

## A contribution to the Orchid flora of Kurung Kumey District, Arunachal Pradesh, India

**S. S. Dash**

Botanical Survey of India, CGO Complex, Sector 1, Salt Lake, Kolkata 700 064, West Bengal, India

*E-mail:* ssdash2002@yahoo.co.in

Revised 06.06.2012; Accepted 09.06.2012

### Abstract

Floristic study in Kurung Kumey district of Arunachal Pradesh was done during 2008 – 2011. The family Orchidaceae with 72 species is the second largest family in the district. The present communication, enumerates all the orchid species reported from Kurung Kumey district with its locality of collection, flowering time, habitat and its distribution in other North-East states. The occurrence of *Chusua chrysea* (W.W.Smith) Hunt has been recorded for first time from India, *Calanthe keshabii* Lucksom recorded first time for Arunachal Pradesh; while authentic collection of *Pleione scopulorum* W.W.Smith was done after a gap of 80 years.

**Key words:** Orchid diversity, Arunachal Pradesh, Kurung Kumey district.

### INTRODUCTION

The family Orchidaceae with 779 genera and over 22,500 species is the second largest family of flowering plants of world next to Compositae (Mabberley, 2008). Many of the species of this family are best known for its commercial and ornamental value. The demand of the orchid cut flowers is estimated to have more than 50 million US \$ trade throughout the world. Many ornamental genera such as *Cymbidium*, *Dendrobium*, *Aerides*, *Renanthera*, *Paphiopedilum*, *Calanthe*, *Vanda* are having the best known commercial hybrids with great demand in world flower trade. In India the family is represented by 184 genera and 1300 species (Singh & Chauhan 1999); out of which North-East India contributes alone 89 % of total genera and 69 % of total species. In North-East India, Arunachal Pradesh has the greatest diversity of Orchids. The state has recorded 141 genera and 568 species (Rao 2007). Floristic study in Kurung Kumey district of Arunachal Pradesh, documented 72 species of orchid, which is the second largest family in the district. The district is one of the most inaccessible regions of our country. The present study is the outcome of floristic study undertaken in the district during 2008 – 2011. This is the first comprehensive floristic work in the district and no such work has been reported before. In the present communication, the orchid species which were collected/ reported from the district are enumerated with the locality of collection, flowering time, habitat and its distribution in North-East India other than Arunachal Pradesh. It is hoped that, this information will help foresters, horticulturist or orchid lovers and the district authority for study of orchid distribution and bioresource management in Arunachal Pradesh and for preserving the indigenous germplasm of the state.

### Geographic limit and Climate

Kurung Kumey district of Arunachal Pradesh is lying between 92° 20' to 94° 15' East longitude and 27° 45' to 28° 22' North latitudes with an area of 6340 sq km. The district is bounded by Mc-Mohan line, in the north, East Kameng District in the west, Upper Subansiri District on the east and Lower Subansiri District and Papum Pare district of the Arunachal Pradesh in the south. The name of the district is based on two rivers Kurung and Kumey flows through the district and

is the main tributaries of river Subansiri. All the boundaries of the district are made up by high ridges of mountains and rivers, which run southward from the main Himalayan ranges. Muph-la and Jammu-la pass in the Sarlee circle and Chimmung-la, Bome-la and Lutin-la pass of Huri-Damin circle connect the district with China in the north-eastern corner of the district in between 4800 – 5600 m. The highest peak of the district is *Tadikiri* situated near Muphla pass with an altitude 6540 m.

The climate of the district is monsoonal and divided into summer (from mid-March to mid-May); monsoon (from mid-May to mid-October); and a prolonged winter from mid-October to mid-March. Pre-monsoon thunders are common in the month of April and the area is also influenced by the retreat monsoon in last quarter of winter. Annual rainfall is about 934.88 cm and relative humidity remains high thorough out the year. Prolonged winter is observed in the high mountainous regions. The average mean maximum and minimum temperature is 33° C and 5° C. Generally November and April are the most pleasant months in the district, December and January are the coldest months whereas July and August are wettest months.

### General Vegetation of the District

The unique phytogeographical position, varied topography and great range of altitude, makes the district the one of the richest and highly phyto-diversed regions of Arunachal Pradesh. Due to its remoteness and inaccessibility, the vegetation in the interior patches is still pristine and virgin. All the four major types, tropical, subtropical, temperate and alpine vegetations are found in the district. The tropical vegetation is seen along the Kumey river of Tali and Huri-Damin circle, the foot hill area boarding to lower Subansiri district, and up to an elevation of 900 m. The area come under this type can be characterized by heavy rainfall during monsoon and post-monsoon periods. The most dominant trees in this zone are *Dipeterocarpus retusus* and *Terminalia myriocarpa*. The main associated tree species are belongs to the genera *Bischofia*, *Callicarpa*, *Castanopsis*, *Cinnamomum*, *Dysoxylum* *Elaeocarpus*, *Quercus* etc. The combination of close canopy and dark-humid environment forms an ideal habitat for luxuriant growth of many orchid species in this zone. Many of the epiphytic orchids such as *Aerides multiflora*, *Bulbophyllum gymnopus*, *Cleisostoma subulatum*, *Coelogyne longipes*, *Cymbidium aloifolium*, *Dendrobium chrysanthum*, *Dendrobium densiflorum*, *Dendrobium fimbriatum*, *Dendrobium gibsonii*, *Dendrobium hookerianum*, *Papilionanthe teres*, *Vanda cristata*, etc are in abundance in this type of forest. The lower vegetation supports the orchid species like *Bulbophyllum odoratissimum*, *Bulbophyllum protractum*, *Bulbophyllum reptans*, and many species of *Dendrobium*. The shady thick humus forest floor of this zone supports the growth of orchids like *Anthogonium gracile*, *Calanthe biloba*, *Calanthe puberula*, *Galeola lindleyana*, *Galeola falconeri* etc.; while the shady river banks, mountain slopes are rich with orchids like *Arundina graminifolia*, *Goodyera foliosa*, *Goodyera procera*, *Spiranthes sinensis* etc.

**The subtropical forest** in the district of Kurung Kumey is evergreen and dense, with uniform species composition and no single species found exclusively dominated. The most significant feature of this zone is the three layered canopy structure. This type of forest is predominating throughout the district with particular reference to Palin and its surroundings, region along the Panyu river beyond Nyapin and Chambang; area adjoining to Koloriang up to Milli, region along the Lee to Damin track route; Dodo to Chambang, Gyapin, the region along the Kurung river in Yangtey, Sangram and Koloriang circle, and area beyond Nuonong of Nyapin circle up to Koloriang. The common trees in the top canopy are the species of *Acer*, *Actinodaphne*, *Cinnamomum*, *Elaeocarpus*, *Engelhardtia*, *Litsea*, *Phoebe* etc, while trees of middle storey consisting of *Archidendron*, *Desmos*, *Celastrus*, *Exbucklandia*, *Glochidion*, *Heteropanax*, *Ostodes*, *Saurauia*, *Schima*, etc.

Most common epiphytic orchids of sub-tropical forests are species of *Bulbophyllum reptans*, *Epiglenium amplum*, *Eria paniculata*, *Eria pannea*, *Eria pusilla*, *Eria spicata*, *Coelogyne griffithii*, *Coelogyne nitida*, *Coelogyne prolifera*, *Cryptochilus lutea*, *Dendrobium densiflorum*, *Dendrobium chrysanthum*, *Neogyna gardneriana*, *Oberonia emarginata*, *Oberonia jenkinsiana*, *Pholidota imbricata*, *Pholidota undulata*, *Schoenorchis gemmata*, *Thelasis pygmaea* etc. Many of the mountain slopes and river banks are with orchids like *Goodyera procera*, *Anthogonium gracile*, *Acrochaene punctata*, *Agrostophyllum callosum*, *Bulbophyllum cauliflorum* etc.

**Temperate Vegetation:** This is found around the upper slopes above the valley of Kurung and Kumei river, track routes from Milli to Vadse, Sarlee to Khili; the forests beyond Phule; beyond the Ruba forest of Huri-Damin circle, area boarding to the Pipsorang circle and upper Subansiri district. Depending on the altitudinal variation the floral composition of temperate forest differs. The broad leaved evergreen forest occupies the lower temperate zone. The naturally occurring trees are the species of *Alnus*, *Betula*, *Eurya*, *Lithocarpus*, *Magnolia*, *Michelia*, *Prunus*, etc. The common orchids include *Bulbophyllum reptans*, *Calanthe keshabii*, *Coelogyne fuscescens*, *Cymbidium lancifolium*, *Dendrobium amoenum*, *Dendrobium gibsonii*, *Dendrobium sulcatum*, *Galeola lindleyana*, *Pholidota articulate*, *Platanthera bakeriana*, *Platanthera leptocaulon*, *Pleione praecox*, *Rhynchostylis retusa*, and *Spiranthes sinensis*.

**Subalpine and Alpine Vegetation:** This type of vegetation is restricted in the higher elevation of the Sarlee, and Huri-Damin circle. This zone is characterized by dominance of coniferous trees in the top canopy and the *Rhododendron* sharing the middle canopy with other broad leaved trees. The common trees are the species of *Acer*, *Betula*, *Magnolia*, *Pyrus*, *Taxus* and *Tsuga*. As one ascent along higher altitude the epiphytic orchids are slowly replaced by ground orchids. The main orchids found in this region are *Chusua chrysea*, *Listera tenuis*, *Platanthera leptocaulon*, *Platanthera bakeriana*, *Pleione scopulorum* etc.

## MATERIALS AND METHODS

Several plant collection tours were undertaken to study the floristic diversity of Kurung-Kumei district during 2008 – 2011. During these tours, live as well as dried specimens of orchids were collected from different altitudinal zones. The live specimens brought under cultivation in the experimental garden of Botanical Survey of India, APRC at Itanagar. While all the dried plant specimens were processed, identified, deposited in herbarium of Botanical Survey of India, Arunachal Pradesh Regional Centre (ARUN) for future references.

## OBSERVATIONS AND DISCUSSION

The Orchidaceae is the second largest family in Kurung Kumei district of Arunachal Pradesh next to Leguminosae. During the study, altogether 1391 species, belonging to 580 genera and 152 families were collected from the district. The monocot to dicot family and genera ratio is 1:5 and species ratio is 1:3.6 respectively. Altogether 72 species of orchid were reported from Kurung Kumei district, of which 51 species were epiphytes, 19 species were terrestrial and two species were saprophytic. Seven species were monopodial while 63 species were sympodial. In context to the vertical distribution, maximum diversity of orchid was found in sub-tropical forests with 35 species followed by 24 species in tropical forests. Seven species were found in temperate forests. Out of total 15 species of alpine orchids occur in Arunachal Pradesh, 6 species were found in Kurung Kumei district.

**Table 2.** Orchid species occur in Kurung Kumey district of Arunachal Pradesh

Plant names; Exsiccatae	Place of collection	Flowering & Fruiting	Habit	Distribution in NE India other than Arunachal Pradesh
<i>Acrochaene punctata</i> Lindley; <i>S.S. Dash 31594</i>	Nyapin vicinity, Begi to Amjee	October – January	E	Sikkim, Nagaland
<i>Aerides multiflora</i> Roxburgh; <i>A.R.K. Sastry 44801</i>	Along Khru river, Palin	May – September	E	Throug hout NE
<i>Agrostophyllum callosum</i> Reichenbach <i>f.; A.R.K. Sastry 40898</i>	Begi to Amjee	May – September	E	Sikkim, Meghalaya, Nagaland
<i>Anthogonium gracile</i> Wallich ex Lindley; <i>S.S. Dash 32777</i>	Sarlee	June – October	T	Throug hout except Tripura
<i>Arundina graminifolia</i> (D. Don) Hochb; <i>S.S. Dash 32564, 32408, 32634</i>	Sagram to Panyu river, Nyapin, Buyang to Ratey, Palin	March – October	T	Throug hout NE
<i>Bulbophyllum cauliflorum</i> Hooker <i>f.</i> ; <i>S.S. Dash 32942</i>	Palin to Amjee	June – November	E	Sikkim, Megahlaya, Nagaland
<i>Bulbophyllum gymnopus</i> Hooker <i>f.</i> ; <i>A.R.K. Sastry 40984</i>	Begi	November – March	E	Sikkim
<i>Bulbophyllum odoratissimum</i> (J.E. Smith) Lindley; <i>A.R.K. Sastry 45477</i>	Amjee	May – September	E	NE except Assam
<i>Bulbophyllum protractum</i> Hooker <i>f.</i> ; <i>S.S. Dash 31595, A.R.K. Sastry 45230</i>	Nyapin, Begi to Amjee	June – August	E	Sikkim
<i>Bulbophyllum reptans</i> (Lindley) Lindley; <i>A.R.K. Sastry 45707</i>	Nyapin	October – January	E	Meghalaya
<i>Calanthe biloba</i> Lindley; <i>A.R.K. Sastry</i> <i>40557</i>	Amjee	September – October	T	Sikkim, Nagaland, Manipur
<i>Calanthe densiflora</i> Lindley ; <i>A.R.K.</i> <i>Sastry 45207</i>	Begi to Amjee	September – February	T	Except Mizoram, Tripura
<i>Calanthe keshabii</i> Lucksom; <i>S.S. Dash</i> & <i>A.A. Mao 23136</i>	Parlo to Sarlee	July – August	T	Sikkim
<i>Calanthe puberula</i> Lindley; <i>A.R.K. Sastry 42188</i>	Begi to Amjee	July – October	T	Sikkim, Nagaland, Meghalaya
<i>Chusua chrysea</i> (W.W. Smith) Hunt; <i>S.S. Dash 31817, S.S. Dash &amp; A.A. Mao</i> <i>23269</i>	Vadse hills	July – August	T	China
<i>Cleisostoma subulatum</i> Blume; <i>S.S.</i> <i>Dash 32573</i>	Near Milli,	May – August	E	NE except Manipur
<i>Coelogyne fuscescens</i> Lindley var. <i>fuscescens</i> ; <i>S.S. Dash 32947, 32180</i>	Kurung river to Chambang, Near Milli	September – January	T	NE except Assam
<i>Coelogyne griffithii</i> Hooker <i>f.</i> ; <i>S.S. Dash</i> <i>32941</i>	Kurung river to Chambang	April – August	E	Nagaland, Mizoram, Manipur
<i>Coelogyne longipes</i> Lindley; <i>S.S. Dash</i> <i>32941 a</i>	Palin to Amjee	April – July	E	Sikkim, Nagaland, Meghalaya, Mizoram
<i>Coelogyne nitida</i> (Wallich ex D. Don) Lindl.; <i>S.S. Dash &amp; A.A. Mao 23154</i>	Parlo	July	E	NE except Tripura
<i>Coelogyne prolifera</i> Lindley; <i>S.S. Dash</i> <i>35234</i>	Near Purchi village, Amjee	Aug – September	E	NE except Assam, Tripura

Plant names; Exsiccatae	Place of collection	Flowering & Fruiting	Habit	Distribution in NE India other than Arunachal Pradesh
<i>Coelogyne longipes</i> Lindley; S.S. Dash 32941 a	Palin to Amjee	April – July	E	Sikkim, Nagaland, Meghalaya, Mizoram
<i>Coelogyne nitida</i> (Wallich ex D. Don) Lindl.; S.S. Dash & A.A. Mao 23154	Parlo	July	E	NE except Tripura
<i>Coelogyne prolifera</i> Lindley; S.S. Dash 35234	Near Purchi village, Amjee	Aug – September	E	NE except Assam, Tripura
<i>Cryptochilus lutea</i> Lindley; A.R.K. Sastry 40801	New Sayata	May – August	E	Sikkim, Nagaland, Manipur
<i>Cymbidium aloifolium</i> (Linnaeus) Swartz; S.S. Dash 32437	Nyapin to Gyamar	February – May	E,	Throughout NE
<i>Cymbidium lancifolium</i> D. Don; A.R.K. Sastry 40788	Sayata to Palin	September – November	E	NE except Assam, Tripura
<i>Dendrobium amoenum</i> Wallich ex Lindley; A.R.K. Sastry 45437	Palin to Old Sayata	May – July	E	Sikkim
<i>Dendrobium chrysanthum</i> Lindley; S.S. Dash 31034, 31707	Yangtey vicinity, Milli, Begi to Amjee,	July – February	E	NE except Tripura
<i>Dendrobium densiflorum</i> Wallich ex Lindley; A.R.K. Sastry 42175	Begi to Amjee,	April – July	E	NE except Tripura
<i>Dendrobium denudans</i> D. Don; S.S. Dash 31593a	Palin	April – July	E	Sikkim, Nagaland, Mizoram
<i>Dendrobium devonianum</i> Paxton; A.R.K. Sastry 45471	Begi to Amjee,	March – June	E	NE except Assam, Sikkim, Tripura
<i>Dendrobium farmeri</i> Paxton; A.R.K. Sastry 45265	Palin river bank	April – July	E	Sikkim, Nagaland, Manipur
<i>Dendrobium fimbriatum</i> Hooker f.; S.S. Dash 31593	Nyapin	April – July	E	NE except Tripura
<i>Dendrobium gibsonii</i> Lindley; S.S. Dash 31208	Nyapin to Seppa road,;	July – Aug	E	NE except Assam, Tripura
<i>Dendrobium hookerianum</i> Lindley; S.S. Dash 31338	Miri to Yangtey	August – November	E or T	NE except Assam, Tripura
<i>Dendrobium lituiflorum</i> Lindley; S.S. Dash 32911	Palin	September – November	E	NE except Sikkim, Meghalaya, Tripura
<i>Dendrobium longicomu</i> Lindley; A.R.K. Sastry 40779	Sayata to Paji	September – November	E	NE except Assam, Tripura
<i>Dendrobium nobile</i> Lindley; S.S. Dash 31205	Nyapin to Lumba	April – June	E	NE except Tripura
<i>Dendrobium porphyrochilum</i> Lindley; A.R.K. Sastry 45435	Palin to Old Nyapin	April – July	E	NE except Assam, Tripura
<i>Dendrobium sulcatum</i> Lindley; S.S. Dash 31708	On way to Milli	June – August	E	NE except Tripura
<i>Epigenium amplum</i> (Lindley) Summerhayes; S.S. Dash 31594	Nyapin vicinity	September – November	E	NE except Assam, Tripura
<i>Eria paniculata</i> Lindley; S.S. Dash 31596	Nyapin vicinity	December – March	E	NE except Tripura

Plant names; Exsiccatae	Place of collection	Flowering & Fruiting	Habit	Distribution in NE India other than Arunachal Pradesh
<i>Epigenium amplum</i> (Lindley) Summerhayes; <i>S.S. Dash</i> 31594	Nyapin vicinity	September – November	E	NE except Assam, Tripura
<i>Eria paniculata</i> Lindley; <i>S.S. Dash</i> 31596	Nyapin vicinity	December – March	E	NE except Tripura
<i>Eria pannea</i> Lindley; <i>A.R.K. Sastry</i> 45352	Palin	May – July	E	NE except Assam, Tripura
<i>Eria pusilla</i> (Griffith) Lindley; <i>A.R.K. Sastry</i> 45553	Amjee	March – June	E	Meghalaya
<i>Eria spicata</i> (D. Don) Handel-Mazzetti; <i>A.R.K. Sastry</i> 40809	Paji to Nyapin	August – October	E	NE except Tripura
<i>Eria stricta</i> Lindley; <i>A.R.K. Sastry</i> 45723	Paji to Nyapin	December – April	E	Sikkim, Nagaland, Meghalaya
<i>Galeola falconeri</i> Hooker f.; <i>S.S. Dash</i> 31712	On way to Milli	July – November	Saprophytic,	NE except Assam, Tripura
<i>Galeola Lindlana</i> (Hooker f. & Thomson) Reichenbach f.; <i>A.R.K. Sastry</i> 55157	Begi to Amjee	August – November	Saprophytic,	NE except Assam, Tripura
<i>Goodyera foliosa</i> (Lindley) Bentham ex C.B. Clarke; <i>S.S. Dash</i> 32751	On way to Milli	July – November	T	NE except Assam, Tripura
<i>Goodyera procera</i> (Wallich ex Ker Gawler) Hooker; <i>S.S. Dash</i> 32999, 32994	Kurung river to Chambang, .	February – April	T	Throughout NE
<i>Liparis bootanensis</i> Griffith; <i>A.R.K. Sastry</i> 40816	Nyapin	July – September	E	NE except Assam, Tripura
<i>Liparis caespitosa</i> (Lamarck) Lindley; <i>A.R.K. Sastry</i> 42191	Nyapin	July – October	E	NE except Assam, Tripura
<i>Liparis mannii</i> Reichenbach f.; <i>A.R.K. Sastry</i> 45716	Amjee	November – January	E	Sikkim, Assam, Meghalaya
<i>Liparis stricklandiana</i> Reichenbach f. ; <i>A.R.K. Sastry</i> 40910	Nyapin to Paji	October – December	E or T	Sikkim, Nagaland,
<i>Listera tenuis</i> Lindley; <i>S.S. Dash</i> 31836	Vadse hills	July – September	T	Sikkim
<i>Neogyna gardneriana</i> (Lindley) Reichenbach f. ex Pfitzer; <i>S.S. Dash</i> 32687	Buyang-Ratey-Sarlee	June – September	E	NE except Assam, Tripura
<i>Oberonia emarginata</i> King & Pantling; <i>A.R.K. Sastry</i> 55155	Palin	September – November	E	Sikkim, Nagaland,
<i>Oberonia jenkinsiana</i> Griffith ex Lindley; <i>S.S. Dash</i> 35148	Amjee	August – October	E	Sikkim, Meghalaya
<i>Papilionanthe teres</i> (Roxburgh) Schltr. ; in cultivation.	Parlo	May	E	Throughout NE
<i>Phaius tankervilleae</i> (L'Herit.) Blume; <i>A.R.K. Sastry</i> 45538	Palin to Old Nyapin	April – June	T,	NE except Assam
<i>Pholidota articulata</i> Lindley; <i>S.S. Dash</i> 32965, 31215	Kurung river to Chambang, Nyapin to Seppa road	August – October	E	Throughout NE
<i>Pholidota imbricata</i> Hooker; <i>S.S. Dash</i> 32991, 32524	Dado to Chambang, Sangram to Panyu river	May – August	E	Throughout NE
<i>Pholidota undulata</i> Lindley; <i>S.S. Dash</i> 32524	Amjee	November – January	E	Assam

Plant names; Exsiccatae	Place of collection	Flowering & Fruiting	Habit	Distribution in NE India other than Arunachal Pradesh
<i>Pholidota imbricata</i> Hooker; S.S. Dash 32991, 32524	Dado to Chambang, Sangram to Panyu river	May – August	E	Throug hout NE
<i>Pholidota undulata</i> Lindley; S.S. Dash 32524	Amjee	November – January	E	Assam
<i>Phreatia elegans</i> Lindley; A.R.K. Sastry 45600	Palin	July – September	E	Sikkim, Nagaland, Meghalaya
<i>Platanthera bakeriana</i> (King & Prantling) F. Kranzlin; S.S. Dash & A.A. Mao 31863	Vadse hills	July – August	T	Sikkim
<i>Platanthera leptocaulon</i> (Hooker f.) Soo; S.S. Dash & A.A. Mao 23299	Vadse hills	July – August	T	Sikkim
<i>Platanthera</i> spp.; S.S. Dash & A.A. Mao 23300	Vadse hills	July – August	T	Sikkim
<i>Pleione praecox</i> (J.E. Smith) D. Don; A.R.K. Sastry; 40800	Sayata to Paji	July - Sept	E	NE except Assam, Tripura
<i>Pleione scopulorum</i> W.W. Smith; S.S. Dash 31801	Vadse hills	July – September	T	China
<i>Rhynchostylis retusa</i> (Linnaeus) Blume; S.S. Dash 32576	Near Sangram	April – July	E	Throug hout NE
<i>Schoenorchis gemmate</i> (Lindley) J.J. Smith; S.S. Dash 31704	Sarlee to Parlo	June – August	E	NE except Assam, Tripura
<i>Spiranthes sinensis</i> (Persoon) Ames; S.S. Dash 31241, 31247	Koloriang, Shiva to Lee	April – June	T	NE except Assam, Tripura
<i>Thelasis pygmaea</i> (Griffith) Blume; A.R.K. Sastry 45599	Nyapin	July – September	E	Sikkim, Manipur
<i>Vanda cristata</i> Lindley; S.S. Dash 31763	Palin to Amje, Along Khru river	July – September	E	NE except Assam, Tripura

It is interesting to note that some of the Orchid species found in Kurung Kumey were depicting interesting distributional aspects. The distribution of *Chusua chrysea* was recorded for the first time for India, while *Calanthe keshabii* recorded for first time from Arunachal Pradesh. Distribution of seven species viz. *Bulbophyllum gymnopus*, *Bulbophyllum protractum*, *Calanthe keshabii*, *Dendrobium amoenum*, *Listera tenuis*, *Platanthera leptocaulon*, *Platanthera bakeriana* were restricted only to Sikkim other than Arunachal Pradesh in North-east region; while *Bulbophyllum reptans*, *Eria pusilla* were recorded only in Meghalaya. Out of total species found in Kurung Kumey, distribution of 22 species was not recorded from Assam while distribution of 27 species was not recorded from Tripura. Distribution of 8 species was found in all the state of North-east India.

*Pleione scopulorum* was one of the less known species of the genus. Due to its rarity in occurrences and important horticultural values, the species is enlisted in appendix II of CITES (UNEP 2003). The species is having a restricted distribution; only known to be found in the adjacent parts of western Yunnan, SE Xizang (Tibet), Northern Myanmar and a solitary record in Naga Hills of Assam (Cribb & Butterfield 1999). Earlier collections of the species from Yunnan

by G. Foster in July 1917 are available in K & CAL herbaria; while collections from Northern Myanmar by Kingdon Ward in 1923 are available in Kew herbarium only. The present collection forms basis of recollection of the species from a different part in India after a gap of more than 80 years. The species shows a great display of colour dimorphism in flowers ranging from white, bright scarlet rose to vivid magenta, white with crimson spotted to bright sulphur yellow.

A close observations of phenology of orchid species found in Kurung Kumey district show that, maximum flowering is occur in rainy season, least flowering occurs during winter. About 44 % of species found flowering during July to September, 35 % of species flowers during April to June, 13 % species found flowering during October to December while the least percentage 8 % during January to March. However, overlapping of flowering period in the subsequent months also commonly observed.

In the recent years with the construction of roads, unplanned jhum cultivation, cutting of forests for human settlements and house construction, the natural habitats of orchid affected adversely. Many orchid populations have declined substantially in nature. Because of the rapid, widespread destruction of natural orchid habitat, *ex situ* orchid cultivation is essential in maintaining orchid survival and biodiversity. Priority should be given for the *in situ* as well as *ex situ* conservation of the orchid genetic resources of the district by setting up of protected areas in rich diversity areas. At present, there are no protected areas in the district. Certain important valleys rich in germ-plasm diversity such as, region north of Milli, Lee-Huri-Damin area, Dodo-Chambang, region may be declared wild life sanctuaries or National Parks.

#### Acknowledgements

The author is thankful to Director, Botanical Survey of India, Kolkata and Scientist E & H.O.O., BSI, Arunachal Pradesh Regional Centre, Itanagar for encouragement and facility.

#### LITERATURE CITED

- Cribb, P. & Butterfield, I. 1999. The Genus *Pleione* (2nd ed.). Natural History Publications in association with the Royal Botanic Gardens, Kew. Pp. 166.
- Mabberley, D.J. 2008. *Mabberley's Plant book: a portable dictionary of plants, their classification and uses*. 3<sup>rd</sup> edition. Cambridge University Press, Cambridge. Pp. 606.
- Rao, A.N. 2007. Orchid flora of North East India – An up-to-date analysis. *Bull. Arunachal For. Res.* 23: 6 – 38.
- Singh, P. & Chauhan, A.S. 1999. Plant diversity in Sikkim Himalaya in P.K. Hajra *et al* ( ed.) *Plant diversity hotspots of India- An overview*. pp. 137-154. Director, BSI, Calcutta.
- UNEP 2003. Checkl. CITES Species. 1 – 339. UNEP World Conservation Monitoring Centre, Cambridge.