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Published by: Jomotsangkha Wildlife Sanctuary Department of Forests and Park Services Samdrup Jongkhar: Bhutan

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Design: Wang Arts, Tashi & Lekey Chaida

Printed: Wang Arts

ISBN: 978-99980-931-1-9

First published: 2020

Citation: Chaida, L. & Tashi. (2020). A Pictorial Record of Orchids of Jomotsangkha Wildlife Sanctuary. Jomotsangkha Wildlife Sanctuary, Department of Forests and Park Services

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Publication funded by: Bhutan for Life
Department of Forests & Park Services

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ACKNOWLEDGEMENT

The authors would like to thank and convey appreciation to every individual who were involved in publication of this pictorial record of orchids of Jomotsangkha Wildlife Sanctuary. Before all, we would like to thank Lobzang Dorji, the Director of Department of Forests and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan for allowing us to come up with this book and Mr. Ugyen Tshering, Park Manager for encouraging to come up with this book to validate the presence of orchids in the Sanctuary.

The authors are grateful to Dr. Dhan Bdr Gurung, Professor at the College of Natural Resources, Bhutan for helping us to identify species. We would like to extend our gratitude to Mr. Ugyen Chopel, Dzongkhag Beautification Officer of Samdrup Jongkhar Dzongkhag and Nima Gyeltshen Sr. Biodiversity Officer at National Biodiversity Centre for contributing orchid photos from the Sanctuary.

We would equally convey our sincere gratitude to all the individuals for providing orchid photographs. We sincerely thank BFL for providing funds for printing the booklet as part of communication materials.

FOREWORD

It gives me immense pleasure to introduce this publication “A Pictorial Record of ORCHIDS, Jomotsangkha Wildlife Sanctuary”. The Sanctuary recorded 111 species of orchid in between 2018 to 2020. It is important to assess and document biodiversity of the Sanctuary in order to undertake suitable management intervention.

This is the first pictorial record of orchids found in the Sanctuary and will serve as a useful document for the staff and other stakeholders. I am delighted to know that field staff have contributed photos for the publication. It is my sincere hope that this book will encourage the field staff to assess and record more species in future.

I am extremely glad to note that the Sanctuary is launching this book on the important occasion of World Rangers Day 2020. It is an opportunity to commemorate the hard work performed by frontline staff to protect rich biodiversity of our country. I take this opportunity to express my sincere appreciation to the authors and staff for your effort in coming up with this document.



Lobzang Dorji
DIRECTOR
Department of Forests and Park Services

INTRODUCTION

Orchids in Bhutan have been generally studied for a long time with publication such as *The Orchids of Bhutan* by Pearce & Cribb (2002), *An Illustrated Guide to the Orchids of Bhutan* by Gurung (2006), *The Field Guide to the Orchids of Bhutan* by Dorji (2008), Namgyel & Tenzin (2009), *A Century of New Orchid Records in Bhutan* by National Biodiversity Centre (2017), and *A Pictorial Book on Orchids of Sakteng Wildlife Sanctuary* by Wangdi (2017). However, detail documentations of orchid diversity in Jomotsangkha Wildlife Sanctuary have never been done.

This publication “*A Pictorial Record of Orchids of Jomotsangkha Wildlife Sanctuary*” is an attempt to document the orchid diversity in the Sanctuary. It is a first official record of orchids in the Sanctuary and it is expected to provide fast hand guide to orchid enthusiasts, foresters, researchers and students. All the photographs in the book were captured from their natural habitats in the Sanctuary. Located adjacent to the Indian state of Arunachal Pradesh, that the Sanctuary host a diverse species of orchids, and this Sanctuary is expected to host a good number of orchids beyond the current number.

So far, Bhutan has recorded 476 species of orchids (NBC, 2017). This book illustrates and describes 105 orchid species that are found in Jomotsangkha Wildlife Sanctuary belonging to 50 genera, of which five species have been recorded for the first time in the country. Details of habitat types and flowering periods along with color photographs are provided for each species. Furthermore, the Sanctuary hosts some threatened orchid species such as the *Paphiopedilum fairrie anum* (Lindley) Stein and newly discovered *Spathoglottis jetsunae* Gyeltshen, Tobgyel & Dalstron. The Sanctuary is located in subtropical forest with high humidity which provides excellent condition for the orchids to thrive. The purpose of the book is to maintain pictorial record of orchid diversity in the Sanctuary and guide towards conservation, environmental and economic benefits of orchids.

Acanthophippium striatum Lindley



Growing habit: Terrestrial
Forest type: Subtropical forest
Flowering time: April-July

Aerides multiflora Roxburgh



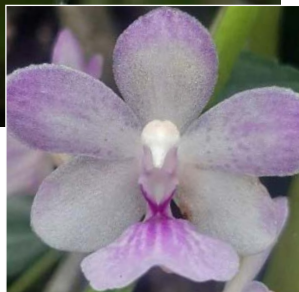
Growing habit: Epiphyte
Forest type: Subtropical forest
Flowering time: May-June

Aerides odorata Loureiro



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: March-June

Aerides rosea Lodd. ex Lindley & Paxton



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-June

Agrostophyllum callosum Reichenbach f.



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: March-July

Agrostophyllum planicaule (Wallich ex Lindley) Reichenbach f.



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-June

Anoectochilus cf. brevilabris Lindley

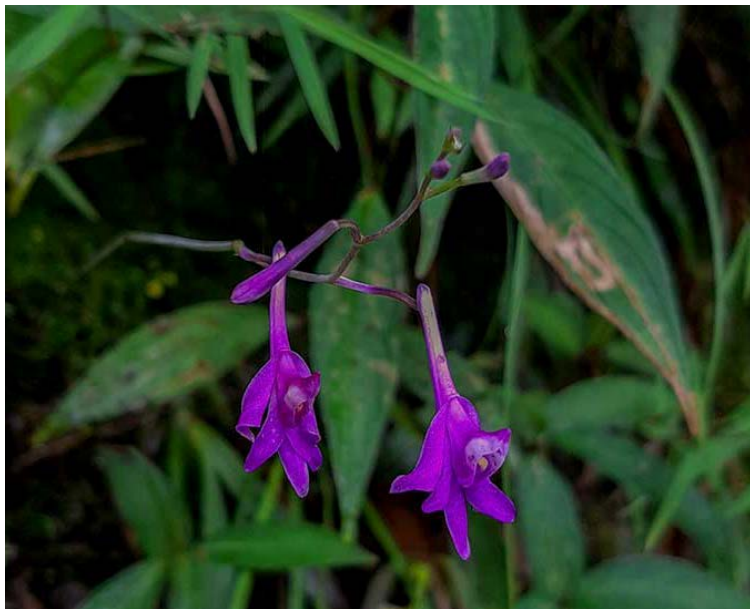


Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: October-December

Anthogonium gracile Wallich ex Lindley



Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: June-October

Arachnis cathcartii (Lindley) J.J. Sm



Growth habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: March-April

Arachnis clarkei (Rchb.f.) J.J. Sm



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: January-March

Arundina graminifolia (D. Don) Hochreutiner



Growing habit: Terrestrial
Forest type: Subtropical forest
Flowering time: January-November

Biermannia arunachalensis Rao

New record to Bhutan



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-July

Bulbophyllum caudatum Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-August

Note: Prior authors have considered *Bulbophyllum caudatum* (Lindley) as a synonym of *Bulbophyllum sterile* (Lam.) by Pearce and Cribb (2002), Gurung (2006) and Dalstorm.

Bulbophyllum cylindraceum Wallich ex Lindley



Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: October-January

Bulbophyllum guttulatum (Hooker f.) N.P.Balakrishnan



Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: August-September

Bulbophyllum gymnopus Hooker f.



Growing habit: Epiphyte

Forest type: Broadleaved forest

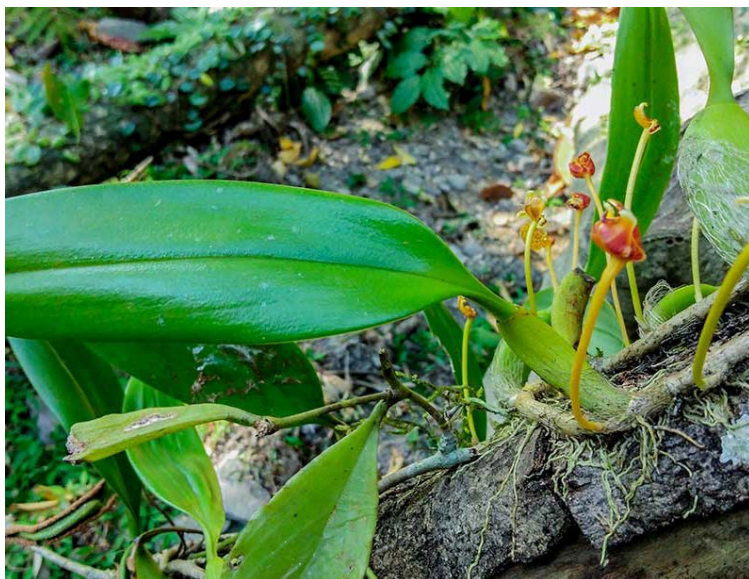
Flowering time: November-January

Bulbophyllum interpositum J.J. Verm., Schuit & de Vogel



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-July

Bulbophyllum pteroglossum Schltr.



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: January-March

Bulbophyllum reptans (Lindley) Lindly ex Wallich



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: October-May

Bulbophyllum roseopictum J.J.Verm., Schuit. & de Vogel



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: October-December

Calanthe plantaginea Lindley



Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: January-June

Calanthe sylvatica (Thouars) Lindley



Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: August-September

Callostylis rigida Blume



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: March-April

Ceratostylis himalaica Hooker f.



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-June

Coelogyne barbata Lindley ex Griffith



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: August-February

Coelogyne fimbriata Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: June-November

Coelogyne flaccida Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: March-May

Coelogyne nitida (Wallich ex D. Don) Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: February-June

Coelogyne ovalis Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-July

Coelogyne prolifera Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: March-July

Coleogyne rigida E.C. Parish & Rchb.f.

New Record to Bhutan



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-August



Coelogyne schultesii S.K. Jain & S. Das



Growing habit: Epiphyte or lithophyte

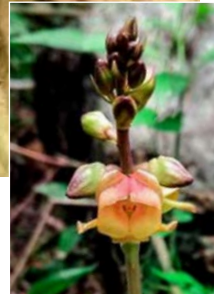
Forest type: Broadleaved forest

Flowering time: March-June

Crepidium josephianum (Rchb.f.) Marg



Growing habit: Terrestrial
Forest type: Subtropical forest
Flowering time: April-May



Cryptochilus lutea Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-August

Crytosia lindleyana Hook f. & Thomson



Growing habit: Mycotropical terrestrial

Forest type: Broadleaved forest

Flowering time: June-July

Cymbidium aloifolium (Linnaeus) Swartz



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-July

Cymbidium cyperifolium Wallich ex Lindley



Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: November-December

Cymbidium erythraeum Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: September-December

Cymbidium elegans Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: September-December

Dendrobium spetella Rchb f.



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-September

Dendrobium aphyllum (Roxburgh) C.E.C. Fischer



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: March-June

Dendrobium chrysanthum Wallich ex Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: July-October

Dendrobium densiflorum Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: March-July

Dendrobium denudans D. Don

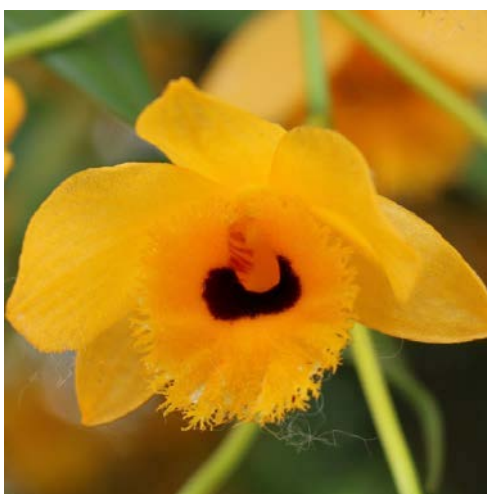


Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: September-October

Dendrobium fimbriatum J.D. Hooker



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-May

Dendrobium fugax Reichenbach f.



Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: May-August

Dendrobium hookerianum Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: July-September

Dendrobium jenkinsii Wallich ex Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-June

Dendrobium longicornu Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: August-December

Dendrobium moschatum (Banks) Swartz



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-August

Dendrobium nobile Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: March-June

Dendrobium porphyrochilum Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-July

Dendrobium transparens Wallich ex Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-May

Dendrolirium ferrugineum (Lindley) A.N. Rao



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-May

Dendrolirium lasiopetalum (Willdenow) S.C.Chen & J.J. Wood



Growth habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: February-April

Dienia ophrydis (J. Koenig) Seidenfaden



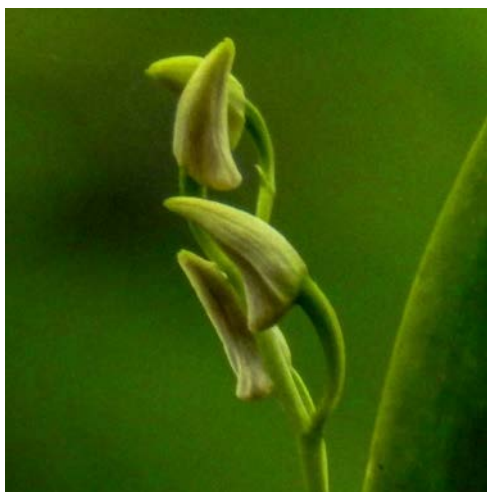
Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: May-October

Epipogium roseum (D. Don) Lindley



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: May-July

Eria clausa King & Pantling



Growing habit: Epiphyte & lithophyte

Forest type: Broadleaved forest

Flowering time: February-May

Eria coronaria (Lindley) Reichenbach f.



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: October-January

Eria javanica (Swartz) Blume

New record to Bhutan



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-June

Eulophia zollingeri (Reichenbach f.) J.J. Smith



Growing habit: Terrestrial
Forest type: Subtropical forest
Flowering time: April-June

Gastrochilus acutifolius (Lindley) Kuntze



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: October-December

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



Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: March-May

Gastrochilus inconspicuus (Hooker f.) Kuntze



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: June-July

Gastrochilus obliquus (Lindley) Kuntze



Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: March-May

Geodorum densiflorum (Lamarck) Schlechter



Growing habit: Terrestrial

Forest type: Sandy river sides in Subtropical forest

Flowering time: April-July

Goodyera foliosa (Lindley) Benth. ex C.B. Clarke



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: November-January

Goodyera procera (Ker Gawler) J.D. Hooker



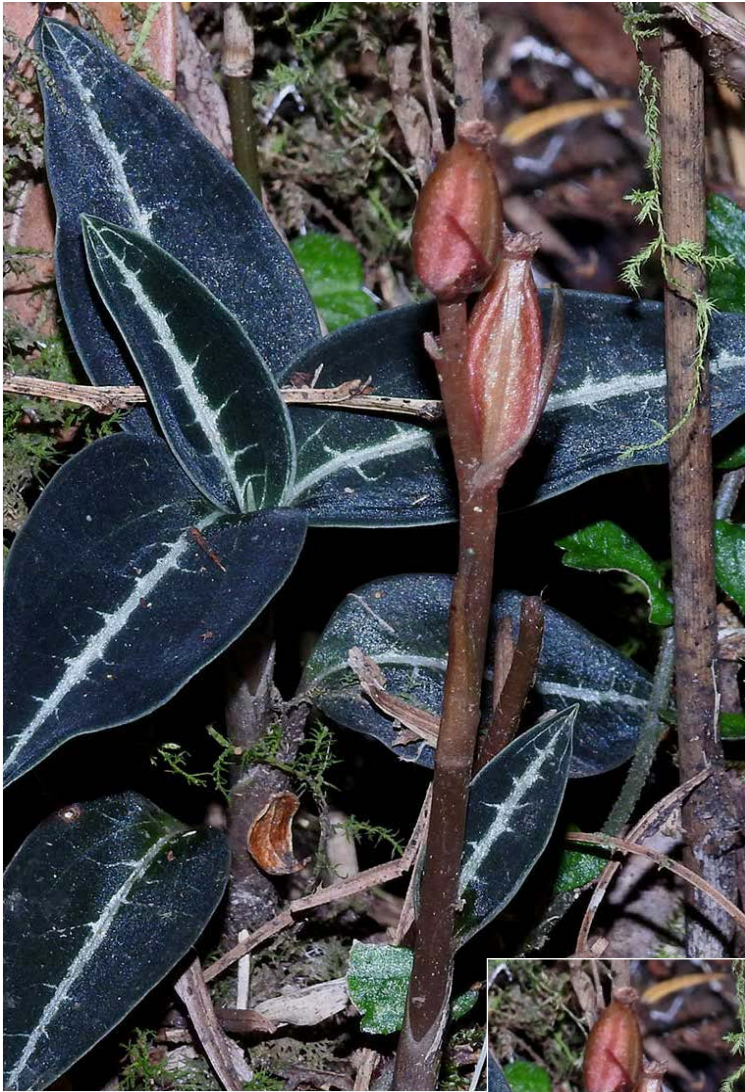
Growing habit: Terrestrial
Forest type: Moist Broadleaved forest
Flowering time: February-May

Goodyera robusta Hooker f.



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: August-November

Goodyera vittata (Lindley) Bentham ex Hooker f.



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: July-September

Liparis bootanensis Griffith



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: June-September

Liparis plantaginea Lindley



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: April-June

Liparis viridiflora (Blume) Lindley



Growing habit: Epiphyte

Forest type: Broadleaved forest

Flowering time: October–November

Luisia zeylanica Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-May

Micropera mannii (Hooker f.) T. Tang & ET Wang

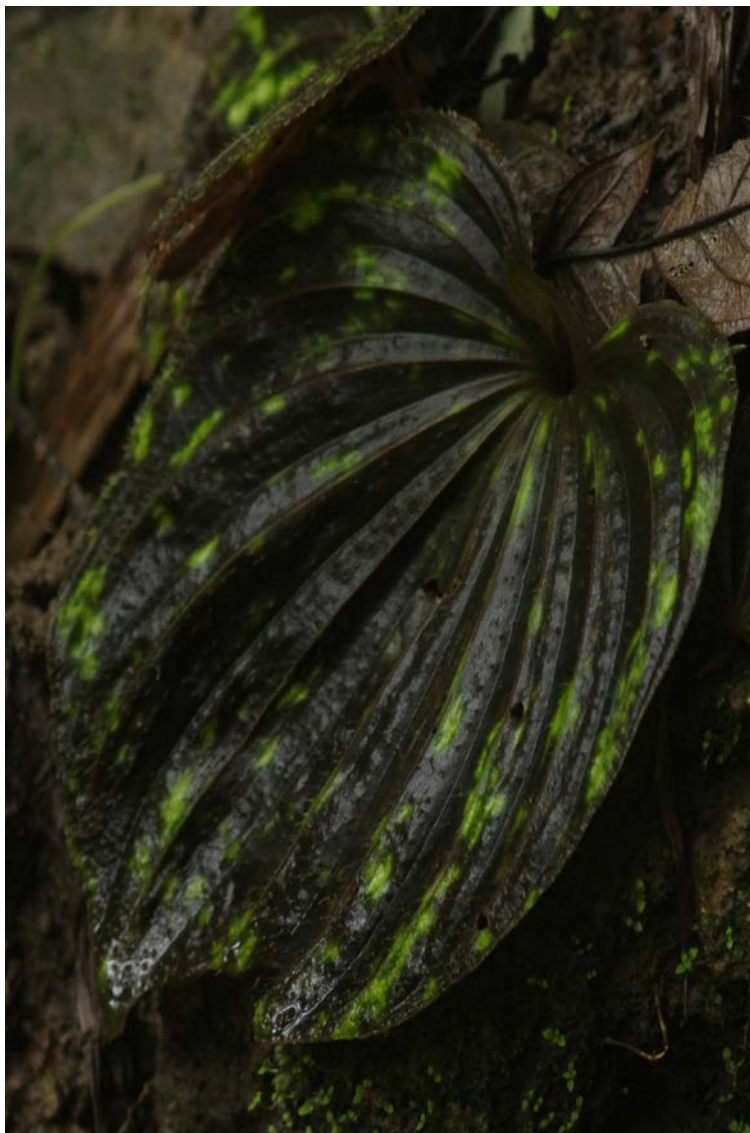


Growing habit: Perennial terrestrial, epiphyte or lithophyte sometimes mycotrophic.

Forest type: Broadleaved forest

Flowering time: May-July

Nervilia plicata (Andrews) Schlechter



Growing habitat: Terrestrial
Forest type: Subtropical valleys
Flowering time: April-May

Oberonia falcata King & Pantling



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: July-October

Odontochilus poilanei (Gagnepain) Ormerod

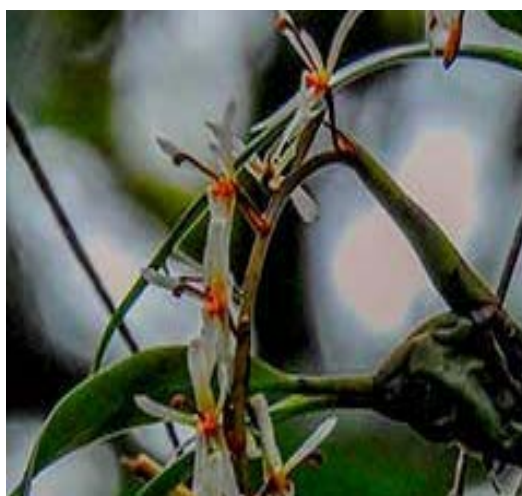


Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: August-September

Otochilus fuscus Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: November-January

Otochilus lancilabius Seidenfaden



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: October-April

Paphiopedilum fairrieianum (Lindley) Stein



Growth habit: Terrestrial on limestone outcrops

Forest type: Broadleaved forest

Flowering time: October-December.

Papilionanthe teres (Roxburgh) Schltr.



Growing habit: Epiphyte
Forest type: Subtropical forest
Flowering time: May-June

Phaius flavus (Blume) Lindley



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: January-June

Phaius mishmensis (Lindley & Paxton) H.G. Reichenbach



Growing habit: Terrestrial

Forest type: Broadleaved forest

Flowering time: September-January

Phaius tankervilleae (Banks) Blume



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: April-July



Phalaenopsis mannii Rchb. f.



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-June

Pholidota imbricata J.D. Hooker

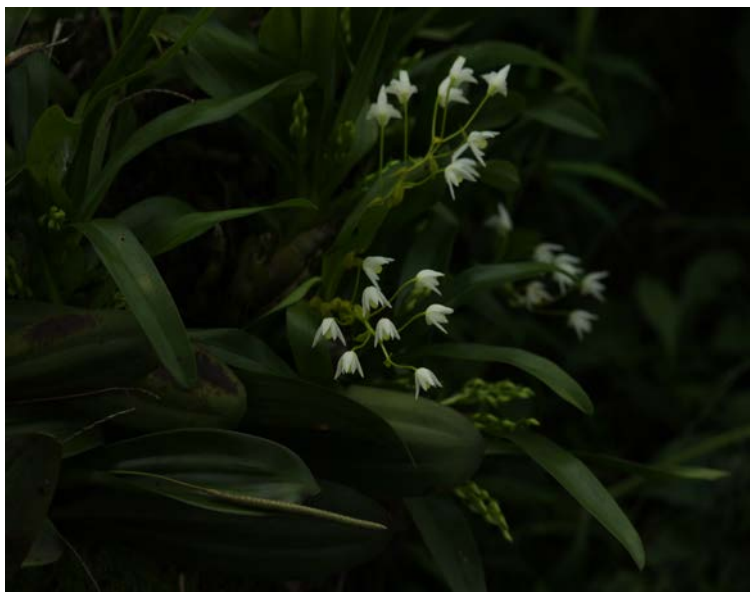


Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: March-July

Pinalia acervata (Lindley) Kuntze



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-August

Pinalia amica (Rchb.f.) Kuntze



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: March-May

Pinalia stricta (Lindley) Kuntze



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: November-April

Pleione humilis (J.E. Smith) D. Don



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: January-March

Pleione praecox (J.E. Smith) D. Don



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

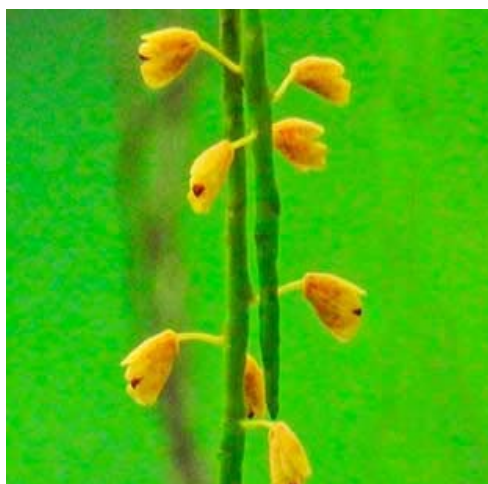
Flowering time: May-July

Porpax fibuliformis (King & Pantling) King & Pantling New record to Bhutan



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-June

Pteroceras teres (Blume) Holttum



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: May-July

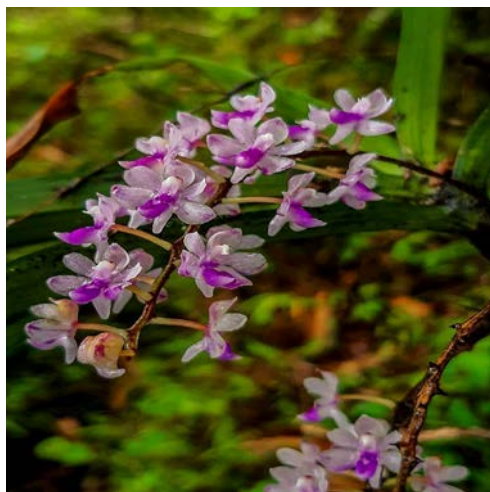
Rhynchostylis retusa (Linnaeus) Blume



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-July

Sarcoglyphis smithiana (Kerr) Seidenf.

New record to Bhutan



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-May

Smitinandia micrantha (Lindley) Holttum



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-June

Spathoglottis jetsunae Gyeltshen, Tobgyel & Dalstrom



Growing habit: Terrestrial with limestone outcrop

Forest type: Broadleaf forest

Flowering time: May-July

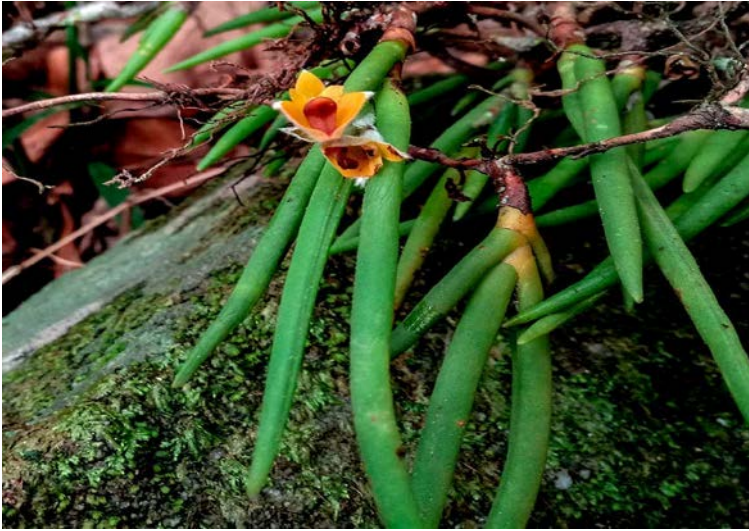


Stereochilus hirtus Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: August-October

Strongyleria pannea (Lindley) Schuit., Y.P. Ng & H.A. Pedersen



Growth habit: Epiphyte or lithophyte

Forest type: Warm broadleaved & Subtropical forest.

Flowering time: May-July

Thelasis pygmaea (Griffith) Lindley



Growing habit: Terrestrial
Forest type: Broadleaved forest
Flowering time: May-July

Thunia alba var. *bracteata* (Roxburgh) N. Pearce and P. J. Cribb



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: July-August

Vanda alpina (Lindley) Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: April-July

Vanda bicolor Griffith



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: February-May

Vanda cristata Wallich ex Lindley



Growing habit: Epiphyte
Forest type: Broadleaved forest
Flowering time: April-June

Vanda griffithii Lindley



Growing habit: Epiphyte or lithophyte

Forest type: Broadleaved forest

Flowering time: March-June

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