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Diversity and ethnobotany of Fodder plants in the Himalayan rangelands : a case of the Uttarakhand Mountains , India

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Introduction Himalayan rangelands are natural repositories of biodiversity . The vegetation is predominantly of forest communities with frequent interruption of scrub jungles , savanna , grassy localities and crop fields . Several environmental factors control the distribution of vegetation . Vegetation is demarcated on the basis of altitudinal gradients because edaphic , topographic , climatic and associated factors tend to be altered with altitude (Gaur 1999) . Utilisation of rangelands in the Himalayan region dominated by livestock-dependent communities is primarily for livestock production . A panorama of the biodiversity presented in this paper counts and characterizes the plant species that have some kind of fodder value . Ethnobotanical values associated with certain fodder plants have also been described .

Materials and methods Enumeration of diversity of fodder plants in the rangelands is based on the extensive survey and collection of range plants from the mountain districts of Almora and Champawat in Uttarakhand . Frequent field trips were made during different seasons of three consecutive years (2003-2006) . Plants species preserved in Herbarium were identified with the help of recent and relevant floras and revisions and compared with the authentic Herbarium specimens of Botanical Survey of India and HNB Garhwal University Herbarium . Ethnobotanical values were known through interviews of local farmers and in discussion with some experts .

Results and discussion The rangelands covered for this study were located in sub-montane and montane areas . As many as 541 fodder plant species belonging to 84 families in the study areas were identified . Largest number of fodder species (164 or 30% of the total) belonged to the family Poaceae alone . Next in order was the Fabaceae which contained 69 species (or 13% of the total species) . The Moraceae and the Asteraceae families had 21 (4%) and 19 (3%) fodder species , respectively , while Rubiaceae and Urticaceae families showed 13 (2%) representative species of fodder value . Other families had only fewer fodder plants . Apart from fodder value , many of the plants also provided edible fruit , fuel wood , fibre , timber , flowers , buds , vegetables , seeds , dye , bee-forage , etc . Some species have unique ecological role , such as specific soil-binding properties , water conservation , pollination , etc . Earlier , Bohra (2006) reported only some 160 fodder plants from the same area and focus of her study was on the fodder value for dairy animals in the mountains .

Some fodder plants are of crucial ethnobotanical importance and are used for various purposes , such as in curing of certain diseases , in health amelioration , religious rituals , cultural rites , etc . Different parts (such as root , shoot , leaves , flowers , and seeds) of a species are used through certain physical and chemical processes in the curing of prevailing diseases , such as skin and eye problems , diarrhoea , dysentery , digestive problems , menstrual disorders , gonorrhoea , dysmenorrhoea , measles , respiratory problems , bronchitis , fever , malaria , dropsy , piles , diabetes , jaundice , suppressed urination , urinogenital problems , delivery-related complexities , etc . Many fodder species are of ethno-veterinary uses and people variously use them to prevent and cure livestock diseases . Certain species are regarded as sacred and are used in various cultural and religious rites .

Conclusions A positive indicator to assess and diagnose the health of Himalayan rangelands is that they harbour enormous diversity of fodder plants so critical for the livestock-based livelihoods of a sizeable population of farmers and pastoralists in the region . Fodder resource utilisation also exhibits one of the unique examples of ethnobotanical knowledge of range-dependent mountain communities . The fodder diversity in mountain rangelands needs to be conserved and enhanced and its sustainable use needs to be ensured to realize an increase in livestock production in the region .

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