

HERBACEOUS MEDICINAL PLANTS OF THE WESTERN RAJASTHAN

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The traditional medicinal plants throughout the world played an important role in development of new herbal drugs. In India utility of medicinal plant wealth can be traced since very ancient times. India is known for some of the important medicinal plants which are in the great demand all over the world. In India about 540 plant species are utilized by the pharmaceutical formulation in India (Kapoor and Mitra 1979). Among these 100 plant species are in much demand by the pharmaceuticals.

Arid ecosystem of western Rajasthan exhibits a great variety of geology, physiography, peculiar edaphic and climatic conditions. The region is a rich repository of genetic material of important arid medicinal plant wealth. These plants are not only valued as herbal drugs but also utilized for food, fodder, gums & resins, essential oils, dyes, fatty oils, condiments, spices etc. The arid region of Rajasthan has been grouped into two macro ecological regions viz. arid and transitional belt between arid and semiarid based on topoclimatological conditions (Sen 1972).

In the past the natural vegetation of the arid region is subject to drastic changes due to heavy grazing pressure, urbanization, introduction of IGNP, changes of cropping pattern by tube well irrigation etc. Combined effect of these factors affected the composition of natural vegetation as well as depletion of important economic plant species of this region.

The diversity of medicinal plants of arid region offer most valuable source of genetic material for breeding programme. Some of the arid species represent a distinct genetic stock adapted to harsh environmental conditions and has preserved their original genetic makeup. Attempts had earlier been made to document the medicinal plants of arid zone of Rajasthan (Chopra *et al* 1960; Chopra and Abrol, 1964; Ganguley and Kaul, 1965, Gupta *et al* 1966). In last few decades ethnobotanical studies also has been carried out covering different tribes and region of Rajasthan; and compiled the information as "Ethnobotany of Rajasthan" (Singh and Pandey 1998).

It is well known that most of the medicinal plants of arid region belong to the families such as Apiaceae, Asclepiadaceae, Asteraceae, Cactaceae, Cappariadaceae, Chenopodiaceae, Convolvulaceae, Cucurbitaceae, Lamiaceae, Leguminosae, Molluginaceae, Solanaceae and

Zygophyllaceae. In arid region some of the plant species are quite restricted in distribution. The species like Gugal is much exploited locally for its oleo-gum resin and now in the list of endangered species in its natural habitat. Over exploitation of the key species can lead to disequilibrium in the arid ecosystem and subsequently loss of genetic diversity of the species.

Presently only few medicinal species like Isabgol (*Plantago ovata* Forsk.), Sonamukhi (*Cassia angustifolia* Vahl) are in the cultivation. The species like Gwarpatha (*Aloe barbadensis* Mill.), Indrayan/Tumoa (*Citrullus colocynthis* (L.) Schrad), Ashwagandha (*Withania somnifera* (L.) Dunal) etc. are also potential medicinal plants of the region. There are still a large number of plants of arid region which are either under-exploited or under-utilized for active constituents. Most of the medicinal species of arid region are collected from the wild population. The needed attention was not paid to less known species which are in used by the inhabitants. We have to find out the ecological distribution of those species, which are restricted in distribution to western Rajasthan. Ecological information of such species is important for their sustainable utilization as well as conservation in harsh climatic conditions. The herbal wealth of the region can be properly utilized by cultivating the herbs or utilizing the raw material from wild population on a sustainable manner.

In view of the aforesaid the focus in the present paper is on the less known herbaceous medicinal plants for their sustainable utilization and conservation.

VEGETATION OF WESTERN RAJASTHAN

Vegetation of western Rajasthan, which is pre-dominantly xerophytic and quite sparse, but occurs on a great variety of habitats for various economic plants. Blatter and Hallberg (1919-21) termed the vegetation types of Rajasthan as 'formations', and recognized five habitats viz., (i) Aquatic (ii) Sand (iii) Gravel (iv) Rock and (v.) Rudral. Later on, Champion (1936) classified the arid zone vegetation into four types which were subsequently (Champion and Seth 1964) reclassified into eight forest types. Gupta (1975) enlarged the five vegetation types of Satyanarayana (1964) into six types which were, later on, slightly modified by Saxena (1977) but the original six types has been maintained. The six vegetation types are: (1) Mixed xeromorphic thorn forest, (2) Mixed xeromorphic wood land, (3) Mixed xeromorphic riverine thorn forest, (4) Lithophytic scrub desert, (5) Psammophytic scrub desert, and (6) Halophytic scrub desert. Shankar and Kumar, (1998) described the various desertic habitats viz., hills and rock outcrops, upper piedmont plains, lower piedmont plains, rocky/gravelly and shallow buried pediments, flat buried pediments, flat older alluvial plains, sandy undulating older alluvial plains, sand dunes, graded river beds, saline flats and depressions, and aquatic habitat with their characteristic plant species.

Based on edaphic factors, Shetty (1994) also described the vegetation of western Rajasthan under eight habitats viz., sand dunes and interdunal plains, sandy and hummocky plains, rocky/gravelly pediments, isolated hills and rock outcrops, saline flats and depressions, river beds, marshy aquatic areas and weeds of cultivated, fallow fields.

Environmental Adaptations of Arid Plants

In arid region plants are adapted to soil moisture stress, dryness of air and high atmospheric temperature. Desert plants show morphological adaptations that enable them to survive under lack of moisture and prolonged periods of drought. Prakash and Sen (1987) reported