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Bofedal soil assessment to determine the ecological quality of high Andean ecosystems

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Abstract

The *bofedales* are high Andean ecosystems of great socioeconomic and ecological importance. The Chimborazo Fauna Production Reserve has 16 *bofedales* in its jurisdiction, located at the provinces of Chimborazo, Bolívar, and Tungurahua. The objective of this study was to establish the relationship between plant species composition and the physicochemical characteristics of water and soil. To determine the floristic composition, destructive sampling of species was applied, and three sampling points of 1 m² were established every 100 m per wetland. At each sampling point, physicochemical variables were recorded *in situ* and at the laboratory for water and soil samples. The floristic analysis identified 78 species of riparian plants (63 vascular, 12 bryophytes, 4 pteridophytes) and 1 lichen. In the aquatic environment, seven vascular plants, recognized as macrophytes, were recorded. The results show great heterogeneity in the soil, water, and vegetation characters because they respond to a mineralization gradient (as indicated by the high values of electrical conductivity and dissolved ions). Additionally, it was observed that the total amount of soluble solids that characterizes the Los Hieleros wetland [W11] is independent of hardness and chemical oxygen demand, which correlate with each other and, in turn, better describe the Pachancho wetland [W12]. The highest degree of turbidity corresponds to the Cóndor Samana [W9] and Portal Andino [W10] wetlands. The Culebrillas [W6], Puente Ayora ANI [W14], and Pampas Salasacas (W1) wetlands are characterized by the presence of dissolved oxygen, so it is assumed that these are the wetlands with the best water quality. Consequently, it is imperative to make double efforts to describe the ecology and status of these high Andean wetlands to promote their conservation.

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