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## Biogeography and GIS: Case Study *Centrosema brasilianum*

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### Abstract

Plant and animal biodiversity is constantly decreasing as result of demographic pressure and overexploitation of natural resources, and valuable genetic resources are lost. This includes many unexplored and/or insufficiently researched plant species that could be useful for nature and humankind.

Among such species, the wild pasture legume *Centrosema brasilianum* (L.) Benth. is insofar an interesting species as it is well adapted to drought and acid, low-fertility soils. Because of these characteristics, it has a high potential for marginal production conditions where farmers are in particular need of improved livelihoods. Available germplasm collections of *C. brasilianum* have still a narrow genetic base which, for successful germplasm development programs such as breeding projects, should be increased by further collecting. However, the natural distribution of the species is not sufficiently well known to design cost-efficient collection strategies.

In this study, an updated digital map of the geographic distribution of *C. brasilianum* germplasm in tropical America is created with the help of the GIS tool FloraMap<sup>TM</sup>. The species occurs from latitude 10° N (north Venezuela) to 16° S (southwest Brazil) and from longitude 35° W (northeast Brazil) to 80° W (Panama). Furthermore, distribution maps according to rainfall conditions at the origin sites are presented. Their potential for eventual germplasm selection aiming at cultivar development is discussed.

Then, with focus on Venezuela from where particularly much germplasm and herbarium information is available, a map of probable distribution of *C. brasilianum* is presented. Since the FloraMap<sup>TM</sup> software only considers climate information, our study recurs to a second important data source, the soil and terrain database SOTER, which is concerned with soil properties. By combining FloraMap<sup>TM</sup> with SOTER, and applying appropriate GIS technology, it was possible to create a map of Venezuela showing various levels of probability regarding regions where *C. brasilianum* can be expected to occur and, thus, where future collection missions should concentrate. High probabilities were identified for some regions of the state of Zulia, the west of Guárico, Anzoátegui and the northern part of Bolívar.

**Keywords:** Biodiversity, Biogeography, *Centrosema brasilianum*, GIS, Latin America, pasture legume, Venezuela