The first record of collection in the Jammu and Kashmir state is that of William Moorcroft in 1822 who with Trebeck 1841 wrote ‘Travels in the Himalayan Provinces of Hindustan.’ Royle send collectors to the valley of Kashmir under the guidance of shawl dealers when they were returning to home, and published the first account on the flora of Kashmir (with illustration) in ‘Illustration of the Botany and other branches of the Natural History of the Himalayan Mountains and of the Flora of Kashmir’ (1833-1839).

Jacquemont, was the first botanist to visit the valley through Poonch in 1831 but he did not survive long to see through the publication of his excellent collection, which was later executed by Combessedes and Decaisne in 1844 (Stewart 1982), Thomson also made collections from different part of the valley (1847). However the account of plants of the state till then is only available in the Hooker’s Flora of British India (1872-1897).

With the reorganization of the Botanical Survey of India and the establishment of its Northern Regional Circle at Dehradun in 1956 the exploration activities in the state have joined appreciable momentum. Among the major collectors from this premier organization, mention be made of Rao (1960, 1961), M.A. Rau (1974).

The general pattern of forest vegetation in India has been known for many years (Champion and Seth, 1968), but significant progress in this direction has been made at different places in India by Kenoyer (1921) and Dodgeon and Kenoyer (1925), Meher Homji (1973), and Saxena and Singh (1982). Champion was the first to classify and describes forests of Himalaya (Champion H.G, 1936).

Singh and Kachroo (1976) describe the Pinus roxburghii forest of Kashmir. Javaid also (1979) made contribution to the forest diversity
of Kashmir. Singh (1994) described Pir Panjal range as one of the most
dense forest divisions of Kashmir.

Converyr’s ‘Wild Flora of Kashmir’ (1923-1930) and Blatter’s
‘Beautiful Flowers of Kashmir’ (1927-1929) need also be mentioned.

Floristically Jammu and Kashmir represents a mega-diversity state
comparable only with east Himalayan state of Arunachal Pradesh and
Sikkim (Singh & Hajra, 1996; Chowdhery, 1999, Singh & Chauhan
1999).

According to Singh et al (1999) the proportion of dicotyledons in
the state is approximately 5:1 at family level 3: 7: 1 at generic level
and 4: at specific level which compares well with India, viz. 4.6:1,
3.3:1, and 3:1 respectively. The over all genus to species ratio in the
flowering plants of the state is 1:3.5 as against 1:5.6 in India

Collection

The practice of seed collection is very old. Certain tribes in
Mongolia and American Indians collected seeds for food long before
the dawn of history.

Evidence of man’s domestication of plants dates back only to
about 9000 B.C. (Ucko and Dimbleby, 1969). It was during this period
between 9000 BC and 7000 BC in the old world and 6000 BC in the
new world, that some human population gradually changed from
hunter gatherers to the agrarian type. This gradually change labelling
the Neolithic Revolution by Child (1943), permitting the first great
population expression and the first step towards civilization (Bennett,
1965; Mangelsdorf, 1965).

Harris (1969) described the type of people that domesticated the
plants. Fussel (1965) speculated it was the women who first played
the role in harvesting plants and seed collection. At least three centers
of seed domestication have been located in the old world (Saucer, 1952).

A seed collection zone is an area with defined boundaries and altitudinal limit, in which soil and climate are sufficiently uniform to indicate high probability of producing a single ecotype (Anon, 1974). Seed collection zones have been established in most of the forest growing areas in the world (Aldhous, 1972). Khanna, 1984 defined seed stands as vigorously growing, middle aged to mature trees of good quality; seed stands were also defined by Dorman (1976).

The collection of good quality of seed needs greater care for raising successful plantation. The seed collection in India is generally made from local stand, without considering the structure of seed (Champion and Seth, 1968). Most of the forest tree seeds are obtained from natural and artificial stands in India (Khanna, 1984). The selection of seed source is the most important aspect of nursery seedling and identification purpose (McMillan, 1979; Dirr and Heuser, 1987). To select the tree for seeds, the guidelines may be followed (Stein et al, 1974). Generally there are four types of seed stands that are being used for seed collection (Anon., 1974). Bates (1928) and Lentz (1929) set aside stands which are especially adopted to seed collection either by reason of ease in collection; excellence of tree form or productivity of seed. Productivity, testing and distribution of high quality seeds need to be regulated by strict quality control through seed certification (Anon, 1979).

Seeds may be either collected locally or imported as in the case of exotic species (Jackson, 1987). The site factor plays important role in the quality collection of seeds (Thapliyal and Rawat 1982).

Seed production depends mainly on climatic conditions, but is also effected by the age of the tree and manner of growth; seeds from tree just beginning to bear are often of poor quality (FAO, 1955). In
conifers, especially *Cedrus deodara*, the good seed crop occurs at an interval of four to five years (Troup, 1921). Seed collection in Chir (*Pinus roxburghii*) for consecutive three years synchronizing with heavy, low and medium seed years showed average seed yield (Thapliyal 1986). The colour change in fruits is no doubt the best available criteria for judging the maturation of seeds (Maithani et al 1987). However in some species however fruit colour does not appear to be useful criteria of seed maturation (Maithani et al 1989). Fruit colour is related to seed germinability (Bahuguna et al 1986). Maithani et al (1987) gives the criteria for maturity indices for various species, however, in case of *Cedrus deodara* the cone dehisces seed immediately after reaching the maturity.

There is a great variety of methods and equipments available for collection of seeds and fruits (Robbins et al 1981). Although there are some species of trees of which seeds can be collected from ground e.g. *Aesculus, Juglans* while in other species of trees seeds cannot be collected from forest floor (Campbell 1980), e.g *Betula, Morus*.

Anon. (1974) mentions four types of seed stands that are being used for collection. Dominant trees were by far the best cone producers (Fowells & Schubort, 1956). The number of dominant trees should vary from species to species but should vary between 50-75 trees per hectare (Zebel and Talbert, 1984). The dominant trees should have 30 cm diameter (Cole, 1963).

At the time of seed collection care must be taken to avoid collection of insect infected seeds (Harsh and Joshi, 1993). Methods of extraction are also important for seed characteristics (Schimidt, 2000).

The chief problem regarding the forest seeds in India is their need in extremely large quantities (Srimathi & Emmanuel, 1986) which makes it compulsory to collect all available seeds, both of good
and poor quality. Almost all the tree seeds attain best quality only when allowed to ripe fully on the trees (Wakety, 1938).

**IDENTIFICATION**

Seed identification is the field of botany that has been developed over the past fifty years to meet the problem of labeling forestry seeds, agriculture seeds, vegetable seeds etc.

Isely (1947) was the pioneer in developing the seed identification keys to the families. Variation in seed size, shape, and colour are important in seed identification; some seeds are stenospermous and others are euryspermous (Eames 1961). The common seed shapes are ellipsoid, globose, lenticular, oblong, ovoid, reniform (Duke 1969). A seed key for northern birches has been developed by Cuninghan (1957).

Isely (1947) and McClure (1957) were most helpful in preparing the seed description of some families. Isolated seeds, may be identified to genus and species (Dallimore and Jackson 1966; Forest Service, 1948. Hutchinson (1960, 1969) recognized eight genera with the fruit characters. Seed characteristics have seldom been used below the family level (Benson 1969, Britton and Rose, 1963). The surfaces of seed coat vary from highly polished to markedly roughen. Although surface topography is advantageous (Murley, 1951).

Seed identification keys to some forest species were also developed by Madan Gopal and Thapliyal, (1970, 1971). A seed identification key to nine species of Pinus has also been developed by Paliwal et al (1984). Of different people in the United States who have contributed to our knowledge on seed identification, the name of Hillman stands out foremost (Hillman 1897). Korsmo’s (1935), Beijerinck (1947) published the seed plates of 306 species of weed seeds. Musil (1963) gave keys to various species of crop and weed seeds.
seeds on the morphological characters, which were published in the year book of Agriculture handbook.

Martin (1946) discussed the internal morphology of 1,256 species of seeds. Studies of seed coat surface may be facilitated by using cellulose acetate peels (Stoddard 1965) or acrylic polymer emulsion peels (Horanic and Gardner 1967). Anghel et al, (1959, 1965), Beijernck (1947), Berggren (1969), Bertsch (1941), Bouwer (1927), Brower and Stahlin (1955) emphasized external seed identification at family level.

Seed size is greatly related to its germination rate (Champion 1928) Bonner 1987).

Seed morphology in advantageous for artificial regeneration as it can influence the collection, processing, storage and treatment of seeds. The external and internal morphological features of seeds are remarkably stable; they provide reliable criteria for positive identification of unknown seeds (Martin & Barkley, 1961; Gunn, 1972; Kozlowski, 1972). Seed morphology of grasses and bamboo has also been discussed by Arber (1934) and Bor (1960).

Seed size which is one of the morphological features of seed plays an important role in seed germination. The seed size often controls the germination and initial seedling growth (Langdon 1958; Kandiya 1978). The medium size seed of Pinus roxburghii gave higher germination and plant percent (Ghosh et al 1976b). Medium size seeds have also performed better in Quercus leucotrichophora (Singh et al 1995). Surface structure or appearance of seed is important for seed identification. For very small seed it is often the main diagnostic feature (Boland et al 1980). Seed morphology of some species of family Malvaceae has also been carried out by Pal and Nair (1987) and is very important for identification.
Morphological characters of seed provide valuable information on the evolutionary classification of flowering plants (Corner, 1996; Takhtajan, 1991). Seed identification key has also been developed to some aquatic and wetland plants of north western Himalaya (Durani & Majeed Kak, 1987).

**Ethnobotany:**

The term Ethnobotany was first used by Harshberger (1896) who defined it as the study of “plants used by the primitive and aboriginal people”. Robbins *et al* (1916) broadened this definition and suggested that the science of ethnobotany should include the investigation and elevation of the knowledge of all places of plant life among primitive societies and of the effects of the vegetal environment up on the life, customs, beliefs and history of the tribal people. Jone (1941) suggested that ethnobotany is the study of interrelationship of primitive man and plants. In the present day ethnobotany is the totality of place of plants in culture and direct interaction by the people with the plants (Ford, 1978).

Ethnobotanical research has a long history, which include the Egyptian Queen Hatshepsut who in 1495 B.C sent an official to distinct areas to collect living specimens of fragrant trees (Coat, 1970). The modern approach to the science of ethnobotany evolved in U.S.A (Shah, 1987). The South west of U.S.A is the best area studied in the world for ethnobotany (Ford, 1985). Anderson (1985) investigated ethnobotany of Akha tribes of Thailand and reported 121 species and medicinal uses or uses attributed to them. Bhat *et al* (1990) have reported 52 plant species collected during ethnobotanical survey Kawara state of Nigeria.

Vast ethnobotanical knowledge exists in India from ancient times. Written records of the use of plants for curing animal and human diseases in India can be traced back to the earliest (4500-1600
B.C) scripture of Hindus, Rig-Veda (Jain 1994). An ethnobotanical investigation has led to the documentation of a large number of wild plants used by tribal for meeting their multifarious requirements (Anonymous, 1990).

Studies on ethnobotany were initiated by E. K. Janaki Ammal as an official programme in Economic Section of Botanical Survey of India (Janaki Ammal, 1956). From 1960 Jain started intensive field studies among the tribals of central India (Jain, 1963, 64, 65)

Berlin (1984) has taken this interdisciplinary approach one step further by tracing and incorporating indigenous collaborators in the process of obtaining ethnobotanical data

The first written account of medicinal plants were made as old Egyptian hieroglyphics, the Bible, the Vedas and Chinese herbal detailed the extensive use of medicines from nature. The natural environment remained the major source of healing remedies worldwide (Singh and Singh, 2003).

Nature has bestowed India with enormous wealth of medicinal flora (Salapathy 1992, Jain 1992). Out of 15,000 angiosperm plants in India, about 3500 plants have been recorded, so far their curative properties as medicinal plants (Pal, 2003).

Ethnobotanical field work can as individual play a critical role in participating economic development (Chamber 1983). Kaul (1928) in his book on forest products of Jammu and Kashmir has enlisted 19 drug plants which were collected from forest areas of Kashmir.

The ethnic groups inhabiting North West and Trans-Himalayan region fundamentally depend on agriculture and pastoral activities. As they have been living in isolation for thousands of years, their knowledge of indigenous uses of native plants need to be studied before it gets extinct (Kaul et al, 1990).
The medicinal plants of Jammu and Kashmir have also been studied by (Ragunathan, 1970; Dhar, 1980; Srivastav and Gupta 1982).


Nawchoo and Bhat (1994) studied the ethnobotanical important plants used by Gujjar, Backerwal, tribes in Jammu and Kashmir. Shoukat Ara and Naqshi (1972) studied the ethnobotany of Gurais Valley.