

JARDINES BOTANICOS

Y LA

ESTRATEGIA MUNDIAL PARA CONSERVACION



LAS PALMAS DE GRAN CANARIA - 1985



EXCURSION GUIDE

This Guide to The Excursion to the "Los Tiles de Moya" Reserve has been written by Carlos Suarez Rodriguez, biologist. The historical data and maps have been prepared with the help of Antonio Santana Santana, geographer.

One part of the graphics material have been extracted of the book "VEGETACION DE LAS ISLAS CANARIAS" in elaborations by EDIRCA S.A.

GUIDE TO:
THE EXCURSION TO THE "LOS TILES DE MOYA"
RESERVE

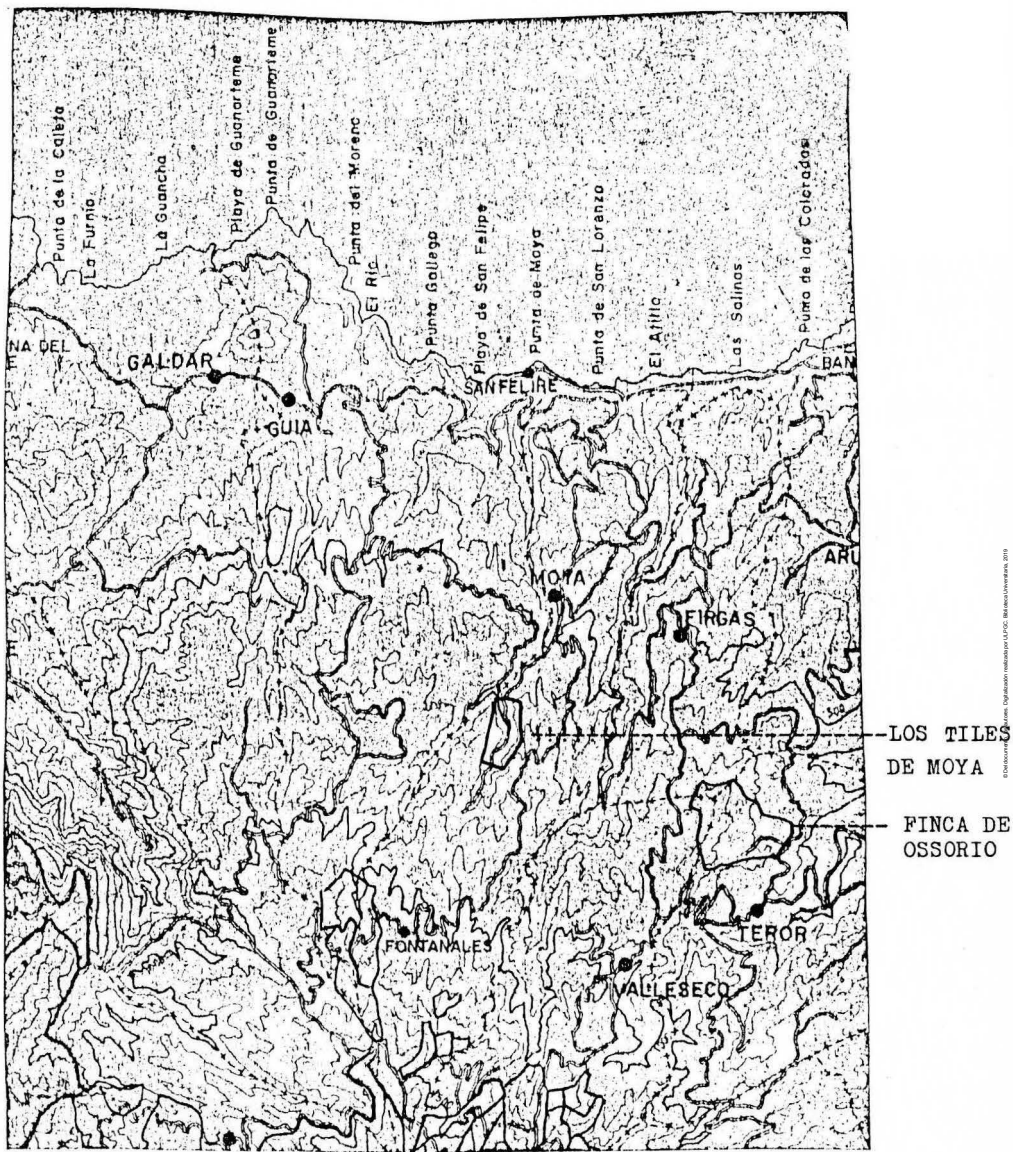
THE INTERNATIONAL SYMPOSIUM
"BOTANICAL GARDENS
AND WORLD STRATEGY FOR CONSERVATION"



Instituto Nacional para la Conservación
de la naturaleza
(ICONA)

Las Palmas de Gran Canaria,

28th. November, 1985



Localizacion del area de Los Tiles de Moya y La Finca de

 Ossorio (E 1/100.000)

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- II General description of the "Los Tiles de Moya" area.
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- IV Development of the Plan: Programme for Genetic Recovery
- V Programme for the reforestation and restoration of the area

EXCURSION PROGRAMME

- 9.00 am. Departure by bus from the Iberia Hotel
- 10.00 am. Arrival at "Los Tiles de Moya"
Visit to the reforested areas
and the local Nursery.
- 11.30 am. Departure to the "Finca de Ossorio"
Stop at Moya for coffee and refreshment.
- 12.30 am. Arrival at Ossorio. Explanation of
the Project for the Use and Management
of "the Finca"
- 1.30 pm. Lunch

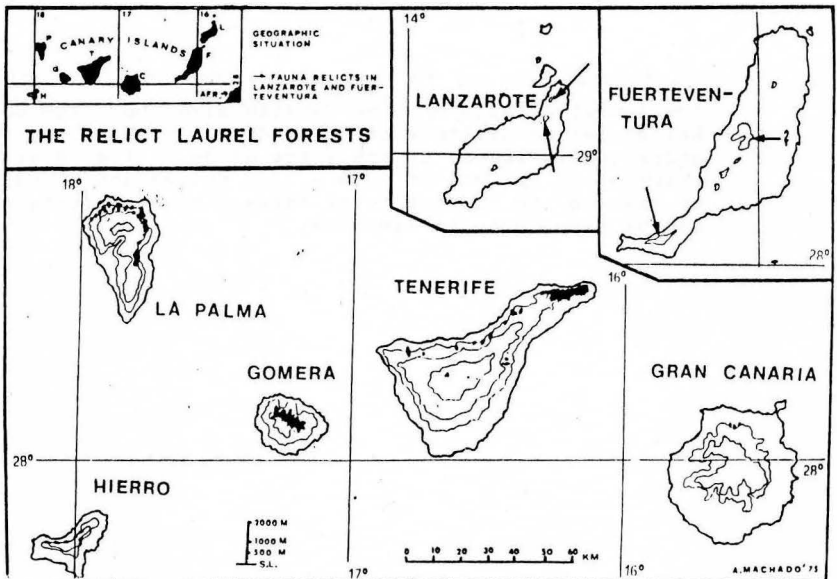
I. HISTORICAL BACKGROUND OF THE LAUREL FOREST IN GRAN CANARIA.

Laurel forests are plant formations of great floral diversity which are considered relics of periods prior to the ice age.

They developed in relatively uniform climates, always humid, and are to be found in different regions of the world, among which are the macaronesic archipelagos, specially Madeira and the Canaries.

At present Laurisilva formations in the Canaries are in different stages of conservation and their extension and quality vary between islands. The best and largest example of Laurel forestation is to be found in La Gomera and has been declared a National Park.

In Tenerife some good examples are encountered in the Anaga peninsula (El Pizaral and Las Vueltas de Taganana) and in the Northwest in Los Montes de Silos. In La Palma examples exist in La Galga and Los Tilos.



Presumed extent of laurisilva on Gran Canaria.

A considerable portion of the north of Gran Canaria was covered with laurisilva which, through progressive degradation, has been reduced to only 1% of its original extension (Kunkel, 1973).

Unfortunately this degradation is a perfect example of the damage done to woodland resources by overexploitation; by demand for land and by population pressures, all of which modify the original characteristics of ecosystems to an irreversible point.



The laurel forests of Gran Canaria stretched from Guia and Galdar, at an altitude of over 500 m., towards the northeast under the influence of the trade winds. The upper reaches extended to heights of 1200 - 1300 metres above sea level, where on meeting the mountain pine forests mixed forests developed as can be seen today in Tamadaba.

Location of forest areas in the XVIth century

The island's woodland areas deteriorated noticeably after their take over by the Crown of Castille which instituted an agricultural economy directed towards export. The demand for timber for ship-building and construction and the diversification in cattle farming made inroads into the forests.

Sugar cane cultivation was one of the principal colorits. More than 17 sugar refineries existed on the outskirts of the laurel forests using their wood as fuel.

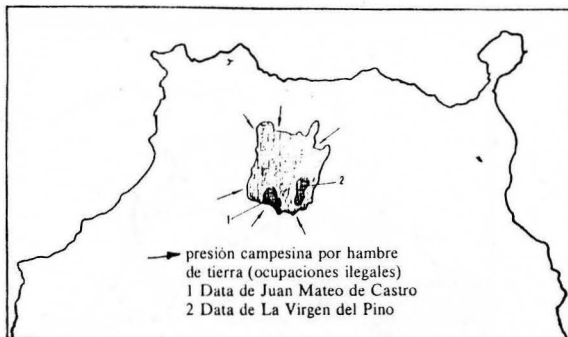


The distribution of land amongst the Conquistadores led to its clearing for use as agricultural and grazing land.

State of the forests in the 17th and 18th Centuries.

Pressure on the forests decreased at the end of the 16th Century as the monoculture of sugar-cane diminished. However, the increase in population with the concomitant demand for land continued the process of de-forestation.

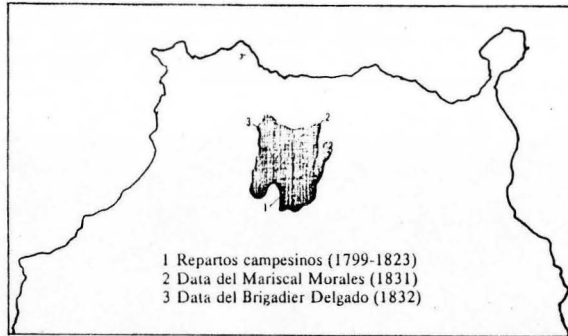
This hunger for land principally affected communal and state-owned land. One of the worst-hit areas was the Montaña de Doramas.



During this period the principal negative effects upon the forests were the illegal occupation of land and its distribution among settlers by the Crown of Castille coupled to the wide-spread practice of charcoal making.

State of the forests in the 19th Century.

Although during the 18th Century the Crown of Castille had endeavoured to institute protectionist measures these were resisted by local authorities who found that they had to accede to local demands for land. In consequence legal and illegal occupation of wooded land continued.



A fundamentally farming and agricultural community meant that there was a continuing demand for wood for farming implements.

Charcoal making and cattle grazing also continued, impeding the application of such protectionist measures relating to specific varieties of wood and certain forest areas as existed.

Clandestine occupation of wooded areas was sometimes violent, as occurred in 1799 and 1823 when uprisings took place demanding the distribution of communal among the local populace.

Concessions made to General Morales and Brigadier Ruberto Delgado by the Crown of Castille in respect to debts incurred finally broke up the existing forests.

THE STATE OF THE FORESTS IN THE 20 th CENTURY

During this century the privatization of la Montaña de Doramas was completed. The process of exploitation of the few remaining forest areas - continued, the period during the First World War (1914-18) being the -- worst time.

The teams of wood cutter were so active that at time "it was possible to dance to the sound of the axe blow" according to an old wood cutter still in the area.



Today all that remains of the old forest area secondary and degraded formations.

Among the most interesting area the number of tiles (Ocotea foetens) that still survive in the Barranco that bears their name and the Fayal/Brezal in the area of Brezal del Palmital there still exists an area dominated by tree heathers and wild holly.

There also exist small pockets of interesting vegetation which are still being destroyed by man, as much by new roads as by new areas of cultivation.

II GENERAL DESCRIPTION OF THE "LOS TILES DE MOYA" AREA

Geographic and Physiographic Characteristics

The Tiles de Moya is located in the middle section of the Barranco de Moya basin within the stretch between 475 and 550 metres above sea level, including the bed and sides of the ravine. The highest points of its sides are, on the east, La Sorpresa, 725m., and Lomo del Peñon on the west, 700m.

The protected area covers some 43 hectares which include alluvia areas and the bed and sides of the ravine; these last with gradients mostly greater than 1 in 2.



Background.

Los Tiles de Moya has been renowned for its great beauty and for its water course, named "Las Madres de Moya", since the days of the "Conquista".

Cairasco de Figueroa (1581) and Cristobal de la Camara (1634) described the area as one of the most luxuriant and beautiful of the laurel forest. Viera y Clavijo, the famous naturalist and encyclopedist also described it in 1780. They all agreed on the outstanding attractions of the groups of *Ocotea foetens* which covered the ravine bed; often called "The Cathedral" because of the column-like appearance of the trees.



The historic character of this well-known beauty spot protected it from the depredations suffered by other wooded areas. During the 1st World War, when widespread felling was taking place, the continuing vigilance of its owner (Dña. Mercedes Morales a descendant of General Morales) kept the Tiles de Moya from the same fate as most of its surround.

Later, in 1971, the Cabildo Insular de Gran Canaria purchased the area with the intention of designating it a Natural Park.

The area was initially opened to the public and became a favourite week-ending spot. This had a deleterious effect on the forest destroying the undergrowth and impeding the reproduction of the trees.

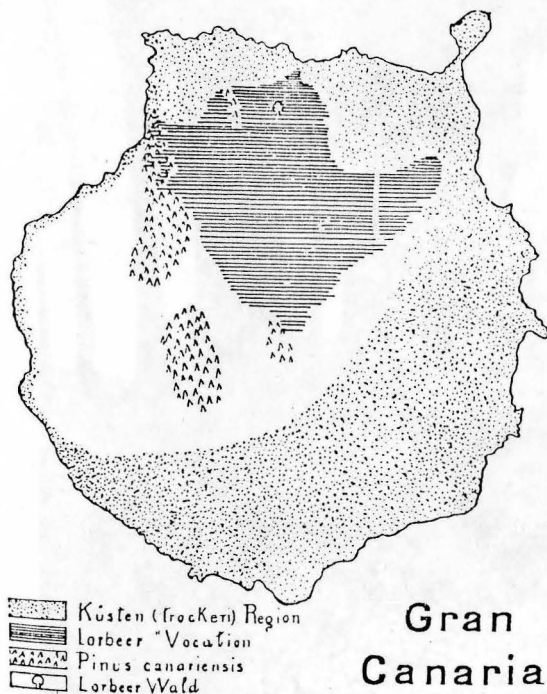
In consequence the Viera y Clavijo Botanical Garden issued a report and it was decided in 1981 to close the area to the public for a period of 20 years, whilst at the same time coming to an agreement with ICONA (Instituto Nacional De Conservacion de la Naturaleza) to restore and re-forest the area.

Scientific Evaluation

In 1780 the naturalist Viera y Clavijo, with clear taxonomic interest, was the first to scientifically describe the floral wealth of the area. Although he was the first to collect species it was foreign scientists such as Francis Masson (1770) and Broussonet (1801) who really initiated the collection of botanical material thereby converting the "Madres de Moya" into a classic botanizing locus.

Later, scientists such as Christian Smith (1815), Webb and Bertheloth (1830-1842), Lowe (1855), Boile (1893) and D.H. Christ (1885) also collected material relating to cryptogamic and higher plants.

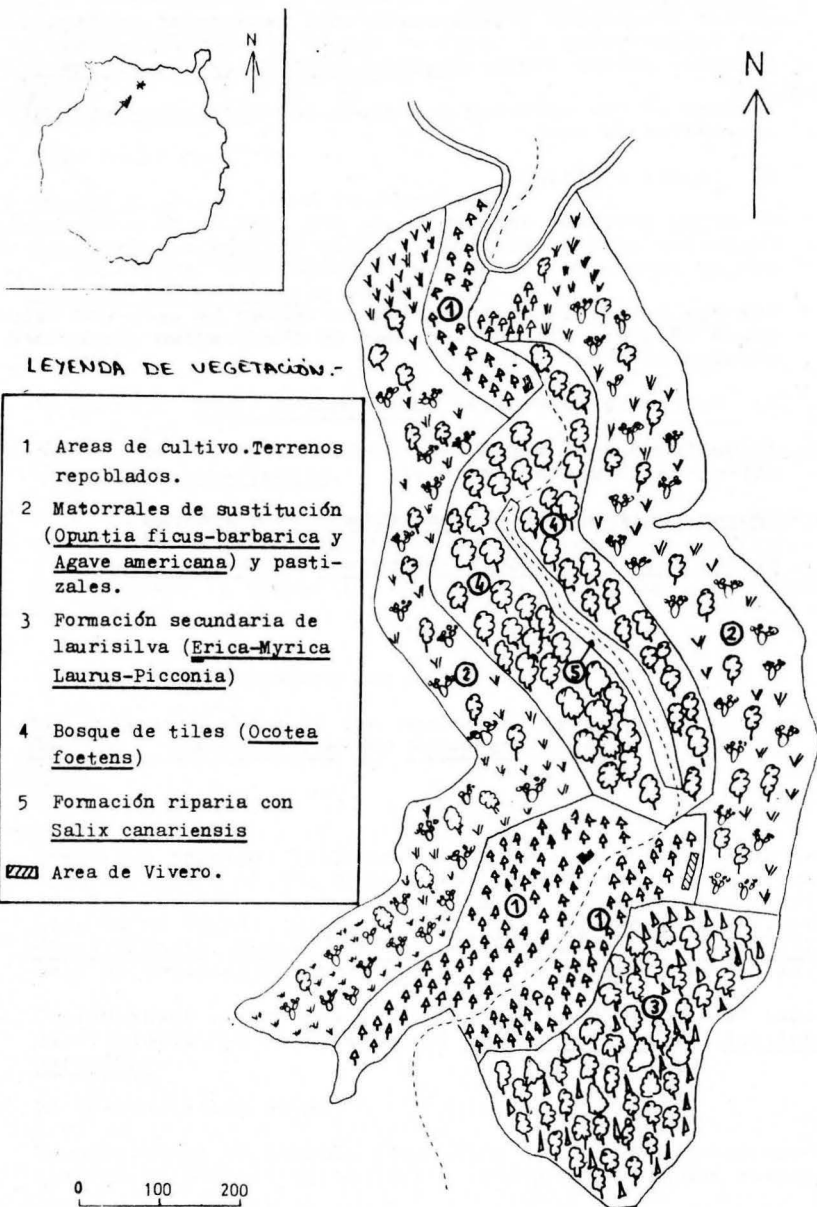
In the first half of the 20th Century more information was forthcoming from other visitors, such as Knoche (1923) and Borgesen (1924) contributed data on the state and extent of the different plant communities, as well as cataloging of species. Knoche drew up a plan showing a hypothetical distribution of the laurel forest within which he placed the location of the small Tiles de Moya forest.



Gran
Canaria

(Knoche, 1923) (p. 181)

Later G. Kunkel and E. R. Sventenius carried out the most complete study of the area in 1972, with a catalogue of the flora and a description of the communities found in the area.



Vegetation and Flora of Los Tiles de Moya.

Considering its vegetation Los Tiles de Moya could be classed within the potential laurisilva area (Class Pruno-Lauretea azoricae) although it is located in a lower sector in contact with transitional vegetation as is evident from the intrusion of belts of shrubs and bushes typical of this inferior sector (Order Mayteno-Juniperion phoeniceae).

A study of the attached map shows the principal units of vegetation to be:

1) Cooses of Tiles

Of prime interest as they house the remains of a monospecific formation of this species (Ocotea foetens). Very old til trees can be observed - heights of between 10 m. and 20 m.

The "La Catedral" area was most affected by week-end trippers and now ^{shows} a recovery with an increase in the dry leaf cover and a good showing of shoots.

2) Secondary Laurisilva formation.

To be found on the right-hand sides of the ravine - dense and uniform with predominance of:

Laurus azorica Picconia excelsa Erica arborea

Myrica faya Apollonias barbujana Ilex Canariensis

It is an area of major interest because it houses the four most representative shrub species:

Isoplexis chalcantha (Fam. Scrophulariaceae)

Sideritis discolor (Fam. Lamiaceae)

Ixanthus viscosus (Fam. Gentianaceae)

Bercomia cuadata (fam. Rosaceae)

Also to be seen are:

Visnea mocanera (Fam. Ternstroemiaceae)

Myrsine canariensis (Fam. Sapotaceae)

Sideroxylon marmulan (Fam. Sapotaceae)

Now very scarce in Gran Canaria.

3) Banks of Salix canariensis

When there was water in the bed of the ravine it was populated with Salix canariensis.

After water channels were introduced these regressed as did the communities of water dependant plants associated with it.

Its recovery is one of the priorities of the management plan of the area.

4) Substitute shrubbery and pastures.

Occupies both sides of the ravine and is principally composed of Opuntia ficus-barbarica and Agave americana.

These two species, introduced from America, have turned into the most aggressive of the area spreading and impeding the recovery of the autochthonous bushes. The following associated species are also to be found: Kleinia neriifolia, Lavandula canariensis, Rumex lunaria, Rubus ulmifolius and Ageratina adenophora, as well as pastureland where Hypharrhenia hirta predominates.

Dotted about within the whole can be found species of laurisilva, particularly the more resistant Laurus azorica and Apollonias barbujana.

5) Re-population areas.

Re-population of species pertaining to laurisilva has been started on the old agricultural land and contiguous slopes.

III MANAGEMENT PLAN FOR THE LOS TILES DE MOYA AREA.

Since agreement between the Cabildo Insular and ICONA was reached work was started on re-population of laurisilva in optimum locations.

First plantings were experimental due to a lack of knowledge in the re-construction of multi-specific forests such as laurisilva.

Progressively a Management Plan has been developed and instituted.

The philosophical objectives contained in the plan are:

"The Los Tiles de Moya Reserve is to be considered an area where it is essential to apply management techniques which will guarantee the survival and restoration of certain communities of plant and animal life so that their existence in future is assured.

The primary objective in this area is to Protect Nature and in view of this any form of agricultura or farming is not recommendable."

Management Plan for the Protected Area of Los Tiles de Moya.

General Objectives.

To conserve and restore an area whose historical, natural and cultural importance must be considered unique in the Canary Islands.

To achieve this the following must be undertaken:

- a) Protect the remains of the natural ecosystem which used to cover the northern sector of the island.
- b) Restore all areas perturbed by human activity.
- c) Guarantee the area's genetic resources, especially the flora.
- d) Promote research into laurisilva and particularly in regard to the recovery of lost areas.
- e) Protect significant ethnographic and cultural resources.
- f) Promote, without prejudice to the above, ecological education among the public and the significance of the area.

Area Management Criteria

- Prohibit any activity likely to damage protected species.
- Eliminate exotic plant species.
- Actively restore through re-population of laurisilva all areas damaged by human activity.
- Re-introduce into the ecological space created local endemic species which have disappeared.
- Avoid the disappearance, albeit from natural causes, of local autochthonous endemic species, either insular or canarian (Programme of genetic recovery).
- Limit the collection of examples to those to be used for exhibitions or that are indispensable for study.

Management Objectives

- eliminate introduced tree species whether they be productive fruit trees or ornamentals - (eucaliptus, pine and elm).
- Eliminate invasive species especially tunera, agave, blackberry and canes.
- Re-populate with native species suitable to the ecological area; assisting their reproduction in their surround through their own seeding.

- Carry out continuous clearing of those species which are most aggressive and can compete with the natural species or those re-populated.
- Ensure that there is a minimal flow of water down the ravine bed so that natural water-dependant plants can survive there after re-introduction.
- Collect seeds and shoots from the area to establish a genetic pool (laurisilva nursery).
- Control animal species in the area, especially rabbits.
- Protect and introduce into the area protected animal species allowing for nesting, feeding and watering areas.
- Restore existing buildings and ensure that future ones are in the typical local style.
- Make available an educational area without defeating the objectives outlined.

Proposed Studies

- Carry out studies of the local climate especially horizontal precipitation.
- Understand the situation of the local endangered flora and fauna in danger of extinction both within the reserve and in the Montaña de Doramas area, by studying the dynamics of the population.
- Establish a follow-up programme of the zones re-populated within the area. Establish pilot plots using different methods of re-population.
- Study the auto-ecology of some species of laurisilva in regard to:
 - . the production and germination of seeds
 - . their flowering and reproduction
 - . production of the bio-mass for each one in relation to the area/time ratio
- Initiate a breeding plan - in captivity - for the Columba trocaz bollei, turque pigeon, for eventual controlled re-introduction.
- Confirm the possible existence of some species of bats in the area and, if present, study means for their protection and reproduction.
- Prepare a project to study the insects in the zone.

IV DEVELOPMENT OF THE PLAN; PROGRAMME FOR GENETIC RECOVERY

In line with the objectives laid out in the Management Plan the construction of a Nursery was started in 1981 with the intention of creating a stock of laurisilva usable for re-population of the area and also to assist in the recovery of the more endangered endemic species.

In order to establish priorities in the work to be undertaken a programme for genetic recovery was created.



During the implementation of this programme specialised nursery staff training has been undertaken and seeds and shoots have been collected.

As a result we can now consider the following as being out of danger:

Isoplexis chalcantha Sideritis discolor and Ixanthus viscosus

List of plants susceptible of inclusion in the Genetic Recovery Plan for Laurisilva in Gran Canaria

In line with the criteria established by Bramwell in "Priorities for the conservation of the genetic diversity of flora in the Canary Islands" the following list of species has been compiled. These species are in need of genetic recovery if their natural populations are not to be lost and if they are to be re-populated in appropriate areas.

IUCN grading of endangered species:

Ex. Extinct.- Species of which there is no knowledge of their existence in the wild.

E. Threatened. - species in danger of extinction - their survival is improbable if the factors causing the diminishing population persist.

V. Vulnerable.- species likely to be included shortly in the threatened category if present causes persist.

R. Rare.- species with small world populations which although not at present threatened or vulnerable are likely to become so.

I. Species which are known to be either in Ex, E, V, or R but upon which there is no information.

K. Uninsufficiently known species.

NT. Neither rare nor threatened. This classification relates to the territory within which it is used. So an NT within the archipelago could be an E on the mainland.

1.- Generos endémicos mono-u oligoespecíficos (1-4 sps)

ESPECIES	DISTRIBUCION	CATEGORIA IUCN	G.C.
Gesnouinia arborea	CTGPH	V	V
Bencomia caudata	CT	V	V
(+) Rivasgodaya nervosa	C	E	E
Visnea mocanera	CTGPH	V	V
Tinguarra montana	CTGHP	NT	V
(+) Heberdenia bahamensis	FLTGPHC	V	E
(+) Pleiomeris canariensis	CTGP	V	E
Picconia excelsa	CTGPH	V	V
(+) Ixanthus viscosus	CTGPH	V	E
Phyllis nobla	CTGPH	NT	V
Cedronella canariensis	CTGPH	NT	V
(+) Isoplexis chalcanta	C	E	E
Bystropogon canariensis	CTGPH	R	V
Bystropogon origanifolius var. canariae	C	V	V
(+) Bystropogon x serrulatus	C	E	E
(+) Semele androgyna var. -- gayae	C	E	E

2.- Generos endémicos con mas de 4 sps.

Argyranthemum adautum ssp jacobaeifolium	C	V	V
Aeonium virgineum	C	R	R
Aichryson porphyrogenetos	C	R	R

3.- Parientes endémicos de plantas cultivadas

Gen, Crambe, Solanum, Phalaris, Isoplexis, Senecio setc.
Pericaulis, Persea, Maytenus, Olea, Tamus.

4.- Géneros no endémicos con importantes secciones endémicas

ESPECIE	DISTRIBUCION	CATEGORIA IUCN	G.C.
<i>Crambe pritzelii</i>	C	R	R
<i>Convolvulus canariensis</i>	TGHCP	R	R
<i>Echium callithyrsum</i>	C	V	V
(+) <i>Sideritis discolor</i>	C	E	E
(+) <i>Senecio hadrosomus</i>	C	E	E
(+) <i>Senecio appendiculatus</i> <i>var. preauxii</i>	C	E	E
<i>Senecio cruentus</i>	C ?	Ex ?	Ex ?
<i>Sonchus canariensis</i>	TC	V	V
<i>Sonchus congestus</i> ?			

5.- Todas las otras especies endémicas amenazadas, no incluidas en las categorías anteriores

<i>Canarina canariensis</i>	CTGPH	R	R
(+) <i>Arbutus canariensis</i>	CTPGH	V	E
(+) <i>Smilax canariensis</i>	CTHPH	V	E
(+) <i>Syderoxilon marmulano</i>	CTGP	V	E
(+) <i>Rhamnus glandulosa</i>	(C)THPH	V	Ex?
<i>Scrophularia calliantha</i>	C	V	V
(+) <i>Solanum vesperilio</i>	TC	E	Ex?
(+) <i>Prunus lusitanica</i> ssp. <i>hixa</i> (no endémica)	TC ?	V	E

Helechos:

Asplenium terorense
Woodwardia radicans
Pteris arguta
Diplazium caudatum
Dryopteris oligodonta
Athyrium filixfémina
Adiantum reniforme
Asplenium hemionitis

Reproduction Priorities

The following species should be considered of prime importance.

A) Mono or Oligo-specific Endemic Genera.

1) Rivasgodaya nervosa (Fam. Fabaceae)

Endemic to Gran Canaria, only one known locus, near Teror.

Species of interest as a forage plant.

2) Isoplexis chalcantha (Fam. Scrophulariaceae)

Endemic to Gran Canaria, only known in two locus (Los Tiles and Barranco Oscuro).

Belongs to the digitalis group with possible medicinal applications.



ISOPLEXIS CHALCANTHA SUENT & O'SHAN.

3) Bystropogon serrulatus (Fam. Lamiaceae)

Endemic to Gran Canaria. Its only known location is in Barranco Oscuro.

Species belonging to the aromatic labiates with possible medicinal applications.

4) Ixanthus viscosus (Fam. Gentiaraceae)

Endemic to the islands and common in other islands but nearly extinct in Gran Canaria. Forms part of the undergrowth in the laurisilva forests and is of interest for re-population.

Only small groups exist in the wild (Los Tiles, Barranco Oscuro, Ossorio),

5) Semela androgyna var. gayae (Fam. Liliaceae)

Local variety of Gran Canaria. Belongs to the laurisilva lianas. Of interest for re-introduction into the re-population areas.



SEMELE ANDROGYNA VAR. GAYAE



HEBERDENIA BAHAMENSIS

6) Heberdenia bahamiensis (Fam. Myrsinaceae)

A tree which grows on the edges of the laurisilva, common in the other islands but very rare in Gran Canaria.

Until recently considered extinct in Gran Canaria, but there do exist some groups in Los Tiles de Moya.

Of interest for re-introduction.

7) Pleiomereis canariensis (Fam. Myrsinaceae)

A tree of similar ecological characteristics as the above. Also considered extinct in Gran Canaria. Some isolated groups have been found in the ravines towards the northwest.

Of interest for re-introduction.



PLEIOMERIS CANARIENSIS

Non-endemic Genera with Significant Endemic Sections.

8) Sideritis discolor (fam. Lamiaceae)

Shrub specie of the laurisilva sector of Gran Canaria.

Local endemic with only a few known populations (Los Tiles and Barranco Oscuro).

9) Senecio hadrosomus (Fam. Asteraceae)

Local shrub of Gran Canaria. Until very recently considered extinct. Small groups have been located in San Mateo.

Endemic plant of interest because of its connection to all the Senecio group frequently to be found in gardens.

10) Senecio appendiculatus var. preauxiana (Fam. Asteraceae)

Riparian plant with only one known site in Gran Canaria and in imminent danger of extinction. Appropriate types could possibly be re-introduced in protected areas.

c) Other Endemic and Non-endemic threatened Species.

11) Arbutus canariensis (fam. Ericaceae)

Endemic to the Canary Islands. Rare in Gran Canaria, but common to the remainder. Only a few known isolated examples exist (Guayedra and Tamadaba).

Of interest for the recovery of the laurisilva.

12) Syderoxylon marmulano (fam. Sapotaceae)

A tree characteristic of the transition areas of the laurisilva but almost extinct in Gran Canaria. Only a number of them are to be found in the wild (Los Tiles de Moya).

A specie to be considered for the re-construction of the origin forest.



SIDEROXYLON MARMULANO

13) Rhamnus glandulosa (fam. Rhamnaceae)

A characteristic tree of the laurisilva considered to be very rare in Gran Canaria. Only a few known specimens, with unconfirmed sightings in Guayedra.

To be used for re-population.

14) Prunus lusitanica ssp hixa (fam. Rosaceae)

Non-endemic tree but a common element of the laurel forest. Very rare in Gran Canaria. Only a few groups in Barranco de los Propios near Los Tiles.

A specie of interest for introduction into the new areas to be re-populated.

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T L H L P V P P L B T B T T B T B T L B L L B S H L A H L B H L T L H B T V V H

Especies presentes:

L: Laurus azorica

T: Ocotea foetens

B: Apollonias barbujana

P: Picconia excelsa

H: Myrica faya

V: Persea indica

A: Ilex canariensis

S: Rhamnus glandulosa

Superficie de los rectangulos:
250 m²

Número de arboles por Hectarea:
1430 arboles/Ha.

Los Tiles de Moya control plot.

A follow-up of the evolution of the different species is being undertaken with dasometric measurements as well as studying changes in undergrowth.

Subsequent to this re-population the nursery at Los Tiles started production of their own plants. Seeds were collected and sown and shoots were obtained from the forest itself.

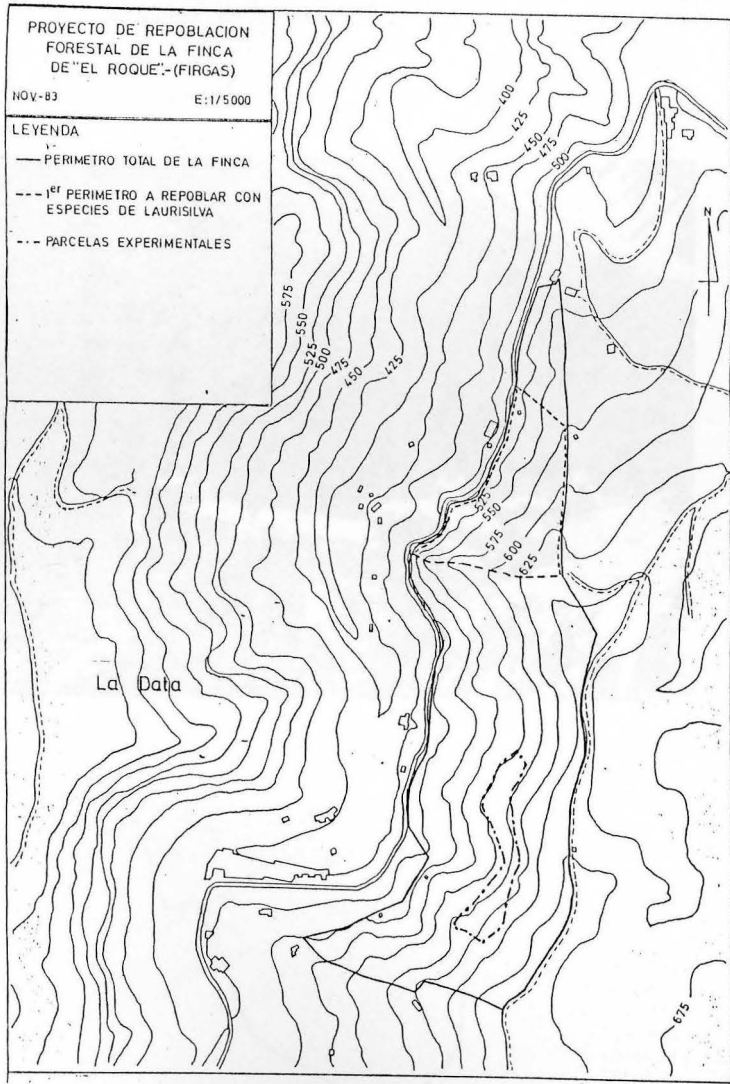
Since then replacements have been made and new areas re-planted with the nursery's own stock.



Also, during 1984, re-population has been carried out on a farm belonging to the Ayuntamiento of Firgas with a view to extending the re-planting to all the potential laurisilva areas of Gran Canaria.

Before doing so a study was made of the distribution of the various species over the island (Los Tiles, Bco. de la

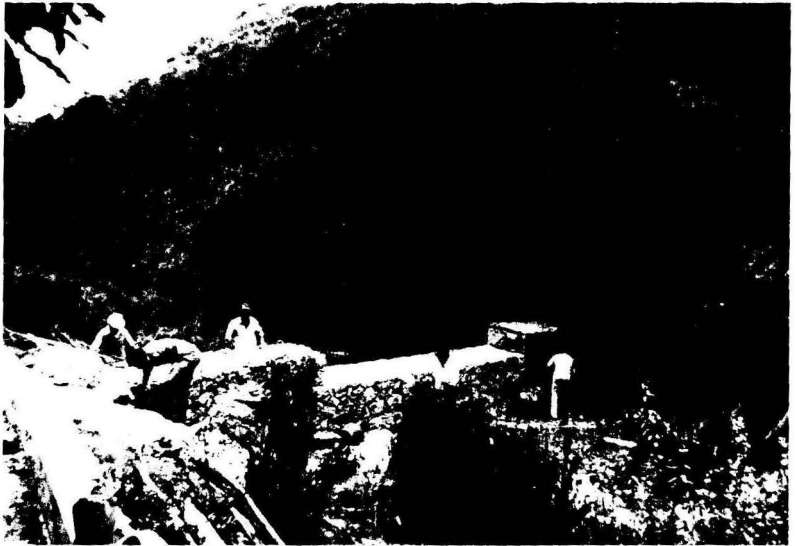
Virgen, El Brezal de Guia) in consequence of which the number of each specie and its distribution was established.



Restoration of Riparian Communities.

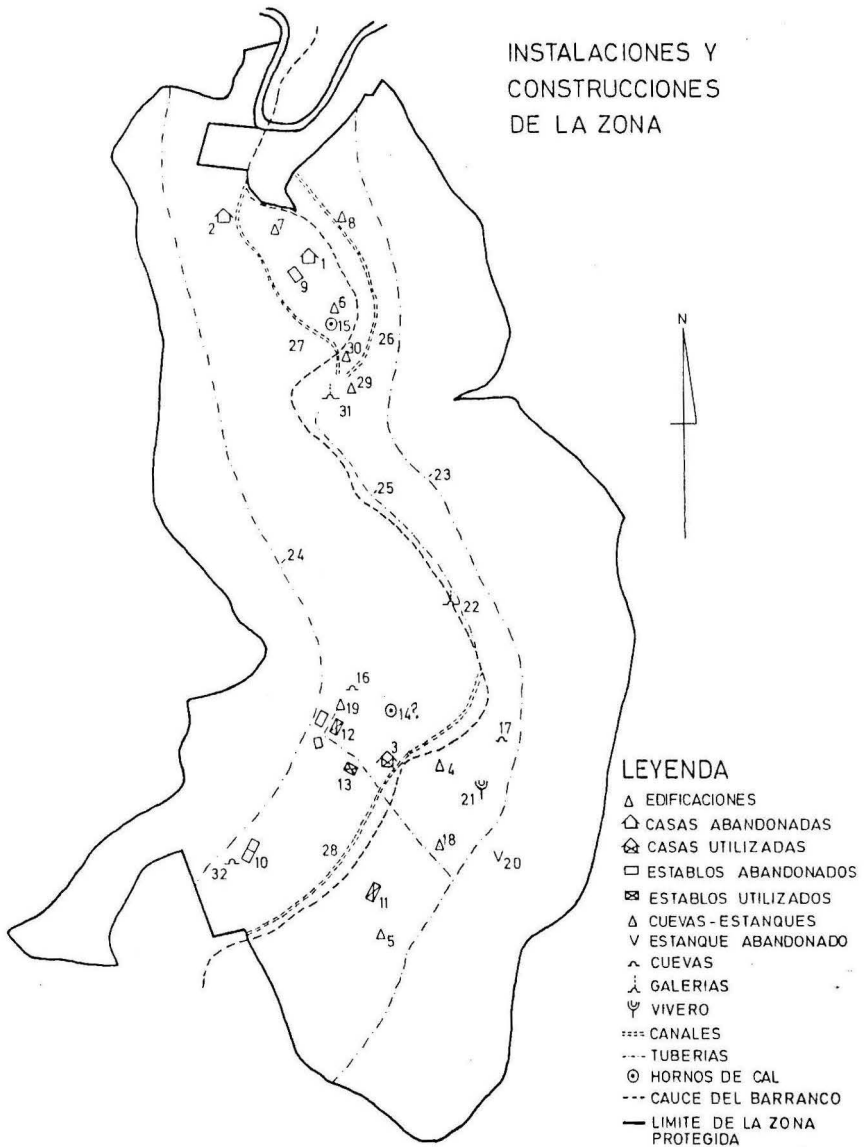
The channeling off of water from the "barranco" beds dried a major part of willows and associated riparian vegetation.

In order to assist the recovery of the vegetation small dry-stone dykes have been built. These retain soil and water creating artificial pools where it is hoped to re-establish willows.

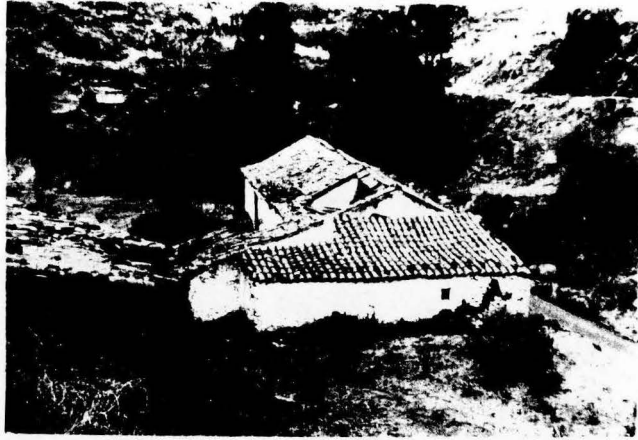


Restoration of Buildings and Installations in the Area.

An inventory has been carried out of all the buildings in the area. Of note among these are a lime kiln, various stables and a cottage.



It is intended that these buildings be adapted for use as educational centres. The cottage at the entrance of the reserve is to be used as a study and information centre.



So far educational activities have been limited to preparing a short itinerary for school children during which the salient characteristics of the laurel forests are explained.



