Distribution of vegetation types in northwest Himalaya with brief remarks on phytogeography and floral resource conservation

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Abstract. The vegetational wealth of northwest Himalaya is discussed in this paper. Unlike the vegetation of eastern Himalaya, the forests are not diverse and rich. The forests here are mainly classified under (i) tropical forests, (ii) subtropical forests, (iii) temperate forests, (iv) subalpine forests and (v) alpine vegetation, primarily based on the altitude. The plant resources of the region are briefly outlined with reference to (i) wild edible plants, (ii) medicinal and aromatic plants, (iii) ornamental plants, (iv) orchids, (v) fodder resources, (vi) bamboos and (vii) other biologically interesting species. The brief phytogeographical affinities of the northwest Himalayan flora, the major threats to the flora and some conservation programmes are also discussed.

Keywords. Northwest Himalaya; plant resources; affinities; threats and conservation.

1. Introduction

Although the Himalaya form a continuous chain of mountain system the distribution pattern of vegetation varies significantly from west to east. The eastern Himalaya are more green and diverse compared to the dry arid regions in the western Himalaya. The northwest Himalaya for this study comprises the areas of Jammu and Kashmir, Himachal Pradesh and western Uttar Pradesh.

2. Vegetation

The vegetation type met with in any particular area depends on the climate, the soil, topographical situation and geographical location. The topography of northwest Himalayan region is irregular and disturbed by valleys and plateau of various extent and as such the stratification is not clear. There is also a great diversity in the floristic pattern due to great altitudinal variation, coupled with rainfall factor which becomes lesser and lesser as one travels from east to west. However, on the basis of altitude and climate the vegetation types of this region may be divided as follows:

1. Tropical forests:
   (i) Scrub forests
   (ii) Deciduous forests
   (iii) Tree savannah forests
   (iv) Swamp forests

2. Subtropical forests:
   (i) Broad leaved forests
   (ii) Pine forests
   (iii) Subtropical evergreen sclerophyllous forests
3. Temperate forests:
   (i) Broad leaved forests
   (ii) Coniferous forests

4. Sub alpine forests

5. Alpine vegetation.

The details of the floristic composition and distribution of these forests are avoided as the same are discussed in detail by Schweinfurth (1957), Gupta (1964), Champion and Seth (1968), Rau (1974), Dhar and Kachroo (1983) and Singh and Singh (1987).

3. Affinities

The study on the phytogeographical affinities of the flora of the northwest Himalaya with the surrounding regions is indeed very fascinating. The close affinity between the flora of the northwest Himalaya with those of Europe, the near east and middle east is well established (Legris 1963; Gupta 1962, 1964, 1982; Meher-Homji 1973; Rau, 1974, 1975, 1981; Dhar 1978; Sahni 1982).

The European and central Asian elements are frequent in areas west of the river Sutlej, while the Chinese elements extend from Yunnan in the east right through the east Himalayan ranges.

From the dry mountains of western and middle Asia many elements have spread to the western ranges of the Himalaya. This influx is greatly due to the arid and dry conditions prevailing here particularly in the interior ranges of Ladakh, Lahul and Spiti valley. Several such species of middle Asia like *Rosularia alpestris*, *Salix karelinii*, *Sorbaria tomentosa*, *Lathyrus humilis*, *Acantholimon lycopodioides*, *Myricaria squamosa*, *Oxytropis microphylla*, *Halogeton glomeratus*, *Biebersteinia odora* etc. are found in the northwest Himalayan region.

*Cedrus deodara* common on the west Himalayan slopes is also distributed as far away as in Afghanistan. The eastern limit of the distribution of the species is the western part of Nepal. Based on this as well as on the distribution pattern of several species it has been concluded that the zone of transition between the phytogeographical regions of eastern and western Himalaya is approximately the area between 80°E to 84°E longitude (Stearn 1960; Banerji 1963).

As far as number of gymnosperm species is concerned, although the eastern Himalaya is richer there exist vaster, coniferous forests in the western Himalaya. *Pinus gerardiana*, *Juniperus polycarpos*, *Picea smithiana* are among the gymnosperms distributed in the northwest Himalaya but absent in the eastern Himalaya. Similarly *Ephedra*, an important genus of medicinal value, is well represented in the northwestern Himalaya with 6 species while only one species occurs in the eastern Himalaya.

Several species like *Larix griffithiana*, *Picea spinulosa*, *Cephalotaxus griffithii*, *Gnetum montanum*, *Cycas pectinata* etc. found in east Himalaya are absent beyond east Nepal.

Several temperate species from Europe and other temperate regions have also found their way to this region. Some of these species are *Melilotus officinalis*, *Medicago falcata*, *Aconogonon alpinum*, *Trifolium repens*, *Lotus corniculatus*,