

Conservation genetics of a threatened Mexican tree species, *Fagus grandifolia* var. *mexicana*.



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This document has been written for the Davis Expedition Fund to fulfil the conditions of submitting a report outlining the main achievements of the expedition.

PROGRESS REPORT

Fieldwork

An expedition to Mexico was undertaken in order to map remaining populations of a threatened Mexican tree species, *Fagus grandifolia* var. *mexicana* and to collect leaves from each population (project objectives listed in Table 1). The five locations where the species is reported to exist in the literature were visited (Table 2). The *Fagus* species was successfully found in all but one of the sites. The area near Tezuitlan, in the state of Puebla, was searched for two days by myself and accompanying field assistants after which we abandoned our search. I have since discovered that the entire population was probably cut and converted to agriculture (Dr. Williams-Linera, pers. com.). Details of *Fagus* forest locations were not explicate in the literature consulted and much time was wasted locating population. Hence, in addition to mapping populations using a GPS, the area of *Fagus* forest was marked onto Mexican topographical maps (Figure 1). Leaf samples were collected, successfully dried and brought back to Edinburgh University for genetic analysis. Thanks to the kind co-operation of the Institute of Ecosystem Studies, Millbrook, NY, a sample of *Fagus grandifolia* leaves from a north American population was also obtained, to enable comparison of genetic diversity with this less endangered, more widespread species.

Table 1. Objectives of the project 'Conservation genetics of a threatened Mexican tree species, *Fagus grandifolia* var. *mexicana*'.

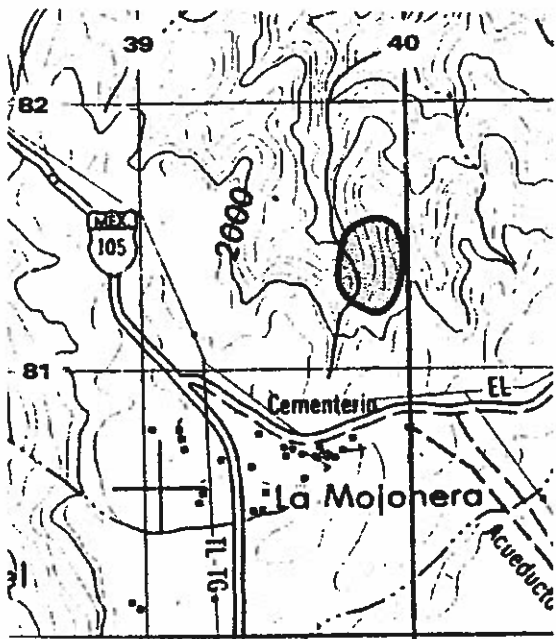
Objectives	
1.	to map population location and record details of habitat for each population of <i>F. grandifolia</i> var. <i>mexicana</i>
2.	to investigate population differentiation by using RAPDs markers to quantify: genetic variation within populations; genetic variation between populations
3.	to define management units from genetic information gained, for use in conservation and restoration of populations of this endangered species

Table 2. Location and altitude of the five locations visited at which *Fagus grandifolia* var. *mexicana* was reported in the literature to exist

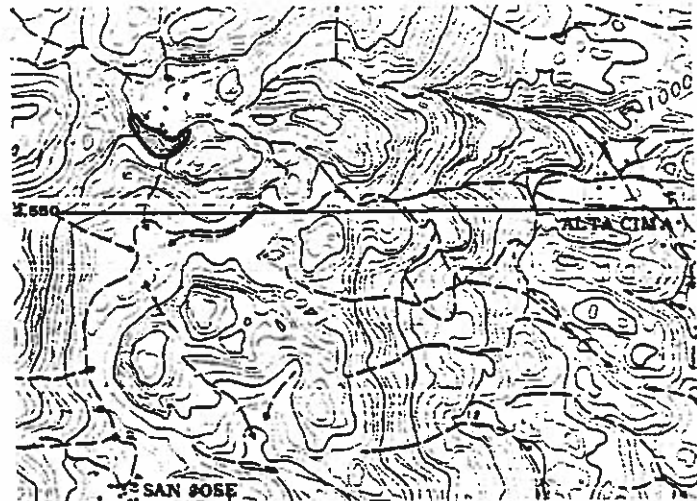
State	Locality	Latitude (N)	Longitude (W)	Altitude (m)
Puebla	Tezuitlan	19° 53' 32.1"	97° 19' 49.1"	1450
Hidalgo	Zacualtipán	20° 37' 42.6"	98° 37' 2.5"	1780-1920
Tamulipas	El Cielo Biosphere Reserve	23° 03' 57.8"	99° 12' 3.8"	1500
Veracruz	Acatlan Volcano	19° 40' 43.9"	96° 51' 9.8"	1840-1900
"	Mesa de la Yerba	19° 33' 37.2"	97° 01' 9.8"	1900

Lab Work

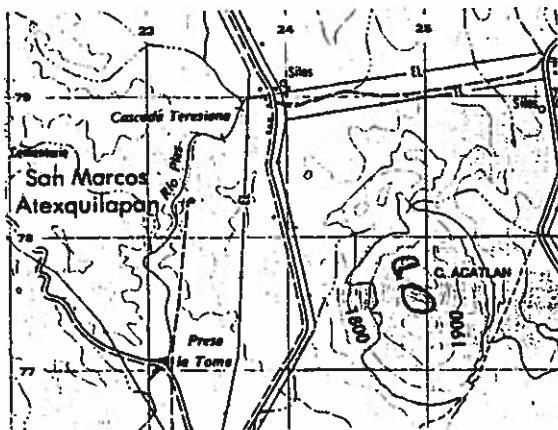
The RAPDs marker technique was used to amplify fragments of *Fagus* DNA with the purpose of determining population genetic structure. A total of 62 RAPD bands were scored from the PCR using 18 random primers. The presence/absence of each scored band was detailed in a binary data matrix for each individual in the sample of 120 *Fagus* trees. The number of bands scored for each primer ranged between one and six and 33 of the bands were polymorphic. Appropriate statistical analysis has been performed in order to fulfil the objectives of the study. The master's dissertation detailing the whole study is currently being written. This dissertation will be submitted on Monday 23 August, 1999, and a copy for the Davis Expedition Fund will be delivered to the Division of Biological Sciences office shortly afterwards. It is hoped that a paper will result from this work and if accepted for publication, a copy of this will also be delivered to the office.



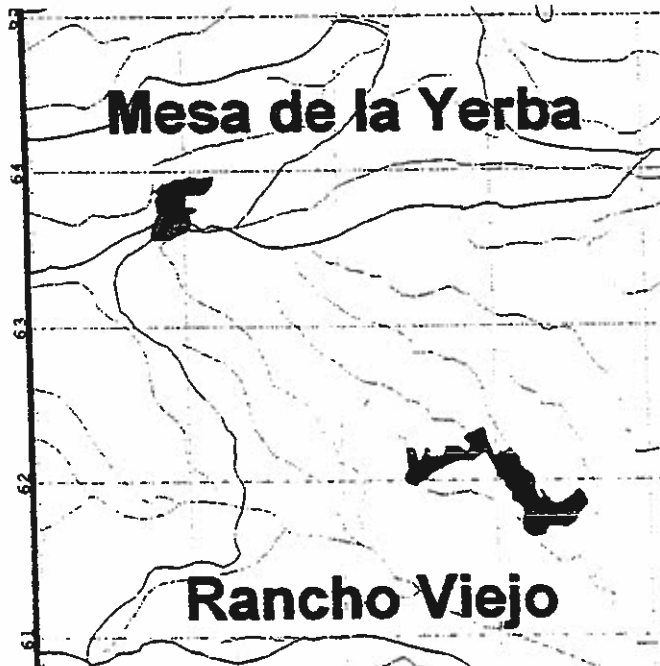
a) Population 1, Zacualtipán
Map: Zacualtipán, Hidalgo y Veracruz F14D62



b) Population 2, El Cielo Biosphere Reserve
Map: Gomez Farias, Tamaulipas F14A49



c) Population 3, Acatlan Volcano.
Map: Jalapa, Veracruz E14B27



d) Population 4, Mesa de la Yerba, Veracruz
Map: copied from Dr. Williams-Linera

Figure 1. Location of sample sites of Mexican populations of *Fagus grandifolia* var *mexicana*. Topographical maps (1:50,000) are produced by the Institute Nacional de Estadística Geografía e informática. Grey shading indicates *Fagus* forest (N.B. on map d, population 4 is at the lighter area of grey shading in the upper shaded region).