

# History and Ecology of Vanilla

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Along with cacao, amaranth, chili peppers and tomatoes, vanilla is considered one of Mexico's main contributions to the world. Its delicious flavor and delicate aroma are obtained from the mature fruit of an orchid known as vanilla, *caxixinath* ("hidden flower" in Totonac) or *tlilxochitl* ("black flower" in Nahuatl). Its scientific name is *Vanilla planifolia* Andrews ex Jackson.

Just like today, in pre-Columbian Mexico, vanilla's flavor and aroma were appreciated and valued. However, in contrast with our time, it was reserved for a select few, restricted to the nobility. They drank a beverage of vanilla mixed

with chocolate, which was the way Hernán Cortés first tasted it, during an audience with Moctezuma.

Throughout history, vanilla gathering and production have been associated with a few towns in Mexico's southeast and more generally with the Totonac culture, located in the Papantla, Veracruz area. Totonac documents testify to the fact that they gathered vanilla fruit in their tropical forests and offered it as tribute to the Aztecs. In these forests, vanilla grew on vines that climbed the trees seeking sunlight. Once the orchid vine reached the tops of their hosts they began to produce flowers and green fruit in spring. The young fruit, which looked like a bean pod or green bean, hung from the top of the trees, watery and without scent or flavor. But,

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when they ripened in winter, they took on their characteristic flavor and smell: they turned a very dark brown, almost black, and some opened to form a kind of fan that looked like a flower. The ripe fruit was offered as tribute.

We know that the vanilla harvest was not very large; all the more reason why it was considered rare and precious. One of the reasons for the paucity of the crop was that the flowers depended for their fertilization on the abundance of metallic green bees, known scientifically as *Euglossa viridissima*. Another reason that has been cited as a cause of low vanilla production has been the fruit's lack of nectar and fragrance, the function of which is to attract pollinating insects.

Some controversy exists about the moment when vanilla began to be cultivated in our country. Some authors think it began among the Totonacs before the arrival of the Spaniards, while others say that it started in the mid-eighteenth or even the early nineteenth century. Regardless of the date, we know that today's traditional cultivation method is almost identical to that used in the past in the tropical forest: the orchid spreads through stakes or pieces of stem planted at the base of a tree or host. Once the plant takes root, it begins to grow and creep up the host; when it is over three meters long, the vanilla begins to produce flowers and fruit. In communities where traditional forms of planting continue to be used (for example, Papantla, Veracruz; Sierra Norte de Puebla and Chinantla Baja, Oaxaca), trees under five meters high are chosen as hosts, while the taller ones are used for the shade the crop needs.

After the conquest, because of the enthusiasm for the spice in Europe, several attempts were made to extend production to other parts of the world. Based on the Totonac experience, it was introduced into Java, Réunion, Mauritius and Madagascar, where the plants developed well, but when the orchids flowered, fruit production was nil or almost nil. This was due to the absence of pollinating insects, a serious limitation for expansion of cultivation. Thus, for more

than two centuries, Mexico was the world's only supplier of vanilla, bringing the country considerable profit. In the mid-nineteenth century it was discovered that vanilla flowers could be fertilized manually. This made it possible to produce the fruit on plantations outside its natural area (southeastern Mexico and Central America) and led to intensive vanilla cultivation in different tropical regions, making its production intensely commercial.

Manual pollination is a common practice on all the world's vanilla plantations now, though it is the activity that consumes the most time, money and effort. This is because the flowers



Young, unripe vanilla plants.



Manual pollination is a common practice all around the world.

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do not all open at the same time. For each raceme with two to 25 buds, usually only one flower opens a day and lives only six hours. This is why pollination is carried out during morning hours; in a productive vanillery more than 500 flowers may be pollinated in one day. In the Papantla region, manual pollination is known as “the marriage of the vanilla” and is carried out mainly by women and children.

Today, vanilla is one of the most profitable products of the humid tropics; this is why producers pollinate the largest possible number of flowers per plant, to get large harvests. However, this practice has negative consequences, par-

ticularly in plants with a large number of racemes (over 20). A plant can be weakened if it is heavily laden with fruit and can lose much of the fruit formed. In addition, the following year a weak plant will yield a low number of flowers and fruit, or none at all; and some of the orchids can even die or develop diseases. To avoid these negative results, indigenous Totonac planters recommend pollinating five flowers per raceme and maintaining the same number of fruits. However, growers increase or decrease the number they recommend according to their experience and the plant’s vitality.

With the permanent aim of achieving high productivity, vanilla cultivation techniques have changed over time to adapt to the area where the vanilleries have been planted. Unfortunately, the most successful experiences have been in areas outside the species’ place of origin. This means that current vanilla production is concentrated in countries where it was artificially introduced, like Indonesia, Réunion, the Comoros Islands and, above all, the Malagasy Republic, which has been the world’s leading producer of vanilla for the last five decades, with an output of 1,000 tons a year. Mexico has been left behind with its 12 to 30 tons a year because a large part of cultivation is done with traditional systems, with, unfortunately, low productivity. However, if we take into account the rapid deforestation of the Mexican tropics, this agroforestry system has the advantage of preserving the fauna and a large number of species of the original vegetation.

A recent development has shown another advantage of Mexico’s vanilleries: their genetic variation. This means that although the plants look similar, they are actually different, like the difference between a father and his children. When this difference is very small, the plants are genetically very similar or identical: this is the case of the twins or clones that share the same genetic information, making them less resistant to disease. Mexico’s vanilleries have greater genetic variety than those of other countries, which means that the latter suffer from low resistance



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Manual pollination is carried out during morning hours.



Ricardo Carbay

When the fruit is ripe and almost black in color, it yields its characteristic flavor and smell.



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Today, vanilla production is concentrated in countries where it was artificially introduced.

to disease and that all the plants in the vanillery are in the same precarious situation. Therefore, if a plant is infected with a certain disease, such as the fungus that causes the root to rot (*Fusarium batatatis, vanillae* variety), it is very likely that all the orchids will be infected, thus turning it into blight that will destroy the crop (this has happened, for example, in Madagascar), while the outcome would not necessarily be the same in our country.

One advantage of genetic variety is that it makes it possible to select strong vanilla plants, both on plantations and in their natural environment, that could be laden with a high number of fruits or with fruit resistant to drought

and disease, among other things, which would bolster vanilla production in Mexico.

Finally, Mexico's vanilla production does not seem very encouraging, but there are several options for improving it, among them: 1) continuing with traditional cultivation, and, with a few modifications, supporting it so the crop can be introduced into the alternative market of organic products; 2) supporting the transformation and establishment of modern cultivation techniques; and 3) creating genetic improvement programs.

Vanilla production is a good option for Mexico, particularly if we take into account that the world's yearly production covers only 50 percent of demand for natural vanilla. We should take advantage of this opportunity. ■■

#### FURTHER READING

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