Phytosociology and natural subtropical grassland communities on a granitic hill in southern Brazil

Fitossociologia e comunidades de campos subtropicais naturais em um morro granítico no sul do Brasil

Robberson Bernal Setubal & Ilsi Iob Boldrini

Appendix 1 – Floristic and phytosociological list and communities distribution of the 177 species registered in 70 sampling units (1 x 1 m) in the sampling of the grassland vegetation at Morro São Pedro, Porto Alegre municipality, RS state, Brazil, ordered by botanical families. FA = absolute frequency; FR = relative frequency; CA = absolute cover; CR = relative cover; IVI = importance value index. First 30 IVI-rated species in bold. Vouchers were deposited in the Herbarium ICN

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<th>Mog</th>
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**BROMELIACEAE**

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<th>Mog</th>
<th>Mag</th>
<th>FA (%)</th>
<th>FR (%)</th>
<th>CA (%)</th>
<th>CR (%)</th>
<th>IVI (%)</th>
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<td><strong>Dyckia leptostachya</strong> Baker</td>
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**CACTACEAE**

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<th>IVI (%)</th>
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<tr>
<td><strong>Parodia ottonis</strong> (Lehm.) N.P. Taylor</td>
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### CELASTRACEAE

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<tr>
<td><em>Maytenus cassineformis</em> Reissek</td>
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<td><em>Cuscuta sp.</em></td>
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### CYPERACEAE

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<td><em>Bulbostylis juncoideus</em> (Vahl) Kük. ex Osten</td>
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<tr>
<td><em>Centrosema virginianum</em> (L.) Benth.</td>
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<td>Dg</td>
<td>Mog</td>
<td>Mag</td>
<td>FA (%)</td>
<td>FR (%)</td>
<td>CA (%)</td>
<td>CR (%)</td>
<td>IVI (%)</td>
</tr>
<tr>
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<td>Glandularia marrubioides (Cham.) Tronc.</td>
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Appendix 2 – List of 16 indicator species from four grassland communities at Morro São Pedro, Porto Alegre municipality, RS, based on the calculation of phytosociological parameters per community and analysis of indicator species (p = 0.05). FA = absolute frequency; FR = relative frequency; CA = absolute cover; CR = relative cover; IVI = importance value index.

<table>
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<tr>
<th>Families</th>
<th>Species</th>
<th>FA (%)</th>
<th>FR (%)</th>
<th>CA (%)</th>
<th>CR (%)</th>
<th>IVI (%)</th>
<th>p (%)</th>
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<td>16.00</td>
<td>5.05</td>
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<td>1.74</td>
<td>13.50</td>
<td>4.26</td>
<td>3.00</td>
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<tr>
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<td>1.74</td>
<td>9.00</td>
<td>2.84</td>
<td>2.29</td>
<td>0.01</td>
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<tr>
<td>DRY GRASSLANDS</td>
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<tr>
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<tr>
<td>Cyperaceae</td>
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<td>25.00</td>
<td>8.98</td>
<td>6.82</td>
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<td>13.50</td>
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<td>12.50</td>
<td>4.49</td>
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<td>1.50</td>
<td>1.90</td>
<td>4.90</td>
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</table>
Appendix 3 – List of the 16 species in decreasing IVI order registered in the four communities evaluated in the sampling of the grassland vegetation at Morro São Pedro, Porto Alegre municipality, RS, Brazil. Calculations carried out with the subsets of sampling units from each community. FA = absolute frequency; FR = relative frequency; CA = absolute cover; CR = relative cover; IVI = importance value index.

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<th>ROCKY GRASSLANDS</th>
<th>DRY GRASSLANDS</th>
</tr>
</thead>
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<td>13.06</td>
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<tr>
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<td>9.61</td>
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<td>4.21</td>
</tr>
<tr>
<td>Eryngium pristis Cham. &amp; Schltdl.</td>
<td>3.84</td>
<td>9.61</td>
</tr>
<tr>
<td>Axonopus suffultus (Mikan ex Trin.) Parodi</td>
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<td>5.05</td>
</tr>
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<td>1.85</td>
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<td>Chromolaena congesta (Hook. &amp; Arn.) R.M. King &amp; H. Rob.</td>
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</tr>
<tr>
<td>Rhynchosis corylifolia Mart. ex Benth.</td>
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</tr>
<tr>
<td>Species</td>
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<td>CR (%)</td>
</tr>
<tr>
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<tr>
<td>Scleria balansae Maury</td>
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<td>Schizachyrium tenerum Nees</td>
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<td>Eryngium elegans Cham. &amp; Schltdl.</td>
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<td>4.85</td>
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<td>Rhynchospora barrosiana Guagl.</td>
<td>2.87</td>
<td>4.49</td>
</tr>
<tr>
<td>Stipa nutans Hack.</td>
<td>3.23</td>
<td>4.13</td>
</tr>
<tr>
<td>Saccharum villosum Steud.</td>
<td>2.51</td>
<td>4.67</td>
</tr>
<tr>
<td>Aspilia montevidensis (Spreng.) Kuntze</td>
<td>3.94</td>
<td>2.87</td>
</tr>
<tr>
<td>Sisyrinchium palmifolium L.</td>
<td>3.23</td>
<td>3.23</td>
</tr>
<tr>
<td>Sisyrinchium vaginatum Spreng.</td>
<td>4.30</td>
<td>1.76</td>
</tr>
<tr>
<td>Paspalum maculosum Trin.</td>
<td>1.79</td>
<td>3.77</td>
</tr>
<tr>
<td>Dichanthelium sabulorum (Lam.) Gould. &amp; C.A. Clark</td>
<td>2.87</td>
<td>2.51</td>
</tr>
<tr>
<td>Paspalum plicatum Michx.</td>
<td>2.51</td>
<td>2.51</td>
</tr>
<tr>
<td>Andropogon lateralis Nees</td>
<td>2.15</td>
<td>2.69</td>
</tr>
<tr>
<td>Chaptalia piloselloides (Vahl) Baker</td>
<td>2.87</td>
<td>1.44</td>
</tr>
<tr>
<td>Gymnopogon burchellii (Munro ex Doell) Ekman</td>
<td>2.51</td>
<td>1.62</td>
</tr>
</tbody>
</table>
### Appendix 4 – List of the 37 common species among four phytosociological studies of grassland vegetation carried out in the chain of granitic hills at Porto Alegre municipality, RS, Brazil (Morro da Polícia - Boldrini et al. 1998; Morro Santana - Overbeck et al. 2006; Morro do Osso - Ferreira et al. 2010; Morro São Pedro).

<table>
<thead>
<tr>
<th>Familie</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anacardiaceae</td>
<td><em>Schinus weinmannifolius</em> Engl.</td>
</tr>
<tr>
<td>Apiaceae</td>
<td><em>Eryngium ciliatum</em> Cham. &amp; Schltdl.</td>
</tr>
<tr>
<td>Apiaceae</td>
<td><em>Eryngium horridum</em> Malme</td>
</tr>
<tr>
<td>Apiaceae</td>
<td><em>Eryngium pristis</em> Cham. &amp; Schltdl.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Aspilia montevizensis</em> (Spreng.) Kuntze</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Baccharis articulata</em> (Lam.) Pers.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Baccharis crispa</em> Spreng.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Baccharis ochracea</em> Spreng.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Baccharis sessiliflora</em> Vahl</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Calea uniflora</em> Less.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Disynaphia ligulifolia</em> (Hook. &amp; Arn.) R.M. King &amp; H. Rob.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Lucilia acutifolia</em> (Poir.) Cass.</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Orthopappus angustifolius</em> (Sw.) Gleason</td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Vernonanthura nudiflora</em> (Less.) H. Rob.</td>
</tr>
<tr>
<td>Cactaceae</td>
<td><em>Parodia ottonis</em> (Lehm.) N.P. Taylor</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td><em>Rhynchospora setigera</em> Griseb.</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td><em>Euphorbia selloi</em> (Klotzsch &amp; Garcke) Boiss.</td>
</tr>
<tr>
<td>Fabaceae</td>
<td><em>Centrosema virginianum</em> (L.) Benth.</td>
</tr>
<tr>
<td>Fabaceae</td>
<td><em>Desmodium incanum</em> DC.</td>
</tr>
<tr>
<td>Fabaceae</td>
<td><em>Macroptilium prostratum</em> (Benth.) Urb.</td>
</tr>
<tr>
<td>Fabaceae</td>
<td><em>Rhynchosia diversifolia</em> Micheli</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Andropogon lateralis</em> Nees</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Aristida filifolia</em> (Arechav.) Herter</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Aristida flaccida</em> Trin. &amp; Rupr.</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Aristida laevis</em> (Nees) Kunth</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Axonopus suffultus</em> (Mikan ex Trin.) Parodi</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Chascolytrum subaristatum</em> (Lam.) Desv.</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Chascolytrum uniolae</em> (Nees ) Essi, Longhi-Wagner &amp; Souza-Chie</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Dichanthelium sabulorum</em> (Lam.) Gould. &amp; C.A. Clark</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Paspalum plicatum</em> Michx.</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Piptochaetium montevidense</em> (Spreng.) Parodi</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Schizachyrium tenerum</em> Nees</td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Trachypogon montefarii</em> (Kunth) Nees var. <em>montefarii</em></td>
</tr>
<tr>
<td>Rubiaceae</td>
<td><em>Galianthe fastigiata</em> Griseb.</td>
</tr>
<tr>
<td>Rubiaceae</td>
<td><em>Richardia grandiflora</em> (Cham. &amp; Schltdl.) Steud.</td>
</tr>
<tr>
<td>Rubiaceae</td>
<td><em>Spermacoce verticillata</em> (L.) G. Mey</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td><em>Lantana montevidensis</em> (Spreng.) Briq.</td>
</tr>
</tbody>
</table>