



## Brazilian plants urgently needing conservation: the case of *Vriesea minarum* (Bromeliaceae)

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### Abstract

Difficulties in identifying *Vriesea minarum* as well as a conflict of interest among mining companies and local conservationists are pushing this species towards extinction. *Vriesea minarum* was categorised as data deficient in the Brazilian official plant red list despite earlier works indicating its vulnerability. This species is restricted to the Iron Quadrangle area, Minas Gerais, Brazil, where it grows over iron rock outcrops. Here we use *V. minarum* to illustrate the importance of taxonomic investigation as well as the presentation of accurate distributional data in order to establish conservation strategies. We emphasize the importance of well-conserved herbaria collections and adequate type material to avoid taxonomic issues that delay the understanding of species limits. This paper presents taxonomic notes and the redefining of *V. minarum* based on the survey of 22 herbaria collections and fieldwork. The additional material obtained and a morphometric approach allowed us to better delimit the related taxa. The species *V. ouroensis* is considered to be a new synonym of *V. minarum*. A map showing the occurrences of populations of *V. minarum*, pictures of living specimens in the field, as well as its updated conservation status are provided. Historic records housed in herbaria indicate that this species has been progressively losing its area of occurrence.

**Key words:** endemism, Espinhaço range, Iron Quadrangle, metallophytes, mining, Tillandsioideae

### Introduction

The state of Minas Gerais (MG) is located in the southeast of Brazil and has an elevated number of bromeliad species that occur in a wide variety of vegetation types (Versieux & Wendt 2007). Inside MG, the genus *Vriesea* is notable by presenting the highest number of species (Versieux & Wendt 2006). The main area of endemic Bromeliaceae within MG is the Espinhaço mountain range (Versieux *et al.* 2008). This mountain range is considered to be floristically one of the richest areas in South America (Giulietti *et al.* 1997), and hosts along its southernmost portion a region (~7,000 km<sup>2</sup>) known as the Iron Quadrangle (IQ) or, in Portuguese, Quadrilátero Ferrífero (Dorr 1965). The origin of this name relates to the almost square-shaped geographic orientation of the mountain ranges rich in high-grade iron ores present there. This is one of the most important iron ore mining districts in the world (Dorr 1965, Dardenne & Schobbenhaus 2001, Spier *et al.* 2003).

This economic and biologically rich area is responsible for the majority of the iron ore produced in Brazil, besides other deposits of gold and manganese as well as other minerals (Dardenne & Schobbenhaus 2001). The IQ is an ecotonal area that has extremely rich vegetation composed of a mosaic of semi-deciduous seasonal forest, savannas, open fields, and rupicolous vegetation over iron ore or quartzitic outcrops (Jacobi *et al.* 2007, Viana & Lombardi 2007, Versieux *et al.* 2011). The IQ is a hotspot for Bromeliaceae and also shelters endemic and endangered species of birds among other organisms, being considered one of the top priority areas for conservation within the whole state of MG (Drummond *et al.* 2005, Versieux & Wendt 2007, Vasconcelos & Rodrigues 2010). All over the world the flora of metalliferous soils is threatened by human activities, especially mining (Faucon *et al.* 2010) and this scenario is no different within the IQ. In this region