STUDY OF THE FLORA OF RUCAMANQUE, CAUTIN PROVINCE, CHILE[1]

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ABSTRACT

The flora of forest, scrub, and grass communities was studied in Rucamanque, located near the city of Temuco, Cautín Chile, in the central valley of south central Chile. Forty-six vegetation samples were made, and plants were collected intensively outside the sample areas. A catalog was written for 203 plants species, which were analyzed for systematics, phytogeographics, life forms, the biological spectrum that they compose, the frequency and relative importance of each in the different vegetational communities, and their uses in industry, crafts, and medicine.

Rucamanque, "The House of the Condor" in Mapudungun, the language of the indigenous people of this region (Ramírez-Sánchez, 1985), is a valley located 12 km northwest of the city of Temuco, capital of the IX Region of the Araucanía, Chile (Fig. 1). The primitive forest vegetation of this valley escaped destruction during last century's process of colonization of central southern Chile (Donoso, 1983) because it was protected as an early watershed area for the drinking water for Temuco (Magofke, 1985).

With the increase in population, water for the city had to be drawn from other sources, principally subterranean, so the state lost its interest in Rucamanque and offered it for sale in March of 1986. Because of its value as a forest relict and its scientific interest, several state and private institutions and ecological organizations intervened to preserve it from exploitation. Finally, the University of the Frontera in Temuco became the legal owner, saving the relict forest for science, education, and the general public.

The present catalog of the flora of Rucamanque was made during the time that the land was for sale.

STUDY AREA

Rucamanque is a small river valley oriented southeast–northwest to the south of the Ñielol-Huimpil hills (Magofke et al., 1986). Through it runs Chivilcán Creek, which receives the water of two small unnamed streamlets. Its elevation ranges from 300 to 530 m. The area occupies about 525 ha, including some of the adjacent forests that belong to private owners. The basin and slopes of Rucamanque Valley are covered by native forest, which is evergreen in the lower areas and partially deciduous at higher elevations. In several places the forest has been destroyed and secondary scrub replaces it. In the higher slopes, originally of deciduous forest, permanent grasslands of human origin can be found. Small bogs, which we include in the grassland formation, appear in open areas on the edges of streams at the bottom of the valley.

The climate of the area is humid and temperate with a Mediterranean influence (Di Castri & Hajek, 1976). The average annual rainfall is 1,400 mm and the median annual temperature is 12°C. Rainfall is abundant in winter, and summers often have one to two dry months, as shown in the climatic diagram in Figure 1. Winter and spring frosts are frequent. To this climate corresponds a subtropical semideciduous forest type as natural vegetation (Schmithüsen, 1956).

The Ñielol-Huimpil hills comprise a tectonic unit characteristic of the central valley of Chile and do not connect with either the Coastal Ranges or with the Andes. The red clay soil does show similarity to the Coastal Range soils (Weinberger & Binsack, 1970). When cultivated or grazed, this soil is subject to erosion.

METHODS

The catalog of plant species of Rucamanque was made from 46 vegetation samples taken using the

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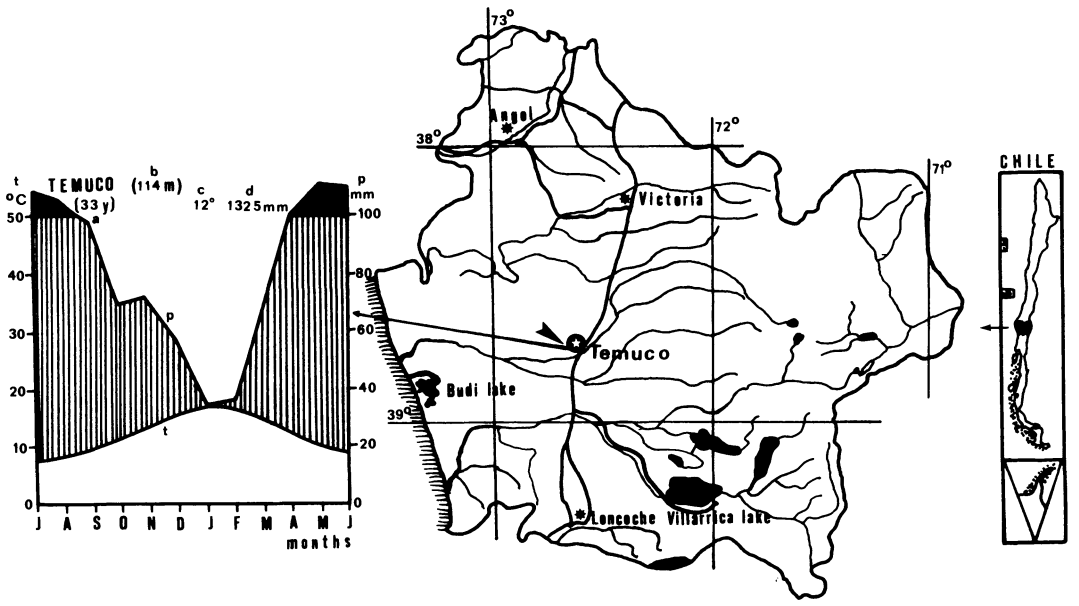

FIGURE 1. Ninth Region of Chile. Climate diagram of Temuco according to Hajek & Di Castri (1975): a = years of observation, b = altitude, c = year average temperature, d = year average precipitation, p = precipitation, t = temperature. Black areas = surplus of precipitation.

Braun-Blanquet (1964) phytosociological method for the study of the local vegetation. Other plants, collected outside the study quadrats, were added to the collection. Eighteen samples were taken in the forest, 20 in scrub vegetation, 6 in pastures, and 2 in bogs. The vegetation contains the following associations: *Lapagerio–Aextoxiconetum punctatii*, *Nothofago–Perseetum linguae*, *Fuchsio–Chusqueetum quilae*, *Rhaphithamno–Aristotelietum chilensis*, *Chusqueetum coleu*, *Aristotelio–Rubetum constrictae*, *Hyperico–Agrostidetum castellanae*, and *Juncetum procerii* (Oberdorfer, 1960; Ramírez, 1982; Hilldebrand, 1983).

The frequency of each species was estimated in each plant association. The relative importance value was calculated adding this frequency and the average cover expressed in relative percentage of each species in the different associations according to the Wikum & Shanholtzer (1978) method. This value was not determined for species collected outside the quadrats.

Nomenclature and phytogeographic origin of the taxa were based on Marticorena & Quezada (1985) and the family nomenclature on Cronquist (1981). The common names are according to Muñoz (1966). Introduced species were classified using the German flora by Rauh & Senghas (1968). The collected species were kept in the herbarium of the Institute of Botany, Austral University of Chile (VALD).

Life forms follow the Raunkiaer system (Ellenberg & Mueller-Dombois, 1966). Vines, epiphytes, and parasites were included under phanerophytes. The interpretation of the biological spectrum was based on Cain (1950).

Information was added on the present and potential uses of the plants.

RESULTS AND DISCUSSION

The flora of the study area is made up of 203 species, of which 190 were inventoried in the 46 vegetation samples taken in the forest, scrub, and grassland formations (Appendix I). The other 13 species were collected outside the sample quadrats. The 203 species are distributed among 161 genera, 84 families, and 6 classes (Table 1). The class with the greatest number of taxa was Magnoliopsida (dicotyledons), which include almost 69% of the species present in Rucamanque. Following these are the Liliopsida (monocotyledons) with 42 species (21%), and the Polypodiopsida (Filicinae) with 16 species (8%).

The best-represented family of the Magnoliopsida was the Asteraceae, with 18 genera and 25 species, amounting to 12% of the total. Next came the Fabaceae with 4 genera and 9 species, the Apiaceae with 6 genera and species, the Lamiaceae and Rosaceae with 5 species each, and the Myrtaceae, Proteaceae, and Scrophulariaceae with 4

TABLE 1. Taxonomic distribution of the flora of Rucamanque.

Classes	Families	Genera	Species (%)
Bryopsida	3	3	3 (1.47)
Equisetopsida	1	1	1 (0.49)
Polypodiopsida	7	9	16 (7.88)
Pinopsida	1	1	1 (0.49)
Magnoliopsida	60	115	140 (68.96)
Liliopsida	12	32	42 (20.68)

species each. Outstanding among the Liliopsida are the Poaceae, with 16 genera and 18 species, the Cyperaceae with 5, and the Juncaceae with 4 species. Among the ferns, the Hymenophyllaceae presented 6 species, all of which were epiphytes in the forest formation.

ORIGIN

Of the 203 species, 147 (72.41%) are native and 56 (27.58%) are introduced (Table 2). This high percentage of introduced weeds indicates a strong human influence on the vegetation (Sukopp, 1969). The introduced species only belong to the classes Magnoliopsida and Liliopsida, and make up 31.4% and 28.6% of each group, respectively. Of course the greatest percentage of introduced species is found in the shrub grassland formations, of anthropic and therefore secondary, origin (Ramírez, 1982). The evergreen forest of *Aextoxicon punctatum* is the association least invaded by weeds. The majority of the introduced species are originally European and of little grazing value (Montaldo, 1975; Añazco et al., 1981).

LIFE FORMS

The biological spectrum of the study area was constructed from 200 species; the remaining three were mosses. In the epiphytic synusia that were not considered, mosses are very abundant (Riveros & Ramírez, 1978). The most-represented life form was the phanerophytes with 80 species, representing 40% of the total. This life form abounds in forest and scrub formations, occupying different strata in the vegetation. Chamaephytes and cryptophytes were the scarcest, with eight species (4%) each. Hemicryptophytes appeared in about the same numbers as phanerophytes, with 78 species, or 39%. Therophytes were represented by 26 species, or 13%. The latter two herbaceous life forms were abundant in grassy and scrub formations (Table 3).

The biological spectrum here described (Fig. 2) corresponds to a phanerophytic phytoclimate, typical of intermediate latitudes in temperate zones (Cain, 1950). The relative abundance of hemicryptophytes and therophytes is related to the degree of anthropic intervention suffered by the original vegetation. In the original vegetation, these life forms certainly were not as important.

TABLE 2. Phytogeographic origin of the flora of Rucamanque, distributed by class. Percentages in parentheses.

Classes	Native	Introduced	Total
Bryopsida	3	0	3
Equisetopsida	1	0	1
Polypodiopsida	16	0	16
Pinopsida	1	0	1
Magnoliopsida	96 (68.6)	44 (31.4)	140
Liliopsida	30 (71.4)	12 (28.6)	42
Total	147 (72.41)	56 (27.58)	203

This is confirmed by separating the native elements from the introduced for each life form (Table 4, Fig. 3). Only one of 80 phanerophytes is exotic. The cryptophytes are all native. Among the chamaephytes and hemicryptophytes, the percentage of introduced species is much higher, reaching 37.5% and 38.5%, respectively. Cryptophytes are not very frequent, unlike the hemicryptophytes, which contribute 30 exotic species. These perennial cespitose herbs and rosettes are plants that accompany man and do not characterize any particular phytoclimate (Le Blanc, 1963). Their abundance is due to destruction of forest and to grazing, which impedes their replacement by more aggressive woody species (Pessot & Montaldo, 1974).

The therophytes constitute a special case of plants typical of dry climate or weeds of cultivated areas. They act as pioneers in uncovered soil (Cain, 1950). Only 15% of the therophytes present in the study area are native. This life form was scarce in the original vegetation but invaded anthropogenic grasslands formed on eroded soils, where the vegetational cover never reaches 100%. Thus, therophytes are not typical of Rucamanque.

The phanerophytes, therefore, make up the most

TABLE 3. Biological spectrum of the flora of Rucamanque.

Life Forms	Species	Percentage
Phanerophytes	80	40%
Chamaephytes	8	4%
Hemicryptophytes	78	39%
Cryptophytes	8	4%
Therophytes	26	13%
Total	200	100%

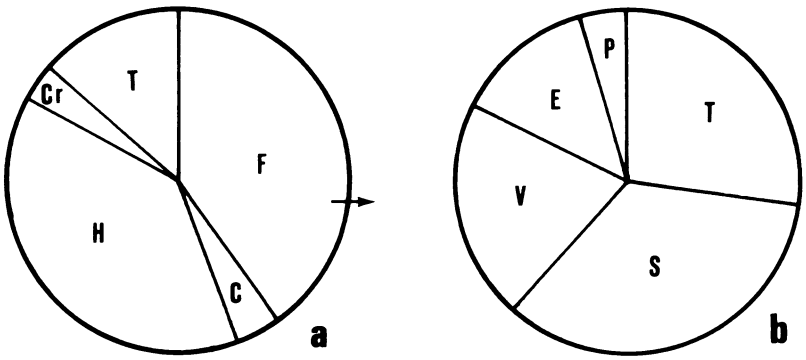

FIGURE 2.—a. Biological spectrum of Rucamanque. F = phanerophytes, C = chaemaephytes, H = hemicryptophytes, Cr = cryptophytes, T = therophytes.—b. Distribution of phanerophytes: T = trees, S = shrubs, V = vines, E = epiphytes, P = parasites.

abundant and representative life form of the research area, including trees, shrubs, epiphytes, and parasites (Table 5). Shrubs were very abundant, with 28 species, 35% of all the phanerophytes. This life form dominates the secondary scrub and tends to invade degraded and abandoned pastures or grassy areas (Ramírez et al., 1984a, 1985). Twenty-two species of trees were present, or 27% of the total.

Sixteen climbing plants flourish in Rucamanque, making up 20% of the total. The most robust of these, *Hydrangea serratifolia*, can have a stem diameter of up to 15 cm. Climbers are typical of forest and proliferate in secondary scrub where more light penetrates. The epiphytes, principally filmy ferns of the Hymenophyllaceae, presented 11 species, or 13.5%. Only three parasitic species were present.

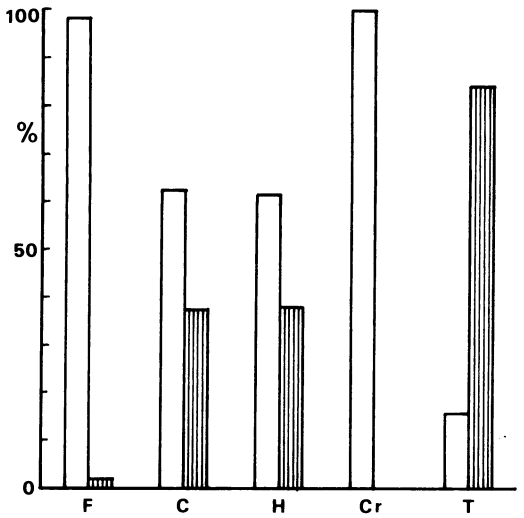

FIGURE 3. Native vs. introduced species in the biological spectrum of Rucamanque. F = phanerophytes, C = chamaephytes, H = hemicryptophytes, Cr = cryptophytes, T = therophytes. White bars = percentage of native species. Hatched bars = percentage of introduced species.

FREQUENCY IN THE PLANT ASSOCIATION

Only two species were present in each of the eight studied plant associations: *Rubus constrictus* and *Prunella vulgaris* (Table 6). These are European weeds, the first a spiny, semiclimbing shrub, and the second, a chamaephytic herb. Both have wide ecological ranges, colonizing any disturbed site in central-southern Chile. Another European species, *Holcus lanatus*, was found in seven of the eight associations studied. In six associations, *Plantago lanceolata*, another European herb, was found along with *Aristotelia chilensis* and *Eucryphia cordifolia*, two native woody species.

Native species with a frequency of five, that is, which occur in five associations, are: *Aextoxicon punctatum*, *Luma apiculata*, *Baccharis racemosa*, *Lapageria rosea*, *Cissus striata*, *Boquila trifoliolata*, and *Blechnum hastatum*. The first two are arboreal species of forests and scrubland; the third is a small shrub fairly frequent in the south of Chile. The remaining three are vines that

TABLE 4. Phytogeographic origin of the plant species of Rucamanque distributed by life form. Percentages in parentheses.

Life Forms	Native	Introduced	Total
Phanerophytes	79 (98.75)	1 (1.25)	80
Chamaephytes	5 (62.50)	3 (37.50)	8
Hemicryptophytes	48 (61.53)	30 (38.47)	78
Cryptophytes	8 (100)	0 (0)	8
Therophytes	4 (15.38)	22 (84.62)	26

TABLE 5. Habits of phanerophytes present in the flora of Rucamanque.

Habits of Phanerophytes	Numbers of Species	Percentage
Trees	22	27.50
Shrubs	28	35.00
Vines	16	20.00
Epiphytes	11	13.75
Parasites	3	3.75
Total	80	100.00

form large populations in secondary brush, and the last is a fern tolerant of a wide range of luminosity, as Godoy et al. (1981) demonstrated. The exotic hemicryptophyte herbs having the same frequency (5) are *Agrostis castellana* and *Rumex acetosella*. The former dominates the grassy vegetation in the study area (Oberdorfer, 1960) and the latter thrives on worn-out soils.

IMPORTANCE VALUES

Chusquea quila, a climbing bamboo, was found to be the most important species in the vegetation of Rucamanque (Table 6). It grows in areas of moist soil (Ramírez et al., 1984b) and prefers light in forest clearings. It forms extensive and impenetrable secondary scrub, locally called "quilantales." Following it with slightly less importance is the blackberry (*Rubus constrictus*), which colonizes all of the vegetational communities in Rucamanque. This blackberry forms scrubby areas called "murrales" when it invades degraded meadows and hedges (Hildebrand, 1983). It is an aggressive, woody plant whose control poses a serious problem in the study region (Ramírez, 1973). The importance of these two shrubs, which belong to disclimax communities, indicates the degree of anthropic intervention found in the vegetation of Rucamanque. They invade areas when the forest has been cut, and in this case make difficult the regeneration of the original forest community (Ramírez et al., 1985).

Third in order of importance is "olivillo" (*Aextoxicon punctatum*), a tall tree that forms evergreen forests in the lowest and deepest parts of Rucamanque Valley. *Aristotelia chilensis* and *Nothofagus obliqua* show similar importance values. The former dominates in shrub communities and the latter in partially deciduous forests of the *Nothofago–Perseetum*. The next-lowest values were found for *Agrostis castellana*, *Chusquea coleu*, and *Juncus procerus*, these dominant in grassy areas, scrub, and bogs, respectively.

TABLE 6. Frequencies in the plant associations, and importance values of the main species of Rucamanque.

Species	Frequencies	Importance Values
Chusquea quila	4	11.69
Rubus constrictus	8	9.33
Aextoxicon punctatum	5	7.92
Aristotelia chilensis	6	6.96
Nothofagus obliqua	4	6.66
Agrostis castellana	5	5.61
Chusquea coleu	2	5.03
Juncus procerus	1	2.93
Blechnum chilense	4	2.81
Eucryphia cordifolia	6	2.46
Prunella vulgaris	8	2.39
Holcus lanatus	7	2.30
Persea lingue	4	2.25
Trifolium repens	4	2.17
Senecio yegua	4	2.00
Plantago lanceolata	6	1.95
Leontodon taraxacoides	2	1.95
Peumus boldus	3	1.91
Cynosurus echinatus	4	1.90
Baccharis racemosa	5	1.88
Conium maculatum	2	1.88
Lapageria rosea	5	1.79
Vulpia bromoides	3	1.77
Baccharis concava	3	1.74
Cissus striata	5	1.64
Leucanthemum vulgare	3	1.62
Blechnum hastatum	5	1.49
Luma apiculata	5	1.49
Boquila trifoliolata	5	1.49
Rumex acetosella	5	1.49

APPLICATIONS

The flora of Rucamanque offers many uses, some of which are employed by the Araucarian Indians (Mapuche) who populate Cautin Province. *Chusquea coleu* and *C. quila* are used in crafts and for the construction of furniture and household articles. To fasten pieces of these bamboos, "voquis" (*Boquila trifoliolata* and *Campsidium valdivianum*) serve as ties. *Juncus procerus* is used to make mats. From *Luma apiculata*, tool handles are cut, and the wood of *Embothrium coccineum* is carved.

Applications as construction materials are important for tree species, including *Aextoxicon punctatum*, *Laurelia sempervirens*, *Persea lingue*, *Nothofagus obliqua*, *N. dombeyi*, and *Weinmannia trichosperma*. Tannins for the leather tanning industry are obtained from the barks of *Persea lingue* and *Weinmannia trichosperma*. Many individuals of the latter species can presently be

found with the bark cut off, resulting from excessive exploitation. *Eucryphia cordifolia* is valued for domestic firewood, and for this reason the tree is being cut so extensively that it risks local extirpation. Edible fruits grow on *Lapageria rosea*, Chile's national flower. "Maqui cider" is made from the berries of *Aristotelia chilensis*. Edible fruits also grow on *Gevuina avellana*, *Ribes trilobum*, *Fragaria chiloensis*, *Ugni molinae*, *Fuchsia magellanica*, and *Peumus boldus*. The fruits of *Rubus constrictus* are used to make jams.

The bark of *Dasyphyllum diacanthoides* allegedly regulates blood sugar; *Boquila trifoliolata* is applied for eye infections; *Peumus boldus* is used for stomachaches and liver illnesses; an infusion of *Tristerix tetrandrus* is thought to reduce cholesterol in the blood. *Solanum gayanum* is a reputed febrifuge; *Buddleja globosa* allegedly helps heal ulcers; and *Equisetum bogotense* is used as a diuretic. The following introduced plants have applications in popular medicine: *Urtica urens* as an antirheumatic, *Hypericum perforatum* as a vulnerary, and *Mentha rotundifolia* and *M. pulegium* for the stomach.

The rhizomes of *Dioscorea brachybotrya* are edible and high in starch. *Maytenus boaria* and *Chusquea quila* provide excellent winter forage.

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APPENDIX I. Scientific names, families, local names, life forms (Lf), origins (O), frequencies (F), and importance values (I.V.) of the flora of Rucamanque (Cautín, Chile).

Scientific Name	Family	Local Name	Lf	O	F	I.V.
BRYOPHYTAE						
Dendrolygotrichum dendroides (Hedw.) Brot.	Polytrichaceae	Musgo pinito		n	1	0,29
Hypopterigium thouinii Bridges	Hypopterygiaceae	Paragua de sapo		n	1	0,29
Rygodium implexum Schwaegr.	Brachytheciaceae	Lana del pobre		n	2	0,59
EQUISETATAE						
Equisetum bogotense H.B.K.	Equisetaceae	Limpiaplata	Cr	n	1	0,29
POLYPODIATAE						
Adiantum chilense Kaulf.	Adiantaceae	Patita negra	H	n	3	0,89
Asplenium dareoides A. N. Desv.	Aspleniaceae	Apio del monte	F	n	2	0,59
Asplenium trilobum Cav.		Calahuala	F	n	2	0,59
Blechnum blechnoides (Bory) Keyserl.	Blechnaceae	Helecho	H	n	2	0,59
Blechnum chilense (Kaulf.) Mett.		Quil-Quil	H	n	4	2,81
Blechnum hastatum Kaulf.		Palmilla	H	n	5	1,49
Ctenitis spectabilis (Kaulf.) Kunkel	Aspidiaceae	Unknown	H	n	2	0,59
Hymenoglossum cruentum (Cav.) K. Presl	Hymenophyllaceae	Helecho película	F	n	1	0,29
Hymenophyllum caudiculatum Mart.			F	n	1	0,29
Hymenophyllum dentatum Cav.			F	n		col
Hymenophyllum krauseanum Phil.			F	n	1	0,29
Hymenophyllum pectinatum Cav.			F	n		col
Hymenophyllum plicatum Kaulf.			F	n	2	0,59
Hypolepis rugosula (Labill.) J. E. Sm.	Dennstaedtiaceae	Unknown	H	n	2	0,59
Polypodium feuillei Bert.	Polypodiaceae	Hierba del lagarto	F	n	3	0,89
Polystichum chilense (Christ) Diels	Aspidiaceae	Helecho palmita	H	n	1	0,29
PINATAE						
Podocarpus salignus D. Don	Podocarpaceae	Mañio hoja larga	F	n	1	0,90
MAGNOLIATAE						
Acaena ovalifolia R. et P.	Rosaceae	Cadillo	H	n	3	0,89
Aextoxicon punctatum R. et P.	Aextoxicaceae	Olivillo	F	n	5	7,92
Anagallis arvensis L.	Primulaceae	Pimpinela escarlata	T	f	1	0,29
Anmannia coccinea Roth	Lythraceae	Unknown	T	f	1	0,29
Aristotelia chilensis (Mol.) Stuntz	Elaeocarpaceae	Maqui	F	n	6	6,96
Aster bellidiastrum Nees ex Walp.	Asteraceae	Unknown	H	n	1	0,50
Azara integrifolia R. et P.	Flacourtiaceae	Aromo	F	n	2	0,66
Azara lanceolata Hook. f.		Corcolén	F	n	3	0,89
Azara microphylla Hook. f.		Chin-chín	F	n	1	0,29
Baccharis concava (R. et P.) Pers.	Asteraceae	Chilca	F	n	3	1,74
Baccharis confertifolia Bert. ex Colla			F	n		col
Baccharis linearis (R. et P.) Pers.			F	n	3	0,89
Baccharis racemosa (R. et P.) DC.			F	n	5	1,88
Baccharis rosmarinifolia Hook. et Arn.		Romerillo	F	n		col
Boquila trifoliolata (DC.) Dcne.	Lardizabalaceae	Pil-pil voqui	F	n	5	1,49
Buddleja globosa Hope	Buddlejaceae	Palguín, matico	F	n	1	0,29
Calcluvia paniculata (Cav.) D. Don	Cunoniaceae	Tiaca	F	n	1	0,29
Callitriche stagnalis Scop.	Callitrichaceae	Estrella de agua	H	f	1	0,81
Carduus pycnocephalus L.	Asteraceae	Cardo	T	f	1	0,29
Centaurea calcitrapa L.		Unknown	T	f	1	0,29
Centella triflora (R. et P.) Nannf.	Apiaceae	Centella	H	n	1	0,29
Cerastium arvense L.	Caryophyllaceae	Cerastio	C	f	3	0,89
Chevreulia sarmentosa (Pers.) Blake	Asteraceae	Unknown	H	n	1	0,94
Chrysosplenium valdivicum Hook.	Saxifragaceae		H	n	1	0,29
Cichorium intybus L.	Asteraceae	Achicoria	H	f	1	0,29
Cirsium vulgare (Savi) Ten.		Cardo negro	T	f	4	1,19
Cissus striata R. et P.	Vitaceae	Voqui-naranjillo	F	n	5	1,64
Citronella mucronata (R. et P.) D. Don	Icacinaceae	Huilli-patagua	F	n	3	0,98
Conium maculatum L.	Apiaceae	Cicuta	T	f	2	1,88

APPENDIX I. Continued.

Scientific Name	Family	Local Name	Lf	O	F	I.V.
Coniza bonariensis (L.) Cronq.	Asteraceae	Coniza	T	f	4	1,19
Crepis capillaris (L.) Wallr.		Crepis	T	f	2	0,59
Cryptocarya alba (Mol.) Looser	Lauraceae	Peumo	F	n	1	0,29
Cynanchum pachyphyllum (Dcne.) Schum.	Asclepiadaceae	Voqui	F	n	2	0,59
Dasyphyllum diacanthoides (Less.) Cabr.	Asteraceae	Palo santo	F	n	2	0,59
Daucus carota L.	Apiaceae	Zanahoria silvestre	T	f	4	1,32
Dichondra sericea Sw.	Convolvulaceae	Oreja de ratón	H	n	1	0,29
Digitalis purpurea L.	Scrophulariaceae	Cartucho	T	f	1	0,29
Discaria serratifolia (Vent.) B. et H.	Rhamnaceae	Chacay	F	n	1	0,29
Disopsis glechomoides (A. Rich.) Muell.-Arg.	Euphorbiaceae	Unknown	H	n	1	0,60
Echium vulgare L.	Boraginaceae	Viborera	T	f	1	0,29
Ecremocarpus scaber R. et P.	Bignoniaceae	Chuplin	F	n	1	0,29
Elytropus chilensis (A. DC.) Muell.-Arg.	Apocynaceae	Quilmay	F	n	2	0,59
Embothrium coccineum J. R. et G. Forster	Proteaceae	Notro	F	n	1	0,29
Epilobium puberulum Hook. et Arn.	Onagraceae	Epilobio	H	n	1	0,29
Ercilla volubilis A. H. L. Juss.	Phytolaccaceae	Voqui-auca	F	n	1	0,29
Eryngium paniculatum Cav. et Domb.	Apiaceae	Cardoncillo	H	n	1	0,29
Escallonia alpina Poepp. ex DC.	Escalloniaceae	Siete camisas	F	n	3	1,19
Eucryphia cordifolia Cav.	Eucryphiaceae	Ulmo	F	n	6	2,46
Flourensia thurifera (Mol.) DC.	Asteraceae	Incienso	F	n		col
Fragaria chiloensis (L.) Duch.	Rosaceae	Frutilla	H	n	1	0,29
Francoa appendiculata Cav.	Saxifragaceae	Llaupangue	H	n	1	0,29
Fuchsia magellanica Lam.	Onagraceae	Chilco	F	n	3	1,33
Gamochaeta americana (Mill.) Wedd.	Asteraceae	Vira-vira	H	n	2	0,59
Gamochaeta spicata (Lam.) Cabr.		Unknown	H	n	1	0,40
Geranium robertianum L.	Geraniaceae	Core-core	T	f	4	1,19
Gevuina avellana Mol.	Proteaceae	Avellano	F	n	3	0,89
Hydrangea serratifolia (H. et A.) F. Phil.	Hydrangeaceae	Pehuelden	F	n	4	1,21
Hydrocotyle poeppigii DC.	Hydrocotylaceae	Tembladerilla	H	n	3	0,89
Hypericum brevistylum Choisy	Hypericaceae	Ñanco	H	n	1	0,19
Hypericum perforatum L.		Hierba de San Juan	H	f	5	1,63
Hypochaeris radicata L.	Cichoriaceae	Hierba del chancho	H	f	4	1,19
Lardizabala biternata R. et P.	Lardizabalaceae	Voqui-cógüil	F	n	2	0,59
Lathyrus hookeri D. Don	Fabaceae	Clarincillo	T	n	1	0,29
Laurelia philippiana Looser	Monimiaceae	Tepa	F	n	2	1,23
Laurelia sempervirens (R. et P.) Tul.		Laurel	F	n	4	1,32
Leontodon taraxacoides (Vill.) Mérat	Cichoriaceae	Chinilla	H	f	2	1,95
Leptocarpha rivularis DC.		Palito negro	F	n	3	0,89
Leucanthemum vulgare Lam.		Margarita	H	f	3	1,62
Linum usitatissimum L.	Linaceae	Lino	T	f	4	1,19
Loasa acanthifolia Desr.	Loasaceae	Ortiga caballuna	H	n	3	0,89
Lobelia tupa L.	Lobeliaceae	Tabaco del diablo	H	n	1	0,29
Lomatia dentata (R. et P.) R. Br.	Proteaceae	Piñol	F	n	4	1,19
Lomatia ferruginea (Cav.) R. Br.		Huinque	F	n	1	0,29
Lotus corniculatus L.	Fabaceae	Lotera	H	f	1	0,29
Lotus uliginosus Schkuhr		Alfalfa chilota	H	f	2	1,2
Luma apiculata (DC.) Burret	Myrtaceae	Arrayán	F	n	5	1,49
Margyrycarpus pinnatus (Lam.) O.K.	Rosaceae	Perlilla	C	n	1	0,29
Matricaria perforata Mérat	Asteraceae	Manzanilla	H	f	1	0,29
Maytenus boaria Mol.	Celastraceae	Maitén	F	n	1	0,56
Mentha pulegium L.	Lamiaceae	Poleo	C	f	3	0,89
Mentha rotundifolia (L.) Hudson		Menta alemana	H	f	1	0,29
Mimulus bridgessii (Benth.) Clos	Scrophulariaceae	Berro	H	n	1	0,29
Misodendrum brachystachyum DC.	Misodendraceae	Injerto	F	n		col
Mitraria coccinea Cav.	Gesneriaceae	Botellita	F	n	3	1,16
Muehlenbeckia hastulata (J. E. Sm.) Johnst.	Polygonaceae	Voqui-quilo	F	n	4	1,34
Mutisia retusa Remy	Asteraceae	Clavel del campo	F	n	1	0,29

APPENDIX I. Continued.

Scientific Name	Family	Local Name	Lf	O	F	I.V.
Myoschilos oblonga R. et P.	Santalaceae	Orocoipo	F	n	2	0,59
Myrceugenia exsucca (DC.) Berg	Myrtaceae	Pitra	F	n		col
Myrceugenia planipes (H. et A.) Berg		Picha	F	n	2	1,06
Nertera granadensis (Mutis ex L. f.) Druce	Rubiaceae	Rucachucao	H	n	1	0,29
Nothanthera heterophylla (R. et P.) D. Don	Loranthaceae	Quintral del boldo	F	n	1	0,29
Nothofagus dombeyi (Mirb.) Oerst.	Fagaceae	Coigüe	F	n	1	0,36
Nothofagus obliqua (Mirb.) Oerst.		Roble	F	n	4	6,66
Osmorhiza chilensis H. et A.	Apiaceae	Asta de cabra	H	n	2	0,59
Oxalis araucana Reiche	Oxalidaceae	Vinagrillo	T	n	4	1,19
Persea lingue (R. et P.) Nees	Lauraceae	Lingue	F	n	4	2,25
Peumus boldus Mol.	Monimiaceae	Boldo	F	n	3	1,91
Plantago hirtella H.B.K.	Plantaginaceae	Llantencillo	H	f	1	0,29
Plantago lanceolata L.		Siete venas	H	f	6	1,95
Prunella vulgaris L.	Lamiaceae	Hierba mora	C	f	8	2,39
Pseudopanax valdiviensis (Gay) Seem. ex Reiche	Araliaceae	Curaco	F	n	3	0,91
Ranunculus minutiflorus Bert. ex Phil.	Ranunculaceae	Botón de oro	H	n	4	1,19
Relbunium hypocarpium (L.) Hemsl.	Rubiaceae	Relbún	C	n	4	1,19
Rhammus diffusus Clos	Rhamnaceae	Murta negra	F	n	2	0,59
Rhaphanus sativus L.	Brassicaceae	Rabanito silvestre	T	f	1	0,29
Rhaphithamnus spinosus (A. L. Juss.) Mold.	Verbenaceae	Huayún	F	n	4	1,22
Ribes trilobum Meyen	Grossulariaceae	Zarzaparrilla	F	n	3	0,89
Rubus constrictus Muell. et Lef.	Rosaceae	Zarzamora	F	f	8	9,33
Rumex acetosella L.	Polygonaceae	Romacilla	H	f	5	1,49
Rumex sanguineus L.		Romaza	H	f	2	0,59
Sanguisorba minor Scop.	Rosaceae	Pinpinela	H	f	1	0,29
Sanicula crassicaulis Poepp. ex DC.	Apiaceae	Pata de guanaco	H	n	1	0,59
Sarmienta repens R. et P.	Gesneriaceae	Medallita	F	n	2	0,59
Satureja multiflora (R. et P.) Briq.	Lamiaceae	Menta de árbol	F	n	1	0,29
Senecio chilensis Less.	Asteraceae	Palo de yegua	F	n	3	0,89
Senecio otites Kunze ex DC.		Tutuco	H	n	3	1,08
Senecio yegua (Colla) Cabr.		Palpalén	F	n	4	2,00
Sherardia arvensis L.	Rubiaceae	Unknown	T	f	1	0,29
Solanum gayanum (Remy) Reiche	Solanaceae	Natri	F	n	3	0,89
Solanum nigrum L.		Tomatillo	T	f	3	0,89
Solanum valdiviense Dunal		Yaguecillo	F	n	3	0,89
Soliva sessilis R. et P.	Asteraceae	Dicha	H	n		col
Stachys grandidentata Lindl.	Lamiaceae	Unknown	C	n	1	0,29
Stellaria cuspidata Willd.	Caryophyllaceae	Quilloi-quilloi	C	n	2	0,59
Taraxacum officinale Weber	Cichoriaceae	Diente de león	H	f	1	0,29
Trifolium dubium Sibth.	Fabaceae	Trébol enano	T	f	3	0,99
Trifolium polymorphum Poir.		Trébol	H	f	1	0,29
Trifolium repens L.		Trébol blanco	H	f	4	2,17
Tristerix tetrandrus (R. et P.) Mart.	Loranthaceae	Quintral del álamo	F	n	2	0,59
Tropaeolum ciliatum R. et P.	Tropaeolaceae	Espuela de galán	Cr	n	2	0,59
Ugni molinae Turcz.	Myrtaceae	Murtilla	F	n	2	1,44
Urtica urens L.	Urticaceae	Ortiga	H	f	3	0,89
Valeriana floribunda Phil.	Valerianaceae	Valeriana	H	n	3	0,89
Verbascum thapsus L.	Scrophulariaceae	Hierba de paño	H	f	1	0,29
Veronica anagallis-aquatica L.		No me olvides del campo	H	f	1	0,29
Vestia foetida (R. et P.) Hoffmanns.	Solanaceae	Huevil	F	n		col
Vicia macraei H. et A.	Fabaceae	Arvejilla	T	n		col
Vicia sativa L.			T	f	1	0,29
Vicia vicina Clos			T	n	2	0,59
Weinmannia trichosperma Cav.	Cunoniaceae	Tineo	F	n	2	1,28

APPENDIX I. Continued.

Scientific Name	Family	Local Name	Lf	O	F	I.V.
LILIATAE						
Agrostis castellana Boiss. et Reuter	Poaceae	Chépica	H	f	5	5,61
Aira caryophyllea L.		Aira	T	f	1	1,68
Alstroemeria pulchra Sims	Alstroemeriaceae	Amancay	Cr	n	2	0,59
Arachnitis uniflora Phil.	Corciaceae	Flor de la araña	Cr	n	1	0,29
Arrhenatherum elatius (L.) P. Beauv.	Poaceae	Pasto cebolla	H	f	3	0,89
Bomarea salsilla (L.) Herb.	Amaryllidaceae	Copihuito	Cr	n	1	0,29
Briza minor L.	Poaceae	Tembleque	T	f	1	0,29
Bromus unioloides H.B.K.		Pasto lanco	H	n	1	0,59
Carex acutata Boott	Cyperaceae	Cortadera	H	n	1	0,29
Carex fuscula D'Urv.			H	n	1	0,29
Chloraea cylindrostachya Poepp.	Orchidaceae	Pico de loro	Cr	n	1	0,29
Chusquea culeou Desv.	Poaceae	Colihue	F	n	2	5,03
Chusquea quila Kunth		Quila	F	n	4	11,69
Codonorchis lessonii (D'Urv.) Lindl.	Orchidaceae	Azucena del campo	Cr	n		col
Cynosurus echinatus L.	Poaceae	Cola de ratón	T	f	4	1,90
Dactylis glomerata L.		Pasto ovillo	H	f	3	1,02
Dioscorea andina Phill.	Dioscoreaceae	Papa del monte	Cr	n		col
Dioscorea brachybothrya Poepp.		Papa cimarrona	F	n	2	0,59
Eragrostis lugens Nees	Poaceae	Unknown	H	f	1	0,29
Fascicularia bicolor (R. et P.) Mez	Bromeliaceae	Chupalla	F	n	1	0,29
Gavilea odoratissima Poepp.	Orchidaceae	Orquidea	Cr	n		col
Holcus lanatus L.	Poaceae	Pasto dulce	H	f	7	2,37
Juncus capillaceus Lam.	Juncaceae	Unknown	H	n	1	0,29
Juncus dombeyanus J. Gay. ex Lah.		Junquillo	H	n	1	0,29
Juncus microcephalus H.B.K.			H	n	1	0,29
Juncus procerus E. Mey.			H	n	1	2,93
Lapageria rosea R. et P.	Philesiaceae	Copihue	F	n	5	1,79
Libertia chilensis (Mol.) Gunckel	Iridaceae	Calle-Calle	H	n		col
Libertia coerulescens Kunth et Bouché		Calle-Calle azul	H	n	1	0,29
Libertia ixioides Gay			H	n	3	0,89
Lolium multiflorum Lam.	Poaceae	Ballica italiana	H	f	1	0,29
Lolium perenne L.		Ballica inglesa	H	f	1	0,29
Luzuriaga radicans R. et P.	Philesiaceae	Coralito	C	n	2	0,59
Nasella excerta Phil.	Poaceae	Pasto quila	H	n	1	0,29
Paspalum distichum L.		Unknown	H	f	2	0,94
Polypogon chilense (Kunth) Pilger		Cola de zorro	H	n	1	0,43
Sagittaria montevidensis Cham. et Schlecht.	Alismataceae	Rosa de agua	H	n	1	0,29
Scirpus cernuus Vahl	Cyperaceae	Can-cán	H	n	1	0,43
Stipa poeppigiana Trin. et Rupr.	Poaceae	Quilmén	H	n	1	0,29
Uncinia erinacea (Cav.) Pers.	Cyperaceae	Unknown	H	n	3	0,89
Uncinia phleoides (Cav.) Pers.		Clin-clin	H	n	4	1,19
Vulpia bromoides (L.) S. F. Gray	Poaceae	Cepilla	T	f	3	1,77