

ICIMOD



BIODIVERSITY SERIES

Orchids of Godavari

AND SURROUNDING AREAS

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Abu Hang Samuel

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Foreword

The ICIMOD Knowledge Park at Godavari was set up in March 1993 following the generous provision of 30 hectares of land by Government of Nepal in November 1992. The site was intended for testing and demonstrating various methodologies and appropriate technologies related to integrated mountain development and sustainable farming practices on sloping lands of the mid-hills of the Hindu Kush Himalayan region.

Besides its importance as a site of learning on various aspects of sustainable mountain development, which draws thousands of visitors each year, the Knowledge Park has also become a conservation success story.

When it was handed over, the site was heavily degraded, and initial activities focused on the rehabilitation of the degraded land. Through assisted and natural regeneration, a considerable portion of the degraded forest and shrubland has been gradually restored to semi-natural forest. Regeneration is a long-term process and there is still a long way to go in terms of increasing biomass and species diversity – even so the site already has some of the best forests surrounding the Kathmandu valley. This is an example of what can be done to restore degraded forest patches in the mid hills.

The Godavari-Phulchoki landscape is extremely rich in biodiversity. It is home to over 200 species of birds, over 280 species of butterflies, and 56 species of dragonflies and damselflies. Our camera trapping survey, initiated in February 2019, has also documented the presence of 13 wild mammals in the Knowledge Park. We have benefited greatly from the efforts of researchers and nature enthusiasts who have helped document the incredible diversity of birds, butterflies, dragonflies, and flora.

This latest effort documents in amazing detail the incredible diversity of orchids in the Godavari-Phulchoki landscape, including a new generic record for the orchid flora of Nepal. In highlighting the diversity, it also raises conservation concerns and reminds us that much more needs to be done by way of survey, documentation, and conservation of this diversity. I am thankful to Abu Hang Samuel for this excellent and painstaking voluntary effort that has greatly improved our understanding of the diversity and status of orchids in the landscape. My thanks to Dr Subash Khatri of the National Herbarium and Dr Bhakta Bahadur Raskoti for reviewing the manuscript.

Pema Gyamtsho

August 2022



Preface

Since June 2018, I have been conducting a self-led documentation of the orchids in the Godavari-Phulchoki landscape, starting at the ICIMOD Knowledge Park. A total of 54 species, native and cultivated, have been recorded within the park premises. A species previously unreported from Nepal was also found during this study.

The altitudinal range from Godavari up to the highest point on the Kathmandu Valley rim, Phulchoki, provides various ecological niches for orchids to flourish. Temperate broadleaf forests, rocky areas, riparian stretches, and rhododendron and oak forests at higher altitudes, host some 84 different species of orchids of which a selection has been presented here in this publication. These can be found growing on the forest floor, on various species of trees, moss covered boulders, grassy slopes and so on. Orchids being specialists of the plant world, with their unique ways of life, are vital indicators of ecological health and biodiversity.

The area receives a lot of rainfall, being among the wettest places in the valley. An abundance of water leads to vast richness in terms of flora, as indicated by the diversity of orchids found. As a

biodiversity hotspot and a major water source for nearby localities, this area should be safeguarded.

Development work and a constant influx of tourists is leading to disturbance and degradation of habitats. Plastic pollution, road-widening induced tree felling, and vista clearing are the biggest threats to the orchids of the Godavari-Phulchoki landscape. Illegal collection of orchids for trade has also been reported. The loss of specific pollinator species also threatens these orchids. Steps must be taken to ensure that these amazing species are preserved for future generations.

This work is an attempt at documenting the orchids in this amazing, biodiversity rich landscape. It will hopefully serve as a reference for future studies, help popularise some of these fascinating plants, and raise awareness about their conservation. This is by no means an exhaustive list. The field surveys were mostly opportunistic, carried out on weekends and school holidays. More systematic studies are needed to uncover the rich diversity of orchids in the landscape.

Abu Hang Samuel
August 2022

Agrostophyllum callosum Rchb.f.

Epiphytic, rhizome creeping, branching, rooting at nodes and base. Stems slender, suberect to pendulous, bases enclosed in persistent leaf bases. Leaves linear-lanceolate, base sheath like, clasping stem, apexes retuse to unequally bilobed. Inflorescence terminal, densely flowered. Sepals broadly ovate, apexes subacute. Petals triangular, apexes obtuse. Lip ovate-orbicular, slightly decurved, lateral lobes very reduced, apex clefted. Floral bracts ovate-lanceolate, shorter than or as long as pedicellate ovary.

Forms large clusters of slender stems with downward-facing flowers.



FLOWERING: **JULY TO AUGUST**

ALTITUDINAL RANGE: **6500 FT.**





***Anthogonium
gracile***
Wall. ex Lindl.

Terrestrial, pseudobulbs ovoid, enclosed in leaf sheaths, tapering towards apex, rooting from base. Leaves elliptic lanceolate to linear lanceolate, base narrow, apex acuminate. Inflorescence laxly flowered, up to 8 flowered, sheaths few, clasping, flowers tubular, resupinate. Sepals connate, apexes obtuse, curled backwards. Petals spatulate, apex obtuse to apiculate. Lip roughly 3 lobed, laterals folded inwards, apex beaker like. Floral bracts lanceolate, shorter than pedicellate ovary.

A pale colour form of the species was also located.

FLOWERING: JULY TO AUGUST

ALTITUDINAL RANGE: 4600-5300 FT.

Bulbophyllum affine Wall. ex Lindl.

Epiphytic, rhizome creeping, pseudobulbs cylindric, spaced apart, rooting from base. Leaves coriaceous, succulent, elliptic, base narrow, apex retuse. Flowers arising from the base of the pseudobulb. Lateral sepals falcate, broader at the base, apex acuminate. Dorsal elliptic lanceolate, apex acuminate. Petals lanceolate, apex acuminate. Lip mobile, fleshy, tongue like, curved, apex obtuse. Floral bracts shorter than pedicellate ovary.

Plants can form large colonies. Able to withstand direct sunlight and dry spells.



FLOWERING: **JUNE**

ALTITUDINAL RANGE: **4600 FT.**





***Bulbophyllum
guttulatum***
(Hook.f.) N.P.
Balakr.

Epiphytic, rhizome creeping, unbranched. Pseudobulbs ovoid-conic, tapering towards apex, rooting from base. Leaf solitary, elliptic-oblong, leathery, base contracted into petiole. Inflorescence arising from the base of pseudobulbs, slender, up to 7 flowers per umbel. Lateral sepals obliquely ovate-lanceolate, twisted and narrowing towards base, apex obtuse. Dorsal broadly ovate, concave, apex mucronulate. Petals ovate-triangular, apices mucronulate. Lip sub ovoid, recurved, apex emarginate. Floral bracts lanceolate, shorter than pedicellate ovary.

A robust species with very dainty flowers. Very rare.

FLOWERING: **SEPTEMBER**

ALTITUDINAL RANGE: **4600 FT.**

Bulbophyllum leopardinum
(Wall.) Lindl. ex Wall.

Epiphytic, rhizome creeping. Pseudobulbs clustered together, ovoid to ellipsoid, tapering towards the apex, curved, enclosed in leaf sheaths, rooting from base. Flowers born in pairs, arising from the base of pseudobulbs, base enclosed in sheaths. Lateral sepals ovate, asymmetrical, apex acute. Dorsal smaller, ovate, apex acute. Petals smaller than sepals, ovate lanceolate, apex acute. Lip mobile, fleshy, curled, tongue like, longitudinally grooved. Floral bracts shorter than pedicellate ovary.

Flowers possess a musty scent. Attracts small dipterans (*Drosophila sp.*). A stag beetle (*Dorcus sp.*) was once observed on a flower.



FLOWERING: JUNE–JULY

ALTITUDINAL RANGE: 5200–6500 FT.





Bulbophyllum polyrhizum Lindl.

Epiphytic, rhizomes thin, creeping, branched. Pseudobulbs ovoid, knobbly, clustered together or spaced, enclosed in fibrous sheaths, rooting from base. Leaves oblong, base petiolate, apexes sub-acute. Leafless when in bloom. Inflorescences arising from bases of pseudobulbs, erect to slightly nodding, up to 10 flowered. Sepals elliptic-ovate, apexes sub-acute to obtuse. Petals short, triangular, apex acute. Lip oblong, decurved, apex obtuse, shorter than sepals. Floral bracts short, ovate, shorter than pedicellate ovary.

Very rare, only one small colony was located. A small division collected from that colony is being grown and safeguarded within the Knowledge Park premises.

FLOWERING: APRIL–MAY

ALTITUDINAL RANGE: 4300 FT.

Bulbophyllum purpureofuscum **JJ.Verm**

Epiphytic, rhizome creeping.
Pseudobulbs ovoid-conic, clustered
together. Roots numerous, thin. Leaf
elliptic, coriaceous, base narrow, apex
retuse. Inflorescence arising from
the base of pseudobulbs, erect, 2 to 4
flowered, flowers almost nodding. Lateral
sepals connate, Petals broadly ovate,
apex obtuse, margin slightly serrated. Lip
lanceolate, callus present in the centre of
lip, spatulate, apex obtuse to retuse. Floral
bracts lanceolate, papery, longer than
pedicellate ovary.

Rare species, population localised.
Flowers are short lived.



FLOWERING: **NOVEMBER**

ALTITUDINAL RANGE: **6300 FT.**





Bulbophyllum roseopictum J.J.Verm.

Epiphytic, rhizome slender, creeping, pseudobulbs spaced apart, ovoid, rooting from base, roots slender. Leaves narrowly elliptic, apex obtuse. Inflorescence arising from the base of pseudobulb, pendulous, flowers downward facing. Lateral sepals connate, lanceolate, apices free, acute. Dorsal narrower, lanceolate, apex acute. Petals ovate, margin irregular, apex obtuse. Lip roughly pandurate, lobes near base orbicular, apex obtuse. Lateral lobes lacinate serrate. Apex obtuse, fleshy. Floral bracts lanceolate, papery, longer than pedicellate ovary.

Largely found growing on small tree branches, can form dense colonies. Occurs regularly next to *B. purpureofusum*.

FLOWERING: **OCTOBER**

ALTITUDINAL RANGE: **6300 FT.**

***Bulbophyllum umbellatum* var. *umbellatum*.**

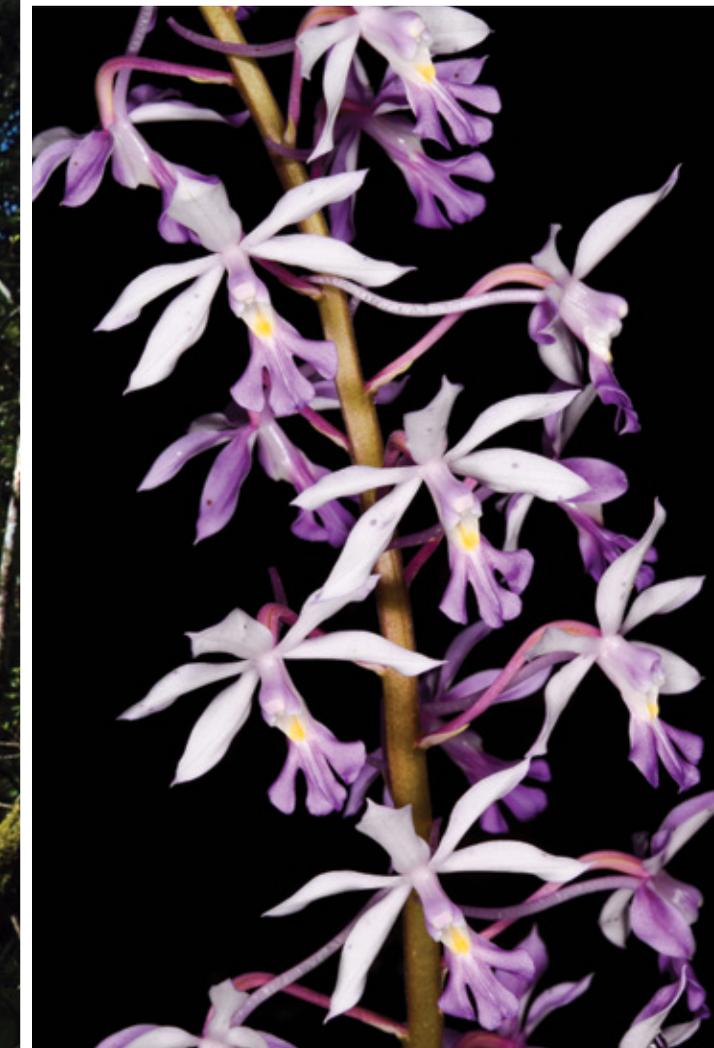
Epiphytic, rhizome creeping, up to 4 mm thick, woody, pseudobulbs spaced apart or clustered, ovoid conic, tapering towards apex, newer ones enclosed in net like sheaths, rooting from base, 48×25 mm. Leaf solitary, very rarely bifoliate, oblong, coriaceous, glabrous, apex minutely retuse. Scape arising from base of pseudobulb, up to 3 flowered. Inflorescence suberect, sheaths 1 to 2. Dorsal sepal hoodlike, 11×6 mm, elliptic, apex acute to apiculate. Laterals ovate lanceolate, falcate, margins involuted, apex acute, 24×8 mm. Petals ovate, 12×7 mm, apexes sub-acute to obtuse. Lip mobile, column hooked, apex loosely attached to lip base. Lobes acute. Floral bracts lanceolate, shorter than pedicellate ovary.

Uncommon, very robust plants. Flowers are not very long lasting.

FLOWERING: MARCH

ALTITUDINAL RANGE: 4900–5900 FT.





***Calanthe plantaginea* Lindl.**

Terrestrial, pseudobulbs globose, rooting from base and nodes. Leaves leathery, broadly oblanceolate, slightly plicate, margin undulating, base petiolate, decurrent. Inflorescence arising from leaf axil, from within new growth. Flowers are fragrant. Sepals oblanceolate, wider than petals, apices acuminate. Petals oblong-lanceolate, apices acuminate. Lip slightly fused to column, lateral lobes rhomboid-obovate, apices obtuse. Mid lobe arrow shaped, apex apiculate. Floral bracts triangular, shorter than pedicellate ovary.

A very floriferous species. Flowers are fragrant.

Common.

FLOWERING: FEBRUARY-MARCH

ALTITUDINAL RANGE: 4500-6500 FT.

Cheirostylis griffithii Lindl.

Terrestrial, plants up to 13 cm tall when in bloom. Rhizome creeping, unbranched, rooting from nodes, succulent, enclosed in sheaths. Leafless when blooming.

Leaves rosetted, ovate, base decurrent, apex acute. Inflorescence erect, up to 3 flowered, flowers nodding. Peduncle hispid. Sepals linear-lanceolate, adaxial surface hispid, apices sub-acute, 15×6 mm. Petals connate, forming hood like structure over the column, apex retuse, upturned. Lip dominant, 10×20 mm, curled downwards, margin lacinate, lobes branching into 2, apices sub-acute. Ovary hispid. Floral bracts longer than pedicellate ovary.

Very rare. Scattered populations discovered.



FLOWERING: APRIL

ALTITUDINAL RANGE: 5500 FT.





***Coelogyne cristata* Lindl.**

Epiphytic or lithophytic, plants pendulous, rhizome woody, rooting at nodes and bases of pseudobulbs. pseudobulbs ovoid, to slightly ovoid conic, bifoliate. Leaves linear lanceolate, up to 270 mm, apex acuminate. Inflorescence arising from the base of pseudobulbs, numerous per plant depending on size. Peduncle enclosed in sheaths till first flower floral bract. Sepals 18×16 mm, linear lanceolate, margins irregularly undulating, folded outwards, apices coiled, acuminate. Lip Floral bracts lanceolate, shorter than longer than ovary.

Widely cultivated for its showy flowers, naturally rare.

FLOWERING: MARCH-APRIL

ALTITUDINAL RANGE: 4900-7000 FT.

Coelogyne fuscescens **Lindl.**

Epiphytic, plants suberect, rhizome creeping, woody, rooting at nodes. Pseudobulbs ovoid cylindrical, tapering at ends, clustered to slightly spaced out. Leaves broadly elliptic, margin undulated, plicate, apex acute to acuminate. Inflorescence proteranthous, arching, 3 to 7 flowered. Sepals elliptic lanceolate, apex sub-acute, dorsal hooded. Petals narrowly linear lanceolate, tapering towards base, apex sub-acute. Lip 3 lobed, laterals elliptic, apex obtuse, epichile elliptic orbicular, margin undulated, apex apiculate. 3 calli present near lip base. Floral bracts are caducous, lanceolate, shorter than pedicellate ovary.

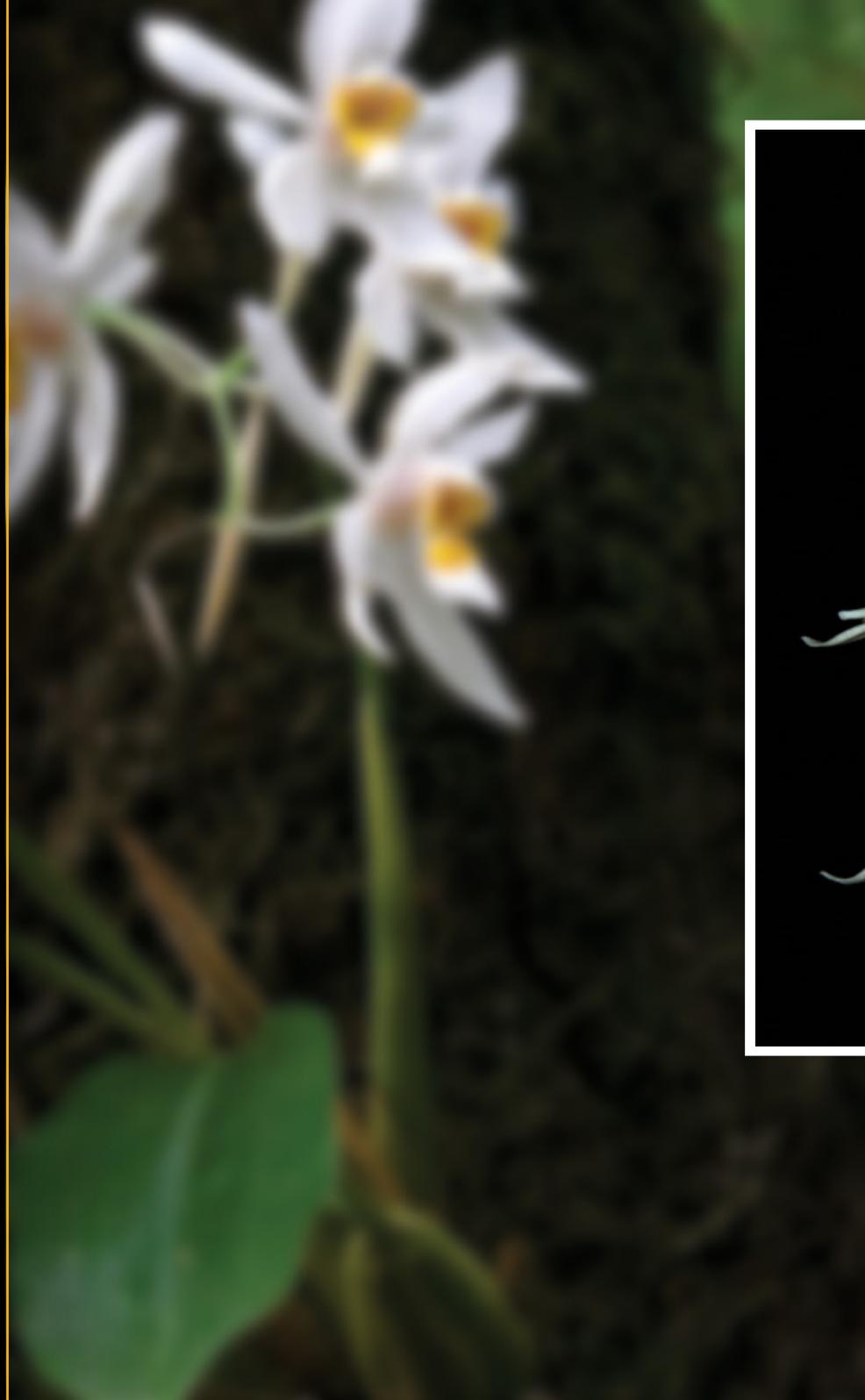
A rarity in the study area, has only been observed in one spot. Fortunately the ICIMOD Knowledge Park has specimens within the premises, a safeguard for this species.



FLOWERING: **OCTOBER**

ALTITUDINAL RANGE: **5300 FT.**





Coelogyne nitida
(Wall. ex D. Don)
Lindl.

Epiphytic to lithophytic, pseudobulb shape variable, ovoid to cylindrical, clustered together, rooting from base. Leaves lanceolate, apex acute. Roots are fibrous. Leaves Inflorescence arching, up to 7 flowered. Sepals elliptic lanceolate, apex acute to obtuse. Petals narrower than sepals, oblanceolate, apex acute to subacute. Lip roughly ovate, 3 lobed, laterals raised, apex obtuse, margin crenate. Apex ovate, apex acute to obtuse. Floral bracts lanceolate, papery, caducous, longer than pedicellate ovary.

A common species, widely cultivated for their floriferous nature and ease of care. Vulnerable to overharvesting from the wild, which is the main source for most plants in trade.

FLOWERING: MAY

ALTITUDINAL RANGE: 4900-5900 FT.

***Coelogyne prolifera* Lindl.**

Epiphytic, rhizome woody, creeping, enclosed in sheaths, rooting at nodes and pseudobulb junctions. Pseudobulbs spaced 1 to 3 cm apart, ovoid, tapering towards apex, occasionally curved, 53×24 mm. Leaves linear lanceolate, tough, 2 per pseudobulb, apex acuminate, 24×2.6 cm. Inflorescences arising from apex of pseudobulb, leaning, up to 5 flowered, peduncle extremely slender. Peduncle and sheath enclosed apex developing well before flowering period. Sepals ovate lanceolate, 8×4 mm, apexes sub-acute. Petals linear oblong, 7×1 mm, apex obtuse. Lip reflexed, 3 lobed, laterals orbicular, apexes obtuse. Epichile curled, margin undulating, apex bilobed, retuse. 8×4 mm. Floral bracts papery, caducous.

Rare in the study area. Plants are very robust, and can form large colonies. Flowers are minute in comparison to the plants.

FLOWERING: MAY

ALTITUDINAL RANGE: 4600 FT.





***Coelogyne stricta* (D. Don) Schltr.**

Epiphytic, rhizomes robust, woody, enclosed in sheaths, rooting from nodes and base of pseudobulbs. Pseudobulbs ovoid-cylindric to ovoid-conic, up to 15 cm long. Leaves robust, lanceolate, 2 per pseudobulb apex, apex acuminate. Inflorescence erect, arising from the apex of pseudobulb, 3 to 7 flowered. Sepals lanceolate to ovate-lanceolate, apex subacute. Petals linear-oblong, narrower than sepals, apex obtuse to subacute. Lip semi-tubular, lateral lobes oblong, apices obtuse. Epichile retuse, margin laciniate-fimbriate, two longitudinal calli present from mid epichile extending to the base. Margins laciniate-fimbriate. Floral bracts lanceolate, papery, caducous.

A very rare species only seen in one spot in the wild. Flower buds enclosed in tough sheaths appear well in advance of the flowering season, which then start growing and open once the conditions are right.

FLOWERING: APRIL

ALTITUDINAL RANGE: 5500 FT.

Crepidium acuminatum **(D.Don) Szlach.**

Terrestrial, pseudobulbs cylindric, tapering towards apex, enclosed in leaf sheaths, rooting from base. Leaves ovate, plicate, base sheath like, apex acuminate. Inflorescence erect, few flowered, flowers resupinate. Dorsal sepal elliptic, margins rolled, apex obtuse. Lateral sepals elliptic lanceolate, margins curled backwards, apex obtuse. Petals narrowly elliptic, margins rolled, becoming tubular, apex obtuse. Lip roughly peltate, lobed, lobed lanceolate, lobe apices acuminate. Apex of the lip slightly retuse to sub-obtuse. Floral bracts deflexed to curled, lanceolate, shorter than pedicellate ovary.

A common terrestrial species, very inconspicuous and well camouflaged.



FLOWERING: JUNE–JULY

ALTITUDINAL RANGE: 4900–5200 FT.





***Crepidium purpureum* (Lindl.) Szlach.**

Terrestrial, pseudobulbs few, cylindric, tapering towards apex, rooting from base. Leaves plicate, rossetted, ovate lanceolate, apex acuminate. Inflorescence synanthous, terminal, erect, sub densely flowered. Peduncle longitudinally grooved. Flowers resupinate. Lateral sepals ovate lanceolate, margins folded outwards, apex acute. Dorsal longer than laterals, lanceolate, margins folded outwards, apex acuminate. Petals linear, apex acuminate. Lip peltate, 3 lobed, laterals semi circular, apex lobed, retuse. Floral bracts are reflexed, linear lanceolate, longer than pedicellate ovary.

A very rare species. Contrary to the species name, only a yellow (flower) colour form has been found in the area.

FLOWERING: JULY

ALTITUDINAL RANGE: 4600 FT.

Cymbidium lancifolium **Hook.**

Terrestrial, rhizome woody, pseudobulbs stem like, cylindrical, enclosed in leaf sheaths, roots stout. Leaves lanceolate, 3 to 4 per pseudobulb, apex acuminate, margin slightly serrated near apex. Inflorescences erect, peduncle base enclosed in sheaths, up to 7 flowered. Sepals elliptic lanceolate, apex apiculate. Petals held over column like a hood, lanceolate, apex subacute. Lip ovate lanceolate, apex acuminate, curled outwards. 2 ridge like callus present in the centre of lip. Floral bracts lanceolate, shorter than pedicellate ovary.

Rare species, populations localised. Plants in the study area seem to be prone to browsing by animals.



FLOWERING: **MAY-JUNE**

ALTITUDINAL RANGE: **5500 FT.**





***Dendrobium
amoenum***
Wall. ex Lindl.

Epiphytic, stems slender, arching, enclosed in sheaths, swollen at nodes, clustered together, rooting at base. Leaves narrowly lanceolate, base clasping, apex acuminate. Flowers arising from nodes on stem, born in pairs. Sepals linear elliptic, slightly falcate, apex acute to subacute. Petals wider than sepals, elliptic, apex subacute. Lip base tubular, elliptic ovate, apex apiculate, margin undulating and serrated, adaxial surface towards the base covered in short hairs. Floral bracts are triangular, papery, shorter than pedicellate ovary.

Uncommon, very floriferous. Flowers are slightly fragrant.

FLOWERING: JUNE-JULY

ALTITUDINAL RANGE: 4600 FT.

***Dendrobium bicameratum* Lindl.**

Epiphytic, varying in size depending on growing location. Stems cylindrical, tapering towards either ends. Leaves coriaceous, elliptic, apex retuse. Inflorescences arising from nodes on stem. Flowers clustered, up to 7 flowered. Multiple inflorescences per stem. Lateral sepals are roughly triangular, lower sides straight, upper sides curved, apex acute. Bases connate, fused to lip base. Dorsal broadly elliptic, apex obtuse. Petals elliptic, margins occasionally minutely serrated, apices obtuse. Lip cup shaped, 3 lobed, laterals short triangular, apices acuminate. Mid lobe prominent, apex turned outwards, subacute to subtruncate. Floral bracts broadly triangular, shorter than ovary.

Plant sizes are quite variable.

FLOWERING: JUNE–AUGUST

ALTITUDINAL RANGE: 4500–5200 FT.





***Dendrobium
heterocarpum***
Wall. ex Lindl.

Epiphytic, stems cylindric clavate, clustered together, up to 430 mm long rooting at base. Leaves elliptic lanceolate, base clasping, apex unequally bilobed. Enclosed in leaf sheaths. Leaves shed during flowering. Inflorescences arising from nodes on stem. 1 to 3 flowers per node. Lateral sepals lanceolate, falcate, bases connate, apices sub-acute to obtuse. Dorsal narrower, elliptic, apex obtuse. Petals ovate lanceolate, margins undulating, apex apiculate. Lip tubular, roughly ovate lanceolate, lateral lobes curled inward. Callus present near base. Roughly rectangular. Entire adaxial surface covered in short hairs. Apex apiculate, curled backwards, margins folded outwards. Floral bracts are triangular, papery, shorter than ovary.

Rare in the study area. In a locality where few specimens were located, 90% of host trees have been cleared.

FLOWERING: MARCH

ALTITUDINAL RANGE: 4600 FT.

Dendrobium longicornu Lindl.

Epiphytic, stems cylindric to cylindric-clavate, covered in short brown hairs, clustered together, rooting at bases. Leaves elliptic, apex unequally bilobed, base decurrent. Inflorescences arising from apex or nodes opposite leaf axils on stems, 1 to 2 flowered, (in the study area) flowers nodding. Lateral sepals lanceolate, apex acuminate, base contracted into spur. Petals shorter than sepals, ovate lanceolate, base contracted into spur. Lip 3 lobed, laterals orbicular at apexes, lip apex acuminate to obtuse, margins fimbriate. Spur cylindric, slightly curved, apex obtuse. Floral bracts are papery, shorter than pedicellate ovary.

Common at mid elevations.



FLOWERING: LATE SEPTEMBER–OCTOBER

ALTITUDINAL RANGE: 5400–6850 FT.





***Dienia
cylindrostachya*
Lindl.**

Terrestrial, tuber globose-conic, sheathed, rooting from base. Stem relatively short, slender. Leaf solitary, ovate-lanceolate, base tube like, apex acute. Inflorescence densely flowered, peduncle grooved lengthwise, flowers non resupinate. Flowers minute. Sepals ovate-lanceolate, apices acute. Petals linear, narrower than sepals, apices acute. Lip ovate-orbicular, margin fleshy, thickened up to acuminate apex. Margin sometimes serrate in some flowers. Floral bracts triangular, shorter than pedicellate ovary.

Quite difficult to spot this small species unless in flower.

Very rare.

FLOWERING: JULY

ALTITUDINAL RANGE: 8600 FT.

Epipactis helleborine **(L.) Crantz**

Terrestrial, stem slender, erect, rooting at base. Leaves arranged spirally, ovate lanceolate, semi plicate, apex acuminate. Inflorescence terminal, densely flowered, up to 19 per peduncle. Flowers nodding. Peduncle pubescent. Sepals lanceolate, apex acuminate to occasionally forked in laterals. Petals lanceolate, apex acuminate. Lip cup like, apex apiculate. Floral bracts leaf like, lanceolate, decreasing in size higher up the inflorescence. Longer than pedicellate ovary.

The species has an extremely wide distribution. Plants are possibly partially mycoheterotrophic, as flowering specimens were observed growing in extremely dim conditions where there is zero undergrowth.



FLOWERING: **JUNE**

ALTITUDINAL RANGE: **7300 FT.**





Eria coronaria **Lindl.**

Epiphytic or lithophytic, stems slender, bifoliate, clustered together, rooting at base. Roots numerous. Leaves semi succulent, lanceolate, apex acuminate. Inflorescence arising from apex of stems, 3 to 4 flowered. Lateral sepals falcate, lanceolate, apex subacute. Dorsal elliptic lanceolate, apex obtuse. Petals elliptic, apex subacute, held over column or spread out. Lip 3 lobed, laterals apex obtuse, apical lobe curled forwards. Lobe margins undulating, crenate. Longitudinal callus present. Floral bracts lanceolate, shorter than pedicellate ovary.

Rare winter blooming species. Populations are very localised. Flowers are fragrant.

FLOWERING: NOVEMBER-DECEMBER

ALTITUDINAL RANGE: 5500-6400 FT.

Gastrochilus acutifolius **(Lindl.) Kuntze**

Epiphytic, stems suberect to pendulous, rooting from nodes, leaf bases and stem base. Leaves elliptic to elliptic falcate, apex acute to acuminate, tricuspidate. Inflorescences pendulous, umbellate, up to 9 flowered. Sepals spatulate, apex obtuse. Petals smaller than sepals, spatulate, apex obtuse. Lip base cup like, epichile roughly semicircular, margin lacinate, patches papillose, apex obtuse. Column short, clawed. Floral bracts deltoid, shorter than pedicellate ovary.

An uncommon species, flowers have a very long development period. Fragrant. A yellow colour form of the species has also been noted in the study area.



FLOWERING: **OCTOBER**

ALTITUDINAL RANGE: **4900–5200 FT.**





Gastrochilus distichus **(Lindl.) Kuntze**

Epiphytic, stems pendulous, rooting at nodes and base. Leaves arranged alternately, distichous, lanceolate to ovate lanceolate, apex acuminate, tricuspidate. Inflorescences are pendulous, 1 to 3 flowered. Sepals space elliptic orbicular, concave, apex obtuse. Petals slightly smaller than sepals, elliptic orbicular, apex obtuse. Lip base cup like, fused to column, epichile roughly ovate rectangular, apex truncate. Callus present in centre, raised, notched, with two bulbous points. Floral bracts deltoid, shorter than pedicellate ovary.

A very difficult species to locate due to its miniature size. Mostly found growing on thin moss covered twigs.

FLOWERING: MARCH

ALTITUDINAL RANGE: 8200 FT.

Gastrochilus calceolaris
(Buch.-Ham. ex Sm.)
D. Don

Epiphytic, stems suberect, short, rooting from nodes and base. Roots numerous, cylindrical, slender. Leaves elliptic-lanceolate to linear-lanceolate, up to 32cm long, base decurrent, apex unequally bilobed or apiculate. Inflorescence pendulous, arising from nodes on stem up to 7 flowered. Sepals spatulate, apex sub-obtuse, 8×5mm. Petals sub-spatulate, apices obtuse, smaller than sepals, 8×3.4 mm . Lip cup shaped, fused to the column, 9 to 10 mm. Apex semi-circular in outline, margin laciniate. Floral bracts triangular, very short.

Uncommon, but seedlings are a common sight on *Prunus* sp. planted at the ICIMOD Knowledge Park.



FLOWERING: MARCH

ALTITUDINAL RANGE: 4600–6200 FT.





Goodyera henryi **Rolfe**

Terrestrial or lithophytic, rhizome creeping, rooting at nodes, branching. Stems slender, rooting at nodes, leaves clustered towards apex. Leaves ovate to ovate lanceolate, margins undulating, apex acute, base tubular, clasping. Inflorescence terminal, hispid, up to 8 flowered, peduncle glabrous. Flowers not opening very wide. Floral bracts linear lanceolate, adaxial sparsely hispid, longer than pedicellate ovary. Sepals ovate lanceolate, laterals slightly asymmetric, apex acuminate. Petals oblanceolate, glabrous, apex acuminate. Lip tongue like, slightly decurved, apex acuminate. Floral bracts linear lanceolate, acuminate, longer than pedicellate ovary. Ovary hispid.

An almost identical species to *G. foliosa*, to which it differs in some floral morphology (glabrous peduncle, lip structure) and flowering time. Found growing exclusively next to streams at lower altitudes, some plants can be almost submerged in the monsoon.

FLOWERING: LATE OCTOBER-EARLY NOVEMBER

ALTITUDINAL RANGE: 4500 FT.

Goodyera repens **(L.) R.Br. in W.T.Aiton**

Lithophytic or terrestrial, rhizome creeping, rooting at nodes. Stem short, rosetted. Leaves shortly elliptic ovate, apex acuminate, base tubular. Inflorescence terminal, sub densely flowered, hispid. Flowers not opening fully. Peduncle erect. Sepals deltoid ovate, apex sub obtuse, adaxial hispid. Petals held over column like hood, apex obtuse. Lip base concave, cup like, apex decurved, apex acuminate. Floral bracts lanceolate, adaxial hispid, apex acuminate, longer than pedicellate ovary.

Largely found growing on moss covered boulders with the prettiest foliage of any species in the study area.



FLOWERING: JULY

ALTITUDINAL RANGE: 7800 FT.





***Goodyera viridiflora* (Blume) Blume**

Terrestrial, rhizome creeping, occasionally branching, rooting at nodes. Stem(s) short, rosetted. Leaves ovate-lanceolate, apex acute to acuminate, base tubular, decurrent, margin occasionally undulated. Inflorescence terminal, erect, peduncle hispid with sheaths halfway up. Sepals elliptic-lanceolate, apexes acuminate. Dorsal clasping petals. Petals connate, roughly ovate-orbicular, forming a hood over column, apex apiculate, sometimes separate. Lip ovate, tubular, margin rolled outwards, apex apiculate. Floral bracts lanceolate, longer than pedicellate ovary.

Uncommon, can be difficult to spot. Scattered, but sizable populations discovered.

FLOWERING: JULY

ALTITUDINAL RANGE: 5900–6500 FT.

Habenaria arietina **Hook.f.**

Terrestrial, Tubers root like, fleshy, cylindrical, tapering, 2 to 3. Stem erect, enclosed in leaf bases. Leaves base tubular, clasping stem, longitudinally grooved, lanceolate, apex acuminate. Inflorescence terminal, sub-densely flowered, up to 11 flowered, peduncle longitudinally grooved, occasionally hispid. Lateral sepals oblique lanceolate, held backwards, apex acuminate. Dorsal elliptic lanceolate, apex acuminate. Petals strongly ovate oblique, upturned, hispid, clasping dorsal, apex acuminate. Lip forked, 3 lobed, laterals branching into filaments, epichile linear, apex obtuse. Spur narrowly clavate cylindrical, tapering towards base, apex obtuse. Floral bracts leaf like, lanceolate, longer than pedicellate ovary, decreasing in size higher up the peduncle.

A robust species whose branched labellum makes for a striking trait. Interactions with pollinators should be studied.



FLOWERING: JULY

ALTITUDINAL RANGE: 8500 FT.





Habenaria intermedia D. Don

Terrestrial, tuber ovoid, rooting from stem junction, roots few. Stem erect, enclosed in leaf bases. Leaves ovate lanceolate, plicate, longitudinally grooved, apex acuminate, base tubular, clasping stem. Inflorescence terminal, few flowered, 3 to 5. Lateral sepal falcate, oblique elliptic, apex unequally bilobed. Dorsal lanceolate, decurved, apex acuminate. Petals are strongly asymmetrical, oblique, sparsely hispid, apex acuminate, curved backwards. Lip superior, complex, forked, laterals branching, epichile linear, apex sub-obtuse, 2 narrowly lanceolate lobes present near base, apex acuminate, curled sideways. Spur cylindrical, thicker near apex or uniform, apex obtuse. Floral bracts leaf like, lanceolate, longer than pedicellate ovary, decreasing in size higher up on the peduncle.

A very rare species which is quite similar to *H. arietina* but differs in terms of flower size, habitat, altitude and floral morphology. Only a few isolated specimens were located.

FLOWERING: JULY

ALTITUDINAL RANGE: 6500–7800 FT.

Herminium clavigerum (Lindl.) X.H.Jin

Terrestrial or lithophytic, tubers globose to cylindrical-ellipsoid. Stem arising from apex, rooting at junction. Roots few. Leaves lanceolate, apex acuminate to acute. base tubular, clasping. Inflorescence erect, terminal, bracts few, densely flowered. Peduncle longitudinally grooved. Lateral sepals ovate lanceolate, apex obtuse, concave. Adaxial very slightly pubescent. Dorsal elliptic lanceolate, apex subacute. Petals curled, narrowly lanceolate, asymmetric, apex acuminate. Lip narrowly lingulate, apex obtuse, reflexed. Floral bracts linear-lanceolate, longer than pedicellate ovary.

A species restricted to higher altitudes. Relatively rare in the study area.



FLOWERING: JULY

ALTITUDINAL RANGE: 8500 FT.





***Herminium
lanceum***
(Thunb. ex Sw.)
Vuijk

Terrestrial or lithophytic, tubers ellipsoid, roots few. Stem slender, leaves 4 to 5. Leaves linear lanceolate, bases clasping stem, apex acuminate. Inflorescence terminal, 1 to 2 bracts, up to 61 flowered. Sepals ovate-elliptic, laterals asymmetric, apex obtuse. Petals smaller than sepals, lanceolate, apex acuminate. Lip downward facing, apex bilobed. Floral bracts lanceolate, shorter than pedicellate ovary.

Tough species to locate as when the plants are not in flower, it is very difficult to differentiate its narrow leaves from grasses and other plants with narrow foliage among which it tends to grow.

FLOWERING: JULY-AUGUST

ALTITUDINAL RANGE: 6600-7500 FT.

Herpysma longicaulis Lindl.

Terrestrial, rhizome creeping, branching into stems, rooting at nodes. Roots hispid, unbranching. Leaves elliptic lanceolate, margins undulating, whorled, clustered towards apex, leaf apex acuminate. Inflorescence terminal, flowers slightly pubescent, clustered together. Lateral sepals elliptic, margins slightly involuted, apexes obtuse. Dorsal ovate elliptic, apex subacute. Petals elliptic lanceolate, apices acuminate. Lip 3 lobed, apical lobe ovate orbicular, central region up till apex raised, margins slightly folded sideways. Lateral lobes short, apices obtuse. Floral bracts large, hispid, lanceolate, longer than pedicellate ovary. Flowers slightly scented.

A rare find, the only species representative of its monotypic genus. Only two populations were located. Threatened by wild boar (*Sus* sp.) foraging.



FLOWERING: **SEPTEMBER**

ALTITUDINAL RANGE: **4500–6200 FT.**





***Lecanorchis
japonica***
Blume

Holomycotrophic geophyte, up to 36 cm tall. Rhizome woody, branching, enclosed in scale like sheaths, 94×7 mm. Roots arising from nodes, wiry, slender, unbranching. Leaves absent. Inflorescences terminal, (up to 3 per plant) peduncle erect, glabrous. Base enclosed in bracts; fewer higher up the peduncle. Up to 7 flowered. Flowers not opening widely. Petals and sepals oblanceolate, stiff, apexes acute, 17×2.5 mm. Petals wider than sepals, 15.5×3 mm. Lip 3-lobed; 16×7 mm; ¾ fused to the column, adaxial densely ciliated. Lateral lobes deltoid, apexes acute. Epichile obtuse, margin slightly dentate. Column narrowly clavate, tapering towards base, slightly curved, apex concave, up to 12×3 mm. Floral bracts deltoid, very short.

A new distributional report for Nepal. (Previously reported from China, Korea, Japan, and more recently northeast India). Very rare ephemeral species whose flowers last for barely a few days.

FLOWERING: MAY

ALTITUDINAL RANGE: 5500 FT.

Liparis cordifolia **Hook.f.**

Terrestrial, plants up to 80 mm tall with flower. Pseudobulbs ovoid, 1 to 2, tapering toward apex, 24×15 mm, rooting from base, roots few. Leaf solitary, cordate, glabrous, apex acuminate, base tubular. 70×69 mm, net like venation. Inflorescence erect, solitary, sub densely flowered, up to 9. Sepals linear, narrow, margins curled inwards, apexes acute, 9×1 mm. Laterals positioned underneath the labellum. Petals filiforme, slightly falcate, smaller than sepals, up to 9 mm long. Lip superior, deltoid, apex broad, truncate-apiculate, 8×9 mm. Column short, curled forward, curved 2×5 mm. Floral bracts deltoid, minute, shorter than ovary.

Very rare, only two specimens were found, one of which was destroyed by foraging wild boar.



FLOWERING: OCTOBER–NOVEMBER

ALTITUDINAL RANGE: 4900 FT.





Liparis elliptica **Wight**

Epiphytic, pseudobulbs ellipsoid to spherical, enclosed in sheaths, strongly flattened, clustered together, rooting from base. Leaves held at apex of pseudobulbs, 2 to 3, elliptic, apex acute. Inflorescence arching, densely flowered, up to 24 flowered, arising from base of pseudobulbs. Peduncle longitudinally grooved. Flowers are small, almost nodding. Sepals elliptic, apex subacute. Petals filiforme, apex acuminate. Lip orbiculate, concave, epichile undulated, apiculate. Floral bracts lanceolate, longer than pedicellate ovary.

Uncommon species, rather difficult to locate being all green even in bloom and due to its affinity for growing on small branches high up on trees.

FLOWERING: **NOVEMBER-DECEMBER**

ALTITUDINAL RANGE: **4900 FT.**

Liparis nervosa **(Thunb.) Lindl.**

Terrestrial, pseudobulbs cylindric, tapering towards apex, enclosed in leaf sheaths, 2 to 3, rooting from base. Leaves strongly plicate, base clasping pseudobulbs, apex acuminate. Inflorescence synanthous, erect, peduncle longitudinally grooved, flowers upwards facing, up to 27 flowered. Sepals elliptic lanceolate, margins rolled outwards, apex acute. Petals filiforme, contorted, apex acuminate to retuse. Lip decurved, apex bilobed, lobes semicircular, apex obtuse. Floral bracts fleshy, deltoid, shorter than pedicellate ovary.

A rare species found growing on moist slopes. Difficult to spot.



FLOWERING: JUNE

ALTITUDINAL RANGE: 4300 FT.





Liparis resupinata **Ridl.**

Epiphytic, pseudobulbs ovoid cylindrical, tapering towards apex, base enclosed in sheaths, clustered together, rooting from bases. Leaves linear lanceolate, base clasping pseudobulbs, 3 to 5, apex acute. Inflorescence arising from apex of pseudobulb, arching, sub densely flowered, peduncle longitudinally grooved, with numerous bracts. Lateral sepals strongly deflexed backwards, lanceolate, margins rolled outwards, apex obtuse. Dorsal erect, curved, margins held back, apex recurved, subacute. Petals linear, almost filiforme, apex retuse. Lip roughly hastate, deflexed downwards, apex recurved, sub-obtuse. Floral bracts lanceolate, shorter than ovary, clasping.

A rarity in the study area, largely found growing on twigs and smaller branches of trees. Flowers take a long time to develop and open.

FLOWERING: JANUARY-FEBRUARY

ALTITUDINAL RANGE: 4900 FT.

Luisia trichorrhiza **(Hook.) Blume**

Epiphytic, stems erect, enclosed in leaf bases, clustered together, rooting at base, roots robust. Leaves terete, narrow, whorled, apex sub-acute, base clasping. Inflorescences arising from nodes opposite leaf axils, umbellate, 3 to 9 flowered. Lateral sepals concave, elliptic-lanceolate, asymmetric, apex off centre, obtuse. Dorsal elliptic, smaller than laterals, apex obtuse to sub-obtuse. Petals linear lanceolate, not spreading, curved, apex sub-acute. Lip hastate, epichile fleshy, almost cordate, adaxial grooved longitudinally, occasionally slightly papillose. Floral bracts short, deltoid.

Largely found growing high up on exposed branches of mature chilaune trees (*Schima wallichii*) Uncommon and difficult to spot.



FLOWERING: **MAY**

ALTITUDINAL RANGE: **4500 FT.**





Malaxis muscifera **(Lindl.) Kuntze**

Lithophytic, pseudobulb globose, enclosed in sheaths. Leaf solitary, elliptic-lanceolate, apex sub-acute, petiole tubular, slender, stem-like. Inflorescence terminal, erect, sub densely flowered, flowers minute, resupinate. Sepals elliptic lanceolate, apices acute, margins rolled. Petals decurved, linear, very thin, apex acuminate. Lip ovate-orbicular, lateral lobes reduced, deltoid, acute. Apex acuminate. Ovary twisted. Floral bracts lanceolate, as long as or shorter than pedicellate ovary.

A very rare diminutive species that is very difficult to locate being all green, small, along with a habit of growing on inaccessible mossy boulders and cliffs

FLOWERING: **JULY**

ALTITUDINAL RANGE: **8500 FT.**

Oberonia falcata **King & Pantl.**

Epiphytic, stems pendulous, clustered, bilaterally flattened, rooting from base. Leaves linear-lanceolate, flattened, falcate, apex acuminate. Inflorescence terminal, peduncle ribbed, grooved lengthwise, densely flowered, flowers minute. Sepals ovate-triangular, apices sub-acute. Petals elliptic-lanceolate, falcate, curled forwards, apices obtuse. Lip roughly rectangular, lateral lobes triangular, apices acuminate. Mid lobe deeply forked at apex, apices acute. Floral bracts minute, lanceolate, shorter than pedicellate ovary.

One of the most unique species of the study area. Very rare, only a few specimens were found.



FLOWERING: JUNE

ALTITUDINAL RANGE: 4600–7500 FT.





***Oberonia longilabris* King & Pantl.**

Epiphytic, stems clustered, pendulous, rooting from base. Stem almost absent, bilaterally flattened. Leaves flattened, linear-lanceolate, apices acute. Inflorescence terminal, peduncle grooved lengthwise, sub densely flowered. Flowers minute. Sepals ovate-lanceolate, apices obtuse to sub acute. Petals oblong, apices obtuse. Lip roughly rectangular, bilobed, apical lobes triangular, apices acuminate. Floral bracts minute, lanceolate-triangular, shorter than pedicellate ovary.

A diminutive species. Tends to be found on mossy branches and twigs.

Very rare. Populations tend to be localised.

FLOWERING: **JULY**

ALTITUDINAL RANGE: **6500–8200 FT.**

Otochilus fuscus **Lindl.**

Epiphytic, pseudobulbs cylindric, pendulous, bases connate, extending, tapering towards apex, up to 90 mm long. Leaves 2, linear lanceolate, apex acuminate. Inflorescence proteranthous, densely flowered. Sepals linear elliptic, margins occasionally undulated, apex acute. Petals narrower than sepals, oblanceolate, apex acute. Lip deflexed at base, lanceolate, concave, apex subacute. Column club like, apex downturned. Floral bracts papery, shorter than pedicellate ovary.

A very rare species, only one clump located, and another single specimen examined at the National Botanical Garden's orchidarium in Godavari.



FLOWERING: **JANUARY**

ALTITUDINAL RANGE: **4900–6500 FT.**





***Otochilus porrectus* Lindl.**

Epiphytic, plants scrambling, pseudobulbs narrowly cylindrical, connate at ends, tapering towards apex and base, rooting at joints. Roots wiry, thin. Leaves 2 per pseudobulb apex, elliptic to elliptic lanceolate, plicate, margins near apex undulated, apex acuminate. Inflorescence protheranthous, arching, sub densely flowered. Sepals linear elliptic, laterals base sub-falcate, apices acute. Petals linear, apex acuminate. Lip simple, linear lanceolate, apex acuminate. Floral bracts are papery, lanceolate, caducous, longer than pedicellate ovary.

A scrambling species that can grow into very large clumps. Rare.

FLOWERING: **OCTOBER-DECEMBER**

ALTITUDINAL RANGE: **4500-5200 FT.**

***Phalaenopsis
difformis***
(Wall. ex Lindl.)
Kocyan & Schuit.

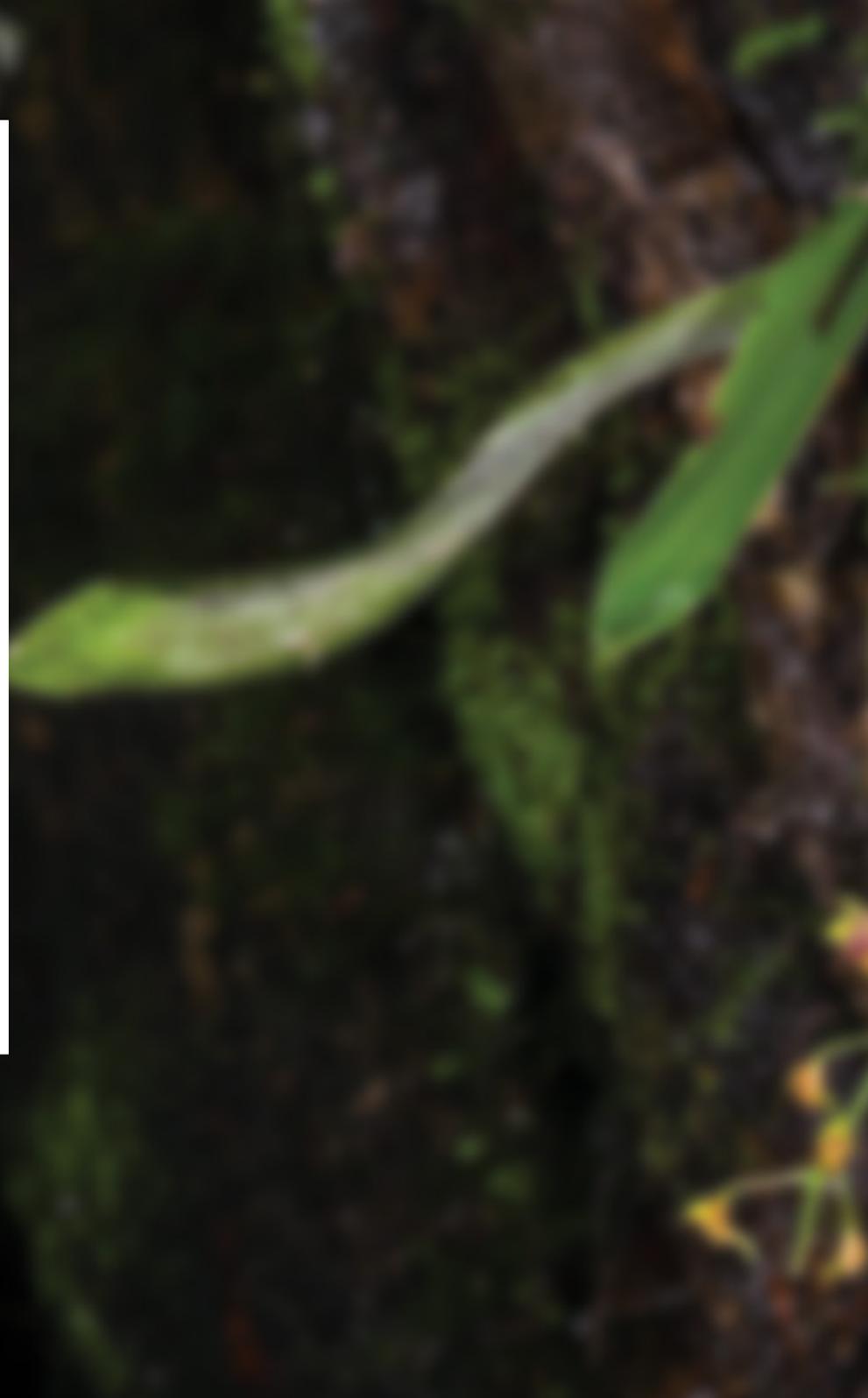
Epiphytic, stem short, enclosed in leaf sheaths, suberect, rooting from base and leaf axils. Leaves elliptic lanceolate, thick, apex unequally bilobed. Inflorescence arising from leaf axil, pendulous, branching, up to 41 flowered. Lateral sepals widely oblong, apex obtuse. Dorsal oblong, slightly hooded towards apex. Petals smaller than sepals, oblong, apex obtuse. Margins near apex on both sepals and petals slightly dentate. Lip complex, apex margins lacinate-fimbriate. Spur cylindrical, slightly tapering, apex obtuse. Floral bracts lanceolate, shorter than ovary. Flowers are mildly fragrant.

Very rare species, only a single specimen was located by chance. Quite possibly locally extinct.



FLOWERING: JULY

ALTITUDINAL RANGE: 5500 FT.





***Phalaenopsis
taenialis***
(lindl.) Christenson
& Pradhan

Epiphytic, stem short, rooting from base. Roots numerous, flattened, sprawling. Leaves 1 or 2, elliptic-lanceolate to ovate-lanceolate, apices unequally bilobed. Leaves absent sometimes. Inflorescence arising from base of stem, suberect to slightly arching. Lateral sepals broadly ovate-lanceolate, apices acute. Dorsal elliptic-lanceolate, apex sub-truncate to retuse. Petals broadly spatulate, apices obtuse. Lip 3-lobed, lateral lobes elliptic, apices obtuse. Mid lobe oblanceolate, decurved. Floral bracts triangular, shorter than pedicellate ovary.

Uncommon, populations tend to be localised.

FLOWERING: MAY

ALTITUDINAL RANGE: 4200–7850 FT.

Pholidota articulata **Lindl.**

Epiphytic, pseudobulbs cylindric, bases connate, suberect to pendulous, rooting at base and nodes between joints. Leaves elliptic lanceolate, 2, margins undulating, apex acuminate. Inflorescence terminal, arising from apex of pseudobulb, arching to pendulous, 3 to 13 flowered. Sepals broadly lanceolate, concave, apex sub-acute. Petals smaller than sepals, lanceolate, apex acute. Lip concave, base cup-like, longitudinal callus present. 3 lobed, laterals curled inwards to form the cup like base, apex bilobed, lobes roughly rectangular, margins irregular, obtuse. Floral bracts ovate, papery, longer than pedicellate ovary.

Largely restricted to lower altitudes, plants can form large clumps. A very robust species.



FLOWERING: MAY-JUNE

ALTITUDINAL RANGE: 4800 FT.





***Pholidota protracta* Hook.f.**

Epiphytic, plants pendulous, pseudobulbs translucent, narrowly flask shaped, tapering towards apex, curved, enclosed in sheaths, rooting at nodes. Leaves 2 per pseudobulb, elliptic lanceolate, slightly plicate, apex acuminate. Inflorescence arising from base of pseudobulbs, up to 13 flowered, flowers not opening widely. Lateral sepal broadly elliptic oblique, apex acute. Dorsal broadly elliptic, hood like, apex obtuse. Petals smaller than sepals, broadly elliptic, apex obtuse. Lip flattened, roughly elliptic, apex obtuse truncate. Floral bracts papery, deltoid ovate, shorter than pedicellate ovary.

Another rare, tiny gem of the forests, this species has only been found in a few locations.

FLOWERING: **OCTOBER**

ALTITUDINAL RANGE: **5200–5500 FT.**

Pinalia spicata **(D.Don) S.C.Chen & J.J.Wood**

Epiphytic, pseudobulbs clustered together, new ones enclosed in leaf sheaths, cylindric to sub-cylindric, tapering towards base, rooting from base. Leaves lanceolate, up to 5 per pseudobulb. Inflorescences densely flowered, arching, arising from nodes on pseudobulbs, peduncle slightly hispid, bracts many. Lateral sepals ovate-orbicular, asymmetric, apex acuminate, slightly falcate, base connate. Dorsal elliptic, apex obtuse. Petals elliptic lanceolate, apex sub-acute. Lip epichile roughly hastate, apex recurved, truncate, lateral lobes obtuse. Base deeply grooved longitudinally, curved. Floral bracts ovate lanceolate, apex acuminate, abaxial slightly hispid, longer than pedicellate ovary.

Relatively common species, flowers are very short lived as they bloom in the peak of monsoon.



FLOWERING: JULY

ALTITUDINAL RANGE: 4500-5700 FT.





Pleione humilis **(Sm.) D. Don**

Lithophytic or epiphytic, pseudobulbs clustered together, enclosed in mesh like sheath, rooting from base. 50×14 mm, rooting from base. Leaves plicate, oblanceolate, apex acute, solitary per pseudobulb. Inflorescence arising from the base of a pseudobulb, solitary flowered, flowers up to 88 mm wide. Lateral sepals wider than dorsal, 39×11 mm. Elliptic oblong, apex obtuse. Dorsal narrower, elliptic, 40×9 mm. Petals elliptic, 41×8 mm. Lip tubular, 2 lobed, forming tube like structure, apex orbicular, margins fimbriate. Numerous longitudinal callus present with fimbriate margins extending from apex to base of lip. Column narrow, thicker towards the anther cap. Floral bract tubular, shorter than pedicellate ovary.

Very rare, grows on moss covered boulders or large tree trunks.

FLOWERING: **MARCH**

ALTITUDINAL RANGE: **8500 FT.**

Rhynchosstylis retusa **(L.) Blume**

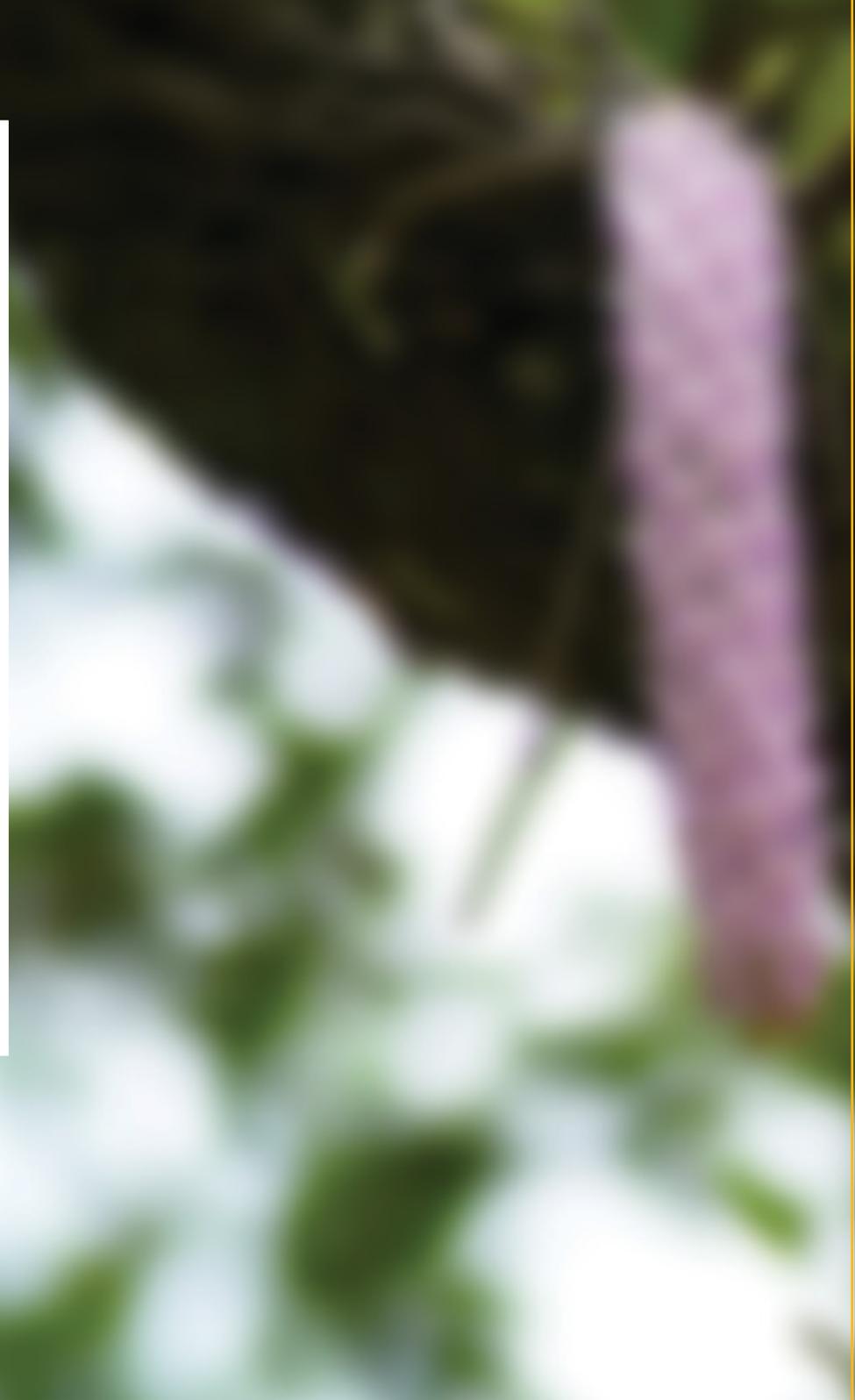
Epiphytic, plants robust, stem enclosed in leaf bases, rooting at nodes and base. Leaves distichous, fleshy, linear, apex truncate to retuse, occasionally cuspidate, base clasping. Roots robust, spreading. Inflorescence arising from leaf axils, densely flowered, pendulous. Peduncle longitudinally grooved. Lateral sepals asymmetrically ovate, apex obtuse. Dorsal narrower than laterals, elliptic, apex obtuse. Petal elliptic, smaller than sepals, apex obtuse. Lip simple, base deflexed, grooved, fused to column. Epichile tongue-like, few calli present, margins raised, apex obtuse. Floral bracts papery, shorter than pedicellate ovary.

A widely cultivated species which is uncommon in the area, possibly due to collection from the wild for horticultural purposes. A very robust orchid.



FLOWERING: JUNE

ALTITUDINAL RANGE: 4200–5300 FT.





Satyrium nepalense **D. Don**

Terrestrial to lithophytic, tubers ovoid to cylindric-ellipsoid, stem arising from apex, rooting from base of stem. Leaves lanceolate, fleshy, acuminate, base clasping. Inflorescence terminal, subdensely flowering, bracts lanceolate. Flowers resupinate. Dorsal sepal elliptic to oblong, apex obtuse. Laterals curled, elliptic, apex obtuse. Petals oblanceolate, apex obtuse. Lip concave, cup like, forming a hood over column, longitudinal callus like ridge present on abaxial surface. Floral bracts prominent, lanceolate, reflexed, longer than pedicellate ovary.

This species has a scattered presence in the landscape, with populations localised to favourable spots. Some rather large specimens have been observed.

FLOWERING: **SEPTEMBER-OCTOBER**

ALTITUDINAL RANGE: **5900-7200 FT.**

Vanda cristata Wall. ex Lindl.

Epiphytic, stems monopodial, enclosed in leaf sheaths, rooting from base and nodes, roots robust, fleshy. Leaves distichous, linear, rigid, succulent, apex truncate to acute, tridcuspidate, base clasping. Inflorescences arising from leaf axils, 2 to 3 flowered. Sepals lanceolate, laterals connate or free, apex obtuse. Petals elliptic lanceolate, asymmetrical, sub flacted, twisted forwards, apex obtuse. Lip tongue like, adaxial papillose, lateral lobes obtuse. Epichile bilobed, tapering, apex curled inwards, acumintae. Occasionally lobes are absent, apex truncate. Floral bracts deltoid, shorter than pedicellate ovary.

Flowers of this species can be quite variable in form and colour. Uncommon.



FLOWERING: APRIL

ALTITUDINAL RANGE: 4500-5300 FT.





Zeuxine Flava
(Wall. ex Lindl.)
Trimen

Terrestrial, rhizome stout, creeping, rooting at nodes. Leaves lanceolate, base tubular, withered when in bloom. Peduncle erect, covered in short white hairs. Up to 8 flowered. Sepals broadly ovate lanceolate, apexes subacute to sub obtuse, sparsely hispid on the adaxial surface, Dorsal concave. Petals broadly ovate lanceolate, conn. Lip T shaped, lobes roughly square, margins occasionally undulated, apex obtuse. Floral bracts lanceolate, hispid, longer than pedicellate ovary.

Rare. Very difficult to spot unless in flower.

FLOWERING: APRIL-MAY

ALTITUDINAL RANGE: 4500-5500 FT.

Zeuxine reflexa **King & Pantl.**

Terrestrial, rhizome creeping, rooting at nodes. Leaves lanceolate, base tubular, withered when in bloom. Inflorescence erect, peduncle hispid, up to 8 flowered. Lateral sepals ovate-lanceolate, apices sub-acute. Dorsal ovate-lanceolate, hoodlike, broader than laterals, apex obtuse. Sepals adaxially hispid. Petals ovate-lanceolate, clasping column, apex obtuse. Lip T shaped, 2 lobed, oblanceolate, apices obtuse. Floral bracts lanceolate, hispid, longer than pedicellate ovary.

Very rare. A single specimen was located that unfortunately could not be relocated in later years.



FLOWERING: **APRIL**

ALTITUDINAL RANGE: **5600 FT.**



About the author

Abu Hang Samuel is a first-year student of botany at St Anthony's College, Shillong, India. This work was carried out while he was a student at Ullens School, Kathmandu.

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The Park has been designed and structured to showcase and demonstrate simple and easily replicable farm technologies, techniques, and innovations that can improve the ecological and economic conditions of mountain communities in a sustainable way. It serves as a place to test, select, and demonstrate these solutions for adoption and replication and/or upscaling by visitors and partners. It also serves as a place for training and as a repository of faunal and floral resources.

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International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal
T +977 1 5275222 | E info@icimod.org | www.icimod.org