SURVEY OF SOME MEDICINALLY IMPORTANT LEAFY VEGETABLES IN RUPANDEHI DISTRICT OF WESTERN NEPAL

Anant Gopal Singh*
Department of Botany, Tribhuvan University, Butwal Multiple Campus, Butwal, Nepal
*Email for correspondence: aSingh26@rediffmail.com

Abstract
Green leafy vegetable is a major source of vitamins and micronutrients for people using only vegetarian diets rich in carbohydrates. In remote rural settlements where vegetable cultivation is not practiced and market supplies are not organized, local inhabitants depend on indigenous vegetables, both cultivated in agricultural fields or kitchen gardens and wild for enriching the diversity of food. Knowledge of such food is part of traditional knowledge, which is largely transmitted through participation of individuals of households. The purpose of this study was to documentation of plants used as vegetables by the people of Rupandehi district of Lumbini zone of western Nepal. This paper revealed total 51 plant species belong to 45 genera under 32 Families of vascular plants. Out of 32 families, 24 families belong to dicot, 4 families to monocot and 4 families belong to ferns.

Key words: Green leafy vegetable; Rupandehi; Lumbini zone; Terai

Introduction
Leafy vegetable also called greens, vegetable greens; a leafy green or salad green are plant leaves eaten as vegetable, sometime accompanies by tender petioles and shoots. Leafy vegetables often come from short-lived herbaceous plant such as Amaranths and Spinach. Woody plants whose leaves can be eaten as vegetable includes Bauhinia, Ficus, Moringa and so on hold an important place in well-balanced diets.

Leafy vegetables are mainly consumed for their nutritional values without much consideration for their medicinal importance. There are several varieties of these leafy vegetables either in the wild state or under cultivation in rural areas. Many thousands of wild species of plant provide important sources of protein, fats, vitamins, and minerals. This is especially true for both the poorest and the riches socio-economic groups of the people (Akhtar 2001; ICIMOD 2010; Aryan 2010).

Nepal is situated on the southern slopes of central Himalayas and occupies a total area 147,181 km² and its great biodiversity is associated with the exceptional diversity of topography, climate and agroecological conditions. In Nepal, between 5800 (Hara and Williams 1979, Hara et al., 1978, 1982) and 6500 species of flowering plants (WCMC 1994) have been estimated, about 1500, of which are considered useful (Manandhar, 2002). Out of these, 651 species are economically useful including 440 species of wild food plants. About 200 plant species were consumed as vegetables (Manandhar, 2002). Most of them however, are regarded underutilized or neglected.

There is no culture on the earth that has made use of plants for their physical, emotional and spiritual needs of the human life. Plants form an integral part of any society, any time. Use of plants as food, clothes, fodder, medicine, timber etc. by man is since time immemorial. In remote rural societies where vegetable cultivation is not practiced and market is not available for local inhabitants, they should be dependent on locally available plants those can used as vegetables. Ethnic people from various tribes have been started domesticating wild edible and useful plants by trial and error method. That was the base of modern agricultural practices and related research (Prescott & Prescott, 1990, Scherrer et al., 2005 and Bussmann et al., 2006).

Consumption of green vegetables is a chief source of vitamins and micronutrients for those who are vegetarian. Knowledge of these edible plants is part of their traditional knowledge, which is usually transmitted by elders to younger and by participation of individuals in collection of vegetable plants. Now a days, human vegetable consumption is based on rather very limited number of crops, but in many parts of the world the use of wild plants is very common (Bussmann & Sharon, 2006; Kunwar et al., 2006; Cavender, 2006 and Pieroni et al., 2007).

Cultivating and gathering indigenous vegetables for both self-consumption and sale are still very common in Nepal, particularly in remote areas. Increased use of traditional...
Vegetables can contribute to enhancing people’s health and standard of living as well as the economic and social status of the food producers themselves. During food scarcity periods, people from urban and rural communities heavily depend on gathering these vegetables from their natural habitats (Manandhar, 1982). Besides gathering vegetables from the wild, their cultivation in home-gardens plays an important role towards household food and nutritional security.

Vegetables are the edible plants or plant parts such as roots, rhizomes, tubers, bulbs, stems, leaves, flowers or non sweet fruits; eaten with the main course of meal either as salted-spiced-cooked recipe or as dessert and salads. They impart variety of flavor and test to the diet, making it more appetizing and relishing. Now a day, vegetables constitute an important part of the daily diet of millions of people all over the globe than ever before (Pandey 2008). The Terai is a flat and valuable agricultural land in the southern Nepal. It lies at an altitude of 60–300m between the Indian border and outer foothills of Siwaliks and Churia, where over 48% of Nepal population live (CBS 2011). The region is heavily traversed by the major river systems of the country. The soil of the region is a part of alluvial-Gangetic plains including the Bhabar region and the alluvial fans of the Siwaliks. It exhibits the tropical type of climate. The temperature of the study area ranges in between 12°C- 42°C during the coldest month (December-January) and the hottest month (June–July).The annual precipitation ranges from 1,000 to 2,500 mm. The history on the utilization of the plant resources in Nepal dates back to the work of Banerji (1955). In this study, he documented the various food and medicinal plants of eastern Nepal. After his work, some workers continued the ethnobotanical study in the 60’s and 70’s (Dobremez, 1976; Pandey, 1964). The reports on uses of plants by different Nepalese ethnic groups have been recorded only onwards 80’s (Coburn, 1984; Bhattarai, 1989, 1990, 1991, 1992, 1993; Joshi and Edington, 1990; Manandhar 1989, 1990, 1992, 1993a,b, 1994, 1995, 1998, 1999; Mueller-Boeker, 1993; Pohle, 1990; Shrestha, 1985; Shrestha and Pradhan, 1986, Panthi and Chaudhary 2003, Joshi 2008; Bhattarai et al., 2009; Singh et al., 2011 & 2012a and b). These reports documented the information of uses of plant resources.

**Study Area**

Rupandehi district is situated in the Western Development Region of Nepal between 27° 20’00” to 27° 47’25” N latitude and 83°12’16” to 83°38’7” E longitude with an area of 1360 km² (CBS, 2011). The average temperature ranges in between 12°C to 42°C and average annual rainfall is 1391mm. It is surrounded by Nawalparasi district from east, Kapilvastu district from west, hilly districts of Palpa and Arghakhanchi from north and Maharajganj district of Uttar Pradesh (India) from south. The east, west and north sides of the district have high potentiality of plants of ethnobotanical importance like plants used as vegetable and cure of different disease.

**Fig. 1**: Location of Rupandehi in map of Nepal (DDC, Rupandehi)
The total population of this district is 708419 (District Profile of Rupandehi, 2010) Brahmin, Magar, Tharu, Muslim, Yadav, Chetry, Kewat, Chamar, Gurung, Newar, Kami, Teli, Kurmi, Koiri, Damai, Sonar, Thakuri are the major communities living in the district. Author visited villages and cities of Rupandehi district situated near the foothills of Churia like Butwal municipality, Gajedi, Rudrapur, Dudhrakh, Saljhandi, Parroha, Semlar, Motipur and Devdaha Village Development Committees. The study areas are inhabited by Brahmin, Thakuri, Chetry and ethnic communities like Magar, Gurung and Tharu.

**Materials and methods**

The present study was undertaken in and around the main city and villages situated near the churia hills of Rupandehi district in the month of June to April 2011-12. During data collection many thirty-five professional people, villagers etc., who involved in collection and cultivation of wild plants which were used as vegetables are interviewing by preparing a semi structured questionnaire. The professional people determined the local names and traditional uses of plants. The informations obtained were crosschecked with the users. The voucher specimens were identified with the help of relevant taxonomic literature viz., Hara et al. (1978, 1979 and 1982), Sharma (1999) and herbarium specimens of Butwal Multiple Campus Tribhuvan University, Butwal, Nepal.

**Results and Discussion**

The study provides important evidence about traditional knowledge and diversity of wild leafy vegetables. The study area is floristically rich and includes useful wild leafy vegetable species. The present study show 51 wild leafy vegetable species belonging to 45 genera of 32 families tabulated with botanical name, local name, family, habitat and medicinal uses (Table 1). A maximum of 7 plants from family Amaranthaceae, 3 from Brassicaceae, Chenopodiaceae respectively and 2 from Apiaceae, Liliaceae, Fabaceae, Asteraceae, Lamiaceae, Capparaceae, Polygonaceae, and Ophioglossaceae. Local name of the plants given by local people are compared with the book ‘Dictionary of Nepalese Plant Names’ written by Shrestha (1998). Out of 32 families’ 24 families belonging to dicots, 4 to monocots and 4 to ferns (Fig. 2). The majority of collected plant species were 35 herbs, 4 shrubs, 5 trees, 4 climbers, 2 runners and 1 creeper (Fig. 3).

**Table 1: Details of plants studied**

| S.N. | Name of the plants and Family | Local Name | Form of the plants | Parts used | Season of availability | Ethnomedicinal Importance |
|------|------------------------------|------------|--------------------|------------|------------------------|---------------------------|
| 1.   | *Alternanthera sessilis* (L.)DC. Amaranthaceae | Saranchi Sag | Herb | Leaf | April-July | Diarrhoea & Skin diseases |
| 2.   | *Amaranthus caudatus* L., Amaranthaceae | Latte Sag | Herb | Leaf | April-Aug | Stomachache, Piles |
| 3.   | *Amaranthus lividus* L., Amaranthaceae | Lude Sag | Herb | Leaf | April-Aug | Liver disorders, anaemia |
| 4.   | *Amaranthus spinosus* L., Amaranthaceae | Ban Lude | Herb | Leaf | April-Aug | Liver disorders |
| 5.   | *Amaranthus tricolor* L., Amaranthaceae | Rato Latte | Herb | Leaf | April-Aug | Antipyretic, Piles, Gastritis |
| 6.   | *Amaranthus viridis* L., Amaranthaceae | Lude Sag | Herb | Leaf | April-Aug | Decoction is used in toothache, Piles |
Table 1: Details of plants studied

| S.N. | Name of the plants and Family | Local Name | Form of the plants | Parts used | Season of availability | Ethnomedicinal Importance |
|------|------------------------------|------------|--------------------|------------|------------------------|--------------------------|
| 7.   | *Angallis arvensis* L., Primulaceae | Armale     | Herb               | Leaf       | Dec-Mar                | Diuretic, liver & kidney problems |
| 8.   | *Anethum sowa* L. (Dill), Apiaceae | Saunf Sag  | Herb               | Leaf       | Jan-July               | Digestive and Respiratory disorders |
| 9.   | *Asparagus racemosus* Willd., Liliaceae | Kurilo     | Herb               | Tender Shoot | Feb-July              | Diuretic, Cardiac dropsy, & Chronic gout |
| 10.  | *Bacopa monnieri* (L.)Pennell., Scrophulariaceae | Khole Sag  | Herb               | Tender Shoot | Feb-March             | Dysentery, Nervous disorders |
| 11.  | *Basella alba* L. Basellaceae | Poi Sag    | Climber            | Leaf       | June-Aug               | Diuretic, & Appetizer.        |
| 12.  | *Bauhinia variegata* L. Fabaceae | Koiralo    | Tree               | Tender Shoot | April-Sept            | Stomach disorders            |
| 13.  | *Bidens pilosa* L., Asteraceae | Kuro       | Herb               | Tender Shoot | May-June              | Fresh leaf paste applied on wound |
| 14.  | *Blumea lacera* (Burm. f.) DC Asteraceae | Kurkure    | Herb               | Tender Shoot | May-June              | Liver tonic, Bronchitis       |
| 15.  | *Boerhavia diffusa* L., Nyctaginaceae | Punarnava  | Herb               | Tender Shoot | June-Aug               | Gonorrhoea, hepatopathy.     |
| 16.  | *Botrychium lanuginosum* Wall. ex. Hook & Grev. Ophioglossaceae | Jaluko     | Herb               | Shoot      | May-July              | Bodyache                  |
| 17.  | *Capsella bursa pastoris* (L.) Medikus Brassicaceae | Torighans  | Herb               | Leaf       | Jan-April             | Control bleeding from cut & wound |
| 18.  | *Cassia tora* L., Fabaceae | Tapre      | Herb               | Leaf       | July-Aug              | Typhoid fever, Dysentery, Leaf paste on skin disease |
| 19.  | *Celosia argentea* L., Amaranthaceae | Sirvari Sag | Herb               | Leaf       | Aug-Dec               | Diuretic, Cough, Blood purification |
| 20.  | *Centella asiatica* (L.)Urb. Apiaceae | Ghod Tapre | Herb               | Leaf       | Feb-April             | Diuretic, cardiotonic        |
| 21.  | *Chenopodium album* L., Chenopodiaceae | Bethe      | Herb               | Tender Shoot | Jan-April            | Anthelmintic.               |
| 22.  | *Chenopodium gandhiium* Buch-Ham. Chenopodiaceae | Kalo Bethe | Herb               | Tender Shoot | Aug-Nov               | Gastritis, Antipyretic       |
| 23.  | *Cleome viscosae* L., Capparaceae | Ban Methi  | Herb               | Leaf       | Aug-Oct               | Muscular swellings, Cough, Fever |
| 24.  | *Colocasia esculenta* (L.) Schott, Araceae | Karkalo    | Herb               | Tender Shoot | Aug-Oct               | Earache                  |
| 25.  | *Commelina paludosa* Bl., Commelinaceae | Kane Sag   | Herb               | Tender Shoot | April-Sept            | Digestive disorders        |
Table 1: Details of plants studied

| S.N. | Name of the plants and Family | Local Name | Form of the plants | Parts used | Season of availability | Ethnomedicinal Importance |
|------|--------------------------------|------------|--------------------|------------|------------------------|--------------------------|
| 26.  | *Corchorus acutangulus* Tiliaceae | Nalu       | Shrub             | Leaf       | June-Aug               | Overcome anemic disease   |
| 27.  | *Crateva unilocularis* Buch.-Ham., Capparaceae | Siplikan   | Tree              | Tender Soot | Feb-April            | Expel kidney stones, diabetes |
| 28.  | *Cucurbita maxima* Duchesne Cucurbitaceae | Pharsi     | Climber           | Tender Shoot | April-Oct             | Cooling effect, stomachic |
| 29.  | *Dendrocalamus hamiltonii* Nees & Arn. ex. Munro, Poaceae. | Tamabans   | Shrub             | Tender Shoot | Throughout the year | Cooling, Inflammation in stomach |
| 30.  | *Diplazium esculantum* (Retz.) Sw.ex. Schrader, Woodsiaceae | Pani Neuro | Herb             | Leaf       | May-July              | Digestive disorders       |
| 31.  | *Dryoanthryrium boryanum* (Willd.) Ching. Aspidiaceae. | Kalo Neuro | Herb             | Leaf       | Aug-Oct               | Stomatich disorders       |
| 32.  | *Fagopyrum esculentum* Moench., Polygonaceae. | Phapar     | Herb             | Leaf       | May-June              | Tonic, alternative food.  |
| 33.  | *Ficus lacor* Buch.-Ham., Moraceae. | Kavro      | Tree             | leaf       | May-June              | Blood purifier            |
| 34.  | *Ficus rumphii* Bl. Moraceae | Pakro      | Tree             | Leaf       | May-June              | Blood purifier, Stomach disorders. |
| 35.  | *Holarrhena pubescens* Wall. ex. G. Don. Apocynaceae. | Indra jau  | Shrub             | Leaf       | May-June              | Antidisenteric           |
| 36.  | *Ipomea aquatica* Forssk. Convolvulaceae. | Kerunga Sag | Runner           | Tender Shoot | May-Sept         | Nerve tonic, Liver & digestive problems |
| 37.  | *Lepidium sativum* L., Brassicaceae | Chamsur    | Herb             | Tender Shoot | Dec-Feb             | Liver tonic, Syphilis, bleeding piles, asthma, & cough. |
| 38.  | *Leucas cephalotes* (Roth) Spreng. Lamiaceae. | Gumma      | Herb             | Leaf       | March-June            | Digestive disorders, Toothache |
| 39.  | *Lygodium japonicum* (Thunb.) Sw., Schizaeaceae | Janai Lahara | Climber          | Leaf       | May-June              | Gout, Muscular sprains    |
| 40.  | *Mentha spicata* (L.), Spreng. Lamiaceae | Pudina     | Creepers         | Tender Shoot | Throughout the year | Cooling effect, gastro-intestinal disorders |
| 41.  | *Moringa oleifera* Lam., Moringaceae | Shital Chini | Tree             | Young leaf | March-June            | Leaf poultice in glandular swelling |
| 42.  | *Murraya koenigii* (L.)Spreng. Rutaceae. | Karry Patta | Shrub             | Leaf       | Feb-June              | Stomach disorders & vomiting |
| 43.  | *Ophioglossum petiolatum* Hook., Ophioglossaceae. | Jibre Sag  | Herb             | Leaf       | Feb-April             | Check bleeding from nose. |
Table 1: Details of plants studied

| S.N. | Name of the plants and Family | Local Name | Form of the plants | Parts used | Season of availability | Ethnomedicinal Importance |
|------|-------------------------------|------------|--------------------|------------|------------------------|--------------------------|
| 44.  | Oxalis corniculata L., Oxalidaceae. | Chari amilo | Herb | Leaf | April-Oct | Burning sensation and hemorrhoids |
| 45.  | Portulaca oleracea L., Portulacaceae. | Nundhiki | Herb | Leaf | May-Oct | Urinary trouble, Diuretic |
| 46.  | Rorippa nasturtium-aquaticum (L.) Hayek, Brassicaceae. | Sim Sag | Runner | Tender Shoot | Oct-Feb | General Tonic |
| 47.  | Rumex nepalensis Spreng., Polygonaceae | Halhale | Herb | Leaf | Feb-March | Laxative, Stomachache |
| 48.  | Smilax aspera L., Liliaceae | Kuku diano | Climber | Leaf | May-June | Gastritis |
| 49.  | Solanum nigrum L., Solanaceae | Kali gedi | Herb | Leaf | May-June | Digestive disorders, diuretic |
| 50.  | Spinacea oleracea L., Chenopodiaceae | Gobre palungo | Herb | Tender Shoot | Aug-Dec | Diuretic & antibacterial |
| 51.  | Urtica dioica L., Urticaceae | Sisnu | Herb | Tender shoot | Throughout the year | Diabetes, diuretic, anti-rheumatic |

Conclusion

The peoples of the study area have good knowledge on use of wild plant species. Uses of wild leafy vegetables provide seasonal staple foods, and important alternative to the agriculturally cultivated crops. The study shows that wild leafy vegetable use is influenced by traditional knowledge, culture and socio-economic conditions. Several wild leafy vegetables can benefit local people not as food, but also with their medicinal properties. Out of 51 wild leafy vegetables, 12 were threatened in their abundance by several human activities, unscientific harvesting, over-grazing, urbanization and invasive species. Therefore, proper management of these resources for the benefit of local communities as well as to conserve biodiversity is of the utmost importance and contributes to preserve cultural and genetic diversity.

Acknowledgement

Firstly, author thanks to the people who give us knowledge about mode of use of the cultivated/ wild plants as leafy vegetables and there medicinal aspects, without their active participation this paper would not have been possible. I am also grateful to my departmental colleagues for valuable encouragement to prepare the paper.

References

Akhtar F (2001) Uncultivated food in the context of poor people’s livelihood. A Naya krishi experience. In Johnston M.M. (eds.) Proceedings of the regional workshop on uncultivated foods and Biodiversity, September 24-26, Kathmandu, Nepal, pp8-17.

Aryal KP (2010) Uncultivated plants in Nepal. An assessment of their richness and role in the livelihood and culture of two indigenous communities. LAP AMBERT Academic Publishing GmbH and Co K.G. and Licensors, Germany.

Banerji ML (1955) Some edible and medicinal plants from east Nepal J. Bombay Nat. Hist. Soc. 35:153-155.

Bhattarai NK (1989) Traditional phytotherapy among the Sherpa’s of Helambu, Central Nepal. Journal of Ethnopharmacology 27:45-54. DOI: 10.1016/0378-8741(89)90076-7

Bhattarai NK (1990) Herbal folk medicines of Kabhre palanchok district, central Nepal. Int. J. Crude Drug Res. 28(3):225-231.

Bhattarai NK (1991) Folk herbal medicines of Makawanpur district, Nepal. Int. J. Pharmacognosy 29(4):284-295. DOI: 10.3109/13880209109082899

Bhattarai NK (1992) Medical ethnobotany in the Karnali zone, Nepal. Economic Botany 46(3):257-261. DOI: 10.1007/BF02866624
Bhattarai NK (1993) Folk herbal medicines of Dolkha district, Nepal. *Fitoterapia* **64**(5):387-395.

Bhattarai S, Chaudhary RP and Taylor RSL (2009) Ethnomedicinal Plants Used by the People of Nawal Parasi District, Central Nepal. *Our Nature* 7: 82-99. DOI: 10.1186/1746-4269-2-47

Bussmann RW, Gilbreath GG, Solio J, Latuluo R, Kunguru K, Wood N, Mathenge SG (2006) Plant use of the Maasai of Sekenani valley, Maasai Mara, Kenya. *Journal of Ethnobiology and Ethnomedicine* **2**(22). DOI: 10.1186/1746-4269-2-22

Bussmann RW, Sharon D (2006) Traditional Medicinal Plant use in Northern Peru: tracking two thousand years of healing culture. *Journal of Ethnobiology and Ethnomedicine* **2**:47.

Cavender A (2006) Folk medicinal uses of plant foods in Southern Appalachia United states. *Journal of Ethnopharmacology* **108**: 74-84. DOI: 10.1016/j.jep.2006.04.008

CBS (2011) Population of Nepal; Village Development Committees/ Municipalities’ population census 2011 Ram shah Path, Thapathali Kathmandu, Nepal

Coburn B (1984) Some native medicinal plants of the western. *Gurung Kailash* **11**(1-2): 55-88.

District Profile (2010) District Development Committee, Rupandehi, Lumbini Zone, Nepal.

Dobremez JF (1976) Exploitation and prospects of medicinal plants in eastern Nepal In: Mountain Environment and Development Swiss Association for Technical Assistance in Nepal, Kathmandu.

Hara H and Williams LHJ (1979) An Enumeration of the Flowering Plants of Nepal. Vol. 2, British Museum (Natural History), London, UK.

Hara H, Chater AO, and Williams LHJ (1982) Enumeration of the Flowering Plants of Nepal. Vol. 3, British Museum (Natural History), London, UK.

Hara H, Stearn WT and Williams LHJ (1978) Enumeration of the Flowering Plants of Nepal. Vol. 1, British Museum (Natural History), London, UK.

ICIMOD (2010) Mountain Biodiversity of the Hindukush-Himalayas International Year of Biodiversity, 2010.

Joshi AR and Edington JM (1990) The use of medicinal plants by two village communities in the Central Development Region on Nepal. *Economic Botany* **44**(1):71-83. DOI: 10.1007/BF02861069

Joshi KR (2008) Ethnomedicinal uses of Plants- A case study of Sharmol VDC, Darchula District, Nepal: Medicinal plants in Nepal. *An Anthology Contemporary Research* pp., 177-186

Kunwar RM, Nepal BK, Kshhethri HB, Rai SK and Bussmann RW 2006. Ethnemdicine in Himalaya: a case study from Dolpa, Humla, Jumla and Mustang districts of Nepal. *Journal of Ethnobiology and Ethnomedicine* **2**:27. DOI: 10.1186/1746-4269-2-27

Manandhar NP (1982) Wild Edible Plants of Nepal. Bull. Dept. Med. Pl., No. 11. Thapathali, Kathmandu, Nepal.

Manandhar NP (1989) Useful Wild Plants of Nepal. Nepal Research Centre Publications No. 14. Steiner, Stuttgart, Germany.

Manandhar NP (1990) Some endangered medicinal plants of Nepal. *Ancient Science of Nepal* (India) **9**(4):231-233.

Manandhar NP (1992) Folklore medicine of Dhading District, Nepal. *Fitoterapia* **63**(2):163-177.

Manandhar NP (1993a) Herbal remedies of Surkhet District, Nepal. *Fitoterapia* **64**(3):265-272.

Manandhar NP (1993b) Ethnobotanical notes on folklore remedies of Baglung District, Nepal. *Contribution to the Nepalese Studies* **20**(2):183-196.

Manandhar NP (1994) An ethnobotanical survey of herbal drugs of Kaski District, Nepal. *Fitoterapia* **65**(1):7-13.

Manandhar NP (1995) A survey of medicinal plants of Jajarkot District, Nepal. *Journal of Ethnopharmacology* **48**(1):1-6. DOI: 10.1016/0378-8741(95)01269-J

Manandhar NP (1998) Ethnobotanical census on herbal medicine of Banke District, Nepal. *Contribution to the Nepalese studies* **25**:57-63.

Manandhar NP (1999) Conservation of medicinal plants in Nepalese forest: Problems and prospective. *Medicinal plant Conservation*. 5:3-4.

Manandhar NP (2002) Plants and People of Nepal. Timber Press Portland Oregon, USA.

Mueller-Boeker U (1993) Ethnobotanical studies among the Chitwan Tharus. *Journal of Nepal Research Centre* **9**:17-56.

Pandey BD (1964) The wealth of medicinal plants of Nepal. *Peking Symposium, China* pp183.

Pandey HP (2008) Economic Botany Silver Line Publications 17/3 Mathura Road, Faridabad U.P. India.

Panthi MP and Chaudhary RP (2003) Ethno medicinal Plant resources of Arghakhanchi District, West Nepal, *Ethnobotany* **15**: 71-86.

Pieroni A, Houlilhan L, Ansari N, Husain B and Astam S (2007) Medicinal perception of vegetable traditionally consumed by South-Asian migrants living in Bradford, northern England. *Journal of Ethnopharmacology* **113**:100-110. DOI: 10.1016/j.jep.2007.05.009

Pohle P (1990) Useful plants of Manang district. Franz Steiner Verlag Wiesbaden GMBH, Stuttgart.

Prescott-Allen OC and Prescott-Allen R (1990) How many plants feed the world? *Conservation Biology* **4**: 365-374. DOI: 10.1111/j.1523-1739.1990.tb00310.x

Scherrer AM, Motti R, Weckerle CS. 2005. Traditional plant use in the areas of Monte Vesole and Ascea, Cilento National Park (Campania, Southern Italy) *Journal of Ethnopharmacology*, **97**: 129-143. DOI: 10.1016/j.jep.2004.11.002

This paper can be downloaded online at [http://ijasbt.org](http://ijasbt.org) & [http://nepjol.info/index.php/IJASBT](http://nepjol.info/index.php/IJASBT)
A.G. Singh (2015) Int J Appl Sci Biotechnol, Vol 3(1): 111-118

Sharma OP (1999) Plant Taxonomy Tata McGraw-Hill Publishing Company Limited, New Delhi, India

Shrestha I and Pradhan N (1986) Medicinal plants of Chobbar village of Kathmandu district. J. Nat. Hist. Mus. 10(1-4):65-72.

Shrestha K (1998) Dictionary of Nepalese Plant Names, Mandala Book Point, Kantipath Kathmandu.

Shrestha P (1985) Contribution to the ethnobotany of the Palpa areas. Contribution to Nepalese Studies 12(23):63-74.

Singh AG, Kumar A, and Tewari DD (2012b) An ethnobotanical survey of medicinal plants used in Terai forest of Western Nepal. Journal of ethnobiology and ethnomedicine 8:19. DOI: 10.1186/1746-4269-8-19

Singh AG, Panthi MP and Tewari DD (2012a) Wild Plants used as vegetables in Rupandehi District of Western Nepal and their ethnomedicinal importance. J. Nat. Hist. Mus. 26:111-125.

Singh AG, Poudel KN and Tewari DD (2011) Diversity of Cultivated and Wild medicinal Plants used by the People of Devdaha VDC of Rupandehi District West Nepal. Current Botany 2 (2):34-42.

WCMC (World Conservation Monitoring Centre) (1994) Priorities for Conserving Global Species Richness and Endemism. In: Caldecott JO, Jenkins MD, Johnson T and Groombridge B (eds). World Conservation Press, Cambridge, UK.