have been put forwarded knowledge on phytogeography affinities of plants of Assam and North East India which are Rao (1974, 1977, 1979); Das and Deori (1983); Barua *et al* (1988); Rao and Murti (1990); Hajra and Mudgal (1997); Singh (2000); Arora (1964, 2000); Mitra and Mukherjee (2007); Buragohain (2007); Nath and Maiti (2012) and Barooah and Ahmed (2014). It was observed that the Monocot flora of Udalguri district consists of different phytogeographical elements which includes Indian, cosmopolitan, Indo-Myanmar, Tropical Asian, Palaeotropical, Neotropical, Pantropical and Peninsular elements.

This ethnobotanical survey results probably revealed the rich wealth of indigenous knowledge and usage custom of traditional plants associated with Bodo and Rabha people of Udalguri district. Despite their uses in traditional plant medicines, Monocot plant species documented in the present field work have been extensively used for improving the health of livestock, religious or rituals, food, fishing technology, industrial technology and cattle's as well. There was no written document of traditional healing knowledge and transmission to the future generation accept through oral communication. Further the details of their use for various purpose have proved once again that the Bodo and the Rabha people of Udalguri district has a rich heritage of botanical lore. This has been revealed by the repeated collection of information from different areas of the district and repeated field trips made into the forests, remote villages of Bodos and Rabhas, town areas, rivers, streams, ponds, agricultural areas and collection of plant species that form with subsequent identification with the reference to authentic authorities will let one to believed that Bodo and Rabha culture is plant based on or nature based culture.

At the same time, it shows the possibility of *in-situ* (on-site) conservation of such valuable medicinal plants and RET-Monocot plants wealth in this area. It may also serve as germplasm bank for further *ex-situ* (off-site) multiplication. Therefore, there is an urgent need for developing and implementing conservation strategies for the Udalguri district, BTAD, Assam, India.

Let us join our hands together to achieve our cherished goal.