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Ethno-medicinal Uses of some Orchids of Nagaland, North-east India

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ABSTRACT

Orchids, in spite of being considered as highly valuable ornamental plants are also known to possess therapeutic properties because of its rich contents of alkaloid, glycerides and other useful phytochemicals. Their application as herbal medicine in traditional folklore system is well known and widely accepted. Nagaland, one of the 8 North-eastern states of India figures more prominently among the other states as one of the most ideal repositories of several highly diverse orchid species. However, the use of orchids in traditional healing process is restricted due to limited understanding and knowledge about the therapeutic values of these locally available plants. The present investigation was undertaken by describing the habits, distribution and medicinal uses of 30 different orchid species of Nagaland in an attempt to create awareness of their therapeutic importance and encourage people to use them in traditional folklore medicines.

Key words: Orchid, pseudobulb, terrestrial, therapeutic, traditional, herbal medicine

INTRODUCTION

Orchids with over 25,000 species represent one of the most advanced and largest families of angiosperms with innumerable hybrids and varieties (Chugh *et al.*, 2009). Their distribution is found around the globe except the freezing Antarctic region and deadly hot desert areas (Sazak and Ozdener, 2006). They have extremely high floricultural appeal because of their extraordinarily beautiful and highly enchanting flowers with incredible range of variation in floral shape, size, coloration and fragrance (Nongdam and Nirmala, 2012). Besides their high ornamental values and expensive price they command in the international floricultural market, orchids are of considerable importance in medicines as they have high contents of alkaloids, glycosides, phenols and useful phytochemicals (Duggal, 1972; Besra *et al.*, 2011). Their therapeutic values have been extensively utilized in the indigenous system of medicine for the treatment of many ailments in different regions. The North-eastern region of India which is amongst the 8 hottest biodiversity hotspots of the world harbors around 876 orchid species constituting nearly 70% of the total orchid flora of India (Medhi and Chakrabarti, 2009). Nagaland, one of the 8 states of North-east India having rich biodiversity and luxuriant forest vegetation with high density of floras and fauna is considered as one of the floristic hotspots of India. The state lies between 25°06'N and 27°04'N of latitude, 93°20'E and 95°15'E longitude covering an area of 16,579 sq km which generally falls under sub-tropical climatic zone. The average rainfall ranges from 100-300 cm with relative humidity at 80-90% during the rainy season accompanied with varied temperature of 4-25°C during the summer and winter (Deorani and Sharma, 2007). These varying physiographical features coupled with suitable climatic condition of this region offer the best natural habitat for large number of orchid species. Medhi and Chakrabarti (2009) reported the presence of about 241 orchid species under 63 genera in Nagaland. However, the survey conducted by forest department of Nagaland estimated more than 360 species of orchids belonging to

87 genera which accounts for 27.26% of total orchid species of India. Several orchids growing in the region possess high ornamental and medicinal values even though many of them have been listed as endangered in Red Data Book. The alarming reduction in orchid population is due to extensive collection for illegal orchid trade and habitat destruction largely because of the “Jhum cultivation” an age old agricultural practice adopted by local tribes of the region. The *in vitro* conservation approach through the application of synthetic seed and plant tissue culture technology along with *ex situ* methods of establishing “bambusetam” at suitable places have largely restricted the declining population of various species of orchids (Rahman *et al.*, 2005; Mohanraj *et al.*, 2009; Tomar *et al.*, 2009; Nagananda *et al.*, 2011). The plant derived natural products have been used as source of herbal drugs for over 40000 years for partial treatment of various diseases (Shafaei *et al.*, 2011). People since time immemorial have largely been dependent on locally available plants for cure and temporary relief from various forms of ailments as they possess compounds of enormous therapeutic values (Nahak *et al.*, 2014). The local medicinal practitioners use the medicinally important indigenous plants for traditional healing and curing purposes. Though there have few instances of employing orchids by traditional healers for therapeutic treatment in Nagaland, the practice has not been widely adopted in spite of the region being bestowed with rich orchid resources. The limited use of orchids for medicinal and therapeutic purposes may stem from the ignorance of local people towards the usefulness of plants in indigenous system of treatment and remedies. This study was conducted in an attempt to document and highlight the medicinal and therapeutic importance of some orchids of Nagaland in order to provoke awareness among the people and encourage the use of local orchids as traditional folklore medicine in treatment of various ailments.

MATERIALS AND METHODS

The study was carried out between March, 2008 and September, 2011 at Department of Biotechnology, Nagaland University. Extensive literature survey was conducted to access all available reports on the 30 listed medicinal orchids described in present study. Field trips were also arranged in selected areas and interactions with people including local healers and village elders were made to gather additional necessary information about local medicinal applications and traditional knowledge of the plants.

RESULTS AND DISCUSSION

Nagaland being endowed with a very rich biodiversity has a tremendous potential of harboring several important orchids of high therapeutic values. However, in the present study only 30 orchid species have been selected and listed for detailed analysis for their habit, distribution and medicinal uses.

***Acampe papillosa* (Lindl.) Lindl.**

Description: This large sized clump forming epiphytic orchid grows on the large tree trunks and tall branches of trees in semi deciduous or deciduous forest at an elevation of 600-1600 m above the sea level. The stems are elongated and branched with oblong coriaceous leaves. Inflorescence has 10-15 miniature fragrant flowers having yellow sepals and petals with brown spots. The flowering period is in the month of November.

Distribution: The plant is distributed in China, Japan, India, Vietnam, Myanmar, Laos and Thailand. In Nagaland, their distribution is restricted to the areas of Zunheboto and Pesao.

Medicinal uses: The root part of the plant is used to prepare paste which may be applied externally to cool down the burning sensation. It can also be used for controlling asthma, bronchitis, eye diseases, secondary syphilis and other mild uterine diseases.

***Anoetochilus roxburgii* Rolfe ex Downie**

Description: This small terrestrial orchid grows on humus rich soil layers of evergreen and semi evergreen forest at an elevation of 300-1500 m. It has a creeping stem with no leaves at the basal part but the short erect portion of the stem bears leaves. The leaves are ovate, 4-6 in number, spirally arranged, dark brown in color with silvery yellow to orange pink nerves. Flowers are several, small with brownish sepals and petals. Flowering takes place in October and November.

Distribution: The plants are found distributing in Northern India, Nepal, Bhutan, Burma, China, Thailand, Laos and Vietnam. The plants are noticed in interior regions of Meinkong, Longkum and Pesoa of Nagaland.

Medicinal uses: The whole plant is smashed and boiled in water to obtain liquid solution which can be used to control fever, lung diseases and hypertension. The paste prepared from the plant may be applied to treat snake bites (Fan *et al.*, 2001).

***Aeridis odorata* Loud.**

Description: This large epiphytic orchid is found growing in the lowland forest at an elevation of 300-2000 m above the sea level. The branched stem drops down carrying green, thick, linear-oblong leaves with unequal and rounded lobes at the tip. The inflorescence is pendulous with many fragrant flowers (up to 30) all of which open simultaneously. The flowering period is from May to July.

Distribution: The plants are noticed in Bangladesh, India, Nepal, Myanmar, Thailand, Laos, Vietnam, Malaysia and Philippines. In Nagaland, the orchids are reported in Mokokchung, Changtongya and Chare regions.

Medicinal uses: The paste formed from fresh root along with bark paste of *Azadiracta indica* is consumed to cure joint pain and swelling (Hossain, 2011). Leaf juice may be prepared which can be consumed to control mild tuberculosis (Das *et al.*, 2008).

***Arundina graminifolia* (D.Don) Hochr.**

Description: This terrestrial species is commonly known as Bamboo orchid and is usually found residing on the grassy hillsides or by road side at elevation of 1200 m above sea level. The stems are usually erect, leafy upper half and sometimes branched also. The flowers are purple-red, flesh-colored or white with darker lips than the sepals and petals. The short-lived, scented flowers last for about 3 days opening at a time. The flowering period is between June and October.

Distribution: The plants are mainly distributed in India, Nepal, Thailand, Malaysia, Singapore, South China and Indonesia. The occurrence of plants is found in Chare, (Kong *et al.*, 2003) regions of Nagaland.

Medicinal uses: The plant has good medicinal properties due to its rich content of stilbenoid, flavanoid and phenanthrene. The rhizome may be used for controlling bacterial infection as they have antibacterial properties (Hossain, 2011). The root decoction is used for controlling diabetes, tumor, hyperliposis and hepatitis (Kumar, 2002).

Cymbidium aloifolium (L.) Sw.

Description: This large sized epiphytic orchid is found on trees in sparse wood and densely forested regions at an elevation of 100-1200 m. The pseudobulbs are ovoid and slightly flattened which are enclosed in persistent leaves with bilobed at the apex. Raceme is pendulous with 15-35 slightly scented small flowers having light yellow colored sepals and petals. Flowering period is in the month of April and May.

Distribution: The plants are distributed in China, Japan, Thailand, Laos, Nepal, Sri Lanka and India. The plant grows mainly in Pfutsero, Pesao, Japfu and Noklak regions of Nagaland.

Medicinal uses: The leaves are extensively used for stypic properties in the treatment of boil and fevers by the local tribes (Nongdam and Chongtham, 2011). The roots may be pounded with ginger and the mixture is extracted with water and used as medicine to cure paralysis and chronic illness. Local tribal people in the region use small seeds of plants for healing wounds (Medhi and Chakrabarti, 2009). In addition to this, the whole plant can also be used as tonic and in treatment of vertigo, weakness of eyes, burns and sores (Chowdhery, 2001).

Cymbidium ensifolium (L.) Sw.

Description: This highly popular oriental cymbidium is either terrestrial growing on sparsely wooded and grassy slopes or lithophytes residing on mossy limestone rocks at an elevation of sea level to 1500 m. The pseudobulbs are small, ovoid enclosed in persistent leaf bases. The leaves are thin, green in color, thin, strap shaped, acute and sometimes variegated. Inflorescence carries many pale yellowish colored flowers (3-9) which are scented. The flowering time is from June to October.

Distribution: The plants are distributed in Japan, China, Thailand, Malaysia, Indonesia, India and Sri Lanka. The plants are widely scattered in the areas of Japfu, Pfutsero, Hellipong, Longtok and Chentang in Nagaland.

Medicinal uses: The rhizome of plants is boiled and the decoction can be used for the treatment of gonorrhoea. The decoction of flower may also be used to control eye sores.

Cymbidium longifolium D. Don.

Description: This large epiphytic orchid usually grows on the long branches and trunks of tall trees of moist shady places in dense forest at an elevation of 1500-1800 m above the sea level. The pseudobulb is short and sheath with many long, linear broad acuminate green leaves. Raceme is crowded with several slightly scented 25-15 purple colored flowers. The flowering time is in the month of November.

Distribution: The distribution of the plant is found in China, Eastern Himalayas, Nepal, Bhutan, Burma and India. The plants are observed in Japfu range, Saramati and Hellipong regions of Nagaland.

Medicinal uses: The pseudobulb is used for the preparation of salep by locals. It can also be dried and ground to powder and mixed with water to form a solution which can be taken orally in an empty stomach as emetic (Kumar, 2002).

***Cymbidium macrorhizon* Lindl.**

Description: This miniature leafless terrestrial orchid with large roots is found growing in forests along the rivers, low lying areas and open grassy slopes at an elevation of 700-1500 m. The rhizomes are soft, scaly, fleshy and branching with inflorescence bearing 5-8 white or pale colored flowers. The flowering takes place in July and August.

Distribution: The plants grow widely in China, Eastern Himalayas, Thailand, Vietnam, Taiwan, South Korea and India. In Nagaland, the plants are noticed in Kong *et al.* (2003) areas.

Medicinal uses: The decoction prepared from rhizome of the plant is used in treatment of boils and also can be used as diaphoretic (Duggal, 1972).

***Dendrobium candidum* Wall.ex Lindl.**

Description: This small sized epiphytic orchid grows on tree branches of densely forested areas at an elevation of 2000-3000 m. The stems are terete with oblong to lanceolate green leaves clustering towards the apex. Inflorescence is very short with 2-3 small, scented flowers produced from upper leafless stem. Flowering usually occurs during April and June.

Distribution: The plants are widely distributed in Taiwan, Southern China, Nepal, Thailand, Vietnam, India and Myanmar. This orchid is normally recorded in Saramati, Japu range and Phek areas of Nagaland.

Medicinal uses: The leaves are used to prepare aqueous extract which is used for treatment of diabetics. The plant shows anti-hyperglycemic effect with its mechanism of stimulating secretion of insulin from beta cells and inhibiting secretion of glucagons from cells (Wu *et al.*, 2004).

***Dendrobium chrysanthum* Wall. ex Lindl.**

Description: The plants occur as epiphyte on the branches of tall tree or lithophytes on the hard rocks or limestone cliffs in evergreen lowland forest at an elevation of 450-2000 m. The stems are fleshy, cylindrical and pendulous with many internodes covered by leaf sheaths. Leaves are bright shiny, greenish in coloration, numerous and acuminate over the length of stem. The inflorescence is positioned opposite to the leaves with 1-3 fleshy and scented flowers. The flowering takes place in April, August and September.

Distribution: The plants are distributed widely in North-eastern India, Nepal, Bhutan, Burma, China, Thailand, Laos and Vietnam. The plant grows mostly in the Wokha, Mokokchung, Longkhum and Changki regions of Nagaland.

Medicinal uses: The leaves of this orchid may be dried and ground to produce the final powdery product which can be used as antipyretic and also for the treatment of some mild skin diseases (Li *et al.*, 2001). The stem of the plant can be dried and use for enhancing immune system.

***Dendrobium chrystoxum* Lindl.**

Description: This epiphytic orchid also known as golden orchid grows on the long and large branches of tall trees of deciduous forest at an elevation of 700-1200 m. Pseudobulb is erect, variable in size, thick, fusiform and distinctly grooved enveloped by leathery, persistent, oblong and acute leaves. Inflorescence is arching having 15-20 highly honey fragrant flowers with bright yellow shiny coloration. The flowering time of the orchid is in the month of April and May.

Distribution: The plant is found widely distributed in North-eastern India, Nepal, Bhutan, Burma, China, Thailand, Laos and Vietnam. In Nagaland, the plants are noticed in Julukie, Medziphema, Dzuja and Longlen regions.

Medicinal uses: The leaves of this plant may be boiled and the resultant liquid extract is used as tonic and antipyretic. Erianthridin which is phenanthrenes extracted from the body of the plant shows anti-inflammatory activities (Yang *et al.*, 2006).

***Dendrobium fimbriatum* Hook.**

Description: This large sized orchid grows as epiphyte, lithophytes or terrestrial in dense forest at an elevation of 800-2400 m above sea level. The stems are long, erect, arching, pendulous bearing dark green lanceolate leaves. Racemes have many yellow colored flowers making the plant look more attractive. The flowering takes place in April and May.

Distribution: The plants are noticed widely in China, Western Himalayas, Bangladesh, Eastern Himalayas, India, Nepal, Bhutan, Laos and Vietnam. The plants are found growing mostly in the Dzuja, Peren, Mokokchung and Wokha regions of Nagaland.

Medicinal uses: The leaves of the plants may be either boiled or soaked in warm water which can be consumed either as tonic as it promotes the production of body fluid. It can also be applied on fractured areas to set the crack bones.

***Dendrobium nobile* Lindl.**

Description: This orchid is either epiphyte or lithophytes growing on the tree trunks and hard flattened rocks in semi deciduous and deciduous forest at an elevation of 200-2000 m. The pseudobulb is erect but becomes pendulous later and swollen at the internodes carrying distichous, strap shaped or oblong persistent leaves. Flowers are white, 2-4 in number, fragrant, long lasting (3-6 weeks) and highly variable. The plant usually flowers in the month of April and May every year.

Distribution: This important medicinal orchid is distributed mainly in Taiwan, Southern China, Nepal, Thailand, Vietnam, Myanmar and India. The plants are found widely scattered in various areas of Peren, Phek, Kaphire and Noklak regions in Nagaland.

Medicinal uses: Stems are dried and ground into powders which are then added to water to form aqueous extract which may be used as tonic to nourish stomach and promote the production of body fluid (Liu and Zhao, 2003). In Vietnam, the plant is used in the treatment of pulmonary tuberculosis, general debility, thirsty mouth, night sweats, fever and anorexia (Chauhan, 1999). They may also help boost the immune system.

***Eria bambusifolia* Lindl.**

Description: This epiphytic orchid is found growing on the tree trunks and tall tree branches in densely forested areas at an elevation of about 900-1300 m. Stems are elongated and erect carrying 8-10 acuminate, many-nerved, narrowly elliptic-oblong leaves. Raceme is long, simple with many brown flowers. The flowering time of the plant is between December and February every year.

Distribution: The plants are distributed in China, Eastern Himalayas, Bangladesh, India, Nepal, Bhutan, Myanmar and Vietnam. In Nagaland, the orchid is noticed only in Chentang and Japfu range.

Medicinal uses: It is used for preparing herbal medicine. The whole plant and ripe fruit of *Aegle marmelos* are sealed in different earthen pots separately and burnt into ashes. The ash is mixed together in 1:1 ratio. A half spoon is taken with cup of water on empty stomach twice a day for seven days to cure hyper acidity and stomach disorder (Das *et al.*, 2008).

***Eria pannea* Lindl.**

Description: This miniature orchid with its long creeping rhizome is epiphytic growing on the tree branches of broad leaf evergreen, deciduous or semi deciduous forest at an elevation of 1300 m from the sea level. The stem carries 2-3 laterally flattened, ventrally grooved and clasping leaves. The flowers are 2-3 in number, small lightly colored with fragrance of lemons.

Distribution: The orchids are found distributing mainly in the Himalayan regions, North-eastern states of India, Thailand, Laos, Vietnam, Malaysia and some parts of Southern China. In Nagaland, presence of the orchid is restricted to Pangsa and Pesao regions. The flowering takes place in the month of April and May.

Medicinal uses: The leaf and root parts of the plant can be boiled and used in the treatment of bone ache. The whole plant may be ground to form paste which can be mixed with warm bathing water for ague.

***Eria spicata* (D. Don) Hand.-Mazz**

Description: This epiphytic orchid resides mostly on the tree trunks of dense deciduous forest at the elevation of 500-2500 m. Pseudobulb is slightly ovoid and clustered with 3-4 narrowly elliptical leaves. The flowers are usually small-barely a centimeter across with white or straw yellow coloration.

Distribution: This orchid is distributed in China, Myanmar, Thailand, Nepal, Bhutan and India. The plants are found growing widely in Viswema, Tseminyu, Dzuja, Khonoma, Mokokchung, Wokha and Longkhim regions of Nagaland. Flowering takes place during the month of July to September.

Medicinal uses: The stem of the plant can be pounded to make paste with water and applied externally on the forehead to get relieve from headache. The paste can also be taken orally to cure mild stomach ailment (Kumar, 2002).

***Eulophia nuda*. Lindl.**

Description: This large sized terrestrial orchid grows in open grassland, swampy and low laying areas at an elevation of about 600-1000 m. Pseudobulbs are ovoid, subterranean, surrounded with circular marks carrying 4-5 lanceolate, long petiolate green leaves. Inflorescence is thick and fleshy with several lightly colored flowers. The flowering takes place in the month of June and July.

Distribution: The plants are distributed in India, Bangladesh, Nepal, Sri Lanka, Himalayas, China, Laos, Cambodia, Vietnam, Myanmar, Thailand and Malaysia. The plants are observed in interior areas of Namsa, Naginimora and Saring regions of Nagaland.

Medicinal uses: The tubers have good content of phenanthrenes which is used in the treatment of bronchitis, tumors and the other diseases of blood (Kumar, 2002). The fresh plants are smashed and the paste can be applied externally to cure boils and abscesses (Caius, 1988).

***Geodorum densiflorum* (Lam.) Schltr.**

Description: This orchid also known as Nodding swamp orchid is a terrestrial herb occurring in a wide range of habitats including rainforests, open forests, woodlands and low lying grasslands at an of elevation of 1800m. Pseudobulb is ovoid, erect, partially buried with 2-5 thin textured, oblong to elliptic and petiolate leaves. Inflorescence is 15-30 cm long with non spreading 8-20 pale pink colored flowers which are always crowded at the apex. The flowering time of the orchid is between December to February.

Distribution: This orchid is found growing in Japan, China, Taiwan, Philippines, Thailand, Malaysia, Indonesia, Nepal and India. In Nagaland, the distribution of the plants is restricted in Japfu range and Dzukou regions.

Medicinal uses: The fresh root parts may be made paste after pounding them with water and then can be administered orally on an empty stomach to regularize menstrual cycle in women (Das *et al.*, 2008). The paste can also be applied externally for wounds in skins and insect bites (Hossain, 2011).

***Goodyera schlechtendaliana* Rehb. f.**

Description: This small sized terrestrial orchid grows in dense forested mountainous areas at an elevation of 1000-1200 m above the sea level. The orchid does not have pseudobulb but the stem is enveloped completely by green, shiny spotted leaves. Inflorescence bears several small white flowers with acute floral bracts. The flowering time for the orchid is usually in the month of October and November.

Distribution: The plants are distributed in the Eastern Himalayas, India, Bhutan, Nepal, Myanmar, Thailand, Vietnam, China, Korea, Japan and Taiwan. The orchid is scantily found in Chentang and Kohima areas of Nagaland.

Medicinal uses: The whole plant can be dried, crushed and boiled in water and resultant aqueous extract may be used as tonic for curing internal injuries and also to improve circulation of fluid of the body (Du *et al.*, 2002).

***Harbenaria furcifera* Lindl.**

Description: This orchid is either terrestrial growing on thin moist soil layer of hill slopes or lithophytes residing on the hard rocks of densely forested regions at an elevation of 100-1500 m. The tubers are small, oblong and fleshy with 5-8 stalkless leaves. Raceme usually crowded with many small greenish colored flowers. The flowering takes place in the month of September and October.

Distribution: The plants are distributed in China, Bhutan, India, Myanmar, Nepal and Thailand. The orchids are noticed in Japfu range, Dzukou, Longkhim, Longkhum and Meinkong areas of Nagaland.

Medicinal uses: Tubers of the plant are pounded to make paste with water and paste so prepared can be applied externally as ointment for cuts, wounds in skins and also to treat poisonous insect bites. The tubers may also be used as tonic to improve body fluid (Jalal *et al.*, 2008).

***Habenaria intermedia* D. Don.**

Description: This beautiful small to medium sized terrestrial orchid grows in deciduous and semi deciduous forest at an altitude of about 2300 m from the sea level. The plant is erect, 25-60 cm high, terete, robust and stem evenly leafy with usually 3-5 leaves which are nerved and acuminate. Inflorescence consists of 3-5 large greenish white colored flowers. The orchid flowers in the month of July and August every year.

Distribution: The plant grows in Nepal, Himalayas, Pakistan, Myanmar and India. In Nagaland, they are found in the Chentang, Sangsangyu and Pesao regions.

Medicinal uses: The parts of plants used for herbal medicines are leaves and roots. They are sweet in taste and used in reducing many diseases of blood. Root tubers are used as general tonic, expectorant and rejuvenator of life (Rao and Henry, 1996).

***Habenaria pectinata* D. Don.**

Description: This plant is a large sized terrestrial orchid growing in dense forests at an elevation of 900-3000 m. Stems are erect, stout and tubular with many tubular sheaths. The leaves are sessile which are narrowly lanceolate and acuminate. Inflorescences are with many flowers having greenish or greenish white sepals and petals. Flowering of this orchid takes place in the month of July and August.

Distribution: They are distributed in Bangladesh, Himalayas regions, India, Nepal, Myanmar, Malaysia and Pakistan. In Nagaland, they are recorded only in Japfu range and Saramati regions.

Medicinal uses: Leaves of the plant after crushing with water form paste which can be applied in snake bites at the time of emergency (Chauhan, 1999). Sometimes the tubers are ground and mixed with condiments and the product is utilized for controlling arthritis (Singh and Duggal, 2009).

***Liparis odorata* (Willd.) Lindl.**

Description: This small terrestrial orchid usually inhabits low lying wet land areas and tropical valley at an elevation of 900-2000 above the sea level. Pseudobulb is ovoid and conical with 2-3 alternate, strongly five veined, acute and narrow leaves. Raceme is erect with 4-15 miniature flowers. The flowering time is in July and August.

Distribution: The distribution of the plant is found in China, Japan, Eastern Himalaya, Taiwan, Thailand, Laos and North Eastern part of India. The availability of the plant in Nagaland is restricted to the areas of Dzuja and Wokha regions.

Medicinal uses: The decoction prepared from dried pseudobulb is used in treatment of cancerous ulcers, gangrene, lever as well as dropsy (Singh and Dev, 2005).

***Luisia trichorhiza* (Hook.) Blume**

Description: This climbing epiphytic orchid resides on the long branches and trunks of old trees in dense forests at an elevation of 1000-1500 m. The leaves are usually green, alternate, terete and the inflorescence is elongated with several flowers having bee like appearance. The flowering takes place during the month of March and April.

Distribution: The plants are recorded in Indian subcontinent, China, Malaysia, Philippines, Australia and Japan. The orchids are observed only in Viswema and Pfutsero regions of Nagaland.

Medicinal uses: The whole plant can be used to make paste which can be administered orally in empty stomach with water for controlling Jaundice (Das *et al.*, 2008). The plant also shows some antibacterial activity (Kirtikar and Basu, 1975).

***Malaxis acuminata* D. Don.**

Description: This small terrestrial orchid grows in low land forest at an elevation 1500-2100 m above the sea level. Rhizome is located horizontally giving rise to short sub erect stem bearing 3-4 simple, alternate, ovate or broadly lanceolate and acute leaves. Inflorescence densely occupied by several small, yellowish green colored flowers. The flowering of the orchid is usually in the month of May and June.

Distribution: The orchids are distributed in Bangladesh, India, Nepal, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia and Philippines. In Nagaland, the plants grow in some restricted areas of Pulibadze and Jakhama.

Medicinal uses: The part of the plant usually used for medicinal purposes is pseudobulb. Decoction may be prepared from pseudobulb which can be used in controlling bleeding diathesis, burning sensation, fever, arthritis and blood vomiting.

***Nervilia aragaona* Gaud.**

Description: This small terrestrial orchid with underground pseudobulb grows in rainforest at an altitude of about 2300 m from the sea level. The underground erect bulb has a single kidney to heart-shaped, erect, wavy edges leaf. Inflorescence has 2-6 flowers with pale green colored sepals. The flowering time of the orchid is between June and July every year.

Distribution: The orchids are widely distributed in China, Taiwan, Philippines, Vietnam, Laos, Thailand, Malaysia, Indonesia, Myanmar, Nepal and India. The plants are noticed only in Pangsa and Nokland regions of Nagaland.

Medicinal uses: The leaf and tuber can be pounded to make paste with water for use as ointment for wounds. The decoction of leaves is used as protective medicine after childbirth (Yoganarasimhan, 1996). The fresh tubers can be cleaned properly with boiled water and chewed to relive thirst. It also helps in controlling mild mental diseases, epilepsy, diarrhea, asthma, cough and vomiting.

***Renanthera imschootiana* Rolfe.**

Description: This orchid also called Red Vanda is an epiphyte growing on the shrubs, tree trunks and branches of tall trees of lowland forest at an elevation of 400-1200 m. The branched stem carries many leathery bilobed apically leaves. It has a branching spike with many long lasting crimson red flowers having slightly fruity fragrant. The flowering takes place in the month of April and May.

Distribution: The plants are found in North-east India, Southern China, Laos, Myanmar and Thailand. The orchids are restricted to Phek and Wokha regions of Nagaland.

Medicinal uses: The leaves of the plant can be made into paste by grinding with water and the paste can be applied to treat skin diseases (Deorani and Sharma, 2007).

***Rhynchostylis retusa* (L.) Blume**

Description: This epiphytic orchid commonly called Fox tail orchid is found residing on tree branches in deciduous dry lowland forests and woodlands at elevations of 700 m. The stems are usually short and stout bearing 12-20 curved, fleshy, deeply channeled green leaves. Inflorescence is long, pendent and densely flowered having white colored sepals and petals with pink spotted on it. The flowering time is between May and June.

Distribution: This important medicinal orchid is distributed mainly in Taiwan, Southern China, Nepal, Thailand, Sri Lanka and India. The plants are found mainly in Kohima, Phek and Peren regions of Nagaland.

Medicinal uses: Root portion of the plant is mostly used for making herbal medicine. About 3-4 g of root of this orchid and 2 g of fresh leaf buds of *Pisum sativum* are made into paste with water. One gm of the paste is taken orally with water on an empty stomach twice a day for seven days to cure blood dysentery (Das *et al.*, 2008). The plant is also used as emollient and leaf paste is applied externally to cure wounds (Deorani and Sharma, 2007).

***Vanda coerulea* Griff. ex Lindl.**

Description: This large sized epiphytic orchid known as Blue Vanda grows on the tall branches and tree trunks in deciduous forest at an elevation of about 800-1200 m. It has a stout stem bearing corriaceous and distichous green leaves. Inflorescence bears several long lasting blue colored flowers with obovate sepals and petals. The flowering time is in July and August.

Distribution: The plants are noticed in India, Burma and Thailand. In Nagaland, their occurrence is found in Kohima, Phek and Paren regions.

Medicinal uses: The leaves of the plant can be used as expectorant (Deorani and Sharma, 2007). Juice can be prepared from the flower parts which are used as eye drops for controlling glaucoma, cataract and blindness.

***Vanda roxburgii* R.Br.**

Description: This epiphytic orchid commonly known as Rasna in India grows on the tree trunk and tree branches with help of its climbing stem in dense forest at an elevation of about 1400 m. The leaves are linear, long, narrow and fleshy. Inflorescence carries long lasting 10-15 fragrant rose colored flowers. The flowering time of the orchid is in July and August.

Distribution: The plants are widely distributed in Bangladesh, India, Eastern Himalayas, Nepal, Myanmar and Sri Lanka. The occurrence of the plants in Nagaland is observed in Japfu, Mon and Peren regions.

Medicinal uses: Roots, leaves and flowers are used to produce paste and juice by boiling with water or pounding them into powder followed by mixing with water. The resultant product may be utilized for the treatment of certain inflammatory conditions (Chawla *et al.*, 1992). It can also be instilled into human ears as a remedy for otitis. The roots are used in controlling rheumatism, nervous problems, bronchitis and fever. The dried roots of plant are used to prepare paste with cow's urine which can be applied for controlling skin diseases like eczema and scabies.

The traditional practice of employing locally available plants for therapeutic purposes is widely practiced in the state. Majority of the population resides in rural backward areas which lack basic medical facilities. People in interior areas mostly rely on local traditional healers as immediate solutions to different illness for partial cure and temporary relief. The indigenous system of therapeutic treatment using herbal drugs derived from local medicinal plants is quite successful in rural areas because of acute shortage of modern generic drugs in the region. In fact about 75-95% of the rural population in rest of the world depends on herbal medicines as their only health care (Kong *et al.*, 2003). The use of orchids as herbal medicine is largely restricted as their therapeutic knowledge is confine chiefly to few folk healers and local medicine men. Dissipating the traditional knowledge of the plants among the masses is quite necessary to create awareness about their medicinal and therapeutic benefits. Moreover, preparation of herbal drugs for local application is not a daunting task which can be performed as simple home remedies for treatment of different health related problems and ailments.

CONCLUSION

The present investigation identifies the ethno-medicinal importance of thirty different locally available orchids of Nagaland. Their utility in the treatment and remedies of various ailments in the indigenous system of medicine has been analyzed and properly highlighted. This may attribute to increased application of local orchids for therapeutic and medicinal purposes in the region. The region being endowed with rich orchid resources, many undocumented orchids with high medicinal properties are still available which need to be properly identified and investigated for their use in therapeutic application.

REFERENCES

- Besra, R.C., L. Majhee and J. Sharma, 2011. Evaluation of phytochemical, antioxidant and hepatoprotective activity of tuber of *Geodorum laxiflorum* Griff. J. Pharmacol. Toxicol., 6: 610-623.
- Caius, J.F., 1988. The Medicinal Plants of India. Scientific Publication, Judhpur, India.
- Chauhan, N.S., 1999. Medicinal and Aromatic Plants of Himachal Pradesh. Indus Publishing, New Delhi, India, ISBN: 9788173870989, Pages: 632.
- Chawla, A.S., A.K. Sharma, S.S. Handa and K.L. Dhar, 1992. Chemical studies and antiinflammatory activity of *Vanda roxburghii* roots. Ind. J. Pharm. Sci., 54: 159-161.
- Chowdhery, H.J., 2001. Orchid diversity in North-east India. J. Orchid Soc. Ind., 15: 1-17.
- Chugh, S., S. Guha and I.U. Rao, 2009. Micropropagation of orchids: A review on the potential of different explants. Sci. Hortic., 122: 507-520.
- Das, P.K., S. Sahoo and S. Bal, 2008. Ethnobotanical studies on orchids of Niyamgiri Hill Ranges, Orissa, India. Ethnobot. Leaflet., 12: 70-78.
- Deorani, S.C. and G.D. Sharma, 2007. Medicinal Plants of Nagaland. Bishen Singh Mahendra Pal Singh, New Delhi, ISBN: 9788121106016, Pages: 396.
- Du, X.M., N.Y. Sun, N. Takizawa, Y.T. Guo and Y. Shoyama, 2002. Sedative and anticonvulsant activities of goodyerin, a flavonol glycoside from *Goodyera schlechtendaliana*. Phytother. Res., 16: 261-263.
- Duggal, S.C., 1972. Orchids in human affairs. Acta Phytother., 19: 163-167.
- Fan, C., W. Wang, Y. Wang, G. Qin and W. Zhao, 2001. Chemical constituents from *Dendrobium densiflorum*. Phytochemistry, 57: 1255-1258.
- Hossain, M.M., 2011. Therapeutic orchids: Traditional uses and recent advances-An overview. Fitoterapia, 82: 102-140.
- Jalal, J.S., P. Kumar and Y.P.S. Pangtey, 2008. Ethnomedicinal orchids of Uttarakhand, Western Himalaya. Ethnobotanical Leaflet., 12: 1227-1230.
- Kirtikar, K.R. and B.D. Basu, 1975. Indian Medicinal Plants. 2nd Edn., Lalit Mohan Basu Publications, Allahabad, India.
- Kong, J.M., N.K. Goh, L.S. Chia and T.F. Chia, 2003. Recent advances in traditional plant drugs and orchids. Acta Pharmacol. Sin., 24: 7-21.
- Kumar, S., 2002. The Medicinal Plants of North-east India. Scientific Publishers, Judhpur, India, ISBN: 9788172332822, Pages: 212.
- Li, Y.M., H.Y. Wang and G.Q. Liu, 2001. Erianin induces apoptosis in human leukemia HL-60 cells. Acta Pharmacol. Sin., 22: 1018-1022.
- Liu, Q.F. and W.M. Zhao, 2003. A new dedonbrine-type alkaloid from *Dendrobium nobile*. Chin. Chem. Lett., 14: 278-279.
- Medhi, R.P. and S. Chakrabarti, 2009. Traditional knowledge of NE people on conservation of wild orchids Indian J. Traditional Knowl., 8: 11-16.
- Mohanraj, R., R. Ananthan and V.N. Bai, 2009. Production and storage of synthetic seeds in *Coelogyne breviscapa* Lindl. Asian J. Biotechnol., 1: 124-128.
- Nagananda, G.S., N. Satishchandra and S. Rajath, 2011. Regeneration of encapsulated protocorm like bodies of medicinally important vulnerable orchid *Flickingeria nodosa* (Dalz.) Seidenf. Int. J. Bot., 7: 310-313.
- Nahak, G., M. Suar and R.K. Sahu, 2014. Antioxidant potential and nutritional values of vegetables: A review. Res. J. Med. Plant, 8: 50-81.

- Nongdam, P. and N. Chongtham, 2011. *In vitro* rapid propagation of *Cymbidium aloifolium* (L.) Sw.: A medicinally important orchid via seed culture. *J. Biol. Sci.*, 11: 254-260.
- Nongdam, P. and C. Nirmala, 2012. *In vitro* seed germination and mass propagation of *Cymbidium dayanum* Reichb.: An important ornamental orchid of North-east India. *Trends Hortic. Res.*, 2: 28-37.
- Rahman, S.M.M., M. Shahidul Islam, P.K. Sen and F. Begum, 2005. *In vitro* propagation of *Oncidium taka*. *Biotechnology*, 4: 225-229.
- Rao, N.R. and A.N. Henry, 1996. The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India, India, Pages: 259.
- Sazak, A. and Y. Ozdener, 2006. Symbiotic and asymbiotic germination of endangered *Spiranthes spiralis* (L.) Chevall. and *Dactylorhiza osmanica* (Kl.) SoA⁸ var. *Osmanica* (Endemic). *Pak. J. Biol. Sci.*, 9: 2222-2228.
- Shafaei, A., E. Farsi, B.M.K. Ahamed, A. Siddiqui, I.H. Attitalla, I. Zhari and M.Z. Asmawi, 2011. Evaluation of toxicological and standardization parameters and phytochemical investigation of *Ficus deltoidea* leaves. *Am. J. Biochem. Mol. Biol.*, 1: 237-243.
- Singh, M.P. and S. Dey, 2005. Indian Medicinal Plants. Satish Serial Pub. House, Azadpur, New Delhi, ISBN: 9788189304027, Pages: 460.
- Singh, A. and S. Duggal, 2009. Medicinal orchids: An overview. *Ethnobotanical. Leaflets*, 13: 351-363.
- Tomar, J.M.S., D.K. Hore and A. Annadurai, 2009. Bamboos and their conservation in North-east India. *Indian Forester*, 135: 817-824.
- Wu, H.S., J.H. Xu, L.Z. Chen and J.J. Sun, 2004. [Studies on anti-hyperglycemic effect and its mechanism of *Dendrobium candidum*]. *China J. Chin. Mater. Med.*, 29: 160-163.
- Yang, L., Z. Wang and L. Xu, 2006. Simultaneous determination of phenols (bibenzyl, phenanthrene and fluorenone) in *Dendrobium* species by high-performance liquid chromatography with diode array detection. *J. Chromatogr.*, 1104: 230-237.
- Yoganarasimhan, S.N., 1996. Medicinal Plants of India: Karnataka. Vol. 1, Interline Publishing, India, ISBN: 9788172960568, Pages: 237.