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Angiospermic Plant Resources of Palashbari Area of South Kamrup District of Assam with Special Reference to Pollen Morphology of certain *Ipomoea* spp.

Nilashree Borah
Assistant Professor,
Deptt.of Botany,
Guwahati College,
Guwahati, Assam,
India

Pramod Medhi
Assistant Professor,
Deptt.of Botany,
Pandu College,
Guwahati, Assam,
India

Abstract

Palashbari is located in the South Kamrup district of Assam at a distance of 23 km west of Guwahati city proper and in the South Bank of river Brahmaputra. The area lies between 26° 1′ 5″ North latitude to 91° 5′ 4″ East longitude. The present survey of Palashbari area (comprising of Dakhala hills, plain areas and few small wetlands) deals with the wild angiospermic flora (Dicotyledons and Monocotyledons) and also palynotaxonomical study of certain species of *Ipomoea*. A total of 214 species that includes149 Dicot and 65 Monocot species belonging to 74 different families, were collected and identified. Also, pollen morphological features of three species of the *Ipomoea* were enumerated.

Keywords: Floristics, Plant Resource Utilization, Pollen Morphology, Palashbari, Assam

Introduction

Floristic study is a work devoted to the plants of a particular area or region (George H. M. Lawrence, 1951). It covers any area from small patch of a forest to a large district, state or country. The word "Flora" means Goddess of flowers and plants.In the Roman mythology she was the Goddess of fertility. As we know that angiospermic flora dominates the earth's surface and vegetation in terrestrial habitat. As a result floristic study of an area becomes the most important part of plant taxonomy.

Again, the Palynotaxonomy is the science of pollen grain and spore which is valuable aid for taxonomic identification and delimitation of taxa. The morphological characters of pollen are categorized under apertures, size and shape and exine sculpture. Among these aperture character is considered to be of primary importance, the exine surface pattern as secondary and others as tertiary (Nair, 1970). Erdtman (1952), has provided an excellent survey of the use of pollen morphology in taxonomic studies. He grouped the pollen of Convolvulaceae family in *Ipomoea type* and *other type* based on the exine sculpture. The pollen morphology of Convolvulaceae is highly diverse and has taxonomic importance (Telleria and Daners, 2003).

As a part of the perusal of literature for the present work, emphasis was mostly given to the angiosperm floristic studies and the angiospermic plant resource utilization from the erstwhile Kamrup district as well as the state of Assam, India. In that connection, a series of random published standard works in the journals, books and PhD thesis up to the very recent years that are relevant to the present work has been taken into consideration as standard reference. Some of the references for literature study for the present study are, Barua (2001), Das *et al*.(2006), Kar & Borthakur (2007), Baruah *et al*. (2010), Deka *et al*. (2012), Kar *et al*. (2012), Das (2013), Dutta & Kalita (2013), Handique (2013), Barooah & Ahmed (2014), BSI (2015), Chaudhury & Kalita (2015), Das *et al*.(2015), Nath (2015), Boro (2016), Daimari B., Bhuyan & Baruah (2016), Saharia & Yasmin (2016), Saensouk & Saensouk (2017), Tamuli & Ghosal (2017), Bhuyan & Chetia (2018).

Significantly no such documentation work has been reported specifically on the angiospermic plant diversity and their traditional uses and also pollen morphology study from the Palashbari area.

With this backdrop of study, an attempt has been made to enumerate the available wild angiospermic plant species and their utilization and also the pollen morphology study of certain species of *Ipomoea* under the family Convolvulaceae that were present in the Palashbari area of South Kamrup district of Assam.

Study Area

Palashbari is located in the South Kamrup district of Assam at a distance of 23km west of Guwahati city proper and in the South Bank of river Brahmaputra. The area lies between 26°1´5"North latitude to 91°5´4" East longitude and has an average elevation of 46 metres (150feet).The geographical area of Palashbari is 25 sq. km (Approx). The Palashbari area is surrounded in the north by mighty river Brahmaputra; in the south *Harpara*, *Sikarhati* and *Majgaon* villages; in the east Pub-*Borjhar* village and Gopinath Bordoloi International Airport and in the south *Bijoynagar* area.

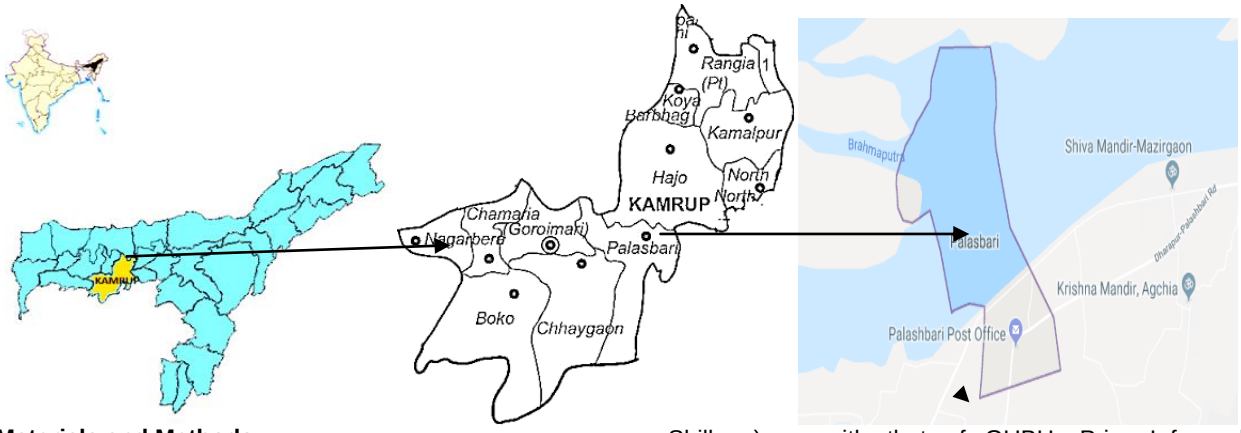
There is a river channel known as *Kalbhog* run through this town from South to North. Two main wetlands namely *Dora beel* and *Cholcholi beel* are present in this area with rich and diversified flora. Besides these, there are two prominent hillocks namely *Dakhala* and *Maliata* present in the northern boundary and southern boundary of Palashbari, respectively.

The study area is mainly composed of alluvial soil of Precambrian gneissic complex. The mean maximum and minimum temperature varies from 38°C to 7°C.The annual rainfall is 1335 mm and about 90% of the rain occurs in between April and September. The vegetation of this area is mainly semi-evergreen and mixed deciduous forest with the presence of sub-tropical broad-leaf hill forest.

As Palashbari is a large area, the present study comprises from *Dakhala hill* to *Mazirgaon* village covering a large number of *beels* and marshes having wonderful terrestrial and aquatic vegetation. The *Dakhala hill* is a very beautiful hillock having a great historical background.There is a *Than (one kind of temple)* called *Dakhala Bura Gosai Than,* is situated there in the top of the hillock.In this *Than* devotees came to worship the presiding deity.

There is a folk tales regarding the medicinal and aromatic plants of *Dakhala hill.* According to the folk tales, *Dakhala* hill is one of the smallest part of the mount *Dronagiri (Mahodaya)* in the Himalayas. In Hindu mythology it was believed that, when lord Hanuman was called upon to fetch the *Sanjeevani* herb from the *Dronagiri* mountain, he lifted the whole mount and bought it to the Battlefield. When he bought this mount, one part of it may fell on the bank of the river Brahmaputra near the *Palashbari* area. This small part of the *Dronagiri* mountain is named as *Dakhala hill*. That is why *Dakhala hill* is also called as *Baidyagiri* due to the availability of its medicinally valuable plants.

Map: 1: Location map of Palashbari Area of South Kamrup District, Assam



Materials and Methods

A survey on the flora of Palashbari area was conducted for documentation of wild angiospermic plants. The species were collected randomly as far as on weekly basis particularly Sunday from *Dakhala hill* and also the plain area of Palashbari. This was done in order to observe their flowering and fruiting habit along with their important aspects such as flowering, fruiting, plant habit and their uses etc. The collected samples were pressed and dried for herbarium preparation following standard techniques (Jain and Rao, 1977) and submitted to the Gauhati University Botany Department Herbarium (GUBH).The specimen were identified consulting literature and comparing with the ASSAM herbarium (BSI, Eastern circle, Shillong) as with that of GUBH. Prior Informed Consent was taken from local *Gaon Burhas* and the priest of *Dakhala Bura Gosai Than* and also discussed clearly about the Intellectual Property Rights and benefit sharing issues of the study outcome, arises if any, in future.

For the pollen study, 3 species of the genus *Ipomoea* namely *Ipomoea carnea, I. vitifolia* and *I. turpethum* were selected. For pollen analysis, mature pollen was collected from mature anther and was acetolysed with a proper acetolysis method(Erdtman,1952). After that, the grains were mounted in gelatin jelly and sealed by applying paraffin wax and heated gently. Then the slide was observed under

high powered compound microscope and were measured and identified.

Result and Discussion

In the present study, a total of 221 species under 177 genera and 66 families were recorded. Out of the total recorded species, dicotyledons comprises about 156 species, belonging to 130 genera and 51 families and the monocotyledons comprises about 65 species, and those belongs to 47 genera and 15 families (Fig-1 /Table-1 and Table-2).

Among the dicotyledons, Asteraceae is the most dominant family in the area in respect to number of species (15spp.) followed by Acanthaceae (9spp.), Lamiaceae (8spp.), Caesalpiniaceae (8spp.), Solanaceae (7spp.), Moraceae (7spp.), Amaranthaceae (6spp.),Euphorbiaceae (6spp.), Rubiaceae (6spp.),Verbenaceae (6spp.) are recorded from the area.

Again, among Monocots, Poaceae is the most dominant family in respect to the number of species recorded (25spp.), which is followed by Cyperaceae (11spp.), Araceae (7spp.), Orchidaceae (4spp.), Zingiberaceae (4spp). In terms of the number of species under the genus *Solanum* (5spp.), *Ficus* (5spp.), *Cassia* (4spp.), *Amaranthus* (3spp.) and *Ipomoea*(3spp.) are found dominant in the study area. Again, among the monocots the *Cyperus* (9spp.) is the most dominant genus followed by *Bambusa* (4spp.), *Saccharum* (3spp.), *Oplishmenus* (2spp.), *Curcuma* (3spp.), *Dioscorea* (2spp.), *Musa* (2spp.), etc.

Fig-1: Total recorded Angiospermic Families, Genera and Species of Palashbari Area

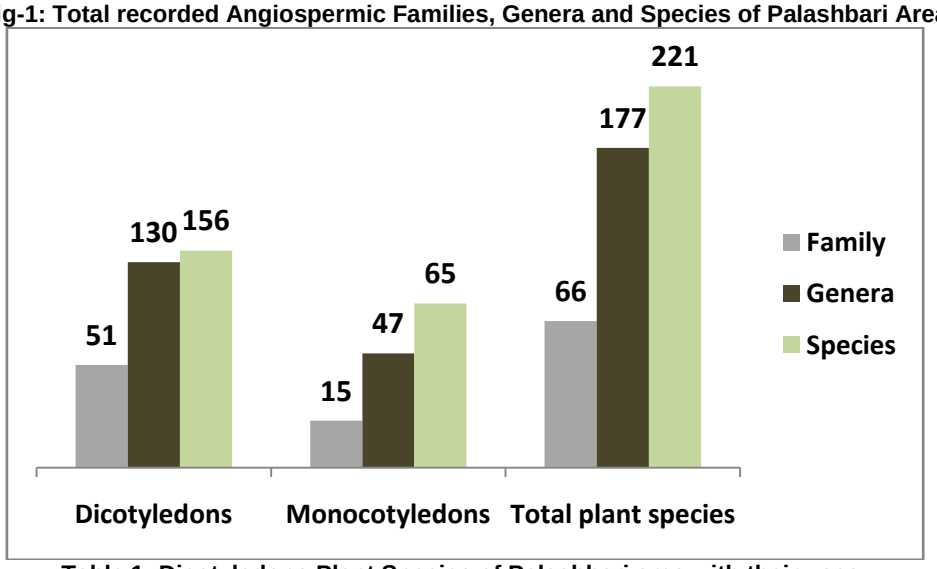


Table 1: Dicotyledons Plant Species of Palashbari area with their uses:

Scientific Name; Exsiccate	Family	Habit	Uses
Abutilon indicum (L.) Sweet [NB-011]	Malvaceae	Herb	Used to treat fever, cough, lung disease.
Acalypha indica L. [NB-008]	Euphorbiaceae	Herb	Used to treat asthma and pneumonia.
*Adhatoda vasica,*Nees [NB-018]	Acanthaceae	Shrub	Used in respiratory troubles.
Anisomeles ovata, Br. (L.)Kuntze [NB-009]	Lamiaceae	Shrub	Useful in the affections of the stomach and bowels. Also used in rheumatism arthritis.
Achyranthes aspera L. [NB-005]	Amaranthaceae	Herb	As antidote medicine for snake bite.
Albizia lebbeck (L.) Benth [NB-002]	Mimosaceae	Tree	Timber plant
Albizia saman (Jacq.)Merr. [NB-007]	Mimosaceae	Tree	Folk remedy for colds, diarrhea, headache, intestinal ailments and stomachache.
Alternanthera philoxeroides(Mart.)Griseb [NB-001]	Amaranthaceae	Herb	Useful in stomach pain and asthma.
Alternanthera paronychioides A.St.-Hill. [NB-003]	Amaranthaceae	Herb	As vegetables.
Amaranthus spinosus L. [NB-014]	Amaranthaceae	Herb	As vegetables.
Amaranthus hybridus L. [NB-010]	Amaranthaceae	Herb	As vegetables.
Amaranthus viridis L. [NB-004]	Amaranthaceae	Herb	As vegetables.
Ammania baccifera L. [NB-015]	Lythraceae	Herb	Useful in Malaria fever, jaundice.
Andrographis paniculata (Burm.f.) Nees [NB-006]	Acanthaceae	Herb	Used to treat infectious diseases.
Argemone maxicana L. [NB-012]	Pappaveraceae	Herb	Useful in kidney pain.
Argyeria nervosa (Burm.f.)Boj. [NB-016]	Convolvulaceae	Climber	As vegetable.
Artocarpus lakoocha Roxb. [NB-013]	Moraceae	Tree	The bark is chewed with paan (betel).
Azadirachta indica A. Juss. [NB-017]	Meliaceae	Tree	Useful in skin diseases.
Azeratum conyzoides L. [NB-036]	Asteraceae	Herb	As fodder.

Bauhinia acuminata L. [NB-039]	Caesalpiniaceae	Tree	Edible
Bauhinia variegata L. [NB-037]	Caesalpiniaceae	Tree	Edible
Blumea lacera (Burm.f.) DC. [NB-038]	Asteraceae	Herb	As treatment of bronchitis.
Bombax ceiba L. [NB-035]	Bombacaceae	Tree	Use to cures pimples.
Borreria articularis (L.f.) Will. [NB-091]	Rubiaceae	Herb	As fodder
Brassica campestris L. [NB-103]	Brassicaceae	Herb	As vegetables
Butea monosperma (Lam.) Kuntz [NB-089]	Fabaceae	Tree	Used in rituals (flower used).
Caesalpinia pulcherima f.flava[NB-88]	Caesalpiniaceae	Tree	Ornamental tree
Callicarpa arborea Roxb. [NB-106]	Verbenaceae	Tree	As wrapper for food fermentation.
Calotropis gigantea R.Br. [NB-092]	Asclepiadaceae	Shrub	Useful in muscles pain.
Calotropis procera (Ait.)Roxb. [NB-104]	Asclepiadaceae	Shrub	Used to treat asthma
Cannabis sativa L. [NB-095]	Cannabaceae	Herb	As vegetable
Cardiospermum helicacabum L. [NB-102]	Sapindaceae	Herb	Edible.
Cassia fistula L. [NB-096]	Caesalpiniaceae	Tree	Timber plant
Cassia siamea Lamk. [NB-094]	Caesalpiniaceae	Tree	Shade tree.
Cassia sophera L. [NB-101]	Caesalpiniaceae	Herb	As fodder.
Cassia tora L. [NB-097]	Caesalpiniaceae	Herb	Useful in fever.
Cayratia trifolia (L.) Domin. [NB-100]	Vitaceae	Lianes	As fodder.
Centella asiatica (L.) Urban [NB-105]	Apiaceae	Herb	Useful in dysentery.
Clerodendrum infortunatum L. [NB-093]	Lamiaceae	Herb	Traditional medicine of diarrhea, liver disorders
Cleome rutidosperma Var.burmanni Wight & Arn. [NB-098]	Capparidaceae	Herb	As fodder
Cleome gynandra L. [NB-099]	Capparidaceae	Herb	As vegetables
Crassocephalum crepidioides (Benth.) S. Moore. [NB-106]	Asteraceae	Herb	Leaf lotion or decoction used to treat headaches.
Crotalaria pallida Aiton. [NB-082]	Fabaceae	Herb	To treat urinal disease
Croton bonplandianum Baill. [NB-086]	Euphorbiaceae	Herb/ Shrub	Used as a fuel and detergent
Croton caudatus Geisel. [NB-083]	Euphorbiaceae	Herb	As food plant larvae for some lepidoptera
Cucumis melo L. [NB-087]	Cucurbitaceae	Climber	Edible
Cuphea carthagenesis (Jacq.) J.F.Macbr. [NB-081]	Lythraceae	Herb	Used in the treatment of high blood pressure.
Deeringia amranthoides (Ham) Merr. [NB-079]	Amaranthaceae	Scandent	Juice of the ripe fruit is used as substitute for red ink
Delonix regia (Bojer) Raf. [NB-084]	Caesalpiniaceae	Tree	Ornamental plant
Dicliptera bupleuroides Nees. [NB-080]	Acanthaceae	Herb	Used against diabetes
Dillenia indica L. [NB-085]	Dilleniaceae	Tree	Fleshy calyx is edible and is anti-diabetic.
Drymaria cordata (L.) Wild.ex schult. [NB-078]	Caryophyllaceae	Herb	Paste of plant used on tongue in fungal infection, juice is given in sinusitis
Duchesnea indica (Jacks.) Focke [NB-049]	Rosaceae	Herb	Edible
Eclipta alba (L.) Hassk [NB-044]	Asteraceae	Herb	Used to rejuvenates memory, hair, teeth etc.
Elephantopus scaber L. [NB-051]	Asteraceae	Herb	Edible(leaves)
Emilia sonchifolia (L.) DC.ex DC. [NB-046]	Asteraceae	Herb	The juice of this plant is used to treat diarrhoea
Erythrina stricta Roxb. [NB-042]	Papilionaceae	Tree	Used in bio-fencing
Eupatorium odoratum L. [NB-043]	Asteraceae	Herb	To treat common cold, fever and influenza
Euphorbia hirta L. [NB-040]	Euphorbiaceae	Herb	Use to treat eczema
Evolvulus nummularis (L.) L. [NB-045]	Convolvulaceae	Herb	As vegetable
Ficus benghalensis L. [NB-041]	Moraceae	Tree	Use in rituals
Ficus benjamina L. [NB-053]	Moraceae	Tree	Ornamental plant
Ficus elastica Roxb. [NB-047]	Moraceae	Tree	Use in rituals
Ficus hispida Vahl. [NB-052]	Moraceae	Tree	As vegetable
Ficus religiosa L. [NB-048]	Moraceae	Tree	As rituals
Flemingia strobilifera L. [NB-050]	Fabaceae	Shrub	Root decoction used in menstrual irregularities
Gmelina arborea Roxb. [NB-43]	Verbenaceae	Tree	Used in furniture making
Gnaphalium indicum L. [NB-50]	Asteraceae	Herb	Edible
Glycosmis pentaphylla (Retz.) DC. [NB-143]	Rutaceae	Shrub	Juice of leaves used for fever.

Gravelia robusta A. Cunn.ex R.Br. [NB-137]	Proteaceae	Tree	Ornamental plant
Hedyotis diffusa Willd. [NB-140]	Rubiaceae	Herb	Used in snake bite and cancer disease.
Heliotropium indicum L. [NB-144]	Boraginaceae	Herb	To treat warts, inflammation and tumours.
Holarrhena antidysenterica (Roth) Wall.ex.A.DC. [NB-138]	Apocynaceae	Tree	Used in dysentery
*Holmskioldia sanguine*a Retz. [NB-142]	Verbenaceae	Lianes	Ornamental plant
Houttuynia cordata Thunb. [NB-136]	Saururaceae	Herb	Used to reduce body pain(Bodyache)
Hoya parasitica Wall ex Traill [NB-139]	Asclepiadaceae	Epiphyti c	Ornamental plant
Hygrophila spinosa T Ander [NB-141]	Acanthaceae	Herb	Used to treat aphrodisiac, renal tonic.
Hyptis suaveolens (L.) Poit. [NB-135]	Lamiaceae	Herb	Traditional medicine of diarrhea.
Ipomoea carnea Jacq. [NB-164]	Convolvulaceae	Shrub	Latex of the plant is used to treat skin disease.
Ipomoea vitifolia Sweet.(Valid Name: *Meremia vitifolia* Hallier f.) [NB-157]	Convolvulaceae	Climber	As fodder
Ipomoea turpethum R.Br. (Valid Name: *Operculina turpethum* Manso) [NB-159]	Convolvulaceae	Climber	It is used as a purgative, well known under the name of Turpeth root or Indian jalap.
Justicia gendarussa Burm.f.[NB-165]	Acanthaceae	Herb	Used in muscles pain
Kalanchoe pinnata (Roxb.)Pers. [NB-170]	Crassulaceae	Herb	As vegetable
Lantana aculeate L. [NB-160]	Verbenaceae	Herb	To treat dog bite
Lagerostromia reginae Roxb. [NB-166]	Lythraceae	Tree	Timber plant
Lawsonia inermis L. [NB-169]	Lythraceae	Small tree	As dye
Leea guineensis G.D [NB-161]	Vitaceae	Tree	To treat muscular pain, arthritis etc
Lepidagathis incurva Buch-Ham.ex D.Don [NB-167]	Acanthaceae	Herb	To treat pulmonary tuberculosis, hepatitis
Leucas plukenetti (Roth) Spreng. [NB-162]	Lamiaceae	Herb	Plant juice is used in nose in sinusitis and tonsil
Lindernia crustacean (L.) F.Muell. [NB-168]	Scrophulariaceae	Herb	As fodder
Lindernea dubia (L.) Pennel [NB-156]	Scrophulariaceae	Herb	Aquarium plant
Lippia alba (Mil.) N.E.Br.ex Britton & P.Wilson [NB-163]	Verbenaceae	Herb	Aromatic leaves are used in herbal baths, to cure fevers and severe stomach pain.
Ludwigia abyssinica A.Rich. [NB-155]	Onagraceae	Herb	Used to treat abdominal pain
Ludwigia octovalvis (Jacq.)Raven [NB-158]	Onagraceae	Herb	As fodder
Mazus pumilus (Burm.f.) Steenis [NB-149]	Schrophulariacea e	Herb	As fodder
Melastoma malabathricum L. [NB-152]	Melastomataceae	Herb	Paste is used to cuts and wounds. Decoction of root is to cure diarrhea.
Melia azedarach L. [NB-154]	Meliaceae	Tree	Timber plant
Mesua ferrea L. [NB-147]	Clusiaceae	Tree	Oil from the seeds is used for sore, scabies, wounds and rheumatism
Mimosa pudica L. [NB-148]	Mimosaceae	Herb	Root is used in male fertility
Mikania micrantha Kunth. [NB-153]	Asteraceae	Climber	Used to treat malaria and eczema
Mirabilis jalapa L. [NB-151]	Nyctaginaceae	Herb	Ornamental plant
Mollugo oppositifolia L. [NB-146]	Molluginaceae	Herb	Used in stomach problem
Murraya koenigii (L.) Spreng [NB-150]	Rutaceae	Shrub	Use to treat gastritis
Nelsonia canescens (Lam.) Spreng [NB-145]	Acanthaceae	Herb	Root is used as anti-inflammatory.
Neolamarckia cadamba (Roxb.) Bosser [NB-133]	Rubiaceae	Tree	Timber plant
Nicotiana plumbaginifolia Viv. [NB-129]	Solanaceae	Herb	As fodder
Ocimum americanum L. [NB-130]	Lamiaceae	Herb	Used in cold cough etc.
Ocimum gratissimum L. [NB-128]	Lamiaceae	Herb	Used to treat stomach problem and fever
Oldenlandia corymbosa L. [NB-134]	Rubiaceae	Herb	Folk medicine for fever and stomach problem.
Oroxylum indicum (L.)Vent. [NB-132]	Bignoniaceae	Tree	Used to treat intestinal worm
Oxalis corniculata L. [NB-131]	Oxalidaceae	Herb	Used in stomach problems.

Oxalis debilis var.*corymbosa*(Dc.) Lourteig [NB-127]	Oxalidaceae	Herb	Whole plant edible
Paederia foetida L. [NB-059]	Rubiaceae	Climber	As vegetables
Pavetta indica L. [NB-065]	Rubiaceae	Shrub	Used in the treatment of constipation, jaundice, headache, urinary diseases and dropsy.
Peperomia pellucida (L.) Kunth. [NB-062]	Piperaceae	Herb	The leaves along with stem are used in urinary disorder, fever.
Phlogacanthus thyrsiflorus Nees. [NB-056]	Acanthaceae	Shrub	Whole plant is use in whooping cough and menorrhagia.
Phyla nodiflora (L.) Greene [NB-055]	Verbenaceae	Herb	Ornamental plant
Physalis minima L. [NB-063]	Solanaceae	Herb	Ripe fruit is used.
Pogostemon benghalensis (B) O.Ktz. [NB-058]	Lamiaceae	Shrub	Leaf paste is used in Burning
Poungamia pinnata L. [NB-067]	Papilionaceae	Tree	Ornamental plant
Rauwolfia serpentina (L.)Bentham ex.Kurz [NB-057]	Apocynaceae	Herb	Used to treat high blood pressure
Ricinus communis L. [NB-060]	Euphorbiaceae	Shrub	As silk worm host plant.
Roripa apetala Y.Y.Kim & B.U.oh [NB-061]	Brassicaceae	Herb	As vegetables
Rungia congoensis C.B.Clarke [NB-064]	Acanthaceae	Herb	Used due to its antioxidant property
Rumex maritimus L. [NB-066].	Polygonaceae	Herb	Used to treat boil and swelling
Scoparia dulcis L. [NB-054]	Scrophulariaceae	Herb	To treat cough
Senna occidentalis (L.) Link [NB-126]	Leguminosae	Shrub	As coffee substitute.
Senna hirsuta (L.) H.S.Irwin & Barneby [NB-111]	Leguminosae	Herb/ Shrub	Leaves are used as kidney and skin disorders.
Shorea robusta, Gaertn. [NB-108]	Dipterocarpaceae	Tree	Timber plant
Sida cordifolia L. [NB-109]	Malvaceae	Herb	As ayurbedic medicine
Sida rhombifolia L. [NB-107]	Malvaceae	Herb	Decoction of tender leaf is given to cure hypertension
Solanum anguivi Lam. [NB-117]	Solanaceae	Herb/ Shrub	Young shoots and leaves are edible.
Solanum angustifolium Mill. [NB-112]	Solanaceae	Herb	As cattle fodder
Solanum indicum L. [NB-118]	Solanaceae	Herb	Used in coughs, congestion of chest due asthma and tuberculosis.
Solanum nigrum L. [NB-125]	Solanaceae	Herb	As vegetables
Solanum torvum Sw. [NB-113]	Solanaceae	Shrub	As vegetables
Sphagneticola calendulacea (L.) Pruski [NB-123]	Asteraceae	Herb	Used to treat cough.
Spilanthes paniculata Jacq.ex S.S. Renner,Balsev & Holm-Niels [NB-114]	Asteraceae	Herb	As health tonic
Stellaria media (L.) Vill [NB-119]	Caryophyllaceae	Herb	As vegetables
Stephania japonica (Thunb.) Miers [NB-124]	Menispermaceae	Climber	To treat cattle muscles infection
Sterculia villosa Roxb. [NB-122]	Sterculiaceae	Tree	Fiber is used
Streblus asper Lour. [NB-115]	Moraceae	Shrub/Tree	Used in toothache
Synedrella nodiflora (L.) Gaertn. [NB-120]	Asteraceae	Herb	Leaves used as pain killer
Syzygiym cumini (L.) Skeels [NB-121]	Myrtaceae	Tree	Used against diabetes
Tamarindus indica L. [NB-116]	Papilionaceae	Tree	As chutney
Tectona grandis L. [NB-110]	Verbenaceae	Tree	Timber plant
Terminalia arjuna (DC.)W&A [NB-077]	Combretaceae	Tree	Used to treat heart disease
Toona ciliata M. Roem. [NB-072]	Meliaceae	Tree	Timber plant
Tephrosia candida (Roxb.) DC. [NB-076]	Leguminosae	Herb/ Shrub	As insecticide and Food poison
Trewia nudiflora L. [NB-071]	Euphorbiaceae	Tree	Timber plant
Tridax procumbens L. [NB-073]	Asteraceae	Herb	As fodder
Turnera ulmifolia L. [NB-070]	Passifloraceae	Herb/ Shrub	Leaves are used to treat hair loss and thrush
Urena lobata L. [NB-074]	Malvaceae	Herb	To treat diarrhea

Vernonia cinerea(L.) Less. [NB-068]	Asteraceae	Herb	As conjunctivitis
Vitex negundo L. [NB-075]	Lamiaceae	Shrub	To treat intestinal worm
Xanthium strumarium L. [NB-069]	Asteraceae	Herb	As vegetable

Table 2: Monocotyledons plant species of Palasbari area

Scientific Name	Family	Habit	Uses
Acorus calamus L. [NB-197]	Acoraceae	Herb	Medicinal value for a wide variety of ailments
Aloe barbadensis Mill. [NB-192]	Liliaceae	Herb	To Promote flow of urine
Amorphophalus bulbifer (Roxb.) BI [NB-196]	Araceae	Herb	As vegetables
Arundinella decempedalis (Kuntze) Janowski [NB-194]	Poaceae	Grass/Herb	As fodder
Axonopus compressus (SW.) P.Beauv. [NB-191]	Poaceae	Grass/Herb	As fodder
Arundo donax L. [NB-198]	Poaceae	Grass/Herb	In fencing
Bambusa balcooa Roxb. [NB-195]	Poaceae	Bamboo	A native dish called kharisa is made from this bamboo which is edible.
Bambusa tulda Roxb. [NB-193]	Poaceae	Bamboo	Young rhizomes are eaten as vegetables.
Bambusa vulgaris Schrader [NB-190]	Poaceae	Bamboo	In construction purpose
Bambusa palida Munro [NB-171]	Poaceae	Bamboo	In construction purpose
Canna indica L. [NB-178]	Cannaceae	Herb	Ornamental plant
Caladium bicolor (W. Ait.) Vent. [NB-189]	Araceae	Herb	Ornamental plant.
Carex baccans Nees. [NB-181]	Cyperaceae	Herb	Used due to its antihelmetic properties.
Chrysopogon aciculatas(Retz.) Trinius [NB-175]	Poaceae	Grass	As fodder
Colocasia esculanta (L.) Schott. [NB-188]	Araceae	Herb	As vegetables
Commelina bengalensis L. [NB-182]	Commelinaceae	Herb	As contraceptive
Costus speciosa(Koen.) Smith [NB-172]	Zingiberaceae	Herb	To treat jaundice
Curcuma amada Roxb. [NB-176]	Zingiberaceae	Herb	Used in chutney making
Curcuma aromatica Salib. [NB-173]	Zingiberaceae	Herb	Used in cosmetic herbal medicine
Curcuma caesia Roxb. [NB-183]	Zingiberaceae	Herb	Used in the treatment of asthma, tumours, piles, bronchitis etc.
Cynodon dactylon (L.) Pers [NB-179]	Poaceae	Herb	Used in ritual
*Cyperus brevifolius (*Rottb.) [NB-184]	Cyperaceae	Grass/Herb	Used due to its anti-inflammatory properties
Cyperus cephalotes vahl. [NB-187]	Cyperaceae	Grass/Herb	Stem is used for mat making
Cyperus compactus Retz. [NB-177]	Cyperaceae	Herb	As folk medicine
Cyperus compressus L. [NB-185]	Cyperaceae	Herb	As ornamental
Cyperus difformis L. [NB-180]	Cyperaceae	Herb	Leaves have antibiotic properties
Cyperus diffusus vahl. [NB-186]	Cyperaceae	Herb	Roots used as an antipyretic, diuretic agent.
Cyperus pilosus vahl. [NB-174]	Cyperaceae	Herb	As green manure
Cyperus tenuispica stend [NB-199]	Cyperaceae	Herb	As fodder
Cyperus rotundus L. [NB-204]	Cyperaceae	Herb	To treat cough
Dendrobium aphylla (Roxb.) Fischer [NB-200]	Orchidaceae	Epiphyte	Ornamental plant
Dioscorea alata L. [NB-201]	Dioscoreaceae	Vine	Tubers can be eaten
Dioscorea bulbifera L. [NB-207]	Dioscoreaceae	Vine	Air potato is used as a folk remedy to treat conjunctivitis, diarrhea and dysentery.
Eleusine indica Gaertn [NB-202]	Poaceae	Grass	As fodder
Eragrostis uniloides Nees. [NB-208]	Poaceae	Grass	As livestock fodder
Eichornea crassipes (Mart.) Solms [NB-206]	Pontederiaceae	Herb	As organic fertilizer
Eichinochloa colonum (L.) link. [NB-205]	Poaceae	Grass	It used to control soil erosion
Fimbristylis squarossa vahl. [NB-203]	Cyperaceae	Grass	Used in sore throat
Gloriosa superb L. [NB-211]	Liliaceae	Shrub	Ornamental plan
Hydrilla verticillata (L.f.) Royle [NB-210]	Hydrocharitaceae	Herb	Aquarium plant

Heteropogon contortus (L.) P.Beauv.ex Roem & Schult [NB-216]	Poaceae	Grass/Herb	Used to thatch hale houses.
Homalomena aromatic (Roxb.)Schott. [NB-209]	Araceae	Herb	High demand in market for its aromatic oil.
Imperata cylindrica (L.) P. Beauv. [NB-214]	Poaceae	Grass	Used for thatching roofs of traditional house.
Leersia hexandra Sw. Prodr. [NB-219]	Poaceae	Grass	As fodder
Lasia spinosa (L.) Thw [NB-217]	Araceae	Herb	As vegetable
Musa balbiciana Colla. [NB-213]	Musaceae	Herb	As vegetables
Musa ornata Roxb. [NB-218]	Musaceae	Shrub	Ornamental banana
Oplismenus burmanni (Retz) Beauv [NB-215]	Poaceae	Herb	As fodder
Oplismenus composites L. [NB-212]	Poaceae	Herb	As fodder
Panicum repens L.[NB-024]	Poaceae	Grass	As fodder
Papilonanthe teres (Roxb.)Schltr [NB-027]	Orchidaceae	Epiphyte	Ornamental plant
Phoenix sylvestris Roxb. [NB-023]	Arecaceae	Palm	Edible
Rynchostylis retusa (L.)Blume [NB-028]	Orchidaceae	Epiphyte	Cultural significance
Saccharum procerum Roxb. [NB-033]	Poaceae	Grass/Herb	As broomsedge
Saccharum officinarum L. [NB-022]	Poaceae	Shrub	Edible
Sacchrum spontaneum L. [NB-030]	Poaceae	Herb	As fodder
Sagittaria sagittifolia L. [NB-026]	Alismataceae	Herb	Tuber is edible
Schizostachyum polymorphum (Munro.) Mazumdar [NB-032]	Poaceae	Bamboo	Used to make hats, baskets, decorative mats etc.
Sorghum nitidum (vahl) Pers [NB-021]	Poaceae	Herb	As fodder
Typhonium trilobatum (L.)Schott. [NB-029]	Araceae	Herb	As vegetable
Thysanolaema maxima Ktze .[NB-025]	Poaceae	Shrub	As broom
Vetiveria zizanioides (L.) Nash. [NB-031]	Poaceae	Grass	As fodder
Vallisnaria spiralis L. [NB-020]	Hydrocharitaceae	Grass/Herb	Aquarium plant
Vanda roxburghii R.Br. [NB-034]	Orchidaceae	Epiphyte	Ornamental plant
Xanthosoma sagittifolium (L.)Schott [NB-019]	Araceae	Herb	As vegetables

From the above tables, it can be said that many recorded plants have medicinal value. The *Dakhala hill* of Palashbari area is called as ***Baidyagiri*** due to the valuable medicinal plants present there. However, some plants have other uses also. The summary of the plants used in various purposes are given below-

Medicinal uses	**No. of species**		**Medicinal uses**	**No. of species**
Muscle pain	4		Sinusitis and tonsil	2
Skin diseases	4		Menstrual irregularities	1
Malarial fever	2		Cut and wounds	2
Dysentery	2		Burning	1
Stomach problem	7		Hypertension	1
Fever	8		Anticancer	1
Diabetes	2		Kill intestinal worm	2
Male fertility	1		Boil & Swelling	1
Health tonic	7		Body ache	1
Urinal diseases	3		Heart disease	1
Menstrual cycle	1			
Teeth ache	2		**Miscellaneous uses**	**No. of species**
Against dog bite	1		Vegetables	27
Conjunctivitis	1		Fodder	24
Cough	9		Rites &Ritual	5
Piles	1		Ornamental	17
Gastritis	1		Dye yielding	1
Against pimple	1		Coffee substitute	1

Anti-inflammatory properties	2		Silk worm host	1
Contraception	1		Construction	2
Kidney problem	3		Soil erosion	1
Bronchitis	3		Thatching	2
Asthma	5		Broom sedge	2
Liver disorder	1		Organic fertilizer	2
Jaundice	3		Aquarium plant	3
Snake bite	1		Mat making	2
Antipyretic and diuretic agent	1		Fencing	1
Pain killer	1		Aromatic plant	1
Hair loss and thrush	1		Cultural significance	1
Infectious disease	1		Timber & Fermented Food wrapper	8
Headaches	2		Fiber	1
Purgative	1		Fuel and detergent	1
Eczema	1		Bio-fencing	1
High blood pressure	2		Ripe fruits used as a substitute for red ink	1
Cattle muscle infection	1		Chutney	2

Again, from the pollen morphological investigation of 3 species of the genus *Ipomoea* reveals the following characteristics-

Table-3: Pollen grain characteristics of three *Ipomoea* sps.

Species	Aperture morphotype	Polarity	Symmetry	Pollen shape	Size	Exine sculpturing	Spine type	Exine thicknes	Aperture length
Ipomoea carnea	Pantoporate	Apolar	Radial	Spheroidal	86×86μ	Rough, microreticulate echinate	Broad base with more or less acute tip (spine length-3μ)	4μ	3μ
Ipomoea vitifolia (*Meremia vitifolia* Hallier f.)	Pentacolpate to hexacolpate	Isopolar	Bilateral	Oblate spheroidal	50×52μ	Smooth with granulate	Spine with blunt apices	3μ (Ectexine is thicker than endexine)	2μ
Ipomoea turpethum (*Operculina turpethum* Manso)	Hexacolpate	Isopolar or polar	Bilateral	Oblate spheroidal	50×48μ	Smooth and microreticulate with granulate	Spine with blunt apices	3μ (Endexine is thicker than ectexine)	3μ

From the above palynological study it is evident that *Ipomea carnea* has broad based spine, gradually tapering towards the apex with a more or less acute tip but in *I. vitifolia* and *I. turpethum* having the spine with blunt apices.

Again, in *I. vitifolia* the pollen grain is prolate spheroidal but in *I. turpethum,*the pollen grain is oblate spheroidal. Significantly, in case of *I. vitifolia,* the ectexine is thicker than endexine but in case of *I. turpethum* endexine is thicker than endexine. All those characters are taxonomically significant within and beyond species level.

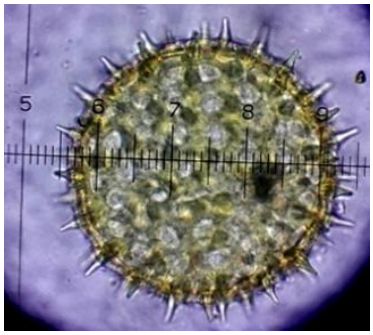


Photo:1: *Ipomoea carnea* (40x)

Photo:2: *I. vitifolia* (40x)

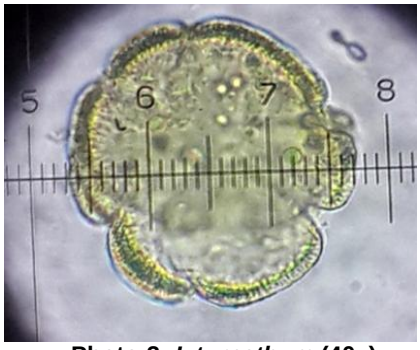


Photo:3: *I. turpethum* (40x)

Conclusion

From the present study and documentation, it can be said that the floristic diversity of Palashbari area is very rich and show seasonal variation.

It is also evident from the mythology and present study that the *Baidyagiri hill* (*Dakhala Pahar*) is very rich in medicinal and aromatic plants.

The anthropogenic activity such as deforestation and wetland depletion are the major threats to the rich floras of this area. Therefore a systematic exploration, documentation and conservation of the flora and fauna is the urgent need of this area which can open up a new vistas as far as plant resource utilization is concerned. Regarding the present study there is no conflict of interest to be noted.

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