Indigenous uses of plant species in Nanda Devi Biosphere Reserve, Uttarakhand, India

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Abstract: The present study has been carried out in the Nanda Devi Biosphere Reserve, Uttarakhand, India, to document the ethnobotanical uses of plants. A total of 41 species belonging to 40 genera and 26 families have been reported. Plant species commonly used by local people for food, fodder, medicine and in other fields of their lives are enumerated. A list of plant species along with their local names, plant part(s) used and mode of application has been given. The findings can be utilized in the future for technological advancement, economic prosperity and providing employment opportunity to the local people. [Report and Opinion 2010;2(2):67-70]. (ISSN: 1553-9873).

Key Words: Nanda Devi Biosphere Reserve, plant species, ethnobotany.

1. Introduction

Nanda Devi Biosphere Reserve is situated in the north-west part of the Himalaya and is shared by the districts of Chamoli, Bageshwar and Pithoragarh. The area of Nanda Devi basin was declared as Nanda Devi Sanctuary in the year 1939, and was elevated to the level of National Park in the year 1982. Again in January 1988, under the MAB programme of UNESCO, it was raised to the status of Nanda Devi Biosphere Reserve, by the Government of India. The Biosphere Reserve located between 30^0 05' - 31^0 02' N latitudes and 79^0 12' - 80^0 19' E longitudes spreads over 5860.69 km^2 of land area with a core zone of 712.12 km^2 and covers a wide altitude range from 1700 -7817 m asl. The buffer zone is inhabited with 47 villages, out of which 34 villages fall in the Chamoli district. The inhabitants of the area belong to both Indo-Mangoloid (Bhotias, Tolchhas) and Indo-Aryan groups (Garhwalis).

The Nanda Devi Biosphere Reserve is well known for its rich biodiversity. The inhabitants of the area largely depend on plants for food, dye, medicine, beverage, wood work and various religious and cultural needs. Floristic excursion in the Nanda Devi Biosphere Reserve has been undertaken by Hajra (1983), Hajra and Balodi (1995), Naithani (1984-1985), Dangwal (1993), Gaur *et al.* (1995), etc. Although some information on the utilization of plant species has been provided by the workers such as Uniyal (1977), Negi *et al.* (1985), Tiwari (1986), Gaur *et al.*(1983), Samant (1993), Gaur (1999), Samant and Pal (2003), yet a detailed study on ethnobotany of this area has not been carried out. The present exploration has resulted into information on plants used as food, fiber, fuel, dye, medicine and in religious practices. Detailed information on plant parts used, methods of preparation and the mode of application have been recorded.

2. Material and Methods

Regular field study was made in the Nanda Devi Biosphere Reserve during the years 2006 to 2009 for the survey of the vegetation and indigenous uses. Ethnobotanical information on plants was collected through interviewing local communities. The informants were medicine-men (*Vaidhyas*), peasants, shepherds, priests and village headmen. A structured questionnaire was used to collect data on local plant names, uses, parts used, and mode of application. Recorded plant species were identified with the help of Garhwal University Herbarium (GUH), Herbarium of the Botanical Survey of India Northern Circle Dehradun (BSD), local Floras and previous works of Duthie 1906; Osmaston, 1927; Rau, 1961; Naithani, 1984-85 and Gaur, 1999. The voucher specimens have been deposited in the GUH.

3. Results

The study revealed 41 plant species belonging to 26 families in the Nanda Devi Biosphere Reserve. In the following text, plant species are arranged

alphabetically with their botanical names followed with the family, local name, part(s) used and the mode of application.

Abies pindrow Royle Pinaceae V. Ragu
Leaf paste is applied twice a day for 7 to 15 days to reduce of swelling of injured parts. Wood used for construction and furniture.

Acorus calamus L. Araceae V. Bauchu.
Tuber powder, approximately half teaspoonful is given twice a day, for 7 to 21 days, for throat infection.

Aconitum balfourii Stapf Ranunculaceae V. Banwa.
The tuber powder is boiled with clarified butter and made into paste. The paste is applied externally on joints twice a day, for 2-4 weeks in arthritis.

Aconitum heterophyllum Wall. ex Royle Ranunculaceae V. Atish.
Tuber of the plant with leaves of Ajuga parviflora are given twice a day, for 1 to 3 months in diabetes.

Aesculus indica (Colebr. ex Camb.) Hook. Hippocastanaceae V. Panger
Seed powder (1/2 teaspoon) is given twice a day for a month, in leucorrhoea. Leaves used as manure, wood for fuel and in making agricultural implements.

Ajuga parviflora Benth.Lamiaceae V. Neelbadi.
Leaf extract is given as a carminative before meals for 1-3 weeks.

Allium wallichii Kunth. Amaryllidaceae V. Lainku.
Tender shoots are made into vegetable by shepherds. The leaves are also used as condiment and in the treatment of cold and cough.

Alnus nepalensis D.Don Betulaceae V. Uteesh
Leaves lopped for manure, wood used for fuel and to construct huts. The tree is used as a soil binder.

Ampelocissus rugosa (Wall.) Planch. Vitaceae V. Chhyapari
Root paste applied on skin ailment (Chhyapadi) of buffaloes, in which the skin peels off.

Angelica glauca Edgew. Apiaceae V. Choru.
Roots are used as condiment. Root powder (10 gm) is given to livestock to cure toxic effects.

Arctium lappa L. Asteraceae V. Kuthu
Rhizome powder mixed with honey is given in asthma. Leaves used as manure. Aromatic roots used as insect repellants in woolen clothes.

Arnebia benthamii Wall. ex G.Don Boraginaceae V. Lal Jadi.
Rhizome powder roasted with clarified butter is made into tablets. One tablet twice a day is given for 2-4 weeks in piles.

Artemisia roxburghiana Wall. ex Besser Asteraceae V. Kunju
Leaves mixed with Paeonia emodi leaves are given twice a day for 1-3 months in diabetes. Plant is regarded as sacred.

Asparagus filicinus Buch.-Ham. Liliaceae V. Jhirni
Tubers are given, twice a day for 1-3 weeks in leucorrhoea.

Astragalus candoleanus Royle ex Benth. Fabaccae V. Rudarwanthi
Roots mixed with the roots of Bombax ceiba are roasted with clarified butter and made into pills. One pill is given twice a day for a month, as general tonic.

Berberis lycium Royle Berberidaceae V. Kirmode
Wood powder (2 gm) is given twice a day, for 1-2 months in diabetes. Fruit are edible and made into sauce. A yellow dye is obtained from the wood.

Bergenia ciliata (Haworth) Sternb. Saxifragaceae V. Chon Silpadi
Root paste mixed with mustard oil is used as a hair tonic. Young tender shoots and flowers used as edible.

Betula utilis D. Don Betulaceae V. Bhauj
Bark paste mixed with cow-urine is applied externally on sores. Bark used in psychomedicine. Plant is regarded as sacred.

Cedrus deodara (Roxb. ex. D. Don) G. Don Pinaceae V. Dewar
Wood oil (1drop/day) is given in piles. Wood used for making furniture. The tree is considered sacred and also used in religious ceremonies. Leaves used as incense.

Celtis australis L. Ulmaceae V. Khadik

Fruit are edible; leaves provide fodder; bark yields yellow dye; wood used as fuel and for making handicrafts.

Cuscuta reflexa Roxb. Cuscutaceae V. Aakash Matri
Stem paste is used as a carminative. Plant used in rituals.

Cyathula tomentosa (Roth) Mog. Amaranthaceae V. Kuru.
Root extract (5ml/day) is given for a month in haematuria. Leaves used as fodder. Spikes used in religious ceremonies especially in local fair Hastola (Kur Jwegi).

Dactylorhiza hatagirea (D.Don) Soo, Orchidaceae V. Hatta Jadi
Tuber paste is applied on joints in arthritis.
Debregeasia salicifolia (D.Don) Urticaceae V. Syanru
Leaves provide fodder; stem yields fuel; bark yields strong fibre for making ropes and cordages; ripened fruit edible. Leaves lopped for manure.

Desmodium elegans DC. Fabaceae V. Chamla
Twigs used as tooth brush, considered effective in pyorrhea. Leaves used for fodder; bark for ropes and sacs.

Elaeagnus parviflora Wallich ex Royle
Elaeagnaceae V. Ginwain
Fruits are edible, made into sauce; Leaves lopped for fodder; plant considered as a good soil binder.

Elsholtzia flava Benth. Lamiaceae V. Pwethi
Seeds are edible; leaves lopped for manure; plant used in religious ceremonies.

Fritillaria roylei Hook. Liliaceae V. Kahir kakodi
Bulb powder is taken with cow-milk as a tonic.
Gerardinia diversifolia (Link) Friis Urticaceae V. Char Kandali
Stem yields a strong silky fiber, used to make rough clothes and winter shoes locally known as 'Chhapyala'.

Habenaria pectinata (J.E. Smith) D. Don
Orchidaceae V. Ridh
Root powder is taken as a tonic.

Hippophae salicifolia D. Don Elaeagnaceae V. Amesh
Decoction of fruits is given in whooping cough. Fruit are edible, made into sauce and juice.

Juniperus recurva Buch.-Ham. Cuprassaceae V. Bhyataru
Twigs and dried leaves are used as incense in religious ceremonies and festivals; wood used as fuel by shepherds and tribal people.

Lyonia ovalifolia (Wallich) Drude Ericaceae V. Angyar
Young leaves mixed with Juglans regia fruit rind and cow-urine made into paste, and applied in psoriasis. Wood used for fuel; leaves lopped for manure 'Passya'.
Malaxis muscifera (Lindley) Kuntze Orchidaceae V. Jeeva.
Bulb is given as a tonic.

Megacarpaea polyandra Benth. Brasicaceae V. Bharamauo
Root extract is given to livestock in internal injury. Leaves used as vegetable, roots eaten raw.

Podophyllum hexandrum Royle Podophyllaceae V. Shon kakari
Rhizome powder is given in leucorrhoea; ripened fruit are edible.

Prunus cerasoides D. Don Rosaceae V. Panya
Seed oil applied externally in arthritis. Leaves lopped for fodder and manure; plant regarded as sacred, used in rituals.

Rhododendron arboreum Smith Ericaceae V. Burans
Flowers are eaten raw or made into juice; wood used for fuel; leaves lopped for manure; flowers useful as bee forage; plant used in religious ceremonies.

Saussurea gossypiphora D.Don Asteraceae V. Fen Kaun
Plant used in religious ceremonies.

Satyrium nepalensis D.Don Orchidaceae V. Mooshali
Root powder is given with cow-milk as tonic.

Taxus baccata L. Taxaceae V. Thuner
Bark used as substitute of tea. Bark powder (5 mg) is

given in cold. Wood used to make furniture, and container 'Parrya'; ripened fruits are edible.

4. Conclusion

The present study provides comprehensive information on indigenous uses of plant species. It is evident from the investigation that the local people have great familiarity with the plants of their ambient environment which has immense importance in advancement of modern sustainable technology. The occurrence of a number of economically important species is enhancing the conservation as well as socio-economic values of the local inhabitants. The day-by-day need of forest resources particularly medicine, fuel-wood, timber, food and fodder species has increased the pressure on the area. Furthermore, the over-exploitation of species for fuel, fodder, medicine, food (wild edibles), and house building may lead to reduction of these species from the area. Therefore, there is a need to develop adequate strategy and action plan for the conservation and management of habitats and species.

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