Edible and Useful Plants of Texas and the Southwest

A Practical Guide:

By Delena Tull
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Introduction

What's in This Book

This book covers a wide range of topics related to the uses of Texas plants, both wild and ornamental. The term "wild" of course refers to plants native to Texas. But the term also includes naturalized plants, those plants that were brought to the United States from other countries and other continents and that flourish so well in our environment that they now grow "like weeds." These nonnative plants may have been introduced to our country as ornamentals, as agricultural crops, or by accident.

The information on edible and poisonous wild plants includes plant characteristics (description, habitat, and range in Texas) to assist you in identifying the plants. These short descriptions can be supplemented by referring to other books on Texas plants. Botanists at local colleges often are more than willing to help identify plants, and the Native Plant Society of Texas (P.O. Box 891, Georgetown, Texas, 78627) holds regional meetings and field trips that will help you in learning more about your local flora.

The following books all provide excellent illustrated references to Texas plants: Delena Tull and George Oxford Miller's *A Field Guide to Wildflowers, Trees and Shrubs of Texas*, Del Weniger's *Cacti of Texas and Neighboring States*, and Robert Vines' *Trees, Shrubs, and Woody Vines of the Southwest*. See Susan and Van Metzler's *Texas Mushrooms* for excellent photographs and detailed information on edible fungi, including recipes. Donovan Correll and Marshall Johnston's *Manual of the Vascular Plants of Texas*, the bible for plant identification, is useful only to those with a background in botany.

The first two chapters of this book cover edible plants and teas and spices, with recipes and instructions for their preparation. The next chapter, on edible and poisonous berries and other fleshy fruits, groups the fruits by color. Jelly and jam recipes are scattered throughout the section on edible fruits.

In addition to giving details on toxic wild plants, the chapter on poisonous and harmful plants provides information on toxic ornamentals as well as plants in our vegetable gardens and on our spice racks that can cause us harm. A section on

dermatitis, with special reference to poison ivy, and a section on hay fever plants also are included in the chapter.

The chapter on plant dyes provides detailed instructions on dyeing wool and other fibers. A list at the end of that chapter includes more than 120 dye plants with recipes for their use. The chapter on fibers explains how to prepare plant materials for use in weaving baskets or textiles, how to use natural dyes on plant fibers, and how to make paper. Plants with industrial value are reviewed in the final chapter.

A glossary at the back of the book furnishes definitions of the botanical terms used in the plant descriptions. Other terms can be found in a standard dictionary. Bibliographical references, noted throughout the text, are compiled in the back of the book. A single index includes both scientific and common plant names. Some allegedly edible plants can cause poisoning, so if you are interested in using a plant, be sure to check all pages listed in the index, to find out its potentially harmful qualities.

Vegetation Regions in the State

Variations in climate, elevation, geology, and soil across the state enable a remarkable diversity of plant life to grow in Texas. The state has a little bit of everything, from a subtropical climate in far South Texas to frequent winter snows in the Panhandle, from 60 inches of rain per year in the Big Thicket to less than 8 inches in the Chihuahuan Desert, from sea level along the Gulf Coast to altitudes of more than 8700 feet in the mountains. Because of the wide range of physical conditions, most plants are restricted to specific areas of the state. I have relied on a few general terms to define the regions that each plant inhabits. For a more detailed description of the various vegetational regions of the state, refer either to Ajilvsgi's or Correll and Johnston's books (listed above).

Briefly, regional terms I have chosen to rely on are the following:

East Texas

A very broad term, basically designating everything east of Austin. This flat to hilly region has a relatively high annual rainfall (30-60 inches). Southeast Texas refers to the Big Thicket, an area of dense pine and hardwood forests and swamps. The Coast includes the flat, humid area from Beaumont to Houston to Brownsville and slightly inland.

South Texas

Another broad term, referring to everything roughly south of San Antonio. Flat to hilly, the area not adjacent to the Coast experiences periodic drought. The western half may have as little as 16 inches annual rainfall, with close to 30 inches in the east. Far South Texas consists of the area around Brownsville. Known as the Rio Grande Valley, this zone has a subtropical climate and rarely experiences freezing temperatures. The Rio Grande, from Brownsville to El Paso, flows through some

of the driest areas of Texas and provides moisture to the alluvial bottomland flanking it, yielding some distinctive vegetation.

North Central Texas

The region centered around Dallas, with extreme summer and winter temperatures, rolling hills, and moderate annual rainfall (25-40 inches).

Edwards Plateau

A specific geographical region, 1000 to 3000 feet in elevation, extending west of Austin roughly to the Pecos River, and from Del Rio north about to Abilene. Also known as the Hill Country, the area has moderate annual rainfall (30 inches) in the east and is semiarid (15 inches) in the west. Summer temperatures can be extreme, with frequent drought, but winters are generally mild.

Panhandle

An area including the High Plains and the Rolling Plains, roughly north of San Angelo and west of Wichita Falls. Encompassing a high (3000-4500 feet), flat plateau in the west and hilly to rough terrain (800-3000 feet) in the east, the Panhandle has extreme summer and winter temperatures and experiences frequent drought (15-21 inches annual rainfall).

Trans-Pecos

Roughly everything west of the Pecos River, ranging from mountains as high as 8700 feet to the Chihuahuan Desert, with an elevation above 2000 feet. The area experiences extreme summers and can have mild or very cold winters. Annual rainfall averages 8 to 12 inches in the desert and 16 inches in the mountains.

Why Use Botanical Terminology?

When you first learn to recognize wild plants, you probably will rely mainly on common names. However, if you move to a different area of the state or the country, you may find that people in that area use a different name for the same plant. Even in the same region a single plant may have several common names. In addition, two different plants may share the same name. For example, "pigweed" may refer to a member of either the genus *Amaranthus* or the genus *Chenopodium*. Because of the confusion that often arises from the use of common names, learning the scientific name of a plant becomes more and more important as you become more familiar with wild plants. Nonetheless, common names are also useful handles for plants. Ideally, you should become familiar with both the common and scientific names of the plants you know. In this book I have provided the common names that appear to be the most widespread. I have attempted to include both an English and a Spanish common name for the plants.

International Congresses decide on the rules that determine validity of scientific names, and those names are recognized worldwide. Unfortunately for the amateur botanist, scientific names occasionally change, as new data on plant identity are

provided through field research. Some of the scientific names used in this book differ from those found in previous publications because of name changes that have occurred in recent years. For example, the agave family, Agavaceae, is a newly created family and consists of several plants that formerly were located in the lily and amaryllis families. Scientific names are based on a Latin word, or as in the case of plants named after botanists, the non-Latin word is given a Latin ending.

Botanists classify plants into groups based on genetic relationships and structural similarities, predominantly of flower and fruit. Other physical characteristics, such as those of root and leaf, also are noted but are not as reliable. The concept of species is complex, but generally a species can be defined as a more or less genetically isolated population of plants that share the same basic characteristics. By the way, "species" is used as both a singular and a plural noun. Species considered genetically and structurally similar are classified in the same genus (plural: genera). Groups of genera with similar characteristics are classified in the same family. Botanists also use larger classification groups, but only species, genera, and families are relevant to this book.

The scientific name of each plant consists of two parts, the generic name, which is first, and the specific epithet, the second part of the name. For example, the scientific name of the potato is *Solanum tuberosum*. The potato belongs to the nightshade family, Solanaceae. More than a thousand different species are included in the genus *Solanum*, but the specific epithet "tuberosum" immediately distinguishes the potato from its many cousins. However, there may be plants in another genus with the specific epithet "tuberosum." The generic name "Solanum" is necessary to distinguish this "tuberosum" from all others in the world (*Phlox drummondii* and *Hedeoma drummondii* provide an example of two unrelated plants with the same specific epithet).

A species may be subdivided into subspecies (abbreviated "subsp.") and varieties (abbreviated "var.") when botanists discover distinctive local variations. Many generic names and specific epithets have as their root the name of a botanist, such as Drummond, Engelmann, and Maximilian. Often, the botanist named is the one who first discovered the species. In some cases the classifying botanist names a plant in honor of another botanist.

With these basic tips in hand, you are ready to begin your adventure into the world of wild plants.

Plants as Medicine: A Commentary

For thousands of years the science of botany has been closely aligned with the study of the healing properties of plants. In fact, the botanist and the healer often were one and the same. The importance of being able to recognize the healing

herbs formed the basis for the earliest systems of plant classification. Often plant relationships were based on the active principles of plants, as demonstrated by their therapeutic actions. In spite of this long history of association, botany and medicine today are viewed as quite distinct professions. In fact, most individuals would be surprised to learn that many of the pills they take are formed from plant extracts, use plants as the basis of synthesis, or are manufactured from synthetic imitations of plant constituents. In a country in which synthetic chemicals seem to have taken over the pharmaceutical industry, roughly 35 percent of the prescriptions written in the United States still include a plant product as at least one of the major ingredients.

And yet the superstition that often surrounds the use of folk remedies has caused a certain distrust and disdain on the part of the medical community toward the idea of using plants in medicine. Such early medical practices as the doctrine of signatures (the theory that each medicinal plant resembled in appearance the bodily organ it was meant to heal) hindered medical progress for centuries. The modern medical profession, in attempts to disassociate itself from superstition and charlatanism, has labeled folk medicine too frequently as quackery and has tried to discredit herbal remedies as useless and even harmful. It is true that a number of herbs are ineffectual in curing the diseases for which such claims have been made (for example, people the world over have used innumerable species of plants in vain attempts to treat syphilis). In addition, many herbal remedies can cause poisoning if misused. But the attempt to discredit the value of herbal medicine has in its turn held back valuable medical knowledge. In spite of the rituals and myths that often shroud traditional herbal medicine, our modern medicinal knowledge emerged from that source and has the potential to gain much more information from herbal medical practice (Swain 1972; Kreig 1964).

Without careful documentation of the effects plants have had on the people who have used them, it is difficult to separate the potentially valuable plant medicines from the bunk. Many medicinal plants, however, have been in common usage for centuries, and their effects are well known. The United States Pharmacopeial Convention has been selecting, naming, and standardizing drugs since 1820. Early editions of the convention publication, The *United States Pharmacopeia*, list many plants that have long been recognized healers.

If you look in your own bathroom cabinet, you will probably find some herbal medicines that you didn't know were there. Witch hazel is a multipurpose remedy made from the distilled extract of the twigs of a small tree called *Hamamelis virginiana*, which grows in East and Central Texas. Among other effects, its astringency makes it useful as a skin freshener and as an external treatment for minor cuts, bruises, burns, and insect bites. You may find a cough syrup that

contains slippery elm. The inner bark of *Ulmus rubra*, a large East Texas elm tree, is the source of this long-valued herbal remedy.

Today, for the first time in history, we have the tools for distinguishing myth from fact. Indeed, modern biochemical techniques have brought about a revolution in our understanding of the chemical constituents in plants and their values in medicine. Besides the drugs obtained from microorganisms, such as penicillin and other antibiotics, researchers are finding that the flowering plants have an enormous potential for providing us with new medicines. In the past few decades, as a result of some major discoveries of plant-derived drugs (particularly the discovery of reserpine, a treatment for hypertension and mental illness, from the herb *Rauwolfia*), universities and medical research centers around the world have taken a renewed interest in investigation of plants. To mention but one example, the Cancer Chemotherapy National Service Center already has examined more than 26,000 chemical constituents from more than 6500 plant species.

Through biochemical analysis, researchers have discovered thousands of plant alkaloids that we never knew existed before this century. In the 1940s, scientists were aware of only 1000 alkaloids, but by 1969, 3350 new ones had been isolated. In addition, many glycosides, saponins, flavonoids, and more than 2000 other organic plant substances are now known. Any or all of these may have value in medicine. Many chemicals from plants will never be put into commercial use because their synthetic equivalents can be more easily derived in the laboratory. But a number of useful chemicals are more readily and cheaply extracted from Mother Nature's laboratory.

For example, the leaves of the foxglove, *Digitalis*, contain cardiac glycosides, digoxin, and digitoxin among others, highly toxic substances that have become invaluable aids in the treatment of heart disease. Because a therapeutic dose may be as high as 70 percent of a toxic dose, drug manufacturers and doctors must take great care in preparing and using the drugs. Drugs derived from the periwinkle, *Vinca rosea*, have become important in the treatment of childhood leukemia and Hodgkin's disease (Lewis and Elvin-Lewis 1977). And recent studies have shown that cortisone and some sex hormones, already synthesized from some plants, are available in a number of other plants, such as in the toxic saponins found in *Agave lecheguilla*.

In spite of the work that already has been done, we have just touched the surface of this vast body of knowledge. Only a small percentage of the world's plants have been analyzed so far. We have much more to learn. And the storehouse of material for study is exceedingly large. A single plant may contain several dozen compounds, each capable of producing a different effect on the human body. The opium poppy, *Papaver somniferum*, for example, contains at least 22 alkaloids

(Kingsbury 1964; LeStrange 1977). Only through extensive research can we discover exactly which compounds or combination of compounds are responsible for producing the healing effects observed in folk medicine and in what new ways we can employ them.

A few medicinals have been included in the chapter on teas and spices, such as recipes for preparing soothing remedies for sore throats and coughs from horehound, *Marrubium vulgare*, and mullein, *Verbascum thapsus* (both illustrated). Refer to books by Euell Gibbons, especially *Stalking the Healthful Herbs*, for details of some of the many uses of these valuable herbs. Yarrow, *Achillea millefolium* (illustrated), and its relatives have been used medicinally throughout the world for thousands of years. During the Trojan War, about 1200 e.c., Achilles is said to have applied bruised yarrow leaves to the wounds of his soldiers to stop bleeding. Yarrow was used in a similar manner to treat battle wounds in the Civil War. Native Americans have used the plant to treat a variety of complaints, including fever, pain, burns, earache, indigestion, toothache, and sore throat. Yarrow gained a listing in *The United States Pharmacopeia* from 1836 to 1882 as a stimulant and an agent to promote menstrual flow. Chemical analysis of yarrow has uncovered more than 120 compounds! It's not surprising that the plant should have been employed in such a wide range of uses. While it may seem contradictory that the same plant should be used both to stop bleeding and to cause it, that anomaly was readily explained once the chemical constituents were known. The plant contains achilleine, an alkaloid that has been found to be a hemostatic agent, which stops the flow of blood. But yarrow also contains coumarin, which promotes blood flow and can cause hemorrhage. Yarrow demonstrates quite graphically the variety of pharmaceuticals that can be extracted from a single species. And it serves as a warning of the potential hazards of misuse of herbal remedies (Chandler, Hooper, and Harvey 1982).

A thorough review of the medicinal uses of wild Texas plants is beyond the scope of this book. I have not attempted to include extensive information on herbal medicines for several reasons. First, a full documentation of the uses of plants in the traditional medicine of native Americans and early American pioneers would easily fill a large volume of text. Practically every edible and poisonous plant mentioned here has been used by someone somewhere as a medicinal, along with many other native plants. Second, many plant uses remain in the realm of hearsay, with few, if any, valid records of how the plants actually affect the body. Third, *most* of the plants used as medicines can have harmful effects if served up in the wrong dosages. Just as with the druggists' pharmaceuticals, herbal medicines must be treated with great caution.

In the chapters on poisonous plants, you will find scattered, brief references to the past and present uses of certain plants in medicine. It seems one of the wonderful ironies of nature that the same alkaloids, glycosides, saponins, and other plant chemicals that can cause human deaths can also save lives. But plants cannot be regulated like manufactured drugs. They come with no warning labels. They do not contain a carefully measured dose of medicine per teaspoon of root, leaf, or flower. Indeed, one of the difficulties in using plant remedies is the unpredictable nature of the chemical composition. In a plant, the concentrations of compounds may differ considerably with variations in climate, soil, stage of growth, amount of water, and method of collecting and preserving the plant. A plant growing in the hot, dry soils of West Texas cannot be expected to contain the same levels of alkaloids as the same species growing in the moist, rich soils of the east. In addition, different plant parts have different chemical compositions.

Besides the alkaloids and toxic substances found in plants, a number of edible plants have medicinal value owing to their vitamin, mineral, or protein content. For example, long before we knew what a vitamin was, chickweed was used to prevent and treat scurvy, a disease caused by vitamin C deficiency. You will find occasional brief notes on these nutritive healers in the chapter on edible plants.

Though folk medicine lacks a scientific basis of evaluation, it can lead us to those plants with the greatest potential for use in modern pharmaceuticals. The Chinese may well be the world leaders in restoring and validating herbal medicine. More than five thousand medicinal plants have been used in China's past, with over a thousand of them remaining in common usage after millennia. In recent times the Chinese have increasingly emphasized the study of plant chemistry. Chinese scientists are in the process of isolating many new compounds from plants and evaluating their effects (National Academy of Sciences 1975).

Folk medicine is plagued with several limitations, notably the superstitions of its practitioners, the lack of careful documentation and analysis of the short-term and long-term effects of plant remedies, and the unpredictable nature of plant chemistry. And yet, herbal remedies still form the basis of medicine in the developing nations. The World Health Organization has concluded that only by using traditional herbal medicine can we meet the minimum health needs of the developing nations by the year 2000 (Croom 1983). Clearly, we cannot ignore the influence that folk medicine still has on a major portion of the world. So perhaps rather than disclaim its validity, we can explore ways of overcoming the limitations of folk practices and encourage the documentation that is so important for guiding us to more and better uses of plants in medicine.

Mushrooms: To Eat or Not to Eat

Mushroom hunting has become a popular sport in recent decadesamong a growing group of people. Edible wild mushrooms provide an astounding variety of delicious foods. Along with the delightful flavors of wild mushrooms, the thrill of the hunt—exploring forests, fields, and back yards—adds much to the excitement of eating wild fungi. But because of the fear of confusing edible species with poisonous ones, wild mushrooms remain a taste sensation enjoyed by few.

More than five thousand species of mushrooms grow in the United States. Along with many edible species, about a hundred species are known to contain toxic substances. The edible or toxic qualities of many more have never been documented. "Toadstool" is a folk term used to refer to mushrooms that should not be eaten. But as with the flowering plants, no generalities can assist you in distinguishing toxic from edible mushrooms. In fact, some edible mushrooms can cause poisoning if you pick them at the wrong stage or eat the wrong part, while some so-called toadstools can be eaten if properly cooked. So much for folk terminology.

Several good field guides are available to assist you in learning to identify mushrooms. I have listed some at the end of this section. Though an essential resource, a field guide alone cannot ensure safe foraging, however. No book can substitute for time spent in the field with someone who has years of experience in identifying and eating wild mushrooms. A number of clubs for mushroom enthusiasts now exist around the country. In Texas, look up the Texas Mycological Society (7445 Dillon Street, Houston, Texas 77061). The society conducts field trips and has monthly meetings, a newsletter, and a list of the species of mushrooms found in Texas. You can also join the North American Mycological Association through the Texas group. Participation in these organizations puts you in contact with local and national experts on mushroom identification and use.

Before you take off for the woods or the cow pasture in search of wild fungi, heed the following warnings. About one hundred cases of mushroom poisoning are officially reported each year in the United States, and probably many cases go unreported. While deaths rarely occur in the United States from eating any wild plants, more than 50 percent of those deaths in recent decades were caused by mushrooms. In 1984 a Houston teenager died after eating a wild mushroom (Michael Ellis, letter to the author, August 1986).

Fortunately for the mushroom aficionado, deaths in healthy adults are attributed to only a few species. Thus, the first goal of the mushroom hunter should be to learn the identity of those species. Members of the following genera contain the most highly toxic fungi in the U.S.: *Amanita*, *Galerina*, *Gyromitra*, *Clitocybe*, *Omphalotus*, and *Inocybe*. Members of the genus *Amanita*—which includes death cup (*Amanita phalloides*) and fly agaric (*Amanita muscaria*, illustrated)—the false

morel (*Gyromitra esculenta*), and some members of the genus *Galerina* are responsible for the highest numbers of mushroom fatalities. The chance of death from ingestion of members of the genera *Amanita* and *Galerina* is 50 to 90 percent. Though some members of the genus *Cortinarius* are considered edible, in rare instances they have caused permanent kidney failure. Children and elderly people in poor health are more likely to become ill from eating toxic mushrooms than are healthy adults. The mortality rate among children and the elderly also is much higher (DiPalma 1981; Keeler, Van Kampen, and James 1978; Kinghorn 1979).

While the above groups of mushrooms have caused extreme illness and death, a number of others can cause less severe poisoning. Individuals react in different ways to edible mushrooms. What one person considers a delicacy may make another very ill. Allergic reactions to certain species are common. Inky cap (*Coprinus atramentarius*), an allegedly edible mushroom that resembles the delicious shaggy mane (*Coprinus comatus*), can be toxic if alcohol is consumed at the same meal or even four or five days later (DiPalma 1981; Kinghorn 1979). People seek out the psilocybin mushrooms for their hallucinogenic effects, but a number of those mushrooms can also cause mild to severe poisoning. In addition, some nontoxic mushrooms are considered inedible, so never experiment with unknown mushrooms.

Most fatal mushroom poisonings occur when foragers mistake an *Amanita* for an *Agaricus*. The genus *Agaricus* contains a number of edible species, including the domestic mushrooms found in groceries. The gills and shredded collar of members of the genus *Agaricus* make it impossible to distinguish these succulent edibles from the deadly members of Amanita without looking at the color of the spores.

Even edible mushrooms that are more easily recognized, such as the puffballs (*Calvatia gigantea*, *Bovista pila*, and others), morels (*Morchella*, illustrated), and shaggy mane have inedible or poisonous look-alikes. To ensure safe foraging, the mushroom hunter must become familiar with the characteristics that distinguish each edible fungus from mushrooms that it may resemble.

For example, always slice puffballs in half and examine them for any signs of gills, which indicate that the plant is not a puffball at all but may be the button stage of one of the *Amanita* species. In addition, throw out any puffballs with pinholes (indicating worms) or a yellow tinge on the interior, signs that the mushroom is past its prime.

One clue for distinguishing the true morels from the deadly poisonous *Gyromitra esculenta* is that true morels have hollow interiors while the interior of this false morel is chambered. But other false morels also exist (for example, *Verpa bohemica*), so familiarize yourself with all of the identifying characteristics of the true morels before sampling (Rodriguez 1985).

If you develop an interest in eating wild mushrooms, start by learning to identify just one or two of the edible species. And remember, even edible mushrooms can cause digestive distress or more severe poisoning if picked at the wrong stage or improperly prepared. Too often a field guide tells you little more than that the mushroom is edible. But you need further information before you bite into the fungus. You must find out what parts of the mushroom you can eat. You need to know whether you must cook the mushrooms before eating them. Some "edible" mushrooms are actually toxic when raw. Also you need to learn to recognize an overripe mushroom, another possible source of toxicity or digestive discomfort. You should eat or preserve most wild mushrooms the same day you pick them. Some species, such as the shaggy mane and inky cap, deliquesce; that is, they become a slimy mass within a day of being collected. Most mushrooms can be preserved by drying and freezing. Refer to the resources listed below for information on identifying and using wild mushrooms.

Recommended Reading

Lincoff, Gary H., and D. H. Mitchell, M.D. 1977. *Toxic and Hallucinogenic Mushroom Poisoning. A Handbook for Physicians and Mushroom Hunters*. New York: Van Nostrant Reinhold Co. (Excellent information for physicians. Fairly technical for the layperson, but comprehensive.)

Metzler, Susan and Van Metzler. 1992. *Texas Mushrooms: A Field Guide*. Austin: University of Texas Press. (Excellent photographs; details on edible and poisonous fungi; also includes recipes.)

Miller, Orson K., Jr. 1978. *Mushrooms of North America*. New York: E. P Dutton. (Provides valuable information on toxic mushrooms and how to prepare edible mushrooms.)

Rice, Miriam C., and Dorothy Beebee. 1980. *Mushrooms for Color*. Eureka, Calif.: Mad River Press. (This interesting and unusual book tells you how to use mushrooms to dye wool beautiful colors.)

Periodical

Mushrooms: The Journal of Wild Mushrooming. (Box 3156 University Station, Moscow, Idaho 83843.)

Edible and Useful Plants of Texas and the Southwest

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