Quercus corrugata photo©Maricela Rodríguez-Acosta

Quercus sebifera photo©Allen Coombes

Oaks of Puebla

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Origins of the oak collection in Puebla

One of the most frequent questions we are asked about oaks is why do we call them encinos in Spanish? To answer this we have to talk about *encina*, the Spanish name for *Quercus ilex* L., which comes from *lecina* derived from *ilicina* (Latin for *Quercus ilex*).

Another question we have to answer very often is why do we like oaks, and we then talk about history, as many of them can reach a thousand years old, such as *Quercus robur* L. An example of this is the Majesty Oak at Fredville House, Kent, UK which currently has a 12 m circumference.

Our experiences with oaks go back to 1992 when we started to propagate oaks and later on they were reintroduced in patches of a private land located in Valsequillo Valley. It was in 1995 that we were involved with a wider project, and 200,000 oaks were propagated for a government office named SEDESOL for planting in different regions in Puebla. Propagating such a number of plants in a region where water is a limiting factor was a very difficult task.

It was then when we started the project to develop an oak national collection devoted to hold as many oaks species as possible. Several field trips were organized and the national collection was placed in two gardens: Louise Wardle de Camacho, the Botanic Garden at Africam Safari (LWC) and a duplicate in the Botanic Garden at the Benemerita University Autonoma de Puebla (Rodriguez-Acosta, 1995).

In 1999, the oak collection held 75 Mexican species (LWC), all of them in the nursery, but unfortunately they were not planted on time and by 2002 there were many losses reducing the species number considerably. By that time the Botanic Garden at Benemerita University of Puebla was growing and many of the oaks introduced as part of the collection were prospering and well established, making it today the best oak collection in Mexico.

Oak Conservation

Oak forests in Mexico have been strongly affected by human population mainly as a source of fuel as firewood and charcoal, and compost for gardens. As a result, the central part of Mexico has seen its oak forests severely reduced, and the same situation applies to more tropical areas in Mexico.

For example, Puebla state has lost 90% of its oak forest in two decades (Rodriguez-Acosta, 2009). 44 Mexican species were reported as potentially threatened (Walter & Gillet, 1998) from which 13 are Data Deficient, 19 are considered Rare, 7 Vulnerable, and 5 more Endangered. With this information and with financial support from IUCN, in 1999 a project was started to determine

the exact status of *Quercus hintonii* E.F. Warb. (Rodríguez-Acosta & Coombes, 2000). Following this, we were able to reduce the category of this species from Critically Endangered to Endangered as it was found to occur over a much wider area than was originally believed.

In 2002, a new project was started devoted to assess the distribution of *Q. insignis* M. Martens & Galeotti, which has its main populations in the Huatusco area in Veracruz state and several locations in Jalisco. We concluded that this species was at greater risk in Jalisco as the water sources there were decreasing in the natural habitat of this species.

These two studies highlight the need for time and money for a complete assessment of the Mexican species and at the same time showed that the best way to protect our oak species was by conserving the forest.

Oak diversity in Puebla

Puebla state is large and diverse and includes almost all the habitats in Mexico with exception of the coast. It includes the two highest volcanoes Citlaltepetl and Popocatepetl and lowlands only 50 meters above sea level. This range gives a higher oak diversity than we originally thought. At the end of 2008 Rodríguez-Acosta reported 37 species, a number that after revision was up to 46 in October 2009. This increase in species number is because of the intensive exploration we have been doing since the beginning of this year. A good range of biological forms is found, from very tall trees such as *Q. corrugata* Hook. growing in different parts of Sierra Norte of Puebla, scrubby oaks such as *Q. sebifera* Trel. growing in Tehuacan Valley or ground cover shrubs such as *Q. repanda* Bonpl. Each one of these species has a particular beauty in the wild and they are adapted to different ecosystems.

We know now that the richest area for oak diversity in Puebla is the Sierra Norte, where the tallest oaks grow, and secondly the temperate forest in the volcanic transversal mountain range. The most restricted area for oaks is the south of Puebla which includes deciduous oaks of small size such as *Q. glaucoides* M. Martens & Galeotti, *Q. magnoliifolia* Née and *Q. liebmannii* Oerst. ex Trel. Two areas less explored are the coastal slope at the northeast and the Oaxaca mountain system between Puebla and Oaxaca.

We expect that these figures will change as our field work continues, but what they do show is that Puebla has a rich diversity that competes with the most oak-rich states of Mexico.

Actions to protect the oak forest

Human activity is the most important cause of forest destruction. In the forest there are enough seeds in most cases, and good seedling development. In the nursery, there is a good rate of germination, good growth, and seedlings establish well. However, we have observed that in order to grow a good oak in the field you need to take care of it during a period of five years and as financial resources for reforestation are scarce, replanting oaks in any number is difficult.

Our recommendation is to grow the oaks as close as possible to their final planting places and use the existing germplasm in the area as a seed source.

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