

Trees of Sagarmatha National Park

A Report submitted to:

Sagarmatha National Park, Namche Bazar, Solukhumbu



Submitted by:

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Acronyms and abbreviations

BM	Natural History Museum, London, United Kingdom
C	Central
CAL	Central National Herbarium, Botanical Survey of India, Sibpur, Kolkata, West Bengal
E	Royal Botanic Garden Edinburgh, United Kingdom
E	East
K	Royal Botanic Garden Kew, United Kingdom
KATH	National Herbarium and Plant Laboratories, Department of Plant Resources
m	Meter
SNP	Sagarmatha National Park
W	West

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सारांश

जैविक विविधताको उपस्थितिको आधारमा नेपालको स्थान विश्वका अग्रपंक्तिमा रहेका राष्ट्रहरू संगसंगै रहेको छ। जैविक विविधता अन्तर्गतको वानस्पतिक विविधताको सर्वेक्षण तथा नामाकरणको शुरुवात नेपालमा सन् १८०२ देखि भएको हो।

सोलुखुम्बु जिल्लाको सगरमाथा क्षेत्र (Mount Everest) र आसपासमा रहेका वानस्पतिक प्रजातिहरूको अध्ययन तथा सर्वेक्षणको थालनी वेलायती चिकित्सक एवं प्रकृतिविद् अलेक्जेंडर फ्रेडरिक रिचमाउन्ड वोलास्टोन (Alexander Frederick Richmond Wollaston) को सन् १९२१ मा Mount Everest Expedition मा सहभागी भए संगसंगै भएको हो। उहाँले सगरमाथा (Mount Everest) आसपासमा पाइने वनस्पति प्रजातिका नमुनाहरू संकलन गरी अध्ययन तथा नामाकरणका लागि वेलायतको रोयल बोटानिक गार्डन क्यू (K Herbarium) सम्म पुर्याएका थिए। उक्त समयमा संकलन भई सन् १९३० मा नामाकरण भएको झारपात वर्गको वनस्पति प्रजाति *Primula wollastoni* विश्व वनस्पति जगतका लागि सगरमाथा क्षेत्रबाट पत्ता लागेको पहिलो वनस्पति प्रजाति हो (Rajbhandari, 2016)। त्यस पछिका समयमा थुप्रै स्वदेशी तथा विदेशी अनुसन्धानकर्ताहरूबाट त्यस क्षेत्रको वानस्पतिक स्रोतको अध्ययन भएको पाईन्छ र सन् २००४ मा जोरसल्ले क्षेत्रबाट संकलन भई सन् २००९ मा नामाकरण पश्चात् प्रकाशित भएको *Sorbus sharmae* नामक रुख प्रजाति पछिल्लो पटक सगरमाथा क्षेत्रबाट पत्ता लागेको वनस्पति प्रजाति हो।

वनस्पति विभागसंगको सह-कार्यमा वेलायतको रोयल बोटानिक गार्डेन इडिनबर्गले सन् २००४ र २००५ मा गरी २ पटक सगरमाथा राष्ट्रिय निकुञ्ज क्षेत्रको सर्वेक्षण तथा अध्ययन भ्रमण गरेको थियो। उक्त समयमा संकलित हर्वेरियम नमुनाहरूको एक प्रति राष्ट्रिय हर्वेरियम तथा वनस्पति प्रयोगशाला (KATH Herbarium) मा र अर्को प्रति वेलायतको रोयल बोटानिक गार्डेन इडिनबर्ग (E Herbarium) मा संरक्षण गरी राखिएका छन्।

संकलित हर्वेरियम नमुनाहरूको आधारमा नेपालको जंगली अवस्थामा ५३०९ प्रजातिका फूलफुल्ने वनस्पतिहरू पाइन्छन् भन्ने पुष्ट्याई *Flowering Plants of Nepal- An Introduction-2017* मार्फत वनस्पति विभागले गरेको छ। वन अनुसन्धान तथा सर्वेक्षण विभागबाट सन् २०१५ मा प्रकाशित *State of Nepal's Forests* नामक पुस्तकमा ४४३ रुख प्रजाति नेपालमा पाइने भनि उल्लेख गरेको छ।

मिति २०७६/३/५ गते देखि २०७६/३/१४ गते सम्म सगरमाथा राष्ट्रिय निकुञ्ज क्षेत्र भित्रका विभिन्न ठाँउहरूको स्थलगत अध्ययन, हर्वेरियम नमुना संकलन र राष्ट्रिय तथा अन्तर्राष्ट्रिय हर्वेरियमहरूमा संरक्षित हर्वेरियम नमुनाहरूको अध्ययनको आधारमा सगरमाथा राष्ट्रिय निकुञ्ज क्षेत्रमा ५७ रुख प्रजातिका वनस्पतिहरू पाइन्छन्।

1. Introduction

Sagarmatha National Park (SNP) is established in 1976 AD with prime objective to conserve biodiversity and sustainable development and management of natural resources. It covers an area of 1148 square kilometers with an altitude range between 2845 m at Monjo to the top of the world highest peak – Mount Everest (Sagarmatha) at 8848 m as sea level. It lies in Solukhumbu district of province number 1. SNP is world heritage site, which was declared in 1979. The area is rich in biodiversity and cultural heritage.

Regarding the flowering plants diversity - 26 species are first time described from the different places of Solukhumbu district and 11 species (*Cortiella lamondiana*, *Aphragmus hinkuensis*, *Carex esbirajbhandarii*, *Gentiana sagarmathae*, *Eriophyton nepalense*, *Eriophyton staintonii*, *Malaxis monophyllos* var. *obtusae*, *Koenigia tortuosa* var. *pubitrepala*, *Argentina emodi*, *Sorbus sharmae*, *Saxifraga harae*) are endemic to Nepal (Rajbhandari et al. 2019). *Pinus wallichiana*, *Tsuga dumosa*, *Quercus semicarpifolia*, *Abies spectabilis*, *Betula utilis*, *Alnus nepalensis*, *Juniperus incurva* and *Rhododendron arboreum* are the major tree species found in the National Park area.

2. Objective

To identification and documentation of tree species found in Sagarmatha National Park.

3. Methodology

- 1) A field visit was carried out from 2076/ 3/5 to 2075/3/14 in different areas of SNP (Surke, Lukla, Ghat, Phakding, Toktok, Jorsale, Namche, Sansa, Phunki Thanga, Tyangboche, Deoboche, Phortse, Dole, Mong, Khumjung valley, Hotel Everest View and Syangboche).
- 2) Enumeration of the tree species and collection of herbarium specimens was made for further study.
- 3) Details of the specimens with field note (habit and habitat, altitude, latitude and longitude, associated species etc.) were recorded in the field and photographed the sample of tree.
- 4) Identification of herbarium specimens in National Herbarium and Plant Laboratories (KATH) and study the herbarium specimens collected from SNP and preserved in KATH.
- 5) Published literatures and the wave site of national and international herbaria were consulted for the correct identification.

4. Result

Information based on the field visit, herbarium study in KATH and wave site consultation of international herbaria (BM, E, K) 57 tree species representing 31 genera and 22 families are found in Sagarmatha National Park, Solukhumbu district (Table 1).

5. Details of the species

The details of the species with their distribution, uses, specimen deposited herbaria and photographs are provided. The arrangements of the species according to families alphabetically order.

ACERACEAE

Acer caudatum Wall. (Fig. 1).

Phirphire

Tree

Distribution Nepal: CE (3000-400 m)

Distribution SNP: Thesiyo, Tengboche to Deboche

Uses: Wood is used for framing in house construction.

Herbarium specimens: Thesiyo, 3651m, 27° 49' 42'' N, 86° 41' 35'' E, 2005.9.15, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY37 (E, KATH). Tengboche to Deboche, 3750 m, 27° 50' 17'' N, 86° 46' 12'' E, 2005.9.16, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 AY65 (E, KATH).

Acer pectinatum Wall. ex Pax (Fig. 2).

Thusi Pangra

Tree

Distribution Nepal: WCE (2700-3800m)

Distribution SNP: Toktok, above Gumela

Uses: Wood is used for framing in house construction (Manandhar, 2002).

Herbarium specimen: Toktok, above Gumela, Solukhumbu district, 2956 m, 27° 45' 26'' N, 86° 42' 19'' E, 2005.9.29, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY 223 (E).

Acer stachyophyllum Hiern (Fig. 3).

Tree

Distribution Nepal: CE (2700 – 3000 m)

Distribution SNP: Monjo

Uses: Wood is used for framing in house construction and also used as fuelwood.

Herbarium specimen: Solukhumbu district, Dudh Koshi Valley, Monjo, entrance to Sagarmatha National Park near Monjo, 2820 m, 27° 46' 27'' N, 86° 43' 19'' E, 2004.5.10, *M. F. Watson, K. R.*

Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety DNEP1 41 (E, KATH).

Acer sterculiaceum Wall. (Fig. 4).

Tree

Distribution Nepal: WCE (2200 – 3200 m)

Distribution SNP: Thesiyo

Uses: Wood is used for framing in house construction.

Herbarium specimen: Bhotekoshi Valley, Thesiyo, trail from Namche Bazar to Thamo, near Thesiyo, 3430 m, 27⁰ 49' 2'' N, 86⁰ 41' 11'' E, 2004.5.11, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 79 (E).

ANACARDIACEAE

Rhus punjabensis J. L. Stewart (Fig. 5).

Tree

Distribution Nepal: WCE (2100 – 2600 m)

Distribution SNP: Ghat to Phankdin

Uses:

Herbarium specimen: Chuthwa, way from Ghat to Jorsale, 2626 m, 27⁰ 43' 58'' N, 86⁰ 42' 47'' E, 2019.6.23, *G. D. Bhatt* 20763025 (KATH).

Rhus succedanea L. (Fig. 6).

Raani Bhalayo / Kaag Bhalayo

Tree

Distribution Nepal: WCE (1100 – 2400 m)

Distribution SNP: On the way of Surke to Lukla

Uses: The acidic pulp of the fruit is edible. Latex is acrid and forms blisters on the skin (Manandhar, 2002).

Herbarium specimen: Observation and photograph taken in the way of Surke to Lukla (27⁰ 40' 22'' N, 86⁰ 42' 58'' E).

AQUIFOLIACEAE

***Ilex dipyrrena* Wall.** (Fig. 7).

Seto Khasaru

Tree

Distribution Nepal: WCE (2500-3000 m)

Distribution SNP: Jorsale to Namche Bazar

Uses: As its attractive fruits, it is planted as ornamental plant.

Herbarium specimen: Namche Bazar to Jorsale, trail from Namche Bazar to Lukla 2820 m, 27° 47' 21'' N, 86° 43' 15'' E. 2004. 5. 24, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 277 (E, KATH).

***Ilex fragilis* Hook. f.** (Fig. 8).

Thoolo Kharaane

Shrub or tree

Distribution Nepal: CE (2200-3000 m)

Distribution SNP: Monjo to Toktok

Uses: It is planted as ornamental plant.

Herbarium specimen: Monjo to Toktok, trail from Namche Bazar to Lukla, near Tok tok, 2730 m, 27° 45' 5'' N, 86° 42' 40'' E, 2004. 5. 25, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 312 (E, KATH).

***Ilex sikkimensis* Kurz** (Fig. 9).

Iris hookeri King

Tree

Distribution Nepal: E (2000-3300 m)

Distribution SNP: Ghat - Phakding

Uses: As its attractive fruits, it is planted as ornamental plant.

Herbarium specimen: Dudh Koshi Valley Ghat to Phakding, trail from Lukla to Namche Bazar, 2600 m, 27° 43' 57'' N, 86° 42' 49'' E, 2004. 5. 9, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 30 (E, KATH).

ARALIACEAE

Merrillioanax alpinus (C. B. Clarke) Shang (Fig. 10).

Brassaiopsis alpina C, B, Clarke

Tree.

Distribution Nepal: E (2000 – 3100 m)

Distribution SNP: Lukla (above hospital area)

Uses:

Herbarium specimen: Lukla, 2985m, 27° 41' 27'' N, 86° 43' 58'' 2019.6.22, G. D. Bhatt 20763007 (KATH).

BETULACEAE

Alnus nepalensis D. Don (Fig. 11).

Uttis

Tree

Distribution Nepal: WCE (500-2700 m)

Distribution SNP: Surke, Toktok

Uses: wood is used in fuel and timber. Leaf paste is applied in cuts and wounds. Stem bark is rich in tannin (Baral and Kurmi, 2006).

Herbarium specimen: Toktok, West bank of river, 2690 m, 27° 45' 35'' N, 86° 42' 36'' E, 2005.9.11, M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya DNEP3 BY11(E).

Betula utilis D. Don (Fig. 12).

Betula bhojpathra Lindl.

Bhojpatra, Bhuspatt

Tree

Distribution Nepal: WCE (2700 – 4300 m)

Distribution SNP: Deoboche, Phortse, Tyanboche, Khumjong valley, Kyanjuma, Sansa, Everest view

Uses: Bark is useful to check excessive menstruation (Watanabe et al, 2013). Bark is used to treat hysteria, epilepsy, otalgia, leprosy, jaundice, bilious fever and skin diseases (Baral and Kurmi, 2006).

Herbarium specimen: Sansa, Solukhumbu district, 2019. 6.25, 2953, *G. D. Bhatt* 44 (KATH). Dudh Koshi Valley, Phortse Tenga around village, 3610 m, 27° 51' 3'' N, 86° 44' 41'' E, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 112. (E).

***Corylus ferox* Wall.** (Fig. 13).

Lekh Katus

Tree

Distribution Nepal: CE (2600 - 3200 m)

Distribution SNP: Toktok

Uses: The cotyledons are edible (Manandhar, 2002).

Herbarium specimen: Toktok above Gumela, 2956 m, 27° 45' 26'' N, 86° 42' 19'' E, 2005.9.29, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY 211 (E).

CELASTRACEAE

***Euonymus fimbriatus* Wall.** (Fig. 14).

Shrub or tree

Distribution Nepal: WCE (2300 - 3600 m)

Distribution SNP: Thame to Thamo, Thesiyo, Ghat to Lukla

Uses:

Herbarium specimens: Thame to Thamo, Thesiyo Khola, 3382 m, 27° 49' 5'' N, 86° 41' 10'' E, 2005.9.26, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BX 256 (E, KATH). Ghat to Lukla, trail from Namche Bazar to Lukla, NW of Lukla, 2700 m, 27° 42' 26'' N, 86° 42' 59'' E, 2004. 5. 25, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 340 (E, KATH).

***Euonymus porphyreus* Loes.** (Fig. 15).

Shrub or tree

Distribution Nepal: WCE (2600 - 3500 m)

Distribution SNP: Lukla, Sanasa to Tengboche

Uses:

Herbarium specimens: Lukla, Nabuk Village, SE of Lukla on trail to Mera Peak, 3002 m, 27° 40' 51'' N, 86° 44' 34'' E, 2005.9.30, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BX 311 (E). Sanasa to Tengboche, 3450 m, 27° 49' 32'' N, 86° 44' 1'' E, 2005. 9. 15, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 AY41 (E, KATH).

CUPRESSACEAE

Juniperus recurva Buch. – Ham. ex D. Don (Fig. 16).

Dhupi

Tree.

Distribution Nepal: WCE

Distribution SNP: Phunki Thanga, Tenboche

Uses: The leaves are used for essential oil and wood for timber. Smoke from green wood is a powerful emetic that produces long and continued vomiting (Baral and Kurmi, 2006).

Herbarium specimens: Phunki Thanga to Tenboche, 3498m, 27° 50' 2'' N, 86° 45' 7'' E, 2019. 6. 24, *G. D. Bhatt* 20763035 (KATH). Dudh Koshi Valley, Mong La to Phortse Tenga, trail from Khumjung to Gokyo, 3940 m, 27° 50' 26'' N, 86° 44' 9'' E, and 2004.5.12, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 99 (E).

ERICACEAE

Lyonia ovalifolia (Wall.) Drude (Fig. 17).

Angeri

Tree.

Distribution Nepal: WCE (1300 – 3300 m)

Distribution SNP: Phakding, Surke

Uses: Young leaves and buds are poisonous. Infusion of young leaves and buds are applied in skin diseases. Tender twigs and leaves are crushed and rubbed on the body for the treatment of itching. Root paste is antidote against dog-bite (Baral and Kurmi, 2006; Watanabe et al, 2013).

Herbarium specimen: Phakding, 2600m, 2004.6.5, *N. Joshi* NJ939 (KATH).

Pieris formosa (Wall.) D. Don (Fig. 18).

Bulu, Lekh Angeri, Praa

Shrub or tree.

Distribution Nepal: CE (2000 – 3300 m)

Distribution SNP: Lukla to Ghat

Uses: Leaf juice is althelminthic and also applied to treat scabies (Baral and Kurmi).

Herbarium specimen: Dudh Koshi Valley, Lukla to Ghat, 2830 m, 27° 41' 33'' N, 86° 43' 41'' E, 2004. 5. 8, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 5 (E).

Rhododendron arboreum Sm. Subsp. **arboretum** (Fig. 19).

Lali Guraans

Tree.

Distribution Nepal: WCE (1500 – 3300 m)

Distribution SNP: Ghat – Namche Bazar, Munjo

Uses: The young leaves are poisonous to cattle. Flowers are taken in case of blood dysentery. Wood is used for building construction.

Herbarium specimen: Ghat – Namche Bazaar, 1958.4.11, *R. S. Rao* 13725 (CAL).

Rhododendron arboreum Sm. Subsp. **cinnamomeum** (Wall. ex G. Don) Tagg (Fig. 20).

Lali Guraans

Tree.

Distribution Nepal: CE (2500 – 3600 m)

Distribution SNP: Khumjong, Tenboche to Phunki Tenja

Uses: The young leaves are poisonous to cattle. Flowers are taken in case of blood dysentery. Wood is used for building construction.

Herbarium specimens: Dudh Koshi, 9500 ft. 1964.4.28, *J. D. A. Stainton* 4519 (BM). Khumjong, Solukhumbu district, 12000 ft., 1964.4.27, *D. McCosh* 46 (KATH). Imja Khola Valley, Tengboche to Phunki Tenga, trail down East from Tengboche, 3670 m, 27° 50' 7'' N, 86° 45' 25'' E, 2004. 5. 23, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 239 (E).

Rhododendron barbatum Wall. ex G. Don (Fig. 21).

Chimaal

Tree.

Distribution Nepal: WCE (2700 – 3600 m)

Distribution SNP: Lukla (above hospital area)

Uses: Dried tender leaves are snuffed to cure sinusitis and also cut as fish poison (Baral and Kurmi 2006).

Herbarium specimen: Lukla, 2953 m, 27° 41' 27.31'' N, 86° 43' 56.35'' E, 2019. 6. 22, *G. D. Bhatt* 20763015 (KATH).

Rhododendron campylocarpum Hook. f. (Fig. 22).

Pahelo Chimaal

Shrub or tree.

Distribution Nepal: E (3000 -4000 m)

Distribution SNP: Debuche, Thesiyo

Uses: A leaf past is applied to relive headache (Poudel et al. 2018 - 2075 BS.)

Herbarium specimens: Dudh Koshi, 13000 ft., 1964.6.7 *J. D. A. Stainton* 4602 (BM). Thesiyo Khola, 3651 m, 27° 49' 42'' N, 86° 41' 35'' E, 2005.9.15, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY52 (E).

Rhododendron cinnabarinum Hook. f. (Fig. 23).

Sano Chimal, Balu

Shrub or tree.

Distribution Nepal: E (3000 – 3800 m)

Distribution SNP: Lukla

Uses: Leaf is poisonous to cattle, and wood fumes to human (Baral and Kurmi, 2006).

Herbarium specimen: Dudh Koshi, Lukla, 11500 ft., 1964.5.1, *J. D. A. Stainton* 4522 (BM, KATH).

Rhododendron hodgsonii Hook. f. (Fig. 24).

Korlinga

Shrub or tree.

Distribution Nepal: CE (2600 – 3800 m)

Distribution SNP: Lukla, Syangboche, Khumjung

Uses: The plant is used as fuel wood.

Herbarium specimens: Dudh Koshi, 13000 ft., 1964.6.7 *J. D. A. Stainton* 4602 (BM). Dudh Koshi, Lukla, 11500 ft., 1964.5.1 *J. D. A. Stainton* 4522 (KATH). Syangboche, trail from Thamo to Khumjung, near Syangboche, 3815 m, 27° 49' 0'' N, 86° 42' 59'' E, 2004. 5.11, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 90 (E).

Rhododendron triflorum Hook. f. (Fig. 25).

Pahenle Chimal

Shrub or tree

Distribution Nepal: E (2400 - 3500 m)

Distribution SNP: Toktok, Lukla

Uses: According to local people the young leaves are considered as poisonous to livestock.

Herbarium specimen: Toktok above Gumela, 2956 m, 27° 45' 26'' N, 86° 42' 19'' E, 2005.9.29, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY 221 (E).

Rhododendron wallichii Hook. f. (Fig. 26).

Wallichko Chimal

Shrub or small tree.

Distribution Nepal: E (3300 – 4200m)

Distribution SNP: Phortse, Debucho, Imja Khola, South of Pongboche, Khumjung valley

Uses: The leaves are used as medicinal and stems for fuel.

Herbarium specimens: Dudh Koshi, Lukla, Solukhumbu district, 11500 ft., 1964.5.1, *J. D. A. Stainton* 4521 (BM, E). Bhothe Koshi valley, Phortse, Solukhumbu district, 3550m, 2005.4.10, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. K. Manandhar and R. K. Uprety* DNEP1 61 (KATH). Dudh Koshi Valley, Phortse Tenga to Dole, trail from Phortse Tenga to Gokyo, 3770 m, 27° 51' 15'' N, 86° 44' 19'' E, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 117 (E).

FAGACEAE

Quercus glauca Thunb. (Fig. 27).

Phalant

Tree

Distribution Nepal: WCE (450 – 3100 m)

Distribution SNP: Cheplung village area, Phakding to Ghat, Surke

Uses: Leaves are used as fodder.

Herbarium specimen: Observation and photograph taken in Cheplung village (2773 m, 27° 42' 17'' N, 86° 43' 6'' E), near Ghat and way from Surke to Lukla (2234m, 27° 40' 31'' N, 86° 43' 6'' E).

Quercus semicarpifolia Sm. (Fig. 28).

Kharsu

Tree

Distribution Nepal: WCE (1700 – 3800 m)

Distribution SNP: Phakding to Ghat

Uses: It is known to use for making charcoal. Leaves used as fodder and wood for timber. Bark juice is applied over muscular pain. Sap of the plant is drunk as tea (Baral and Kurmi, 2006; Manandhar, 2002)

Herbarium specimen: Dudh Koshi Valley, Phakding to Ghat, trail from Namche Bazar to Lukla, near Phakding, 2690 m, 27° 44' 11'' N, 86° 42' 44'' E, 2004.5.25, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 314 (E).

HYDRANGACEAE

Philadelphus tomentosus Wall. ex G. Don (Fig. 29).

Shrub or tree

Distribution Nepal: WCE (2000- 3600 m)

Distribution SNP: Toktok above Gumela

Uses:

Herbarium specimen: Toktok above Gumela, 2956 m, 27° 45' 26'' N, 86° 42' 19'' E, 2005.9.29, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY 210 (E, KATH).

LAMIACEAE

Leucosceptrum canum Sm. (Fig. 30).

Tee

Distribution Nepal: WCE (1000- 2800 m)

Distribution SNP: Phakding - Toktok

Uses: Leaves served as fodder.

Herbarium specimen: Phakding to Toktok, 2610 m, 27⁰ 44' 55'' N, 86⁰ 42' 45'' E, 2005.9.11, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY 8 (E).

LAURACEAE

Lindera pulcherrima (Ness) Hook. f. (Fig. 31).

Kharane / Phusre

Tree

Distribution Nepal: WCE (700 – 3600 m)

Distribution SNP: Sukre to Lukla

Uses: Leafy branches are used as fodder and the wood is used for fuel.

Herbarium specimen: Observation and photograph taken in the way from Surki to Lukla (2234m, 27⁰ 40' 31'' N, 86⁰ 43' 6'' E).

Litsea doshia (D. Don) Kosterm. (Fig. 32).

Kathe Kaulo

Tree

Distribution Nepal: CE (300 – 2900 m)

Distribution SNP: Surke to Lukla, Lukla to Ghat

Uses: The plant is used as fodder.

Herbarium specimen: Lukla to Ghat, 2737 m, 27⁰ 42' 4'' N, 86⁰ 43' 10'' E, 2019.6.23, *G. D. Bhatt* 20763021 (KATH).

Litsea cubeba (Lour.) Pers. (Fig. 33).

Siltimur

Tree

Distribution Nepal: CE (1000 – 2600 m)

Distribution SNP: Lukla to Ghat

Uses: The species has many medicinal properties and used in the treatment of coughs, bronchitis and lung diseases. An essential oil extracted from the seeds is used for genitourinary conditions such as cystitis and gonorrhoea (Baral and Kurmi, 2006).

Herbarium specimen: Lukla to Ghat, 2737 m, 27° 42' 4'' N, 86° 43' 10'' E, 2019.6.23, G. D. Bhatt 20763022 (KATH).

MAGNOLIACEAE

Magnolia campbellii Hook. f. & Thomson (Fig. 34).

Ghoge Chanp

Tree

Distribution Nepal: CE (2200 – 2800 m)

Distribution SNP: Cheplung village near Ghat and Jorsale

Uses: Leaves are used for fodder and wood for quality timber.

Herbarium specimen: Observation and photograph taken in Cheplung village (2773 m, 27° 42' 17'' N, 86° 43' 6'' E) near Ghat and Jorsale (2685 m, 27° 46' 32'' N, 86° 43' 17'' E).

PINACEAE

Abies spectabilis (D. Don) Mirb. (Fig. 35).

Gobre Sallo, Talispatra

Tree.

Distribution Nepal: WCE (2400 – 4400 m)

Distribution SNP: Namche Bazar, Phortse, Syangboche, Lukla

Uses: Decoction of leaves is used for cough and bronchitis at Syabru village. Decoction of leaf top is taken by the Sherpas of Helambu to treat cough (Rajbhandari, 2001). Wood is used as timber.

Herbarium specimen: Namche Bazar - Phortse, 3550m, 27° 48' 19'' N, 86° 42' 22'' E, 2004.5.10, *M. F. Watson, K. R. Rajbhandari, d. Knott, A. G. Miller, B. Adhikari, K. Maden, V. K. Manandhar and R. K. Uprety* DNEP1 58 (KATH).

Pinus wallichiana A. B. Jacks. (Fig. 36).

Raani Sallo, Gubre Sallo

Tree.

Distribution Nepal: WCE (1800 – 3300 m)

Distribution SNP: Surke, Lukla, Jorsale, Namche

Uses: Oil from whole plant is used to treat diarrhoea and hysteria and the plant infusion is given to women to promote menstrual flow (Watanabe et al, 2013). Resin is applied externally as a plaster for bone fracture, and as a pain reliever (Baral and Kurmi, 2006). Wood is used as timber.

Herbarium specimen: Jorsale, 2820m, 2004.5.10, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. K. Manandhar and R. K. Uprety* DNEP1 45 (KATH).

Tsuga dumosa (D. Don) Eichler (Fig. 37).

Thing Sallo

Tree.

Distribution Nepal: WCE (2100 – 3600 m)

Distribution SNP: Lukla, Ghat- Munjo

Uses: Dried leaves are used in preparation of incense at Manang valley (Rajbhandari, 2001). Wood is used as timber.

Herbarium specimen: Lukla, Solukhumbu district, 2828 m, 27° 41' 36.53'' N, 86° 43' 40.21'' E, 2019. 6. 22, *G. D. Bhatt* 20763017 (KATH).

ROSACEAE

Cotoneaster affinis Lindl. (Fig. 38).

Raeens

Shrub or tree

Distribution Nepal: WCE (2200 – 3000 m)

Distribution SNP: Ghat to Jorsale, Larche Dovan area

Uses: The wood is used for making walking sticks and tent pegs. A paste of the root is applied to treat headaches and the juice is given in case of indigestion.

Herbarium specimen: Above Larche Dovan, 2923 m, 27° 47' 25'' N, 86° 43' 57'' E, 2019.6.24, G. D. Bhatt 2076330 (KATH).

Cotoneaster frigidus Wall. ex Lindl. (Fig. 39).

Chharwa/ Kause Phul

Shrub or tree

Distribution Nepal: WCE (2200 – 3400 m)

Distribution SNP: Namche Bazar, Toktok, Jorsale

Uses: A paste of the root is applied to treat headaches (Manandhar, 2002).

Herbarium specimen: Namche Bazar to Toktok, Jorsale, 2870 m, 27° 46' 46'' N, 86° 43' 20'' E, 2005. 9. 28, M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya DNEP3 BX286 (E, KATH).

Prunus cornuta (Wall. ex Royle) Steud. (Fig. 40).

Lekh Aaru

Tree

Distribution Nepal: WCE (2100 – 3500 m)

Distribution SNP: Phakding to Ghat

Uses: The ripe fruits are eaten and used for brewing local liquor. The foliage is cut for fodder (Ohba et al, 2011).

Herbarium specimen: Dudh Koshi Valley, Phakding to Ghat, trail from Namche Bazar to Lukla, South of Phakding, 2650 m, 27° 43' 57'' N, 86° 42' 47'' E, 2004.5.25, M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety DNEP1 324 (E).

Prunus rufa Hook. f. (Fig. 41).

Aaru pate

Tree

Distribution Nepal: WCE (3000 – 3800 m)

Distribution SNP: Jorsale village area

Uses: Fruit is edible.

Herbarium specimen: Jorsale village, 2830 m, 27° 46' 44'' N, 86° 43' 21'' E, 2004.5.10, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 43(E).

Sorbus foliolosa (Wall.) Spach (Fig. 42).

Shrub or tree

Distribution Nepal: WCE (2200 – 4300 m)

Distribution SNP: Omoga

Uses: A paste of the leaves is applied to treat boils (Watson and Manandhar, 2011).

Herbarium specimen: Omoga, Minmo khola valley, 4040 m, 27° 50' 13'' N, 86° 47' 30'' E, 2005.9.25, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 AY168 (E, KATH).

Sorbus himalaica Gabrieljan (Fig. 43).

Shrub or tree.

Distribution Nepal: WCE (2500 – 4100 m)

Distribution SNP: Tarangga to Langboche

Uses: A paste of the leaves is applied to treat boils (Watson and Manandhar, 2011).

Herbarium specimen: Tarangga to Langboche, S. side of the Langboche river, above the track, 4053 m, 27° 51' 43'' N, 86° 36' 55'' E, 2005.9.23, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY163 (E, KATH).

Sorbus microphylla Wenz. (Fig. 44).

Bajhar

Shrub or tree.

Distribution Nepal: WCE (2000 – 4200 m)

Distribution SNP: Tarangga to Langmuche

Uses: Leafy branches are lopped for fodder.

Herbarium specimen: Tarangga to Langmuche, 4053 m, 27° 51' 43'' N, 86° 36' 55'' E, 2005.9.23, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY165 (E, KATH).

Sorbus sharmae M. F. Watson, V. Manandhar & Rushforth (Fig. 45).

Tree.

Distribution Nepal: CE (2500 – 3200m) – Endemic to Nepal

Distribution SNP: Lukla to Namche

Uses: Wood is used for timber and framing in house construction.

Herbarium specimen: Namche Bazar to Jorsale, trail from Namche Bazaar to Lukla, 2990 m, 27° 47' 26'' N, 86° 43' 4'' E, 2004.5.24, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 266 (E, KATH). Paratype (KATH).

Sorbus wallichii (Hook. f.) T. T. Yu (Fig. 46).

Shrub or tree

Distribution Nepal: WCE (1900 – 4100 m)

Distribution SNP: Lukla to Ghat

Uses:

Herbarium specimen: Dudh Koshi Valley, Ghat to Lukla trail from Namche Bazar to Lukla, South of Ghat, 2710 m, 27° 42' 46'' N, 86° 42' 39'' E, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 338 (E, KATH).

RUTACEAE

Zanthoxylum armatum DC. (Fig. 47).

Timur

Tree

Distribution Nepal: WCE (1100 – 2700 m)

Distribution SNP: Chumoa, Lukla to Ghat

Uses: The fruits are pickled or used as spices. The water boiled with few seeds is drunk to treat cough and gastric.

Herbarium specimen: Chumoa, East bank of river, 2005.9.11, 2680 m, 27° 46' N, 86° 43' 22'' E, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY12 (E, KATH).

SABIACEAE

Meliosma dilleniifolia (Wall. ex Wight & Arn.) Walp. (Fig. 48).

Tree

Distribution Nepal: WCE (1800 – 2900 m)

Distribution SNP: Phakding to Ghat

Uses:

Herbarium specimen: Dudh Koshi Valley, Phakding to Ghat, trail from Namche Bazar to Lukla, South of Phakding, 2660 m, 27° 43' 58'' N, 86° 42' 40'' E, 2004.5.25, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 321 (E, KATH). Dudh Koshi, Chauri Kharka, 8000 ft., 1964.6.11, *J. D. A. Stainton* 4620 (KATH).

SALICACEAE

Populus jacquemontiana Dode (Fig. 49).

Lekh Pipal

Tree

Distribution Nepal: CE (2600 – 3200 m)

Distribution SNP: Lukla (above hospital area)

Uses: Leaves are used for fodder and wood for timber.

Herbarium specimen: Lukla, above hospital area, 2953m, 27° 41' 27'' N, 86° 43' 56'' E, 2019.6.22, *G.D. Bhatt* 20763005 (KATH).

Salix daltoniana Andersson (Fig. 50).

Bains

Shrub or tree

Distribution Nepal: CE (3400 – 4400 m)

Distribution SNP: Tengboche to Phunki Tenga

Uses: Roadside ornamental tree.

Herbarium specimen: Imja Khola Valley, Tengboche to Phunki Tenga, trail down East from Tengboche, 3280 m, 27° 49' 56'' N, 86° 44' 48'' E, 2004. 5. 23, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 251 (E, KATH).

Salix longiflora Andersson (Fig. 51).

Bains

Shrub or tree

Distribution Nepal: CE (3000 – 3400 m)

Distribution SNP: Jorsale to Bengkar, Phakding to Ghat

Uses: Roadside ornamental tree.

Herbarium specimen: Dudh Koshi Valley, Jorsale to Bengkar, trail from Namche Bazar to Lukla, 2750 m, 27° 45' 57'' N, 86° 43' 14'' E, 2004. 5. 24, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 296 (E, KATH).

Salix obscura Andersson (Fig. 52).

Bains

Shrub and tree

Distribution Nepal: WCE (2400 – 3600 m)

Distribution SNP: Tengboche to Phunki Tenga, Phurte to Thamo

Uses: Roadside ornamental tree.

Herbarium specimen: Imja Khola Valley, Tengboche to Phunki Tenga, trail down east from Tengboche, 3280 m, 27° 49' 56'' N, 86° 44' 48'' E, 2004. 5. 23, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 252 (E, KATH).

Salix salwinensis Hand. – Mazz. ex Enander (Fig. 53).

Bains

Shrub or tree.

Distribution Nepal: E (2800 – 3800 m)

Distribution SNP: Thore to Phortse, Khumjung to Mong, Pangboche

Uses: Roadside ornamental tree.

Herbarium specimens: Dudh Koshi Valley, Thore to Phortse, trail near Phortse 27° 51' 34'' N, 86° 44' 53'' E, 4090 m, 2004. 5. 20, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 202 (E, KATH). Imja khola valley, Pongboche, 27° 51' 35'' N, 86° 47' 47'' E, 3910 m, 2004. 5. 20, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 211 (E, KATH).

Salix sikkimensis Andersson (Fig. 54).

Bains

Shrub or tree

Distribution Nepal: E (2800 – 4400 m)

Distribution SNP: Nha to Thore

Uses: Roadside ornamental tree.

Herbarium specimen: Dudh Koshi Valley, Nha to Thore, south of Nha on east bank of Dudh Koshi river, 4250 m, 27° 54' 25'' N, 86° 43' 21'' E, 2004.5.18, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 196 (E, KATH).

SYMPLOCACEAE

Symplocos paniculata (Thunb.) Miq. (Fig. 55).

Tree

Distribution Nepal: WCE (1000 – 2500 m)

Distribution SNP: Phakding to Lukla

Uses: Decoction of the bark is used as gargle in bleeding gum. Ripe fruits yield black dye (Sharma et al, 2003).

Herbarium specimen: Dudh Koshi valley, Phakding to Luklat, trail from Namche Bazar to Lukla, South of Phakding, 2660 m, 27° 43' 58'' N, 86° 42' 40'' E, 2004.5.25, *M. F. Watson, K. R. Rajbhandari, D. Knott, A. G. Miller, B. Adhikari, K. Maden, V. Manandhar and R. Uprety* DNEP1 321a (E, KATH).

TAXACEAE

Taxus wallichiana Zucc. (Fig. 56).

Louth Salla

Tree

Distribution Nepal: CE (2200 – 3500 m)

Distribution SNP: Surke to Lukla, Lukla, Ghat, Lamujo to Chumoa.

Uses: Taxol is used for cancer treatment and wood for timber (Bhatt et al, 2017).

Herbarium specimens: Lukla, Solukhumbu district, 2870m, 27° 41' 33.74'' N, 86° 43' 44.73'' E, 2019. 6. 22, *G. D. Bhatt* 15 (KATH). North of Lukla, Solukhumbu District, 2800, 2005.9.26, *M. F. Watson, K. R. Rajbhandari, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. Mccheyne, R. C. Poudel, S. Rajbhandary & S. Vaidya* DNEP3 AY190 (KATH). Lamujo to Chumoa, Solukhumbu District, 1978.06.10, *H. Tabata, K. R. Rajbhandari, Y. Shimizu* 10585 (KATH).

VIBURNACEAE

Viburnum erubescens Wall. ex DC. (Fig. 57).

Asare

Distribution Nepal: WCE (1500- 3000 m)

Distribution SNP: Ghat - Phakding

Uses: Fruits are edible (Joshi, 2005).

Herbarium specimen: Ghat - Phakding, Solukhumbu district, 2500 – 2600m, 2004.5.23, *N. Joshi* NJ803 (KATH).

Viburnum mullaha Buch. – Ham. ex D. Don (Fig. 58).

Distribution Nepal: WCE (1800 – 4000 m)

Distribution SNP: Toktok

Uses: Ripe fruits are edible (Manandhar, 2002).

Herbarium specimen: Toktok, above Gumela, 2956 m, 27° 45' 26'' N, 86° 42' 19'' E, 2005.9.29, *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha, D. Knott, C. A. Pendry, S. K. Acharya, U. Koirala, L. N. Mandar, N. McCheyne, R. C. Poudel, S. Rajbhandary and S. Vaidya* DNEP3 BY 224 (KATH).

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7. Photographs of the tree species found in Sagarmatha National Park



Fig. 1. *Acer caudatum*



Fig. 2. *Acer pectinatum*

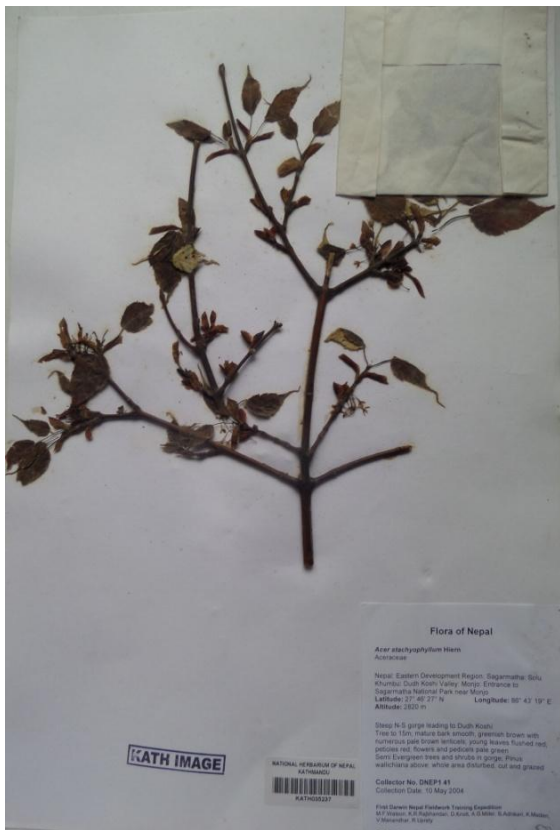


Fig. 3. *Acer stachyophyllum*



Fig. 4 *Acer sterculiaceum*



Fig. 5. *Rhus punjabensis*



Fig. 6. *Rhus succedanea*



Fig. 7. *Ilex dipyrrena*



Fig. 8. *Ilex fragilis*

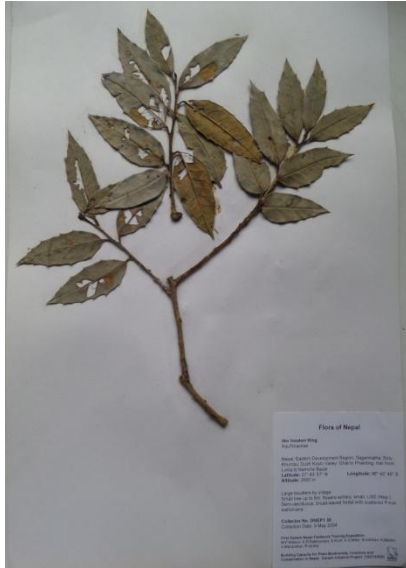


Fig. 9. *Ilex sikkimensis*



Fig. 10. *Merrillioanax alpines*



Fig. 11. *Alnus nepalensis*

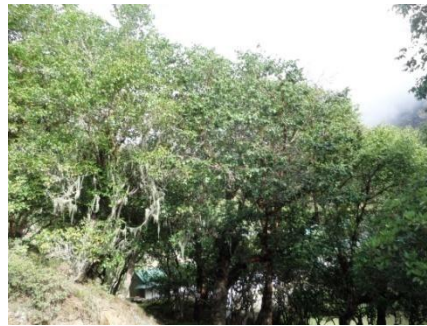


Fig. 12. *Betula utilis*



Fig. 12. *Betula utilis*



Fig. 13. *Corylus ferox*



Fig. 14. *Euonymus fimbriatus*



Fig. 15. *Euonymus porphyrens*



Fig. 16. *Juniperus recurva*



Fig. 17. *Lyonia ovalifolia*



Fig. 18. *Pieris formosa*



Fig. 19. *Rhododendron arboretum*
subsp. *arboreum*



Fig. 20. *Rhododendron arboretum*
subsp. *cinnamomeum*



Fig. 21. *Rhododendron barbatum*



Fig. 22. *Rhododendron campylocarpum*



Fig. 23. *Rhododendron cinnabarium*



Fig. 24. *Rhododendron hodgsonii*



Fig. 25. *Rhododendron triflorum*



Fig. 26. *Rhododendron wallichii*



Fig. 27. *Quercus glauca*



Fig. 32. *Litsea cubeba*



Fig. 33. *Litsea doshia*



Fig. 34. *Magnolia campbellii*



Fig. 35. *Abies spectabilis*



Fig. 36. *Pinus wallichiana*



Fig. 37. *Tsuga dumosa*



Fig. 38. *Cotoneaster affinis*



Fig. 39. *Cotoneaster frigidus*



Fig. 46. *Sorbus wallichii*



Fig. 47. *Zanthoxylum armatum*



Fig. 48. *Meliosma dillenifolia*



Fig. 49. *Populus jacquemontiana*

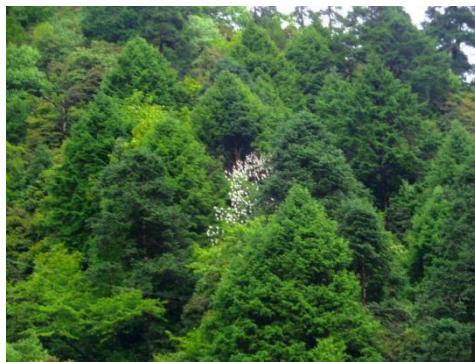


Fig. 49. *Populus jacquemontiana* – white flower (Catkins) inside the forest



Fig. 50. *Salix daltoniana*



Fig. 51. *Salix longiflora*



Fig. 52. *Salix obscura*



Fig. 53. *Salix salwinensis*



Fig. 54. *Salix sikkimensis*



Fig. 55. *Symplocos paniculata*



Fig. 56. *Taxus wallichiana*

8. Table 1. List of tree species found in Sagarmatha National Park

S. No.	Family	Scientific name
1	Aceraceae	<i>Acer caudatum</i> Wall.
		<i>Acer pectinatum</i> Wall. ex Pax
		<i>Acer stachyophyllum</i> Hiern
		<i>Acer sterculiaceum</i> Wall.
2	Anacardiaceae	<i>Rhus punjabensis</i> J. L. Stewart
		<i>Rhus succedanea</i> L.
3	Aquifoliaceae	<i>Ilex dipyrena</i> Wall.
		<i>Ilex fragilis</i> Hook. f.
		<i>Ilex sikkimensis</i> Kurz
4	Araliaceae	<i>Merrillioanax alpinus</i> (C. B. Clarke) Shang
5	Betulaceae	<i>Alnus nepalensis</i> D. Don
		<i>Betula utilis</i> D. Don
		<i>Corylus ferox</i> Wall.
6	Celastraceae	<i>Euonymus fimbriatus</i> Wall.
		<i>Euonymus porphyreus</i> Loes.
7	Cupressaceae	<i>Juniperus recurva</i> Buch. – Ham ex D. Don
8	Ericaceae	<i>Lyonia ovalifolia</i> (Wall.) Drude
		<i>Pieris formosa</i> (Wall.) D. Don
		<i>Rhododendron arboretum</i> Sm. Subsp. <i>arboreum</i>
		<i>Rhododendron arboretum</i> subsp. <i>cinnamomeum</i>
		<i>Rhododendron barbatum</i> Wall. ex G. Don
		<i>Rhododendron campylocarpum</i> Hook. f.
		<i>Rhododendron cinnabarium</i> Hook. f.
		<i>Rhododendron hodgsonii</i> Hook. f.
		<i>Rhododendron triflorum</i> Hook. f.
<i>Rhododendron wallichii</i> Hook. f.		
9	Fagaceae	<i>Quercus glauca</i> Thumb.
		<i>Quercus semicarpifolia</i> Sm.
10	Hydrangaceae	<i>Philadelphus tomentosus</i> Wall. ex G. Don
11	Lamiaceae	<i>Leucosceptrum canum</i> Sm.
12	Lauraceae	<i>Lindera pulcherrima</i> (Ness.) Benth. ex Hook. f.
		<i>Litsea cubebe</i> (Lour.) Pers.
		<i>Litsea doshia</i> (D. Don) Kosterm
14	Magnoliaceae	<i>Magnolia campbellii</i> Hook. f. & Thomson
15	Pinaceae	<i>Abies spectabilis</i> (D. Don) Mirb.
		<i>Pinus wallichiana</i> A. B. Jacks
		<i>Tsuga dumosa</i> (D. Don) Eichler
16	Rosaceae	<i>Cotoneaster affinis</i> Lindl.
		<i>Cotoneaster frigidus</i> Wall. ex Lindl.
		<i>Prunus cornuta</i> (Wall. ex Royle) Steud.
		<i>Prunus rufa</i> Hook. f.
		<i>Sorbus foliolosa</i> (Wall.) Spach
		<i>Sorbus himalaica</i> Gabrieljan
		<i>Sorbus microphylla</i> Wenz.
		<i>Sorbus sharmae</i> M. F. Watson, V. Manandhar & Rushforth
<i>Sorbus wallichii</i> (Hook. f.) T. T. Yu		

17	Rutaceae	<i>Zanthoxylum armatum</i> DC.
18	Sabiaceae	<i>Meliosma dilleniifolia</i> (Wall. ex Wight & Arn.) Walp.
19	Salicaceae	<i>Populus jacquemontiana</i> Dode
		<i>Salix daltoniana</i> Andersson
		<i>Salix longiflora</i> Andersson
		<i>Salix obscura</i> Andersson
		<i>Salix salwinensis</i> Hand. – Mazz. ex Enander
		<i>Salix sikkimensis</i> Andersson
20	Symplocaceae	<i>Symplocos paniculata</i> (Thunb.) Miq.
21	Taxaceae	<i>Taxus wallichiana</i> Zucc.
22	Viburnaceae	<i>Viburnum erubescens</i> Wall. ex DC.
		<i>Viburnum mullaha</i> Buch. – Ham. ex D. Don