

## Oak Woods of Puebla

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Oak forests were highly respected in ancient times. The forest was, for ancient Mexicans, a place of wind, cold, fear and tears, where wild beasts, snakes and tarantulas lived. It was said that everything can get in but nothing can get out. There were big trees whose wood was used in the construction of houses, furniture and instruments, but man had to go into it only protected with a stone axe.

The Ahuatl or oak was considered as a shade tree and good for lumber. Another oak was known as the Teocuathuitl, the “divine or old tree”, perhaps because the “huictlis” were made with this kind of wood to plant the divine corn. The Huictli was the most important tool for indigenous cultures because it was used in all stages of corn cultivation, as well as a planting stick with its fire-hardened tip, it served as a shovel, hoe and dustpan (Aguilera, 1985).

Upon arrival, the *conquistadores* brought ancient knowledge about European oaks. They had perfected the production of various high quality wood products used for construction. The American oaks represented a big challenge for them because they showed dense, hard and very resistant wood. Many oaks ended their long life as beams, wagon wheels, railway sleepers, constructions, firewood, coal and various other products. Another important factor in the loss of forests was the founding of cities in temperate zones, such as Mexico, Veracruz and Puebla. These cities were built where the weather is mild and there were large tracts of pine-oak forest.

What happened to the oak woods in Puebla? Puebla is ranked fifth place in oak diversity in Mexico with 50 species. In pre-hispanic times the impact was not very drastic but later, with the arrival of the Spaniards, the destruction increased up to the point of leaving the great plains without trees and unable to recover. It has recently been estimated that there are 325.5 square kilometers of oak woods in Puebla state, 90% less than in 1981 when 3,390 square kilometers were registered (Benitez 2009).

This essay examines some cases of the loss of the oak woods to urban areas, excessive exploitation and because of ignorance of the ecological value of oaks.

La Calera, or the Villa Galaxy residential area, is one of the last oak forests in Puebla city whose existence is threatened by housing projects in the urban zone. Also Flor del Bosque park and the Amozoc mountains are some of the last oak forests in the city of Puebla. (Mejía, 2009)

It was possible to exploit this forest legally, as according to environmental impact studies the area is categorized with low biodiversity (Tajonar, 2009). However, according to surveys in La Calera forest, there are 7 oak species (6 trees and 1 shrub): *Quercus sebifera* Trel., *Quercus mexicana* Bonpl., *Quercus acutifolia* Née, *Quercus liebmannii* Oerst. ex Trel., *Quercus laeta* Liebm., *Quercus*

*obtusata* Bonpl., *Quercus castanea* Née. Another study found 75 species of birds in this forest of which 3 species are subject to special protection, according to NOM-059-SEMARNAT-2001. These are the migratory Cooper's hawk (*Accipiter cooperii*) and the native Pileated flycatcher (*Xenotriccus mexicanus*) and Brown-backed solitaire (*Myadestes occidentalis*).

There are other species present, that although not listed in the Official Mexican Standard are very significant - *Melanerpes formicivorus* (Acorn woodpecker) Resident; *Picoides scalaris* (Ladder-backed woodpecker) Resident; *Campylorhynchus jocosus* (Boucard's wren) Resident; *Thryomanes bewickii* (Bewick's wren) Resident (Pineda, Mendoza and Jimenez, 2009).

Another case is the Valsequillo Valley, a dry valley adjacent to La Calera and part of the Tenzo mountain range. This valley contains the Manuel Avila Camacho dam built in 1940. The valley was once surrounded by oak woods but the building of the dam saw the beginning of their destruction, now reduced to a few small populations.

In this area there are at least 12 oak species (2 shrubs and 10 trees) which are currently isolated patches in large areas. *Quercus acutifolia*, *Q. mexicana*, *Q. castanea*, *Q. glaucoides* M. Martens & Galeotti, *Q. glabrescens* Benth., *Q. liebmannii*, *Q. magnoliifolia* Née, *Q. obtusata*, *Q. laeta*, *Q. microphylla* Née, *Q. sebifera*, *Q. grahamii* Benth.. There are 12 orchid species (1 epiphyte and 11 terrestrial), 9 bromeliad species (7 *Tillandsia* spp. and 2 *Hechtia* spp.), 8 Agavaceae (1 *Polianthes*, 2 *Manfreda*, 2 *Yucca*, 4 *Agave*) and several native species of small mammals including *Bassariscus astutus*, (civet or Ring-tailed cat), *Mustela* sp. (weasel) and the opossum.

Several other important areas are being affected by the subdivision of



*Q. glaucoides* by the resevoir at Valsequillo.

land. The construction of the Captain Carlos Camacho Espiritu Boulevard was proposed 5 years ago. A two-lane highway became four and brought with it the sale of land without a land-use study. The same site contains several examples of hundred-year-old trees, such as the Ahuacoxtle (*Quercus glaucooides*), which is estimated at 300 years old (Photo 1) and a Chavarro (*Quercus laeta*), which may be in danger of ending its days as fuel (Files Botanical Garden “Louise Wardle de Camacho”).

Another affected area is La Malinche (belonging both to Puebla and Tlaxcala), where oak and pine forests covered the mountains. These forests have been degraded by 90% on the Puebla side of the mountain. This year it was estimated that about 1800 hectares of the 2000 that belong to the municipality have been totally cleared. Illegal logging has been the most acute problem in this area, and although there have been many reforestation projects there is little seedling survival due to underground fires made by the loggers. It is estimated that at least 200 hectares are lost per year. This area is very important because La Malinche is considered a source of water for Puebla City (Newspaper Milenio-Puebla, 2009).

The final example is the locality called Puerto del Aire, adjacent to Veracruz state. In this part of the state of Puebla, it is not possible to estimate the future of oaks. There are two types, the actual oak forest and oak-pine forest and a xeric shrubland dominated by *Quercus sebifera* (a shrub) and *Quercus greggii* (A.D.C.) Trel. (a shrub or tree). There are 3 species of *Sedum* and one *Echeveria*, legumes, agaves and even epiphytic orchids. The oaks here form a complex of very dense thickets. These landscapes are being threatened by pine plantations and cattle grazing, so it is almost impossible to find recent shoots or seedlings and most are mature trees.

There are several strategies, all them with a common goal, to spread the importance and appreciation of oaks and the vital role they play within ecosystems. Actions are being taken to defend the last remaining relics of oak woodland in the city of Puebla, such as a project by the State Ecology Council to expand the zone of the Tehuacan-Cuicatlán biosphere to include Puerto del Aire. Two important *ex situ* oak collections exist in Puebla, the Botanical Garden of the Benemerita University of Puebla and the Louise Wardle Camacho Botanical Garden.

It is clear that competition for space and population growth is affecting these species, however different organizations, both governmental and non-governmental, are giving a major boost to oak conservation to avoid their extinction from the areas formerly occupied.

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# Outline About Oak Woods of Puebla

## Oak Forest Were Highly Respected in Ancient Times

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The forest was for ancient Mexicans a place of wind, cold, fear and tears, where wild beasts, snakes and tarantulas inhabited. It was said that everything can get in but nothing can get out. There are big trees whose wood was used in the construction of rooms, furniture and instruments, but the man had to go into it only protected with a stone ax.

The "Ahuatl" or oak is considered among the shade trees and good lumber. Other one, the "Teocualhuatl" whose name was "divine of old tree", perhaps because the "huictlis" were made with this kind of wood to plant the divine corn.

The "Huictli" was the most important tool for indigenous culture because it was used in all stages of corn cultivation, as well as stick to plant with its fire-hardened tip, served as a shovel, hoe and dustpan. Aguilera, 1985.

Upon arrival, the conquerors brought ancient knowledge about European oaks. With the oaks they had perfected the production of various high quality products, from real estate to construction, the American oaks represented a big challenge for them because it showed dense, hard and very resistant Woods.

Many oaks ended its long life as beams, wagon wheels, railway sleepers, constructions, firewood, coal and various products. The operation was such that only there were small and malformed trees difficult to use. Therefore, the oak fell into the second timber status, being used only as firewood, pulp and coal, the latter being its main use until recent years.

Another very important factor was the opening of temperate zones to founding cities as Mexico, Veracruz and Puebla. These cities are building on which there were large tracts of pine-oak forest, oak and oak-pine, due to mild weather that is characteristic of these vegetations.

This remnant that is left (120 hectare) its rate of natural recruitment is low or sometimes zero.

In this area it has been counted at least 12 oak species (2 shrubs and 10 trees) which are currently isolated patches in large areas: *Quercus acutifolia*, *Q. mexicana*, *Q. castanea*, *Q. glaucoidea*, *Q. glabrescens*, *Q. liebmanni*, *Q. magnifolia*, *Q. obtusata*, *Q. laeta*, *Q. microphylla*, *Q. sebifera*, *Q. grahamii*. 15 orchids species (1 *Laelia* sp and 14 terrestrial), 9 bromeliad species (7 *Tillandsia* spp and 2 *Wickelia* spp), 8 agave species (1 *Poinsettia* sp, 2 *Manfreda* spp, 2 *Yucca* spp, 4 *Agave* spp).



*Basarricus altifolius* "Cacomixtle, siete anillos" Ring Tailed Cat / Resident  
*Mustela* sp "Comadreja" Weasel / Resident  
*Opossum* sp "Zarigüeya" Raccoon / Resident  
*Lampropeltis triangulum* "Falsa Corallillo" Milk Snake / Resident  
*Phrynosoma* sp "Falso camaleón" Horned Lizard / Resident



The valley began to change since 1980, but accelerated by the fragmentation of land, since the last 5 years gave the green light to the proposed construction of the boulevard Capitán Carlos Camacho Spirit. A two-lane highway became 4, bringing with it the start of the sale of lots.

Another site affected is the pine forests, pine-oak and oak pine mountain of La Malinche belonging to Puebla and Tlaxcala. These forests have been degraded to 90% on this side. This year it was estimated that about 1800 hectares of the 2000 that belong to the town are completely deforested. The most acute problem in this area have been illegal logging, although there have been many occasions reforestation projects there is little survival of the seedlings due to underground fires loggers to stop their illegal cutting times of the trees. This area is of paramount importance because the sponge "The Malinche" considered aquifers supplying the city of Puebla. Degradation in the last 25 years has resulted in the release into the atmosphere of 20 tons of carbon dioxide and reduced about 100mm of water in the Valley.

At the time you have several projects for this area, but the lifestyle of the locals can not be carried out entirely.

A further and final example is the locality called "Air Port", adjacent to the state of Veracruz, in this part of the state of Puebla, it could not estimate the future of what will happen with their forests. Here are of three types of vegetation, the actual oak forests, oak pine and a couple of miles before there is a xeric scrub.

The first two have a high abundance of oaks and pines, the presence of epiphytic plants like orchids and bromeliads is very common, for the moisture present in the environment, this area has begun to be populated very little slightly longer be divided by placing nets in all fields to prevent invasion of property. This people remove oaks to pine plantations, since it is more economically profitable.

About two miles before as mentioned above there is a xeric scrub which is dominated by *Quercus Greggii* and *Quercus sebifera*, the first is both shrub and tree and the second is only shrub, they form a dense scrubland in this site can be appreciate crasulacean species (*Sedum* spp and sp), legumes, agaves even epiphytic orchids.

These landscapes are threatened by herbivory as several locals introduce cattle to be fed, it is almost impossible to find recent shoots or seedlings, mostly mature trees.

They are taking action to defend the last remaining relics of oak woodland among these are projects with flagship species by private organizations, unfortunately interests of various natures can not move forward. Tajonar, 2009.

Another solution is the formation of reserves where this genus is important, "Air Port", the Biosphere Reserve plans to expand its site by entering this part of the area.

Reforestation in denuded areas with oak trees, where several institutions have the power to call for massive events such as African Safari, Dear Planet, Starbucks.

The formation of collections of this kind of ex situ manner, such as the Botanical Garden "Ignacio Rodríguez Alconedo" or the Botanical Garden "Louise Wardle de Camacho.

There are several strategies but all with a common goal, spreading the importance of this genus and because of their level within ecosystems vital.

It is clear that competition for space and population growth is affecting these species, but various strategies are giving this kind to avoid the impulse to disappear from the formerly occupied areas.

**But, what happened to the oak woods in Puebla?**



Puebla is ranked fifth place in oak diversity with 50 species.

Since the beginning of the century in Puebla, the opening of fields and the cities growth set off a competition against the surrounding vegetation. The competition began with the ethnic groups from the zone where the impact was not very drastic but after, with the arrival of the conquerors, the competition was speeded up to the point of leaving the great plains without the presence of vegetation and not let them recover.

Nowadays it has estimated that there are 325 square kilometers of oak woods, 10% less than in 1981 where 3,390 square kilometers were registered. Newsletter, Puebla 2009.

Currently, this competition continues. The future of oak woods is uncertain in Puebla city. This essay examines some cases about the loss of the oak woods far up to the urban areas, excessive exploitation and / or contempt and little knowledge about the ecological value that have these trees or shrubs.

The first and most "recent" is nominated for "La Calera" or Fraccionamiento Villa Galaxy, one of the last oak forest in the city of Puebla with the area of "Forest Flower" and the Sierra de Amozoc where the last relic of the city of Puebla is threatening their existence, because the various building projects that were established in this part of the urban area, in which only 68 years have lost at least 10 thousand hectares of forest.

Since 1940 when it began with the introduction of eucalyptus this site was splitting gradually until 2006 that construction started on a major destruction. In just 3 years have been cut at least 5900 mature oaks. Mejía, 2009.

The slogan for exploiting this forest was under "legality" since according to environmental impact studies, the life was not affected because the area is categorized with low biodiversity. "Little biodiversity" people wondered, is this real? According to surveys in "La Calera" forest, there are 2 oak species (6 trees and 1 shrub) *Quercus sebifera*, *Quercus mexicana*, *Quercus acutifolia*, *Quercus liebmanni*, *Quercus laeta*, *Quercus obtusata*, *Quercus castanea*; another study found 75 species of birds in this forest of which 3 species are subject to special protection, according to NOM-059-S/SEMARNAT/2001.

- Accipiter cooperii* / Cooper's Hawk / Migratory
- Xenotricus mexicanus* / Pileated Flycatcher / Endemic
- Myadestes occidentalis* / Brown-backed Solitaire / Endemic

There are other species not listed in the Official Mexican Standard but they are very significant. *Melanerpes formicivorus* / Carpenter ant-eater / Bellero / Acorn woodpecker / Resident  
*Picoides scalaris* / Carpenter mexican / Ladder-backed woodpecker / Resident  
*Campylorhynchus jocosus* / Matraca del Balsas / boucard's wren / Resident  
*Thryomanes bewickii* / Saltaparedes / Bewick's wren / Resident



(Pineda, Mendoza and Jimenez 2009)

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