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Cannabis Sativa L. Misunderstood

According to Mexico's Ministry of the Environment and Natural Resources (Semarnat), the country has 122 forest areas in crisis due to different causes such as clandestine logging and a clear worldwide problem of contamination from non-biodegradable plastics. In this complex context, cannabis is a quick source of important raw materials, since it can be harvested more than once a year, using less water and yielding more than conventional crops.

A Brief Overview

Human beings' relationship with this plant has been active and diverse. Its use for different purposes in different cultures, like China's, has been well documented. In the

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past, one everyday medical application was as an ingredient for anesthesia, but it was also used for rituals and in textiles. It has been utilized as a raw material in navies during colonization, since it was said that an empire was a power in this area due to its ability to develop materials that allowed it to sail the seas, and hemp ropes were more resistant than those made of other materials in that era.

Although one piece of research mentions that hemp may date back as much as twenty-eight million years,¹ human beings have been in contact with it for at least 8,000 years. About 1,800 years ago, the Chinese surgeon Hua To, who seems to have been the first practitioner to use anesthetic, had a formula that included cannabis among its ingredients, and the ancient Greeks prescribed it for back pain. Pedanius Dioscorides, a Greek first century A.D. physician, mentions it in his medical treatise.² In India, it was used for ritual and medicinal purposes.

In the Americas, after it was introduced in Chile by sixteenth-century European explorers, cannabis was used

mainly as a raw material for naval uses since it was highly valued due to its resistance to tension, the climate, and salt water.

It arrived in Mexico during the “Conquest” and began to be grown by Pánfilo de Narváez, but Hernán Cortés also promoted its cultivation, documented in certain areas during the colonial period. Although its use was mainly industrial, the first peoples included it in their ritual customs together with other plants known as *pipilzintles*, due to its psychoactive properties.

The Inquisition condemned any uses other than industrial. However, the ban became stricter in the United States in 1920 mainly for racial reasons, and then extended to Mexico. A campaign to grow it in the U.S. for industrial purposes was waged during World War II, while in Mexico, during the Revolution, marihuana was part of daily life.

The 1961 Single Convention on Narcotic Drugs differentiated between the psychoactive varieties of cannabis (with a high THC content) and the varieties that were not psychoactive (hemp), with low or non-existent THC content, considering the former to have no medical properties and to be potentially addictive. China has never banned hemp cultivation and is the world’s largest producer. In early 2019, the World Health Organization issued a series of recommendations about marihuana and its derivatives. Shortly thereafter, the UN International Narcotics Control Board took cannabis off its List IV, the list of psychotropic drugs. Mexico has decriminalized its use for medicinal and scientific research purposes and the Supreme Court recognizes the individual’s right to personal use for the free development of his/her personality.

The Nature of Cannabis and Its Effect in Human Beings

Human beings have a series of receptors throughout our bodies called the endocannabinoid system, which has homeostatic functions for intercellular communication and responds to molecules produced by cannabis. This system was discovered in the 1980s when the CB1 and CB2 receptors were discovered in 1988 and 1993, respectively, although there are more. We should underline that our bodies produce their own endocannabinoids: anandamide (discovered in 1992) and 2-araquinodilglicerol, or 2-ag (discovered in 1995).

The rediscovery of the plant seems to be in fashion; its cultivation is part of the transitional process our country and the world are undergoing. Cannabis is a gift, a tool for humanity that everyone should have access to.

The phytocannabinoids, so-called because of their plant origins, most studied until now are THC and CBD, the former discovered by Raphael Mechoulam and his collaborators in 1964, and the latter by Lumir Hanus and his team in 1992. There are, however, others of interest, although they appear in smaller quantities, such as cannabigerol (CBG), cannabichomene (CBC), and cannabitol (CBN), among others. More than one hundred of these have been identified up until now.

Before the botanist Carl Linnaeus began using the term “cannabis,” the word “hemp” was generally used to describe the plant.

This is a dioic species—that is, it can either be male or female—that grows annually and can grow to be more than five meters high. Detecting which sex it is before it is visible is fundamental for cultivation in order to obtain flowers as raw materials; the feminized seeds, micro-propagation, or cuttings or slips can be used to determine this. The female cannabis produces the flowers and the resin, which contain the most interesting compounds.

The most common and easiest way of determining the plant’s sex is to observe the spaces between nodes: the presence of small, delicate pistils and the formation of calyces with commonly two pistils each serve to trap pollen from the environment indicates that it is a female plant (the calyx is where the seeds grow). But if little balls or clusters of balls take on the form of small bunches of bananas, commonly yellow, and end by opening to dispense pollen, we are looking at a male plant. A plant can also have both sexual characteristics, due to factors such as gene expression or conditions of environmental or nutritional stress. Depending on what the plant is being cultivated for, whether seeds are required or not, when a plant is not pollinated, it directs its energy to creating inflorescences and more resin. However, when it is pollinated, it concentrates on producing seeds, thus lowering the number of flowers and resin production.

What Does Cannabis Give Us?

The female cannabis plant's inflorescences contain aromatic molecules of interest in pharmacology, such as terpenes and phytocannabinoids and especially its resin. The cannabis root has also been used in compresses, decoctions, or medicinal teas. However, this part of the plant produces almost no, or only insignificant, amounts of cannabinoids compared to the concentration found in the resin, but it contains other molecules that could be of pharmacological use.

Cannabis seeds are a super-food with interesting properties because they contain omega fatty acids and can be used to obtain sub-products such as highly nutritional oil. The leaves and flowers contain vitamins and minerals that can be used in the daily diet and eaten raw without causing any psychoactive effects.

After harvest, the stalks can be used in different ways, among them, to obtain cellulose and fibers, with some varieties providing a greater abundance of them than others. Several companies worldwide use cannabis and/or its derivatives in some of their products, from the auto and military industries to food and pharmaceuticals.

The ligneous or woody part of the plant can be used to obtain products that we currently get from other sources of cellulose and can be used in activities such as construction. A mixture of the bagasse (the pulp of the plant), lime, and water is the basic ingredient for making hempcrete or cannacrete, materials with interesting mechanical and thermal characteristics that give constructions energy-saving and carbon-sequestering properties and making them lighter and more resistant.

Human-caused environmental contamination can cause toxic substances to penetrate groundwater and communities' potable water supply. This is why materials derived from cannabis have been studied as filtration agents; that is, they can be used for phyto-repair in polluted soil, even those contaminated with radioactive agents.

The plant's cellulose can be used to obtain other products, such as the raw material for making paper: cellulose pulp. The first step is to eliminate the greatest amount of ligneous material possible; this is done by making a decoction using an agent to alkalize the water, for example sodium hydroxide (caustic soda), which we can replace with plant ash, preferable made from hardwoods.

After boiling, the cellulose is rinsed until its pH is neutral, and we then can obtain the pulp using a tool to sepa-

rate the fibers in the stalks. During this process or afterward, the pulp can be whitened.

This can be used immediately or can be stored to make other products. It can be molded by hand and, depending on the size of the particles, different textures and qualities can be obtained. Artistic expression is among the variety of uses humans have found for cannabis, a source of inspiration that connects us to other sensations and makes it possible to produce works that perdure in human collective memory.

In short, the entire cannabis plant is useful, and its cultivation can have multiple purposes.

A Resilient Crop

When I did research in my hometown, Grajales, Puebla, I did not find any record of cannabis cultivation in the past. However, people have carried out activism in the area in favor of universal access to the plant. Because the local climate is temperate, harvests are mainly seasonal, and cannabis grows easily in that environment, although it can fall prey to common pests like white flies; aphids; white mealybugs; green worms; certain fungi like powdery mildew, botrytis, or sooty mold; and winter frosts.

Nevertheless, it is resistant and can grow without pesticides or herbicides and in its vegetative phase can resist a frost since it has good recovery capabilities. In addition, its carbon footprint is practically non-existent since during its development it absorbs the same amount of CO² as it exudes.

Lastly, I should point out that, fortunately, the rediscovery of the plant seems to be in fashion; its cultivation is part of the transitional process our country and the world are undergoing. This means we could say that cannabis is a gift, a tool for humanity that everyone should have access to. **MM**

Notes

- 1 J. M. McPartland, W. Hegman, and T. Long, "Cannabis in Asia: Its Center of Origin and Early Cultivation, Based on a Synthesis of Subfossil Pollen and Archaeobotanical Studies," *Veget Hist Archaeobot* no. 28, 2019, pp. 691-702, <https://doi.org/10.1007/s00334-019-00731-8>.
- 2 *De materia medicas* (On Medical Material) a five-volume work on more than 600 substances used in treating patients. Translated by Lily Y. Beck (Hildesheim, Germany: 2005, Olms-Weidman). [Editor's Note.]