CHAPTER-1

Introduction
Plants are universally recognised as a vital part of the world's biological diversity and an essential resource for the planet. In addition to the small number of crop plants used for food and fibres, many thousands of wild plants have great economic and cultural importance and potential for providing food, medicine, fuel, clothing and shelter for people throughout the world. Plants play a key role in maintaining the planet's basic environmental balance and ecosystem stability and provide an important component of the habitats for the world's wild life.

India is one of the leading bio-diversity centres with 45,000 different plant species. Our country has 15,000-18,000 flowering plants, 23,000 fungi, 2,500 algae, 1,600 lichens, 1,800 bryophytes and 13 million microorganisms, in its biodiversity region. Out of these rich resources, 2000 plant species are used in traditional medicinal practices. Thus, India has a rich heritage of its own, because of its wide diversity in soil and climatic conditions and rich flora and fauna. In the past almost all medicines used were from the plants, the plants being the only chemist for ages. Today a great extent of knowledge concerning about therapeutic properties of different plants has accumulated.

India has produced a respectable health care system in which, Ayurveda encompasses the entire spectrum of human health and contributes to the health of an individual. But, due to certain inimical interferences, with the system over the ages, a need has arisen to unify the entire system and codify it. In this context, laying down the standards of Ayurvedic drugs is of paramount importance. This is more so because these days the Ayurvedic drugs are increasingly coming from the industry, rather than the Ayurvedic physician compounding them impromptly. Moreover, commercially Ayurvedic drugs can make a place in international markets, which are looking towards, alternative medicine for the cure of ailments, to which even modern system has no answer. These ailments include metabolic or degenerative disorders such as arthritis, lifestyle induced problems of heart, diabetes and
cancer, dementia and age related disorders, immunological disorders and gynaecological problems. There is a big market of drugs for the cure of these diseases. Firstly we have a bird’s eye view of the status of plant based products globally and underline the thinking in other countries on these drugs and try to reflect on our scenario. Globally, there is an increasing interest in traditional system of medicines. Traditional use of herbal medicine is the basic and integral part of various cultures, which was developed within an ethnic group before the development and spread of modern science. The herbal medicines are the major remedy in traditional system of medicine. They have been used in medical practices for thousands of years and these have made a great contribution in maintaining human health.

Herbs, fruits, cereals, vegetables and variety of other plant parts are the sources, which God has sent to heal our ills. It is for us to use them against diseases, aright since to neglect them is to throw away our greatest treasure “GOOD HEALTH”.

Plants have been used for nourishment by human being with the dawn of civilization. The primitive men used the raw material and raw extracts of the plant to help them in sickness without the knowledge of their composition. From ancient times till to date, people healed themselves with traditional herbal medicines, which in several cases, by trial and error, proved efficacious. In every ethno group there exists a traditional health care system, which is culturally patterned. In tribal communities the traditional health care seems to be the first and foremost line of protection from diseases. The World Health Organization (WHO) has also recognised the contribution of traditional health care in tribal communities.

All indigenous remedies whether traditional or modern have been originated directly or indirectly from superstitions, rituals and folklore etc. Rich traditional skills and oral folk-lore knowledge are fast disappearing and are likely to be lost forever. Hence, this problem must be taken as a challenge by researchers and scientists,
to conserve the valuable knowledge and wisdom of the tribes for the posterity and human welfare. Therefore investigations should be carried out as the natural medicinal resources are dwindling along with traditional ethnic culture.

Potentially every plant occurring on this planet has one or more medicinal properties. An increasing number of investigations have been focussing on the vast store of knowledge, about the properties and uses of plants, still existing in nature. Hence, without paying attention on the traditional and ecological aspects like growth behaviour of plants, their seed germination and presence of active principles etc., it is not possible to conserve and maintain the sustainability of the plants along with their medicinal properties.

As we know that seeds of plants germinate, grow, become mature and develop into a community and ultimately die. Majority of life processes i.e., reproduction, growth, yield and synthesis of active principles in plants are governed by various habitat factors such as: climatic conditions and biotic influences etc. Vegetation of an area plays an important role in the structural configuration of nature and it can be managed, either for physical and recreational benefits or for productive purposes. Plants exercise a moderating influence on air, water, temperature and other various factors. Besides altering the physical and chemical properties of soil, they play an important role in checking flood, drought, erosion and other vagaries of nature. Several factors such as soil, rainfall, altitude, light and method of cultivation etc. also plays a major role for economical success of large scale cultivations of plants. Numerous activities of man too influence the growth and production of plants.

Seeds are the source of life and it may be defined as “fertilised ovule consisting of intact embryo, stored food and seed coat which is viable and has got the capacity to germinate”.

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High quality seed is an absolute necessity as it is the principal means of propagation of most of the plant species. The quality seed is obtained from healthy parent trees (plants), with desired characteristics and from proper environment, thus providing good and healthy plants. The function of the seed is to carry its embryonic plant through the hazards of time and place where new plant can grow, flower and in turn produce seeds. It is the device for the reproduction, preservation, increase and dissemination of plant life. Seed is the important stage of plant and its characteristics depicts the sum of total effects of various stress and strains, which the species have been subjected to and its evaluation in its specific habitat of origin (Nikoloeva, 1958).

Plants have always been a common source of medicament, either in the form of traditional preparations or pure active principles. In a survey done by World Health Organisation (WHO) it has been estimated that 80% of more than 4,000 million inhabitants of the world rely chiefly on traditional medicines for their primary health care needs and it can safely be presumed that a major part of traditional therapy involves, the use of plant extracts or their active principles (Fransworth et al., 1985). In the developed countries too, plant derived drugs are important, in USA, for example 25% of all prescribed people dispensed from community pharmacies, contain plant extracts or active principles prepared from higher plants (Fransworth et al., 1976). There are at least 120 distinct chemical substances derived from plants that can be considered as important drugs (Fransworth et al., 1985).

About 90% of Unani, Ayurvedic, Chinese, Tibetan folk and tribal medicines are of plant origin and 20-30% medicines of modern pharmacopoeia are derived from plant sources. Further realising the harmful side effects in the body and possible breaking of DNA of human genes by synthetic medicines, the global mass tendency is shifting to depend more and more on herbal treatments (Tiwari and Uniyal, 1990).

Medicinal plants are of great interest as pharmaceutical industry depends in greater part on plants for the production of secondary
compounds (Rout, et al., 2002). A vigorous search for the drugs from medicinal plants, during the last century, has resulted in the discovery of many active principles from innumerable plant species. A good number of these have been found to be of great use, in the treatment of diseases and improvement of health.

Before the dawn of modern era in medicine, herbal drugs were the only treatment available to mankind the world over. Advances in science, notably in this century led to the isolation of many active principles out of these herbs in pure form. These active principles along with the synthetic compounds are the drugs now almost exclusively used in the treatment of diseases in the advanced countries.

Plant based material (Natural drugs) may be collected, dried and used as therapeutic agents (Crude drugs), or their chief constituents/active principles, isolated by various chemical processes and are used as medicines. The active principles are carbohydrates, glycosides, tannins, lipids, alkaloids etc. These active principles, or compounds with similar structure and activity are synthesized chemically, to produce the drugs, which are used in the allopathic or in modern system of medicine. With rapid advances in organic chemistry, initiated by Wohlers synthesis of urea, there was a great spurt of activity in the field of synthetic chemistry, which in turn made a significant impact on the drug industry. The dependence on synthetic drugs is mainly due to their rapid action. The fast and continuing depletion of natural resources and plant wealth, has only added to this dependence on synthetic drugs.

The increasing pace of dependence on plant derived drugs, by the population seems to increase because of scepticism against synthetic drugs, due to their side effects. It is true that for acute ailments, there is no crude drug to offer an equivalent alternative to chemically define drugs. However, with no harmful side effects, plant preparations are often considered useful for the treatment of chronic diseases. Thus medicinal plants continue to receive attention of scientists for their chemical, pharmacological and clinical investigations in India and abroad. Besides
these, the studies on folk medicines through ethnobotanical surveys are gaining importance in present day researches and these reveal new biodynamic compounds of therapeutic value. Procurement, cultivation, regeneration and import/export of medicinal plants used in indigenous system of medicine are yet another aspect of current scientific importance as pharmaceutical industry depends on it for raw material.

In view of the aforesaid background the present investigations are carried out on certain medicinal plants on their seed germination, growth behaviour and phytochemical constituents. It is attempted to relate the above attributes with ecological conditions. The medicinal plant species selected are: Abrus precatorious Linn. Mucuna prurita Linn. Gloriosa superba Linn, Swertia chirata and Dioscorea bulbifera Roxb, and the work was carried out on the following lines:

1. (a) Selection of study site
(b) Collection of seeds and other propagules for regeneration studies in the laboratory.
2. Best method of raising the plants
3. Seed viability, seed production, seed dormancy and germination studies under different conditions.
4. Phytochemical studies on proposed plants species was done to ascertain the active chemical principles present in them by standard phytochemical methods.

All these species are very important to the Ayurveda from medicinal point of view and also being used by the rural - tribal forest villagers to cure different ailments. Out of these five species Swertia chirata could not be found in the area as it was reported by some workers that it is found in Pachmari region of Madhya Pradesh. As a matter of fact, during our survey it is confirmed that the species found in Pachmari region is Swertia angustifolia. We have also confirmed from CMAP Lucknow that its seeds do not germinate in this climate.