

**DISTRIBUTION OF MEDICINAL PLANTS IN KURUNG KUMEY,
EAST KAMENG AND WEST KAMENG DISTRICTS OF ARUNACHAL
PRADESH: THEIR SYSTEMIC CONSERVATION**

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ABSTRACT

The state of Arunachal Pradesh is lying at the Northeast extremity of India which is bordered with China in the North and partly Northern east, Myanmar in the East, Assam and partly Nagaland in South and Bhutan in the West. The topography of the state is hilly tract with altitudinal ranges traversing from tropical to sub-tropical, temperate up to alpine zones which develop scope for the occurrence of diverse type of biodiversity of which the medicinal plants are the major component. Districts of West Kameng, East Kameng and Kurung Kumey are geographically stretched in the western part of Arunachal Pradesh wherein also the vegetation distribution is from tropical upto alpine

type of forests. The study was carried out to assess the potential of medicinal plants with its Global positioning in different localities. Field studies were made with collection of plants material and recording data as per GPS positioning and population studies by using quadrat for herbs and line transect for tree species. Records were maintained by preparing herbarium vouchers and identity of plants by matching with authenticated samples by the Botanical Survey of India, Arunachal Pradesh and Eastern Circle Shillong. Medicinal plants belonging to 99 species from 87 genera and 59 Families were recorded and the GPS positioning and population status has been described in tabular form.

KEY WORDS: Kurungkumey, *Picrorhiza kurrooa*, *Berginia ciliata*, Nyishi tribe.

INTRODUCTION

The state of Arunachal Pradesh is lying at the Northeast extremity of India which is bordered with China in the North and partly Northern east, Myanmar in the East, Assam and partly Nagaland in South and Bhutan in the West located between 26.28° N and 29.30° N latitude and 91.20° E and 97.30° E longitude with distribution in an area of 83743 sq. Kilometers occupying topographical land varying from foot hill of 100 msl elevation up to snow clad areas in the upper reaches of the state. The state is divided into 18 districts which covers 22 Forest divisions and its respective ranges. The areas covered under the study falls into Kurungkumey, East Kameng and West Kameng having Koloriang (Kurungkumey), Seppa (East Kameng), Khelong, Rupa and Bomdila (West Kameng) Forest divisions. The districts under studies i.e. Kurungkumey, East Kameng and West Kameng are inhabited by the Nyishing, Aka Sherdukpens and Monpa tribes who use the practices of traditional method of healing practices. The areas falling under the study areas are rich in floral diversity from tropical, sub-tropical, temperate and alpine forests which occupies diverse type of medicinal plants. Generally the biodiversity is used as source of fire wood, wild food and medicine. The distribution of medicinal plants in Arunachal Pradesh has been studied in past by Deb and Dutta, 1972, 1973, 1974, Nath and Bardoloi 1989 (RRL Jorhat), Pandey and Rawat, 1994, Rawat, et al, 1997, Rama Shankar et al. 2000, Rama Shankar and Rawat 2008, 2012, (CCRAS) and others however, the records on conservational aspect and GPS positioning has been recorded for the first time.

METHODOLOGY

Extensive exploration of the districts of Kurung Kumey, East Kameng and West Kameng of Arunachal Pradesh has been made. Records of the collections have been observed with Global Positioning System (GPS) at different places with their distribution recorded at different spots. Frequency of the important medicinal plants has been made by using quadrat with an edge length of 1 meter for herbs, 10 meters for shrubs and 1 Kilometer for tree species. The Herbarium vouchers were made by drying poisoning and mounting on Herbarium sheets as per techniques described by Jain and Rao (1977) and deposited in the Herbarium of Ayurveda Regional Research Institute (Acronym ARRI). Authenticity of Herbarium was made after consulting the Herbarium of Botanical Survey of India, Arunachal Pradesh Circle, and Itanagar. During field observation, suitability of medicinal plants with high demand and commercial values as well as methods for conservation and cultivation has

also been studied by bringing the sufficient germ plasm for cultivation and cultivating in the Medicinal Plants Garden of Ayurveda Regional Research Institute Itanagar.

OBSERVATION

Extensive exploration of medicinal plants in Kurung Kumey, East Kameng, and West Kameng districts of Arunachal Pradesh has been made in different season with an emphasis on pressure of exploitation and status as per GPS records for most of the forest areas in the state (Map). The important medicinal plants distributed in the state are *Abroma augusta*, *Acorus calamus*, *Amorphophalus bulbifer*, *Argyreia nervosa*, *Berginia ciliata*, *Brugmantia Suaveolens*, *Cissampelos pareira*, *Costus speciosus*, *Crasocephalum crepioides crepioides*, *Curcuma aromatic*, *C. longa*, *Cuscuta reflexa*, *Datura stramonium*, *Dendrobium nobile*, *Embelia ribes*, *Holarrhena antidysenterica*, *Mahonia Nepalensis*, *Melastoma malabathricum*, *Meremia tridentata*, *Oroxylum indicum*, *Oxyspora paniculata*, *Paederia scandens*, *Phyllanthus amaras*, *Picrorhiza kurrooa*, *Rubia manjith*, *Saraca asoca*, *Sida acuta*, *S. cordifolia*, *S. rhombifolia*, *Smilax glabra* *Solanum nigrum*, *Stachytaphata imbricata*, *Swertia chirayita*, *S. ciliata*, *Taxus wallichiana*, *Tinospora cordifolia*, *Trichosanthes bracteata*, *T. tricuspidata* *Valeriana jatamansi*, *Zanthoxylum armatum* etc. Medicinal plants are widely used by local traditional healers as well as collectors for trade. Cultivation of some of the medicinal plants is also in practice.



MAP OF ARUNACHAL PRADESH SHOWING AREAS STUDIED UNDER DISTRICTS OF KURUNGKUMEY, EAST KAMENG, SEPPA.

Exploration of medicinal plants needs the identifying areas for maximum occurrence of commercially viable species of medicinal plants, potential of such species in a particular area for commercial utility, less occurring medicinal plants species whose conservation is the need of time, utilization of medicinally important species under local health practices or other

ways of use like food, ornamental or timber etc. and the land suitable for undertaking medicinal plants cultivation. During various explorations in the three districts of Arunachal Pradesh all such types of status has been recorded. During course of exploration it was observed that local traditional healers are using locally available herbs for the treatment of various ailments. Commercial exploitation of *Acorus calamus*, *Berginia ciliata*, *Curcuma aromatica*, *Embelia ribes*, *Oroxylum indicum*, *Smilax glabra*, *Picrorhiza kurrooa*, *Rubia manjith*, *Swertia chirayitais* at highest level.



Figure- 1. Showing photographs of medicinal plants growing in the study areas

Table 1. Distribution of Medicinal Plants in the studied areas of Kurungkumey, East and West Kameng districts of Arunachal Pradesh.

SL. No.	Family	Botanical Name	Vern. Name	Disease	Locality	GPS Data
1	Asteraceae	<i>Ageratum conyzoides</i> L.	Sahadevi bhed	Diarrhea, fever, pneumonia	Nelam- Palin	N27°41.550 E93°37.945
					Sangram-Kolorang	N27°54.172 E93°23.191
		<i>Mikania scandens</i> L.	Bebli lata	Stomach ulcers, scabies, cholic, gastric ulcer, cardiac disorder	Sangram	N27°48.346 E93°32.269
					Jayanti village	N27°19.260 E92°58.221
					Pakye	N27°34.033 E92°39.494
		<i>Spilanthes paniculata</i> Wall. ex DC.	Marsheng, Akarkara	Dysentery, respiratory disorder	Sangram	N27°48.346 E93°32.269
		<i>Artemisia nilagarica</i> L.	Nagadaman	Dysmenorrhea, fever, lung disorder	Meer-Sangram	N27°44.99 E93°36.494
		<i>Bidens pilosa</i> L.	Phutium	Leprosy, eye disorder	Seppa	N27°21.849 E93°02.293
		<i>Crasocephalum crepioides</i> Benth.) S. Moore	Parvati	Intestinal disorders	Pakye	N27°34.033 E92°39.494
2	Araceae	<i>Artemisia vulgaris</i> L.	Nagdamani k	Leprosy, fever, asthma	Khupa	N27°46.114 E93°35.852
		<i>Gnaphalium luteo-album</i> L.	Vajrokantaka	Asthma, cough, bronchitis, fever	Kherang	N27°34.033 E92°39.494
		<i>Scindapsus officinalis</i> (Roxb.) Schott.	Gajapippali	Cough, bronchitis, erectile disorder	Damin road-Sarli	N27°57.176 E93°09.877
		<i>Alocasia indica</i> (Lour.) Schott	Alooka	Influenza, malaria, high fever	Jayanti village	N27°19.260 E92°58.221
3	Araliaceae/Apiaceae	<i>Acorus calamus</i> L.	Vacha	Leprosy, asthma	Mari camp	N27°38.993 E93°05.040
		<i>Amorphophallus bulbifer</i> (Roxb.) Kunth	Ol	Asthma, cough, breast pain, hernia	Palizi bridge	N27°18.298 E92°46.435
3	Araliaceae/Apiaceae	<i>Hydrocotyle rotundifolia</i> Roxb. ex DC.	Dorehm sheel	Headache, urinary problems	Sangram	N27°48.546 E93°32.269
		<i>Centella asiatica</i> (L.) Urb.	Mendooh pinri	Fever, amenorrhea, rheumatism	Sangye	N27°36.555 E93°01.995
4	Athyriaceae	<i>Athyrium falcatum</i> Bedd.	Lady fern	Jaundice, spleen disorder, rheumatism	Budyang	N27°47.383 E93°27.117

5	Apocynaceae	<i>Draga voluvis</i> (L. f.) Benth. ex Hook f.	Akad bel	Sore throat, eczema, asthma	Pakye-Sangye	N27°34.033 E92°39.494
		<i>Dischidia bengalensis</i> Colebr.		Stomach disorders, menstrual pains	Pakye-Sangye	N27°34.033 E92°39.494
		<i>Nerium indicum</i> Mill.	Kaner	Asthma, epilepsy, cancer, malaria	Rupa	N27°12.487 E92°24.172
6	Acoraceae	<i>Acorus calamus</i> L.	Vacha	Gastric problems	Mari Camp	N27°38.993 E93°05.040
					Sarali	N27°18.790 E92°24.279
					Dirang	N27°22.889 E92°13.553
7	Acantheaceae	<i>Dipteracanthos prostates</i> (Poir.) Nees	Kokilaksha	Liver disorder, cancer	Shiva-Kulla	N27°56.439 E93°17.814
					Jayanti village	N27°19.260 E92°58.221
		<i>Thunbergia grandiflora</i> (Roxb. ex Rottler) Roxb	Neel lata	Rheumatic arthralgia, algomenorrhea	Lamkak-Nefa	N27°19.365 E93°03.683
8	Bignoniaceae	<i>Oroxylum indicum</i> (L.) Benth. ex Kurz	Arlu, shyonaka	Dysentery, leucoderma, asthma, bronchitis	Pakye	N27°21.856 E93°02.249
					Lamkak	N27°20.793 E93°02.846
					Palizi	N27°18.191 E92°24.429
9	Berberidaceae	<i>Podophyllum hexandrum</i> (Royle) T.S. Ying	Laghu patra	Jaundice, syphilis, cancer	Rupa	N27°11.762 E92°23.275
					Post chilipam	N27°11.062 E92°22.755
					Pre chilipam	N27°11.762 E92°23.275
10	Blechnaceae	<i>Blechnum orientalis</i> L.	Centipede fern	Skin disease, Stomach pain, menstrual disorder	Old palin	N27°46.114 E93°35.852
					Loryoth – budyeng	N27°47.383 E93°27.117
					Pangche	N27°19.220 E92°58.424
11	Boraginaceae	<i>Cynoglossum glochidiatum</i> Wall. ex Benth.	Andhahuli	Cough, cold	Shiva-Kulla	N27°56.439 E93°17.814
					Pakye-Sangye	N27°34.033 E92°39.494
12	Betulaceae	<i>Alnus nepalensis</i> D. Don	Piak	Cancer, hepatitis, uterine cancer	Shiva	N27°56.439 E93°17.814

					Chno	N27°40.933 E93°08.274
		<i>Cyathea spinulosa</i> Wall. ex. Hook	Tree fern	Gout, staphylococcal	Sangram	N27°48.546 E93°32.269
13	Valerianaceae	<i>Valeriana jatamansi</i> D.Don	Mansi	Liver protection	Rupa	N27°48.546 E93°32.269
					Post Chilipam	N27°11.062 E92°22.755
					Pre chilipam	N27°11.762 E92°23.275
14	Caryophyllaceae	<i>Drymeria diandra</i> Blume	Avijola	Pneumonia , peptic ulcer	Chno	N27°40.933 E93°08.274
15	Convolvulaceae	<i>Argyreia nervosa</i> (Burm. f.) Boj.	Samudra Palakh	Gonorrhea , rheumatism, nervous disorder	Lamkak-Nafa	N27°18.068 E93°02.832
16	Cucurbitaceae	<i>Tricoxanthus bracteata</i> (Lamk.) Voigt.	Mahakala/lal Indrayani	Migraine, leprosy	Neafra village	N27°19.365 E93°02.832
		<i>Tricoxanthus tricuspidata</i> Lour.	Mahakala/lal Indranarayana	Asthma, earache, eczema	Budriang	N27°47.383 E93°27.117
17	Davalliaceae	<i>Nephrolepis cordifolia</i> (L.) C. Presl	Tuberous sword fern	Cough ,cold, headache	Sangram	N27°48.546 E93°32.269
					Pakye	N27°34.033 E92°39.494
18	Dryopteridaceae	<i>Dryopteris cochleata</i> (Buch.-Ham. ex D. Don) C. Chr.	Wood fern	Rheumatism, skin disease, cholera	Budyang	N27°47.383 E93°27.117
19	Dicranopteridaceae	<i>Dicranopteris linearis</i> Burm.	Resam	Diabetes, asthma, epilepsy	Sangram	N27°48.546 E93°32.269
20	Equisetaceae	<i>Equisetum debile</i> Roxb.	Ashwa pucchha	Osteoporosis, gonorrhea, jaundice	Shiva	N27°56.439 E93°17.814
					Rigu Camp	N27°30.387 E93°00.534
21	Ericaceae	<i>Gaultheria fragrantissima</i> Wall.	Kalomba	Rheumatic problem	Lee	N27°34.945 E93°44.287
					Tenga Valley	N27°09.944 E92°44.287
22	Euphorbiaceae	<i>Ricinus communis</i> L.	Erand	Liver disorder, arthritic disorder	Old Palin	N27°46.114 E93°33.625
23	Fabaceae	<i>Entada scandens</i> Rheedii	Prthvika	Cancer, gastrointestinal disorder, diarrhea	Damdila Top	N27°40.416 E93°07.452
		<i>Butea minor</i>	Lata palas	Skin disease,	Nyapin	N27°47.189

		Roxb .ex Willd.		Ulcer, ringworm		E93°30.535
					Damdila Top	N27°40.416 E93°07.452
		<i>Albizia lebbek</i> (L.) Benth.	Sirish	Skin disease, asthma, cold and cough	Bhalukpong	N27°00.169 E92°45.432
		<i>Indigofera tinctoria</i> L.	Jatamansi	Ovarian and skin cancer	Rupa	N27°11.423 E92°23.631
24	Fagaceae	<i>Quercus infetoria</i> Oliv.	Cyprus oak	Skin, vaginal, gastrointestinal infection	Sarali river cross	N27°20.108 E92°28.115
25	Hypoxidaceae	<i>Curculigo orchoides</i> Gaertn.	Kali musli	Spermatorrhea, hemorrhoids, asthma, diarrhea	Palizi bridge	N27°18.298 E92°46.435
26	Juglandaceae	<i>Juglans regia</i> L.	Walnut	Constipation, asthma, diarrhea, dyspepsia	salari	N27°19.552 E92°26.193
27	Lamiaceae	<i>Ocimum tenuiflorum</i> L.	Tulsi, Holy basil	Alzheimer’s disease, ulcer, ringworm	Neelam –palin	N27°41.550 E93°37.945
		<i>Perila ocymoides</i> (L.) Britt.	Janjli tilari	Asthma, inflammatory disorder	Budyang	N27°47.383 E93°27.117
					Palin	N27°46.114 E93°35.852
		<i>Clerodendrum indicum</i> (L.) Kuntze	Bhangli	Jaundice, rheumatoid arthritis, diabetes	Lamkak-Nefa	N27°19.365 E93°03.683
					Palizi	N27°18.191 E92°46.429
<i>Leucas indica</i> (L.) R. Br. ex Vatke	Chota halkusha	Headache, asthma, bronchitis	Salari river cross	N27°19.932 E92°26.486		
28	Lauraceae	<i>Gynocordia odorata</i> R. Br.	Chaulmoogra	Leprosy, scrofula	Seppa river side	N27°21.849 E93°02.293
					Pangche village	N27°19.439 E93°00.645
29	Leeaceae	<i>Leea indica</i> (Burm. f.) Merr.	Kimker,Jihmu	Diabetes, cardiac disorders	Sangram	N27°48.546 E93°32.269
30	Lycopodiaceae	<i>Lycopodium cernum</i> L.	Nagbeli	Rheumatism , gout, menstrual problem	Neelam- Palin	N27°46.050 E93°26.831
					Mari camp	N27°38.993 E93°05.040
		<i>Lycopodium clavatum</i> L.	Club moss	Night blindness, eczema, dyspepsia	5 miles	N27°06.214 E92°36.151
					Dirang	N27°18.208 E92°25.113
31	Lythraceae	<i>Woodfordia fruticosa</i> Kurz.	Dhataki	Reproductive disorder, diarrhea,	Pangche	N27°44.080 E93°38.222

				fever	Palin	N27°44.99 E93°36.494
					Salari	N27°19.932 E93°26.486
					Tenga valley	N27°12.536 E92°26.611
32	Malvaceae	<i>Urena lobata</i> L.	Bachita	Skin disease, arthritis, digestive disorder	Seppa	N27°21.849 E93°02.293
		<i>Sida acuta</i> Burm. f	Bala	Gonorrhea, elephantiasis, ulcers	Seppa River side	N27°21.849 E93°02.293
		<i>Abroma augustum</i> (L.) L.f.	Pishach Karpasa	Uterine disorder, diabetes, dysmenorrhea, gonorrhea, stomach disorders	Marchangla camp	N27°35.558 E93°01.694
33	Marattiaceae	<i>Angiopteris evecta</i> (G. Forst.) Hoffm.	Gaint fern	Cough, skin disease,	Pangche	N27°19.220 E92°58.424
34	Meliaceae	<i>Melia azedarach</i> L.	Bakain/Mah a nimb	Skin disease	Marchangla camp	N27°34.033 E92°39.494
35	Melastomataceae	<i>Osbeckia crinita</i> Benth. ex C.B. Clarke	Number	Toothache, dysentery	Sangram	N27°48.546 E93°32.269
		<i>Osbeckia nepalensis</i> Hook. f.	Tree paeony	Skin disorders, Eye problems, gastro intestinal disorder	Pangche	N27°44.080 E93°38.222
36	Menispermaceae	<i>Stephania glabra</i> Roxb.	Rajpatha	Stomach pain, ulcer, diarrhea, fever	Shiva	N27°56.439 E93°17.814
					Seppa river side	N27°21.849 E93°02.293
					Nafa-yarpin	N27°18.068 E93°02.832
					Palizi bridge	N27°18.191 E92°24.429
		<i>Tinospora cordifolia</i> (Thunb.) Miers	Guduchi	Diabetes, gout, lymphoma	Palizi bridge	N27°18.298 E92°46.435
37	Mimosaceae	<i>Entada scandens</i> Benth.	Prthvika	Wounds, fever, skin disease	Palizi bridge	N27°18.298 E92°46.435
38	Myrsinaceae	<i>Maesa indica</i> (Roxb.) A. DC.	Vidang	Boils, syphilis	Koloriang	N27°54.172 E93°23.191
		<i>Maesa chisia</i> Buch.-Ham. ex D. Don	Vidang bhed	Stimulant	Sangram-Koloriang	N27°54.172 E93°23.191
		<i>Embelia ribes</i>	Vidanga	Skin disease,	Lee-Sarali	N27°34.945

		Burm. f.		bronchitis, urinary discharge, dyspepsia, jaundice		E93°44.287
					Lamak-Yarpin	N27°11.050 E93°02.832
					Nechiphu	N27°19.220 E92°35.966
					Palizi bridge	N27°18.298 E92°46.435
39	Orchidaceae	<i>Arundiana graminifolia</i> (D. Don) Hochr.	Bamboo orchid	Jaundice, antidote, antitumour, antioxidant,	Budriang	N27°47.383 E93°27.117
					Palizi	N27°18.191 E92°24.429
40	Piperaceae	<i>Piper betel</i> L.	Pan	Antioxidant properties	Shivaji bridge	N27°56.495 E93°17.833
41	Pinaceae	<i>Pinus wallichiana</i> A. B. Jacks.	Saral	Antiseptic, diuretic	Damin road-Sarali	N27°57.176 E93°09.877
42	Poaceae	<i>Coixlacryma-jobi</i> L.	Gavedhuka	Cancer, diabetes, acne, digestive problem, abdominal problem.	Damin road sarli	N27°57.176 E93°09.877
					Nyapin	N27°45.025 E93°24.363
43	Polygonaceae	<i>Polygonum macrophyllum</i> D. Don	Red knotweed	Wounds, rheumatic joints	Neelam-Palin	N27°46.761 E93°29.450
		<i>Polygonum capitatum</i> Ham. ex D. Don	Pashin	Inflammatory diseases, urological diseases, dysentery	Neelam-Palin	N27°46.761 E93°29.450
					Lee-Sarali	N27°34.945 E93°44.287
					Damdilatop	N27°40.060 E93°06.828
		<i>Polygonum striatum</i> B. L. Rob.	Knotweed	Diuretic, antiseptic, amenorrhea	Pangche	N27°19.220 E92°58.424
		<i>Rheum australe</i> L.	Rhevand chini	Asthma, back pain, body ache, bone ache	Dirang	N27°16.892 E92°25.469
					Sarali	N27°19.220 E92°58.424
		44	Polypodiaceae	<i>Drynaria quercifolia</i> (L.) J. Sm	Asvakatri	Urinary tract infection , arthritis
Budriang	N27°46.656 E93°26.831					
<i>Polypodium vulgare</i> L.	Adders fern			Hepatitis , jaundice, loss of appetite	Nafra	N27°46.656 E93°26.831
45	Plantaginaceae	<i>Plantago erosa</i> Wall.	Aswagola	Boils ,snake bites, gastrointestinal disorders	Shiva-kedla	N27°17.958 E92°23.817

		<i>Picrorhiza kurroa</i> Royle ex Benth.	Katki	Jaundice, asthma, hepatitis	Dirang	N27°18.208 E92°25.113
46	Pteridaceae	<i>Pteridium aquilinum</i> (L.) Kuhn	Eagle fern	Chronic disorders	Neelam-Palin	N27°41.550 E93°37.945
					Pakye-sangye	N27°34.033 E92°39.494
		<i>Sphenomeris chinensis</i> (L.) Maxon	Lace fern	Dysentery, bronchitis, cough, wounds, skin disorder, abdominal disorders	Neelam-Palin	N27°41.550 E93°37.945
		<i>Sphenomeris chinensis</i> (L.) Maxon	Lace fern	Antibacterial, Dysentery, bronchitis, cough, wounds, skin disorder, abdominal disorders	Jayanti-Pangche	N27°19.260 E92°58.221
		<i>Pteris biaurita</i> L.	Thinleaf brake	Antibacterial uses	Old Palin	N27°46.114 E93°35.852
47	Ranunculaceae	<i>Thalictrum foliolosum</i> .DC.	Mamira	Gastritis, dyspepsia, toothache, hemorrhoids	Salari	N27°18.916 E93°24.123
					Tenga valley	N27°10.323 E92°34.109
48	Rutaceae	<i>Toddalia asiatica</i> (L.) Lam.	Kanchana/Kanj	Diarrhea, fever	Lamkak	N27°18.068 E93°02.832
49	Rubiaceae	<i>Rubia manjith</i> Roxb. ex Fleming	Manjistha	Bronchitis, rheumatism, dysentery, uterine bleeding Wound, skin diseases, eye problems, ulcer	Neelam-palin	N27°38.834 E93°37.402
					Budriang	N27°45.025 E93°24.363
					Damdila top	N27°40.416 E93°07.452
					Nafra	N27°17.773 E92°23.617
					Salari	N27°20.333 E92°28.243
		<i>Rubia sikkimensis</i> Kurz	Manjistha	Malarial fever, anti-tumor	Palin-deed	N27°47.547 E93°37.951
					Lamkak-Nefa	N27°19.365 E93°03.683
		<i>Oldenlandia scandens</i> (Roxb.) Kuntze. H	Bishma	Boils, stomach pain	Jayani-pangche	N27°19.260 E92°58.221

		<i>Paederia foetida</i> L.	Prasarini	Jaundice, chronic abdominal pain, arthritis, rheumatic, inflammatory disorder	Seppa	N27°21.849 E93°02.293
50	Rosaceae	<i>Rubus ellipticus</i> Sm.	Raspberry	Fever, gastric troubles, diarrhea, dysentery, diabetes mellitus	Sangram-koloriang	N27°48.346 E93°35.852
		<i>Rubus rugosus</i> Sm.	Raspberry	Fistula	Basla bridge	N27°57.176 E93°09.877
51	Saxifragaceae	<i>Berginia ciliata</i> (Haw.) Sternb.	Pashan bhed, Kodiya	Fever, diarrhea, pulmonary infection	Rupa	N27°57.176 E93°09.877
					Pre chilipam	N27°11.762 E92°23.275
					Post chilipam	N27°11.062 E92°22.755
52	Solanaceae	<i>Solanum viarum</i> Dunal	Katakari bhed	Cancer, Addison's disease, rheumatic arthritis	Neelam-palin	N27°11.423 E92°23.631
		<i>Solanum torvum</i> Sw.	Vodhata/Brihati	Skin infections, Respiratory tract disorder, gastro intestinal tract disorders	Old palin	N27°44.99 E93°36.494
		<i>Brugmansia suaveolens</i> (Humb. & Bonpl. ex. Willd.) Bercht. & J. Presl	Dhatura	Memory loss, wound, ulcer	Sarali	N27°18.970 E92°24.279
53	Selaginellaceae	<i>Selaginella wallichii</i> (Hook. & Grev.)	Sanjeevani bheda	Eye problem, Parturition	Pakye-sangye	N27°34.033 E92°39.494
54	Scrophulariaceae	<i>Buddleja asiatica</i> Lour.	Neemda	Skin disorder, Malaria, fever, Abortification, Tumor	Lee	N27°34.945 E93°44.287
		<i>Scoparia dulcis</i> L.	Mithi patta	Fever, cough, bronchitis, dental trouble, diabetes	Old seppa	N27°21.849 E93°02.293
55	Smilacaceae	<i>Smilax aspera</i> L.	Salsa	scabies	Palizi	N27°18.191 E92°24.429
56	Theacea	<i>Schima wallichii</i> (DC.) Korth	Chilauni	Uterine disorder, Hysteria	Jayanti village	N27°19.260 E92°58.221

					Palizi	N27°18.191 E92°24.429
57	Taxaceae	<i>Taxus wallichiana</i> Zucc.	Himalayan yew	Common cold, cough, fever	Dirang	N27°16.569 E92°25.538
58	Utricaceae	<i>Pouzolzia viminea</i> Wedd.	Khotsunung yra	Tuberculosis , wounds, burns, toothache	Sangram-Koloriang	N27°54.172 E93°46.492
		<i>P. bennetiana</i> Wight.	Oek	Atrophy	Pangche-luche	N27°19.220 E92°58.424
59	Verbenaceae	<i>Callicarpa macrophylla</i> Vahl	Priyangu	Arthritis, Diarrhea, Dyspsia	Jayanti village	N27°19.260 E92°58.221

People are collecting plants in unplanned and non-scientific manner. Distribution of medicinal plants in different forest areas as per GPS markings is described in table-1.

Frequency of certain medicinal plants per unit area has been described in table 2 for herbs, shrubs and tree species. Results has been expressed with supporting map and photographs (Map, Figure-1)

Table 2: Average Population density of selected important medicinal plants in different localities

Name of plant	Location under GPS	Size of quadrate/ transact	Frequency per unit area
<i>Artemisia nilagarica</i>	N27°44.99 E93°36.494	100M ²	8 per M ²
<i>Acorus calamus</i>	N27°38.993 E93°05.040	100m ²	55 per m ²
<i>Alocasia indica</i>	N27°19.260 E92°58.221	100 m ²	15 per m ²
<i>Centella asiatica</i>	N27°36.555 E93°01.995	25 m ²	38 per m ²
<i>Ricinus communis</i>	N27°46.114 E93°35.852	100 m ²	2.3 per m ²
<i>Woodfordia fruticosa</i>	N27°44.080 E93°38.222	100 m ²	5.83 per m ²
<i>Urena lobata</i>	N27°21.849 E93°02.293	100 m ²	2.6 per m ²
<i>Sida acuta</i>	N27°21.849 E93°02.293	100 m ²	23 per m ²
<i>Angiopteris evecta</i>	N27°19.220 E92°58.424	100 m ²	0.3 per m ²
<i>Stephania glabra</i>	N27°56.439 E93°17.814	100 m ²	1.2 per m ²
	N27°21.849 E93°02.293	100 m ²	0.8 per m ²
	N27°18.068 E93°02.832	100 m ²	0.5 per m ²
<i>Maesa indica</i>	N27°54.172 E93°23.191	100 m ²	0.2 per m ²
<i>Maesa chisia</i>	N27°54.172 E93°23.191	100 m ²	1.6 per m ²
<i>Embelia ribes</i>	N27°34.945 E93°44.287	100 m ²	0.3 per m ²
	N27°18.068 E93°02.832	100 m ²	0.2 per m ²
<i>Plantago erosa</i>	N27°19.220 E92°58.424	100 m ²	24 per m ²
<i>Toddalia asiatica</i>	N27°18.068 E93°02.832	100 m ²	0.1 per m ²
<i>Scindapsus officinalis</i>	N27°57.176 E93°09.877	100 m ²	0.3 per m ²
<i>Rubia manjith</i>	N27°38.834 E93°37.402	100 m ²	0.9 per m ²
	N27°45.025	100 m ²	0.5 per m ²

	E93°24.363		
	N27°40.416 E93°07.452	100 m ²	0.2 per m ²
<i>Rubia sikkimensis</i>	N27°47.547 E93°37.951	100 m ²	0.1 per m ²
	N27°19.365 E93°03.683	100 m ²	0.2 per m ²
<i>Oldenlandia scandens</i>	N27°19.260 E92°58.221	100 m ²	3.2 per m ²
<i>Paederia foetida</i>	N27°21.849 E93°02.293	100 m ²	0.4 per m ²
<i>Rubus ellipticus</i>	N27°48.346 E93°35.852	100 m ²	0.2 per m ²
<i>Rubus rugosus</i>	N27°57.176 E93°09.877	100 m ²	0.3 per m ²
<i>Solanum viarum</i>	N27°41.550 E93°37.945	100 m ²	0.6 per m ²
<i>Solanum torvum</i>	N27°44.99 E93°36.494	100 m ²	0.8 per m ²
<i>Buddleja asiatica</i>	N27°34.945 E93°44.287	100 m ²	1.6 per m ²
<i>Scoparia dulcis</i>	N27°21.849 E93°02.293	100 m ²	4.2 per m ²

DISCUSSION

The paper deals with the medicinal plants distribution in different parts of Seppa Forest Division in East Kameng, Khelang, Rupa, Bomdila in West Kameng and Koloriang Forest Division in Kurungkumey districts, which are used by different Indian System of medicine and the herbal systems in neighboring countries like Bangladesh, Bhutan, China and Myanmar. As per topography and distribution of different tribal communities in the hills of the study areas it is found that the plants and its pharmaceutical parts are collected and traded in Indian markets as well as the neighboring countries are being exploited in very unscientific manner .i.e. cutting trees for collection of stem bark or leaf, uprooting entire plants for root, immature fruits and flowers where active principles are either developed in lesser quantity or undeveloped where fruits and flowers are the useful parts. In long run it happens that the plants are lost from the Natural habitat. Such things are happened in case of *Picrorhiza kurrooa*, *Swertia chiriyita*, *Nardostachys jatamansi*, *Rubia manjith*, *Taxus wallichiana*, *Valeriana jatamansi* and several others in Alpine forests and *Aquillaria malaccensis*, *Oroxylum indicum* due to unscientific collection and not keeping the future prospect in mind.

Total medicinal plants collected during the study belongs to 99 species from 87 genera and 59 families. Maximum number goes to the family Asteraceae with 8 species and minimum species belongs to the families Caryophyllaceae, Dryopteridaceae, Lauraceae, Leeaceae, Lythraceae, Marattiaceae, Meliaceae, Pinaceae, Piperaceae, Orchidaceae, Rubiaceae, Rutaceae, Selaginaceae, Scrophulariaceae, Sterculiaceae, Verbenaceae,

As per requirement of Pharmaceuticals in India and abroad the plants of *Aquillaria malaccensis*, *Oroxylum indicum*, *Berginia ciliata*, *Berberis aristata*, *Paris polyphylla*, *Picrorhiza kurroa*, *Podophyllum hexandrum*, *Rheum australis*, *Swertia chiriyita*, *Nardostachys jatamansi*, *Rubia manjith*, *Taxus wallichiana*, *Valeriana jatamansi*, *Zanthoxylum alatum* and several others are highly demanded and they are growing in these forests which are widely exploited and used in an unscientific manner. This practice may cause depletion of the plants from its Natural habitat. These plants need to be cultivated and conserved in their Natural habitat. Details of cultivation of *Embelia ribes*, *Oroxylum indicum*, *Woodfordia fruticosa* and several others has already been carried out (Rama Shankar et al, 2012; Rama Shankar and Rawat, 2012, 2013; Rama Shankar and Tripathi, 2015). However, the distribution with quantification of the medicinal plants have been described in this communication.

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