# MEDICINAL BOTANY
# UNIT 3

# UNIT 3

# ETHNOBOTANY

Ethnobotany is considered as a branch of ethnobiology, the study of past and present interrelationships between human cultures and the plants, animals, and other organisms in their environment. Like its parent field, ethnobotany makes apparent the connection between human cultural practices and the sub-disciplines of biology.

Ethnobotanical studies range across space and time, from archaeological investigations of the role of plants in ancient civilizations to the bioengineering of new crops. Furthermore, ethnobotany is not limited to nonindustrialized or nonurbanized societies. In fact, co-adaptation of plants and human cultures has changed and perhaps intensified in the context of urbanization and globalization in the twentieth and twenty-first centuries. Nonetheless, indigenous, non-Westernized cultures play a crucial role in ethnobotany, as they possess a previously undervalued knowledge of local ecology gained through centuries or even millennia of interaction with their biotic (living) environment.

The significance of ethnobotany is manifold. The study of indigenous food production and local medicinal knowledge may have practical implications for developing sustainable agriculture and discovering new medicines. Ethnobotany also encourages an awareness of the link between biodiversity and cultural diversity, as well as a sophisticated understanding of the mutual influence (both beneficial and destructive) of plants and humans. In this unit, we will discuss the historic roots of ethnobotany and a brief knowledge about different areas associated with it. The unit intends to highlight the role that local people's knowledge and cultural perspectives can play in resource management and conservation.

# OBJECTIVES

The main objective of this unit is to expand awareness about the intricate relationship between culture, plants, humans, and our environment. After going through this unit you will be able to-

1 Define the ethnobotany and discuss the scope of the subject area covered by this descipline.
2 Discuss the historic roots of ethnobotany and the role that human/plant interactions have had in managing natural resources, and the influence of human on the evolution, distribution and utilization of major food and medicinal plants.
3 Understand and discuss the broad spectrum of terminology of ethnobotany that is often asociated with it.
4 Discuss the role, importance and contribution of ethnomedicine, ethnopharmacology, ethnoecology, ethnogynaecology, ethnomycology, etc., in our modern civilization.

5 Discuss the people-plant relations focusing upon impacts of plant conservation and opportunities for sustainable use.

# DEFINITION AND SCOPE OF ETHNOBOTANY

Since the beginning of civilization, people have used plants to provide them food, shelter, medicines, as well as the materials for construction and the manufacture of crafts and tools and many other products like fuel, paints, poison, etc. Plants often have ritual characters and are used because of their variety of properties. Nowadays their chemical and genetic characters are increasingly explored for human benefits. It had been possible due to ethnobotanical studies that have provided us a plenty of information data about plants either useful or harmful.

Ethnobotany is the study of how people of a particular culture and region make the use of indigenous plants. Ethnobotanists explore how plants are used for such things as food, shelter, medicine, clothing, hunting, and religious ceremonies. These plants are known as ethnobotanicals. The term *ethnobotany* was suggested by John Harshberger in 1896 to delimit a specific field of botany and to describe plant uses. It was defined as "*the use of plants by aboriginal peoples*". Its scope was much elaborated by Ford (1978) and Faulks (1958). Prior to this term (ethnobotany), many botanists were already including the use of plants by people within their study. However, it was Harshberger who proposed that *discipline of ethnobotany* might be developed with its own definition, scope, objectives and methodologies. Although Harshberger's definition still provide the root of the ethnobotany, but to describe the field in broader sense ethnobotanists have given their definitions time to time. Let us look at the slight changes in emphasis through a review of current definitions.

- *Ethnobotany is considered to encompass all studies which concern the mutual relationship between plants and traditional peoples (Cotton, 1996).*
- *In broad terms, ethnobotany is the study of the interrelationship between plants and people. The two major parts of ethnobotany are encapsulated in the word itself;* ***ethno****, 'the study of people', and* ***botany****, 'the study of plants'. However, the field is limited on both sides. On the botanical sides of the field, few ethnobotanical studies are concerned with plants that have no connection to people. On the ethno side, most studies are concerned with the ways indigenous peoples use and view plants. And those uses and those views can provide deep insights into the human conditions (Balick and Cox 1996).*
- *According to Ford 1994, ethnobotany is concerned with a wide range of interest of plants in cultural and ecological context.*
- *According to Martin 1995, ethnobotany is the part of ethnoecology which concerns plants.*
- *Turner 1996 has given an appropriate definition that is "the science of people's interaction with plants".*

So, from the above recent definitions, it may be said that the ethnobotany has become a broader discipline, which is interested in all studies about the relationship between people and plants.

The definition and scope of ethnobotany has remained impressive even by the narrowest definition of the discipline. This is an interdisciplinary science and undertakes a research on the relationship between people and plants in the areas of: linguistics, education, healing, nutrition, archaeology, paleology, resource tenure and management, livelihood, etc. Ethnobotany can therefore serve as a gateway to many disciplines. The following disciplines are often included within the study of ethnobotany:

| ***Discipline*** | ***Relevance to Ethnobotany*** |
|---|---|
| Botany | Study of plants |
| Anthropology | The study of how different cultures use plants |
| Ecology | How human interactions with plants and ecosystems affect ecology |
| Medicine | Study of medicinal uses of plants |
| Chemistry | Study of composition of plants, especially medicinal plants |
| Agriculture | Study of human domestication and management of plants, especially traditional agriculture system |
| Horticulture | Study of management of useful plants (fruits, vegetables, ornamentals) in home garden or orchard |
| Forestry | Study of human management of forest and forest trees |
| Agroforestry | Study of land management for the simultaneous production of food, crops and trees |
| Archaeology | How ancient cultures used plants |
| Economics | Study of economic uses of plants |
| Religious studies | Ritual uses of plants by different cultures and religions |
| Linguistics | Study of linguistic terminonology for plants and plant parts by people of different language groups |
| Systematics | Study of folk taxonomy, how different people classify plants |

As we have seen, ethnobotany is a multidisciplinary science and its scope is not confined to one area but it covers a broad range of study areas, which are interconnected to each other in one sense or the other. So, there is a great opportunity to explore the ethnobotanical approach towards the modern civilization and giving them a firm task, which should include:

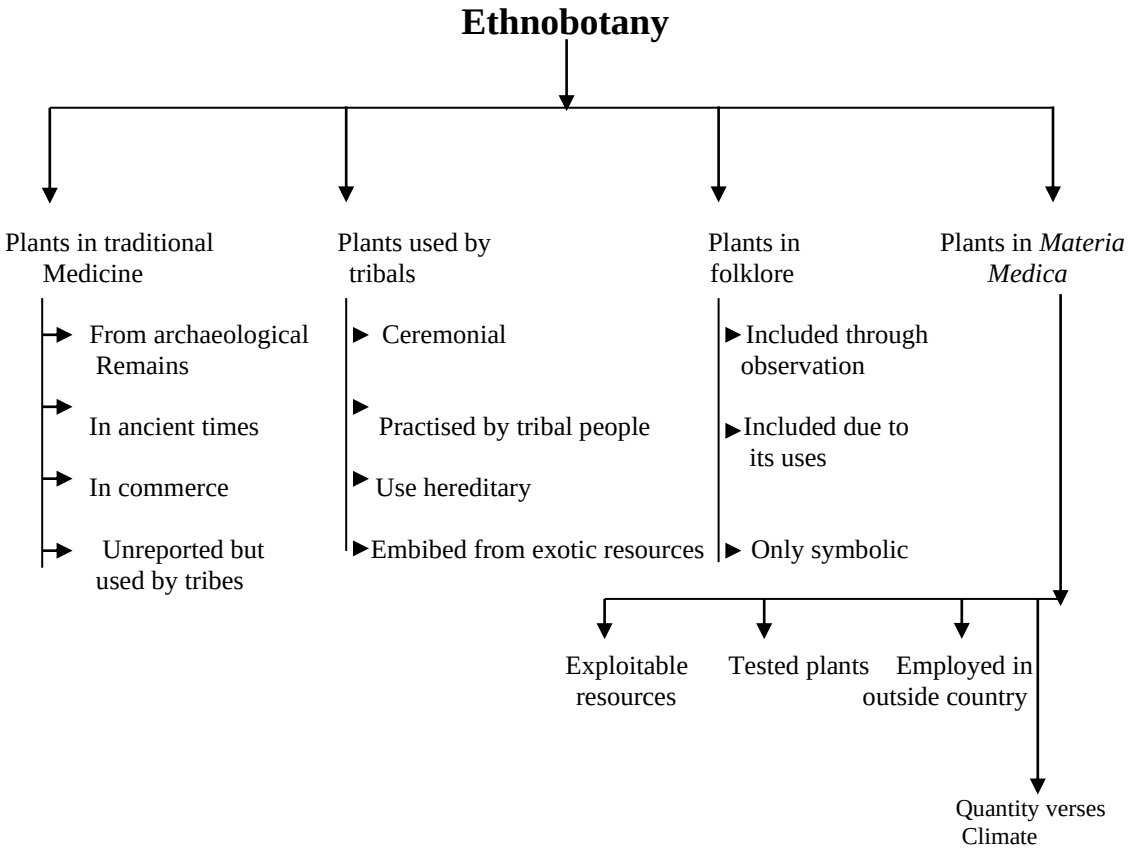
- Conservation of plant species- including varieties of crops and other forms of biological diversity.
- Botanical inventories and assessment of the conservation status of the species.
- Sustainability in supplies of wild plant resources.
- Enhanced food security, nutrition and healthcare.
- Preservation, recovery and diffusion of local botanical knowledge and wisdom.
- Reinforcement of ethnic and national identity.

- Identification and development of new economic products from plants, for instance food, crafts, herbal formulations, horticultural plants, etc.

# HISTORIACL REVIEW

The study of plants in the service of mankind has been a part of human civilization since ages. Information on the economic aspects of plants has been passed from one generation to the next generation. With the knowledge of the traditional practices botanists of world examined the practical uses of plants either reported or unreported. And in the light, a new branch of botany was emerged and termed as *ethnobotany*. In this direction, a detailed account on the origin of the branch has been made and presented here.

Before going to the history of ethnobotany, let us have a look at the flow chart given below to understand the subject deeply. The chart in itself is a full explanation of ethnobotany.




***Diagrammatic representation of ethnobotany in its various perspectives***

Though **the term "ethnobotany" was not coined until 1895 by the US botanist John William Harshberger**, the history of the field begins long before that. In AD 77, the Greek surgeon Dioscorides published "*De Materia Medica*", which was a catalog of about 600 plants in the Mediterranean. It also included information on how the Greeks used the plants, especially for medicinal purposes. This illustrated herbal contained information on how and when each plant was gathered, whether or not it was poisonous, its actual use, and whether or not it was edible (it even provided recipes). Dioscorides stressed the economic potential of plants. For generations, scholars learned from this herbal, but did not actually venture into the field until after the Middle Ages.

In 1542 Leonhart Fuchs, a Renaissance artist, led the way back into the field. His "*De Historia Stirpium*" cataloged 400 plants native to Germany and Austria. John Ray (1686-1704) provided the first definition of "species" in his "*Historia Plantarum*": a species is a set of individuals who give rise through reproduction to new individuals similar to themselves.

In 1753 Carl Linnaeus wrote "*Species Plantarum*", which included information on about 5,900 plants. Linnaeus is famous for inventing the binomial method of nomenclature, in which all species get a two part name (genus, species).

The 19th century saw the peak of botanical exploration. Alexander von Humboldt collected data from the new world, and the famous Captain Cook brought back information on plants from the South Pacific. At this time major botanical gardens were started, for instance the Royal Botanic Gardens, Kew.

Edward Palmer collected artifacts and botanical specimens from peoples in the North American West (Great Basin) and Mexico from the 1860s to the 1890s.

Once enough data existed, the field of "aboriginal botany" was founded. Aboriginal botany is the study of all forms of the vegetable world which aboriginal peoples use for food, medicine, textiles, ornaments, etc.

The first individual to study the emic perspective of the plant world was a German physician working in Sarajevo at the end of 19th Century: Leopold Glueck. His published work on traditional medicinal uses of plants done by rural people in Bosnia (1896) has to be considered the first modern ethnobotanical work.

The term "ethnobotany" was first used by a botanist named John W. Harshberger in 1895 while he was teaching at the University of Pennsylvania. Although the term was not used until 1895, practical interests in ethnobotany go back to the beginning of civilization when people relied on plants as a way of survival.

Other scholars analysed uses of plants under an indigenous/local perspective in the 20th century: e.g. Matilda Coxe Stevenson, Zuni plants (1915); Frank Cushing, Zuni foods (1920); Keewaydinoquay Peschel, Anishinaabe fungii (1998), and the team approach of Wilfred Robbins, JP Harrington, and Barbara Freire-Marreco, Tewa pueblo plants (1916).

In India, it **was Dr. S. K. Jain (1986) from NBRI, Lucknow, affectionately known as "Father of Indian Ethnobotany"** who made pioneering investigations. Growth and development of ethnobotany in India owes much to the painstaking works done by eminent scientists on different aspects of ethnobotany like S. K. Jain, S. L. Kapoor, V. P. Kamboj, K. V. Billore, N. C. Shah, Ved Prakash, R. P. Rao, K. C. Audichya, D. S. Bhakuni, P. V. N. Kurup, K. C. Tewari, Anil Goel, Archana Godbole, Pushpagandan, H. Santapau, Virendra Nath, A. K. Pandey, Momin Ali, Usha Shome, K. K. Kirtikar, M. L. Dhar, B. N. Dhawan, K. Himadri, S. K. Borthakur, K. S. Manilal, etc.

In the beginning, ethonobotanical specimens and studies were not very reliable and sometimes not helpful. This is because the botanists and the anthropologists did not come together on their work. The botanists focused on identifying species and how the plants were used instead of including how plants fit into people's lives. On the other hand, anthropologists were interested in the cultural role of plants and not the scientific aspect. Therefore, early ethnobotanical data does not really include both sides. In the early twentieth century, botanists and anthropologists finally collaborated and the collection of reliable, detailed data began.

# AREAS OF ETHNOBOTANICAL STUDIES

Beginning in the twentieth century, the field of ethnobotany experienced a shift from the raw compilation of data to a greater methodological and conceptual reorientation. Today, the practice of ethnobotany requires a variety of skills:

1 *Botanical training* for the identification and preservation of plant specimens
2 *Anthropological training* to understand the cultural concepts around the perception of plants
3 *Linguistic training* to transcribe local terms and understand native morphology, syntax, and semantics.

Ethnobotanists engage in a broad array of research questions and practices, which do not lend themselves to easy categorization. However, the following headings attempt to describe some of the key areas of modern ethnobotanical study.

- **Archaeoethnobotany**
- **Ethnoecology**
- **Ethnomedicine**
- **Ethnogynaecology**
- **Ethnomusicology**
- **Ethnomycology**
- **Ethnonarcotics**
- **Ethnopharmacology**
- **Ethnotaxonomy**
- **Ethnotoxicology**
- **Paleoethnobotany**
- **Ethnocosmetics**
- **Ethnolinguistics**
- **Ethnoorthopaedics**

- **Ethnoophthalmology**
- **Ethnopediatrics**

# Paleoethnobotany

***Paleoethnobotany***, is the archaeological sub-field that studies plant remains from archaeological sites. Major research themes are recovery and identification of plant remains, the use of wild plants, the origins of agriculture and domestication, and the co-evolution of human-plant interactions.

Paleoethnobotanists use a variety of methods to identify and recover plant remains. One method used to recover macroremains is to sieve excavated material manually in a water bath in order to allow the organic material to float on the surface. This method is known as *flotation.* The matrix (the soil from a suspected archaeological feature) is slowly added to agitated water. The soil, sand, and other heavy material, known as *heavy fraction*, will sink to the bottom. The less dense organic material such as charred seeds, wood and bone will tend to float to the surface. The material that floats to the top, called *light fraction*, is gathered with a sieve. The organic light fraction is then available for examination. Samples of the heavy fraction are also gathered for later analysis. Other types flotation processes include machine-assisted flotation and froth flotation. A paleoethnobotanist may also find concentrated remains of plants that typically are only grown through active cultivation (such as corn, beans, and squash). At the same site, an archaeologist might identify features such as stone walls surrounding enclosures arrayed in a pattern, and deep, layered middens with concentrations of domesticated animal remains such as goats or pigs. An analysis of the site, set within the context of the archaeological features and animal and plant remains, would suggest a settled agrarian community.
Paleoethnobotanists also recover and analyze microremains phytoliths, pollen palynology, human paleofeces (sometimes called coprolite), and impressions in ceramic sherds (such as the imprint of grains in mixing bowl). Palynology is a mature and distinct scientific discipline that studies pollen, typically in the context of reconstructing past environments. Dendrochronology, the study of growth rings on trees relating to study of past environments, is another scientific discipline useful to paleoethnobotanical study.

# Ethnoecology

***Ethnoecology*** is the scientific study of the way different groups of people in different locations understand ecosystems around them; the environments in which they live; and their relationship with these. It seeks valid, reliable understanding of how we as humans have interacted with the environment and how these intricate relationships have been sustained over time.

The “ethno” (see ethology) prefix in ethnoecology indicates a localized study of a people, and in conjunction with ecology, signifies people’s understanding and experience of ecologies around them. A few definitions of ethnoecology are given below:

*Definition 1*- " Ethnoecology encompasses all studies which describes local peoples interaction with the natural environment including subdisciplines such as ethnobiology, ethnobotany, ethnoentomology and ethnozoology" (Martin 1995).
*Definition 2*- " Ethnoecology is the sciences of how people unerstand the relationship between human, animals, plants and physical elements of local environment" (Davison-Hunt, 2000).

Thus, ethnoeology is a multidisciplinary field that intregates techniques from biology, anthropology, ethnology, linguistics, economy and other fields. Ethnoecologists do not only work in primary forests, they are also interested in a broad range of vegetation types which have been altered by people, ranging from homegardens to mature secondary forests, where the majority of plants are found. Research focuses on the ecological knowledge of the indigenous people and of traditional agriculturists. Ethnoecologists address theoretical questions about the relationship between human and their environment and the answers contribute to rural development poverty alleviation, healthcare and conservation (Martin 1995). Thus ethnoecology is not limited to pure science, it can help to understand the dynamic relations between biodiversity and social and cultural systems.

# Ethnomedicine

***Ethnomedicine*** is a sub-field of medical anthropology that deals with the study of traditional medicines—not only those with relevant written sources (e.g., Traditional Chinese Medicine and Ayurveda), but also those whose knowledge and practices have been orally transmitted over the centuries.

While the focus of ethnomedical studies is often the indigenous perception and use of traditional medicines, another stimulus for this type of research is drug discovery and development. Major pharmaceuticals such as digoxin, morphine, and atropine have been traced to foxglove, opium, and belladonna, respectively. Ethnomedical investigations in this century have led to the development of important drugs such as reserpine (a treatment for hypertension), podophyllotoxin (the base of an important anti-cancer drug), and vinblastine (used in the treatment of certain cancers).

In the scientific arena, ethnomedical studies are generally characterized by a strong anthropological approach, or by a strong biomedical approach, particularly in drug discovery programs. The focus of anthropological studies is the perception and context of use of traditional medicines, while biomedical approaches often focus on discovering therapeutic molecules, such as the anti HIV/AID molecule prostratin.

Let us recall what we have discussed so far.

- The term '**Ethnobotany'** was first coined by Harshberger in 1895. Ethnobotany deals with the direct relationship between plants and human. A number of terms are used in varied areas of ethnobotanical research, such as ethnotaxonomy, ethnomedicine, ethnopharmacology, ethnomycology, ethnoecology, etc.

- Though it was Harshberger who first mentioned the ethnobotany as a descipline, but its history begins long before that. Many known scientists had already referred important plants and their various uses in their published records.

- In India, it was Dr. S. K. Jain who made pioneering investigations on ethnobotany and affectionately known as "Father of Indian Ethnobotany".

- Ethnoecology is the field of study of the past and present interrelationships between human societies, and their living and non-living environment. The importance of ethnoecological research is now increasing by the fact that indigenous system could usefully be incorporated into the sustainable development of modern civilization and its management.

- Ethnopharmacology is an interdesciplinary science which deals with the identification, description, observations and experimental investigations of the ingredients used in various recipes prepared by aborigines and the effects of indigenous drugs on animals and human. While ethnomedicine, ethnogynaecology, ethnoophthalmology, ethnoorthopaedics are specific study branches as their name suggests and are linked with ethnopharmacology to some extent.

- After a thorough study, now we are well familier with the fact that *Ethnobotany* is a field on rise nowadays. It is a field of research of great value and have gaines much interest of botanists, chemists, socialists, etc. because of its large study areas. It is possible now to conserve and maintain the biodiversity and indigenous culture with the help of ethnobotanical studies.

# ETHNIC COMMUNITIES IN INDIA

| State | Name of Ethnic community |
|---|---|
| Arunachal Pradesh | Name of Tribes- Adi, **Apatani, Nyishi** People |
| Manipur | Meitei People, Kuki Tribes |
| Jharkhand | Kharwar, Sabar People, Sadan People |
| Odisha | Sabar People, Bonda People |
| Kerala People | Aranandan People |
| Andaman & Nicobar | **Jarawas,** Kora or Khora People. |
| | |

A 

A. Apatani Woman; B. Nyishi Tribe

B 

## PLANTS FOR CERTAIN DISEASE

| Disease | Plant | Family | Parts Used |
|---|---|---|---|
| Jaundice | ***Tinosperma cordifolia*** | Menispermaceae | Stem |
| | ***Adina cordifolia*** | Rubiaceae | Stem bark |
| | ***Andrographis paniculata*** | Acanthaceae | Leaf |
| | ***Boerrhaavia diffusa*** | Nyctaginaceae | Root |
| Cardiac | ***Crataegus songairica*** | Rosaceae | Fruits |
| | ***Cucarbita maxima*** | Cucurbitaceae | Seeds |
| | ***Tamarindus indica*** | Fabaceae | Fruits |
| Infertility | ***Acorus calamus*** | Arecaceae | Whole Plant |
| | ***Asaparagus racemosus*** | Asperagaceae | Root |
| Blood Pressure | ***Alstonia scholaris*** | Apocynaceae | |

| | | | |
|---|---|---|---|
| | ***Catharanthus roseus*** | Apocynaceae | Leaves and Flower |
| | ***Centella asiatica*** | Apiaceae | Whole Plant |
| | ***Clerodendrum colebrookianum*** | Verbenaceae | Leaves |
| Skin disease | ***Holoptelea integrefolia*** | Ulmaceae | Leaf and Bark |
| | ***Dalbergia sissoo*** | Fabaceae | Heart-wood |
| | ***Clerodendrum viscosum*** | Verbenaceae | Leaf |
| | ***Azadirachta indica*** | Meliaceae | Leaf |
| | ***Chenopodium ambrosioides*** | Chenopodiaceae | Leaves |
| | ***Centella asiatica*** | Apiaceae | Whole Plant |

## ADDITIONAL READING

# INDIGENOUS CULTURE

Knowledge may be called indigenous if it originates from, and is bound to local experiences, taking its local world not perhaps as the only one, but as the most relevant of all they know. Indigenous knowledge is human life-experience in a distinct natural and cultural amalgamation within a unique local and timely setting. It is an authentic appropriation of being, meaning that this very process happens exclusively in a given locality at a given time. In the field of medicine, Chinese culture (indigenous) developed Acupuncture technique. An acupunturist places needles into the skin to balance out the flow of chi which is believed to be the energy that flows through the human body. In theory, Chi runs along 14 pathways called meridains and when a patient is injured, stressed, or ill, their chi is supposedly being blocked. By placing needles in the Meridians the patients chi is thought to be put back into balance. Like Chinese culture indigenous culture of different places/countries occur and have their own belief and methods.

There are various ways to speak about indigenous cultures, for example we could speak from the perspective of our so-called ‘civilizations’ but how do we know that this perception is not contrary to the truth. We could speak on the basis of our traditional religious concepts but again these concepts may in reality be the opposite of what we

believe. If we speak about the indigenous from the point of view of an anthropologist we arrive at a cold and empty language, a study that only pays attention to external and superficial matters, in the same way an anatomist analyses our inner organs or our bones but they are still a long way from knowing the reality. We believe that it is better to speak about indigenous cultures on the basis of their own reality, in relation to how they were as much as how they are now because in the course of time from yesterday to today many things have happened that are worth examining.

# FOLKLORES

***FOLKLORES:*** Plants have long been associated with folklore all over the world. So lets delve into the beliefs and mysteries that surround many of the plants around us.

**Aconite** (*Aconitum napellus*)
Its leaves and roots are extremely toxic and were used by the ancients as a poison. The Greek's called it *akoniton* (without dirt) because it grows on rocky ground, and *lykoktonon* (wolf-slaying) because it was traditionally applied by their arrows when hunting wolves.

**Apple tree** (*Malus domestica*)
The apple-tree was an important orchard fruit of ancient Greece. It was associated with love and marriage.

**Sage** (*Salvia officinalis*)
In London, it is a symbol of immortality. It was often planted on graves in days gone by as it was said to live forever, often thriving on neglect where other plants would fail and die, and it’s true that it is one of the easiest plants to grow as long as it is not in wet soil.

**Rose** (*Rosa domascena*)
The rose has many stories about it, Greek mythology tells of its beginnings. Chloris, Greek Goddess of Flowers, found a sad and weak nymph one day, and wishing to restore her to health asked The Graces to help. They granted the nymph the gifts of joy, brightness, and charm. Chloris wanted to do more for the dying nymph so appealed to the other gods and she was given nectar, beauty by Aphrodites, and Zephyr, the west wind, blew away the clouds so the sun could shine upon her. Chloris called this beautiful bloom Rose.
It was believed that all roses were white in the beginning, and one of the many stories of how roses became coloured again comes from Greek mythology. It's told that the god Jupiter saw Venus bathing, she was so embarrassed that she blushed, and all the white roses surrounding her bath turned red in sympathy.

**Red Sandalwood Tree** (*Santalum album*)
According to Indian mythology, sandalwood tree is depicted as being entwined with serpents. Sandalwood remains cool and aromatic even when the poisonous serpent coils around it. This also has another meaning that the basic nature of an individual cannot change because of outer effects.

**Tulsi** (*Ocimum sanctum*)
According to Indian mythology, Tulsi plant is most loved by Lord Vishnu and Vrinda Devi, the Goddess ruling Tulsi is known as the personification of bhakti or devotion to the Supreme Being. Tulsi is considered to be associated with purity and a highly revered and used for all religious purposes among the Hindus. It is considered very auspicious to have a Tulsi plant in the front courtyard of many Hindu households.