

VEGETATION SYNTHESIS OF THE CENTRAL-SOUTHERN REGION OF CHILE

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Introduction

It is always somewhat complicated to characterize vegetation in the framework of a region within Chile given the fact that the individual behaviour of species in response to the environment determines gradual changes that materialize in a vegetation continuum, in which occur overlappings that difficult a clear vision of discrete communities. An effort of abstraction, to identify them is then needed.

Limits of the Central-Southern region of Chile

The geographic latitudinal limits of what might be called the Central-Southern region of Chile are not clearly defined. If we divide the territory in three thirds, the Central region can be located between parallels 30° and 42° S and therefore, the region comprised between parallels 36° and 42° S could be considered the Central-Southern region. The Northern limit can be moved somewhat towards the south, to parallel 36°30', with the aim of making it coincide in the cordilleras, with a natural limit occurring between the mediterranean vegetation and the more hygrophile southern vegetation. In the Central Valley, this limit is moved to parallel 38° S approximately and the southern limit must be shifted also towards the south to parallel 43° S, so as to make it coincide with the southern extreme of the island of Chiloé, which in itself is a natural limit appropriate from a vegetational point of view.

Plant Communities

The high precipitations and moderate temperatures, dominant characteristics of the Central-Southern region, allow the existence of a hydric regime normally favoring the development of trees, which, in turn, determines that the characteristic of the vegetation be the forest communities, with trees as the dominant individuals. The exception to this are the cordilleran areas located above the altitudinal tree limit, where low temperatures, strong winds, precipitation in the form of snow and lack of soil development prevent, in general, the growth of trees and woody vegetation giving way to the vegetation of high-andean prairies mainly composed of stunted shrubs, frequently seasonal herbs, some perennial gramineous, mosses and lichens and variable nude areas; this vegetation, during part of year, rests covered by snow. The most recent works published in relation to this subject, regarding the Central-Southern region, are those of Donoso (1981) and Veblen and Schlegel (1982). The following vegetational synthesis is based in both works following a North-South and East-West orientation.

Forest types of the Central-Southern region of Chile (Figure 5.)

1. Lenga forest type

This forest type can be found from the northern extreme of this region, at the latitude of the Chillán volcano, forming the altitudinal limit of the forest vegetation in the Andean Mountain Range and limiting towards the highest areas with the high andean vegetation or with the everlasting snows. In this conditions it extends as a strip between the 1.600 and 1.900 mts to the 37°27' S.L. In this latitude, it is interrupted by the forests where the dominant species is the Araucaria araucana Mol, continuing more towards the south at the 40°48' south latitude, between the 1.000 and 1.300 mts.

At the altitudinal limit, the Nothofagus pumilio (Poep.et. Endl.) Krasser forest (Lenga) presents itself shrub-sized or as Krummholz. Immediately below it, there occurs a pure Lenga forest with trees in a normal size; as one descends in altitude, Lengas become gradually associated with Nothofagus dombeyi (Mirb.) Blume (coigüe) towards the north and with Nothofagus betuloides (Mirb) Blume (Coigüe from Magallanes) southward of the 40°30' S, to finally dissappear towards lower altitudes.

The ticket forest of these forests is mainly dominated by Chusquea tenuiflora and Drimys winteri andean variety (small Winter's bark) in the highest areas and by Chusquea coleu (Desv. (Colihue) in lower areas.

Besides, Maytenus disticha, Ribes magellanicum (Zarzaparilla), Berberis spp. (Chaura), Myrceugenia chrysocarpa (white Luma), Desfontainea spinosa (Taique), other shrub - like species and other herb - like species of the Viola, Anemone, Valeriana, etc. genus are comun and typical of the grove.

2. Roble-Raulí-Coigue forest type

This forest type develops from the north end of the central-southern region to the 40°30' S. between the 100 and 1.000 mts in both Cordilleras, specially in their inner hillsides and in the cordilleran valleys. South of the 40°30' S. pure forests of Nothofagus dombeyi (Mirb.) Blume (Coigue) may be found that can be considered in the Roble-Raulí-Coigue forest type.

In fact, this forest type corresponds to forests of a second growth, or forests renewed due to felling of trees, forest fires or natural disasters that have eliminated forests of other forestal types, and where the Nothofagus obliqua (Mirb) Oerst. (Roble), Nothofagus alpina (Poep. et. Endl) Blume (Raulí) species have taken advantage of their aggressiveness and colonizing capacity to form forests composed of one or more of these three species, depending on the altitude, latitude and original composition of the forest.

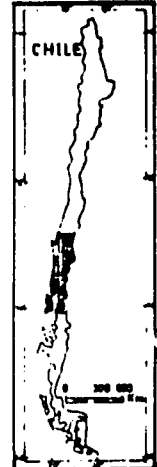
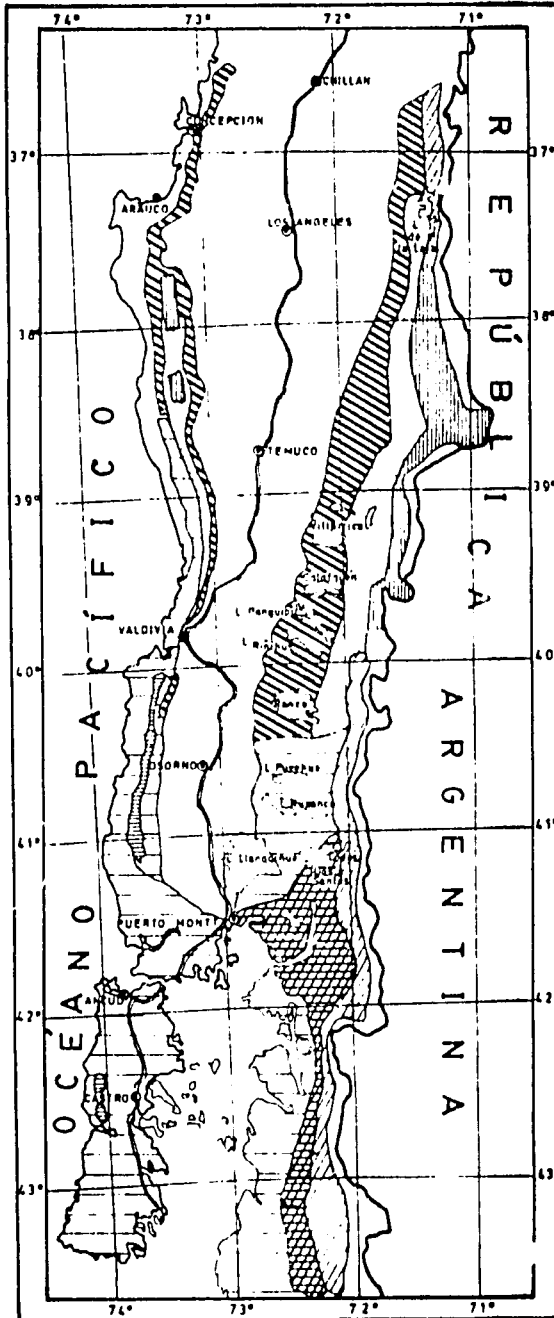
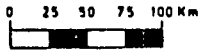
In the Andean Mountain Range, in Chillán area, this type is represented by Coigüe forest growing immediately below the Lenga forest type. Still lower, Roble (Oak) and Raulí appear and, naturally, below the

FIGURE 5.

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MAPA GENERAL DE LOS TIPOS FORESTALES
DE LA REGION CENTRAL-SUR DE CHILE

ESCALA 1:2.500.000



- SIMBOLOGIA**
TIPOS FORESTALES
- ROBLE - RAULI - COIHUE
 - CHIQUE RAULI - TEMU
 - SIEMPREVERDE
 - ARAUCARIA
 - ALFUCE
 - LEMBA
 - ALFUCE/SIEMPREVERDE
i Combustión
 - CARRETERA

500 mts. only new shoots can be found that limit near the Central Valley with the sclerophyll forest type, characteristic of the mediterranean region. Continuing towards the south the altitudinal andean limit of these renewed areas decreases; towards the highest areas they limit with the Araucaria or Coigüe-Raulí-Tepa forest types, depending on the degree of alteration of those forest types; towards the Central Valley they limit with agricultural and cattle land characteristic of the Central-Southern Chile, or with remnants of the Roble-Laurel-Lingue forest type, which, according to the modern forest typology (Donoso, 1981) are considered to be a subtype of the Roble-Raulí-Coigüe forest type.

In all this area, the Coigüe shoots dominate in the higher zones, the Raulí shoots in the intermediate zones and those from Roble in the lower areas, with mixtures in different proportions of the three species.

In the Coastal Cordillera, the forest type is of very small and scarce Roble shoots south of the Itata river; the major part of this area, including the region called Arauco, west of the Cordillera of Nahuelbuta, is at present dominated by Pinus radiata D. Don (Pino insigne). South of the Bío-Bío river, the Roble shoots particularly and also those from Raulí dominate in the mountain slopes of the Cordillera of Nahuelbuta, mainly in the eastern slopes. Towards the higher areas they limit with the Araucaria forest type and towards the Central Valley with agricultural - cattle lands or with Pinus radiata D. Don plantations. Going southward, these new shoots are limited to scarce and small areas.

Besides the three Nothofagus species which characterize this forest type, some prototypes inherent to the original type can be found, depending then on the latitude and altitude in which the forest is located. The most common woody species among the accompanying species is Gevuina avellana mol. (Hazel tree), but also we can find Persea lingue Ness (Lingue), Laurelia sempervirens (R.et.Pav.) Tul (Laurel), L. philippiana (Phil) Losser (Tepa), Aextoxicon punctatum R. et. Pav. (Olivillo), smaller species such as Luma apiculata (D.C.) Kaus. (Myrtle), Lomatia dentata (R.et.Pav.) R. Br. (small hazel tree or Piñol) and many others, among which stands out bamboo, sometimes very abundant, Chusquea quila (Mol.) Kunth, which in some coigüe forests of the highest areas is replaced by Colihue.

3. Coigüe-Raulí-Tepa forest type

In both Cordilleras, this forest type develops a little more towards the south than that of the Roble-Raulí-Coigüe type. In the Andean Mountains, it develops beginning the 37° S.L. approximately, due to the incorporation of Laurelia philippiana (Phil.) Losser (Tepa) to the Nothofagus dombeyi (Mirb) Blume (Coigüe) and Nothofagus alpina (Poep. et Endl.) Oerst (Raulí) forests; from that latitude they extend up to the 40°30' S.L. In a stripe located below the Lengua or Araucaria forest types and beneath the Nothofagus obliqua (Mirb.) Oerst. shoots or of the remnants of the Roble-Lingue-Olivillo type.

In the Coastal Cordillera, this forest type begins from approximately the 38° S.L. to the 40°30' S.L., also located in a strip

which in its superior limit sometimes reaches the highest elevations, or else, limits with the Alerce (larch) forest type, while towards the lower areas it limits with the Roble shoots or with remnants of the Roble-Laurel-Lingue-Olivillo forest type or with the Evergreen forest type towards the western slope of the Cordillera.

The three species composing the name of this forest type are obviously the most characteristics. Nevertheless, there exists a latitudinal variation in the floristic composition; in the septentrional areas, among the dominant trees are common Aextoxicon punctatum R. et. Pav. (Olivillo) and Weinmannia trichosperma Cav. (Tineo), while in the meridional areas the Olivillo disappears and a coniferous type, the Saxegothaea conspicua Lind. (short leave or female Mañío) becomes common. Throughout all the forest type, Dasyphyllum diacanthoides Less (Trevó or Tayú) is present, the only Chilean arboreal composite. In the grove there are differences as well; while towards the north the abundant species are Gevuina avellana Mol. (Hazel tree) and Leucocarpus dentata (R. et. Pav.) R. Br. (Piñol or avellanillo) together with other shrub-like species such as Gaultheria sp. (Chaura), Myoschilos oblonga, Chusquea quila (Mol.) Kunth and Ch. Coleu Desv. (Colihue), they almost disappear more to the south and, in turn, the common species are Drimys winteri andean var. (Small Canelo), Chusquea tenuiflora (small quila) and other shrub-like species.

4. Araucaria forest type

This forest type develops in the Andean Mountain Range between the 900 and 1.700 mts. from the 37°27' to the 40°48' S.L. and in the Cordillera of Nahuelbuta, in the coast, between the 1.000 and 1.400 mts. from the 37°40' to the 38°40' S.L. It is found between the altitudinal forest limit and the Coigue-Raulí-Tepa or Roble-Raulí-Coigue forest types, in the lower areas where it is distributed.

In the highest sectors of its distribution, sometimes the Araucaria araucana species (Mol.) Koch. forms unmixed forests, but it is more common to find it associated with Nothofagus pumilio (Poep. et. Endl.) Krasser (Lenga). In lower altitudes, it associates with Nothofagus dombeyi (Mirb.) Blume (Coigue) and rarely with Nothofagus alpina (Poep. et. Endl.) Oerst. In the cold sites it is found together with Nothofagus antarctica (Forst) Oerst. (Ñirre) and rarely with Nothofagus obliqua (Mirb.) Oerst. (Oak).

The grove of the forest, relatively open, is mainly constituted by Drimys winteri andean var. (small winter's bark), Chusquea coleu Desv. (Colihue), diverse species of the Berberis genus and others.

5. Oak-Lingue-Laurel-Olivillo forest type

This forest type is reduced nowadays to the remnants of an original forest of great value that extended all along the Central Valley and throughout the hill-sides of both Cordilleras below the 400 mts, from the 38° to the 41° S.L.

Besides these scarce remnants, prairies and cultivated areas with big and dispersed individual of Nothofagus obliqua (Mirb.) Oerst. (Oak) and Laurelia sempervirens (R. et. Pav.) Tul (Laurel) are all what is left.

The composition of the remnants of this forest type is characterized by big specimens of N. obliqua and some smaller trees of L. sempervirens, Persea lingue Ness. (Lingue) and Aextoxicon punctatum R. et. Pav. (Olivillo) species. The presence of the coniferous species Podocarpus salignus D. Don (long leaves Mañío) is common in these forests and that of the Nothofagus dombeyi (Mirb.) Blume (Coigüe) in the more humid sectors of it.

Towards the south, Laurelia philippina (Phil) Losser (Tepa) can be frequently found and in the cordilleran hillsides, Eucryphia cordifolia Cav. (Ulmo).

The grove is frequently formed by Gevuina avellana (Mol.) (Hazel tree) Raphithamnus spinosus (A. Juss) Moldenke (male myrtle) Chusquea quila, (Mol.) Kunth. (Quila) and by many other species whose presence will depend on the latitude and the state of the remainder forest. The climbing plant Lapageria rosea (Copihue) is also common in these forests.

6. Evergreen forest type

This forest type can be found approximately from the 40°30' to the south limit of the central-southern region below the 1.000 mts in the Cordillera, although thickets of this type, similar to those of the remnants can be found somewhat more to the north in lower areas. In the Coastal Cordillera, this type begins to appear in the coast at approximately the 38° S and continues towards the south limit of the central region in an increased expansion until it becomes the type that covers the whole Llanquihue and Chiloé regions.

This forest type is characterized for being constituted by a great number of species whose common elements are perennial leaves, hence the name evergreen. This species, which can amount to 20, combine in different ways, originating very variable and different associations. In the coast, where the northernmost limit of the type is found, the most common species is Aextoxicon punctatum R. et. Pav. (Olivillo) which sometimes forms almost unmixed forests up to Chiloé island included; this species associates with Eucryphia cordifolia Cav. (Ulmo) and with Laurelia philippiana (Phil.) Losser (Tepa) species that as elevation becomes higher, replace the Olivillo. Similar Olivillo thickets are also found in the borders of the lakes at the foot of the Andean Mountain Range.

At higher altitudes, the forest is dominated by big Ulmo species, with some Weinmannia thrichosperma Cav. (Tineo) in the upper levels.

As subdominant trees we find Tepas, Manius (Saxegothaea conspicua Lindl., Podocarpus nubigenus Lindl), Dasyphyllum diacanthoides Less. (Trevó) and Drimys winteri Forst. (Winter's bark); this last tree is specially important, and sometimes dominant in the Island of Chiloé. With greater humidity conditions, the Ulmo is absolutely replaced in this forest

by another great height tree, Nothofagus nitida (Phil.) Krasser (Coigüe of Chiloé) without the rest of the composition varying too much. It is characteristic of these forests a great development of arboreal subdominant or intermediate species of Myrtaceas, particularly Amomyrtus luma (Mol.) Legr. et Kaus (Luma), Amomyrtus meli (Phil.) Legr. et Kaus (Meli), Myrceugenia ovata (Hook et Arn.) Berg. (Pataguilla) M. planipes (Hook et Arn.) Berg. (Picha or Patagua), sometimes Luma apiculata (Myrtle) and Tepualia stipularis (Hook et Arn.) Griseb. (Tepú) in very humid areas.

In the Central Valley this type develops in very limited drainage conditions, known as Ñadis and Hualves. In these conditions, besides the mentioned species appear Myrceugenia exsucca (DC.) Berg. (Pitra), Temu divaricatum Berg. (Temu), Nothofagus dombeyi (Mirb.) Oerst. (Coigüe) and Maytenus boaria Mol. (Maitén).

The shrub-like species common in these forests are Azara lanceolata (Aromo), Chusquea spp. (Quila), Lomatia ferruginea (Cav.) R. Br. (Fuinque or Romerillo), Desfontainea spinosa Dum. (Taique), Rhaphithammus spinosus (A. Jun.) Moldenke (male myrtle), Pseudopanax laetevirens (Gay.) Harms. (elderberry) and diverse lianas, climbing and epiphyte plants, besides mosses and ferns.

7. Larch forest type

Larch forests are irregularly distributed from the 39°50' to the 43°30' S. In the Coastal Cordillera it grows in the high areas near the summits, from the south of Valdivia to the 41°15' S.L. in the continent and in thickets in the Cordillera of Saint Peter in Chiloé. In the Andean Mountain Range it is found from the Central Valley to the 1.200 mts in the arboreal height limit, between the 40° and the 43°30' S.L. The old thickets of the Central Valley do no longer exist and only stumps in decomposition remain.

The dominant species in these forests is Fitzroya cupressoides (Mol.) Johnston (Larch). Sometimes it forms almost unmixed forests and sometimes it combines with Nothofagus nitida (Phil.) Krasser (Coigüe of Chiloé) or with Nothofagus betuloides (Mirb.) Blume (Coigüe of Magallanes), Weinmannia trichosperma Cav. (Tineo), Drimys winteri Forst (Winter's bark), Podocarpus nubigenus Lindl. (sharp-leave maniu), Saxegothaea conspicua (Lindl.) and also Laurelia philippiana (Phil.) Losser (Tepa) in the Andean Mountains. Common shrub-like species in these forests are Myrceugenia planipes (Picha), Desfontainea spinosa (Taique), Ugni candollei (myrtleberry) Crinodendron hookerianum (Chaquihue o Polizonte) and Philesia magellanica (Coicopihue) and several other shrubs.

Also in this region can be found groups of trees or isolated trees of Austrocedrus chilensis (D. Don.) Florin et Bout in volcanic or very rocky areas of the Andean Mountain Range.