

# "ANALYSYS OF THE VEGETATION OF THE ILHÉU DE FORA - - SELVAGENS ISLANDS"

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With 2 Tables

**ABSTRACT.** The Ilhéu de Fora is a small islet with an area of 8 ha and the maximum altitude at 18m: It forms, with the other two main islands, the group of the Natural Reserve of Selvagens, and its ground cover consist in a relic of undisturbed natural macaronesian vegetation.

The line intercept transept method was used in a certain period of the year to do the assesment and sampling of the plant community. As the vegetation cover is dense and relatively well distributed, a number of 17 intercept lines with 10m long were adopted, in a random way, in order to give the maximum dispersion and global coverage of the island. All taxa under the vertical projection plane of the lines were measured and identified.

## INTRODUCTION

The present work pretends to develop the analysis of the vegetation of the Ilhéu de Fora - Selvagens islands, following the line intercept transept method, according to CANFIELD, R., (1941). The field collecting data took place during the month of March, and as the plant community show a very homogeneous cover distribution with delineate contours of the herbaceous taxa, the above method was aplicable giving the possibility to provide a good information of the ground cover. The Ilhéu de Fora consists in a small islet with an area of 8ha and a maximum altitude of 18 meters. It is of vulcanic origin and its rocky basalt structure is covered with marine calcareous yellow sand. It forms, with the other two main islands, Selvagem Grande and Selvagem Pequena, the sub-archipelago of the Selvagens islands, considered as Natural Reserve since 1971. Besides the incontestable ornitological interest, the vegetation of this islet represents a relic of undisturbed halofit macaronesian vegetation. The taxa *Euphorbia desfoliata* MENEZES, 1924, for instance, is endemic to this place, besides others, endemic to this group of islands.

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## METHOD

The following methodology was partly extracted from CANFIELD'S description and on its basis there is some guidelines to be followed, such as:

- The sample unity consists on a linear transept with length and vertical dimension only.
- The direct reading of the vertical projections of the plants on the line.
- The dispersion of the lines were made in a random way.

As the homogeneity and density of the vegetation is fairly good, 17 samples with the length of 10 meters each, were used in a random way in order to try to obtain the maximum dispersion on the field. The numbers of samples were considered sufficient to give an accurate result of the vegetation's analysis.

For the application of this method to the creeping plant community, the 10m long tape with centimeters graduation was extended on the vegetation cover, and each plant projection was measured and the plants identified. The dead or dry parts of the plants measured were not considered.

In some cases, when a species forms a long aggregated and uniform spot, which is the case of *Euphorbia desfoliata*, only one specimen was considered, which does not correspond to the reality.

In the case of herbaceous not congregated taxa, the intercept length was considered not only the stalk diameter, but also the projection of the basal or aerial leaves.

Taxa with less than one centimeter of projection were not considered.

When species overlapped, the individual interceptions were measured.

All the field data were compiled in proper forms in which, for each line and for each species was annotated the total number of specimens, the total interception length and the number of intervals for each species occurring on the line.

## RESULTS

The data obtained for each species were converted according to the methodology suggested for this work in order to obtain:

- a - Relative Density (R. Dens), which means the density of one species as a percent of total plant density.
- b - Dominance (Dom) and Relative Dominance (R. Dom).
- c - Frequency (Freq), or the percentage of total lines which contains at least one

rooted individual of a given species.

**d** - Relative Frequency (R. Freq) or the frequency of one species as a percent of total plant frequency.

**e** - Importance (Imp) that refers to the relative contribution of a species to the entire community, and is the result of the sum of relative dominance (or relative cover) plus the relative density and relative frequency.

Thus, in Table I we can see all the taxa encountered on this analysis ordinated progressively according to the value of its importance.

**TABLE I**

| Species encountered            | TN  | L    | NI  | R.DENS | DOM.  | R.DOM. | FREQ. | R.FREQ. | IMP.   |
|--------------------------------|-----|------|-----|--------|-------|--------|-------|---------|--------|
| <i>Limonium papillatum</i>     | 37  | 24,2 | 47  | 14,07  | 14,23 | 20,13  | 27,65 | 16,04   | 50,23  |
| <i>Suaeda vera</i>             | 31  | 23,5 | 37  | 11,79  | 13,79 | 19,52  | 21,76 | 12,63   | 43,91  |
| <i>Lotus glaucus</i>           | 34  | 10,9 | 38  | 12,93  | 6,39  | 9,04   | 22,35 | 12,97   | 34,94  |
| <i>Astydamia latifolia</i>     | 20  | 10   | 28  | 7,6    | 5,89  | 8,34   | 16,47 | 9,56    | 25,48  |
| <i>Scilla maderensis</i>       | 25  | 7,75 | 25  | 9,51   | 4,55  | 6,45   | 14,7  | 8,53    | 24,49  |
| <i>Elytrigia junceiforme</i>   | 23  | 9,5  | 23  | 8,75   | 5,58  | 7,91   | 13,53 | 7,85    | 24,48  |
| <i>Euphorbia desfoliata</i>    | 10  | 9,95 | 13  | 3,8    | 5,85  | 8,28   | 7,64  | 4,43    | 16,51  |
| <i>Mesembr. nodiflorum</i>     | 14  | 5,64 | 13  | 5,32   | 3,32  | 4,69   | 7,65  | 4,44    | 14,45  |
| <i>Frankenia laevis</i>        | 12  | 5,4  | 15  | 4,56   | 3,17  | 4,5    | 8,82  | 5,12    | 14,16  |
| <i>Lobularia canariensis</i>   | 9   | 1,04 | 9   | 3,42   | 0,61  | 0,87   | 5,29  | 3,07    | 10,67  |
| <i>Senecio incrassatus</i>     | 9   | 4,3  | 9   | 3,42   | 2,52  | 3,58   | 5,29  | 3,07    | 10,06  |
| <i>Patellifolia procumbens</i> | 12  | 2,2  | 10  | 4,56   | 1,29  | 1,83   | 5,88  | 3,41    | 9,8    |
| <i>Plantago coronopus</i>      | 12  | 1,13 | 11  | 4,56   | 0,66  | 0,94   | 6,47  | 3,75    | 9,25   |
| <i>Mesembr. cristalinum</i>    | 7   | 2,76 | 7   | 2,66   | 1,62  | 2,3    | 4,12  | 2,39    | 7,33   |
| <i>Bassia tomentosa</i>        | 3   | 1,4  | 3   | 1,14   | 0,82  | 1,17   | 1,76  | 1,02    | 3,32   |
| <i>Chenopod. muralle</i>       | 4   | 0,45 | 4   | 1,52   | 0,26  | 0,37   | 2,35  | 1,36    | 3,25   |
| <i>Cistanche phelipeae</i>     | 1   | 0,1  | 1   | 0,38   | 0,05  | 0,08   | 0,59  | 0,34    | 0,8    |
|                                | 263 | 120  | 293 | 99,99  | 70,6  | 100    | 172,3 | 99,98   | 303,13 |

NOTE: TN. = total number of individuals of each species

L. = the total length of interceptions

NI. = the number of intervals in which each species occurs.

## DISCUSSION

The conclusions concerning the relative estimation of plant species in the community would be more accurate if we consider the conjoined data of the relative density, the frequency, and the dominance; In other words, considering the value of the importance.

This method shows some deviation concerning the rigour of the the frequency and the density. These data develop proporcionaly to the size of the species, which means that bigger species, or forming large spots would have overestimated values.

In reality, we can see on the results (Table I), that to the species with small size (*Elytrigia junceiforme* A. et D. Löwe, or *Scilla maderensis* MENEZES 1926 ssp *melliodora* SVENTENIUS 1969) the data found to the relative frequency and dominance, are, if compared with other taxa; smaller than the data obtained to the density. This fact is obviously due to the relative increase of the dominance and frequency of the bigger species. Anyway, the conjoined use of the three parameters are imperative to the ordinance of the importance of the species.

Observing the data obtained by the line intercept method on the Ilhéu de Fora, and considering the direct obervation of the plant community, we can conclude that: (see Table II)

- The vegetation shows a good homogeneity and dispersion of species on the community.

- The most representative species is the endemic *Limonium papillatum* (WEBB in WEBB & BERTHEL, 1846 ) O. KUNZL 1891 var *Callibotryum* SVENTENIUS 1969, of the Plumbaginaceae family with 17% of the total importance, followed by *Suaeda vera* Forssk. ex GMELIN 1791, with 14,7%.

The less representative taxa is *Cistanche phelipaea* (L. 1735) P. COUT. 1913, of the Orobanchaceae family with an importance value of 0,80% .

The Poaceae *Elytrigia junceiforme* preferes the sandy edges of the islet in close vicinity to the sea, and is well represented on the community with 8% of the total importance, and shares it habitat with the endemic *Lotus glaucus* Dryand. in Ait., (11,7%).

The endemic taxa *Euphorbia desfoliata* (5,3%) is localized around and on a rocky elevation on the northeast part of the island, in association with *Lotus*, *Suaeda* and the endemic *Scilla maderensis* var *melliodora*.

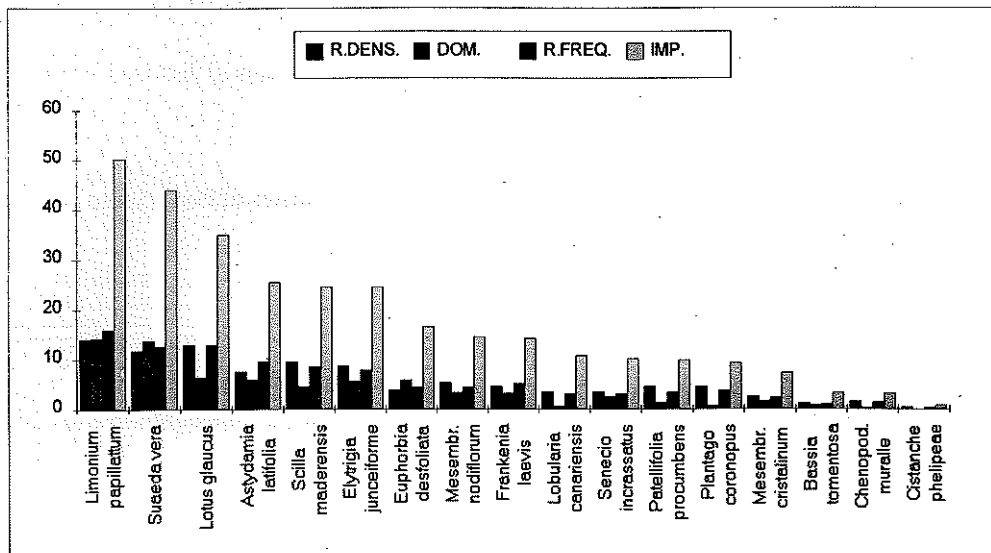
On the central part of the islet we can find a homogeneous dispersion mainly of *Astydamia latifolia* (L. fil 1781 ) BOILLON 1879, *Limonium papillatum* var *callibotryum*, *Frankenia laevis* L. 1753, *Patellifolia procumbens* (CHR. SMITH IN HORNEM. 1819) SCOTT, FORD LLOYD & WILLIANS, 1977, and also *Lotus glaucus*.

On the hardest and dryest soils, grows *Mesembryanthemum crystallinum* L. 1753

and *Mesembryanthemum nodiflorum* L. 1753, and also *Lobularia canariensis* (DC 1821, pro var.) BORGES 1987 ssp *rosula-venti*, and *Plantago coronopus* L.

The taxa *Chenopodium murale* L., prefers rupicolous environments on the basalt structure.

TABLE II



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## REFERENCES

CANFIELD, R.:

1941. "Application of the Line Interception Method in Sampling Range Vegetation". J. Forestry.

HANSEN, A.:

1969. Checklist of the Vascular Plants of the Archipelago of Madeira. *Boletim do Museu Municipal do Funchal*, n° XXIV.

HANSEN, A. & SUNDING P.:

1985. Flora of Macaronesia. Check-List of Vascular Plants (3 Revised Edition). Sommerfeltia 1, Oslo.

LOWE, RICHARD THOMAS, M. A.:

1868. A Manual Flora of Madeira and the Adjacent Islands of Porto Santo and the Desertas. London.

MENEZES, C. A. DE.:

1914. Flora do Archipelago da Madeira. Funchal.

MONOD, T.:

1990. Conspectus Florae Salvagicae. *Boletim do Museu Municipal do Funchal*, suplemento n° 1, Funchal.