



Inconsistencies in the Geographic Distribution of *Passiflora* Species in Brazil

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ABSTRACT

Contradictions were observed in a recent analysis of the ranges of two new *Passiflora* species described for Brazil, *Passiflora itatiaiensis* and *P. pardifolia*, raising questions concerning that author's knowledge of the physical geography of Brazil and South America, as well as adherence to Brazilian legislation regulating the collection of plant specimens. Additionally, an examination of the material available in the herbarium collections cited for these species revealed a new record of *P. itatiaiensis*, expanding its known range.

Keywords: Brazilian legislation, geography, new record, Passifloraceae, *Passiflora itatiaiensis*, *Passiflora pardifolia*, subgenus *Decaloba*.

Evaluations of morphology and geographic distributions of some *Passiflora* L. subgenus *Decaloba* (DC.) Rchb. species occurring in Brazil revealed contradictions regarding the ranges of two species: *Passiflora itatiaiensis* Vanderpl. and *P. pardifolia* Vanderpl., described by John Vanderplank in 2020 and 2006, respectively.

Data concerning *P. itatiaiensis* and *P. pardifolia* were obtained from all voucher specimens deposited in Brazilian and international herbaria and databases available on repositories JABOT (<http://jbrj.gov.br>), Tropicos (<http://www.tropicos.org/>), and SpeciesLink (<http://splink.cria.org.br/>).

Vanderplank (2020) described *P. itatiaiensis* as occurring in the northeastern region of Rio de Janeiro State and as having been collected between the “Macaé” National Park (*sic*) and the Itatiaia National Park. That same author also mentions that these established conservation areas are located in Bahia State, demonstrating a complete lack of knowledge about Brazil's geography, as these two states,

like the aforementioned national parks, are not contiguous (Figures 1, 2).

“A new species of *Passiflora* L. in subgenus *Decaloba* (DC.) Rchb. from Rio de Janeiro State, Brazil is described...”, ... “This epithet is a reference to the National Parks of Itatiaia and Macaé, northwest of Rio de Janeiro, in the state of Rio de Janeiro, Brazil...” (Vanderplank, 2020, p. 139).

“Type: Brazil: Found wild in the Macaé and Itatiaia National Park, Bahia, and cultivated in Europe at the National Collection of *Passiflora*, Lampley Rd., Kingston Seymour, North Somerset, UK” (Vanderplank, 2020, p. 142).

The Itatiaia National Park is located in the northwestern region of Rio de Janeiro State, which has a vegetation cover of Ombrophilous Forest and Altitudinal Grasslands (Instituto Chico Mendes de Conservação da Biodiversidade – ICMBIO, 2013) (Figure 2). The “Macaé” National Park does not exist. It is possible that the latter was confused with the Restinga de Jurubatiba National Park, located in northeastern Rio de Janeiro State (Figure 2). However, that

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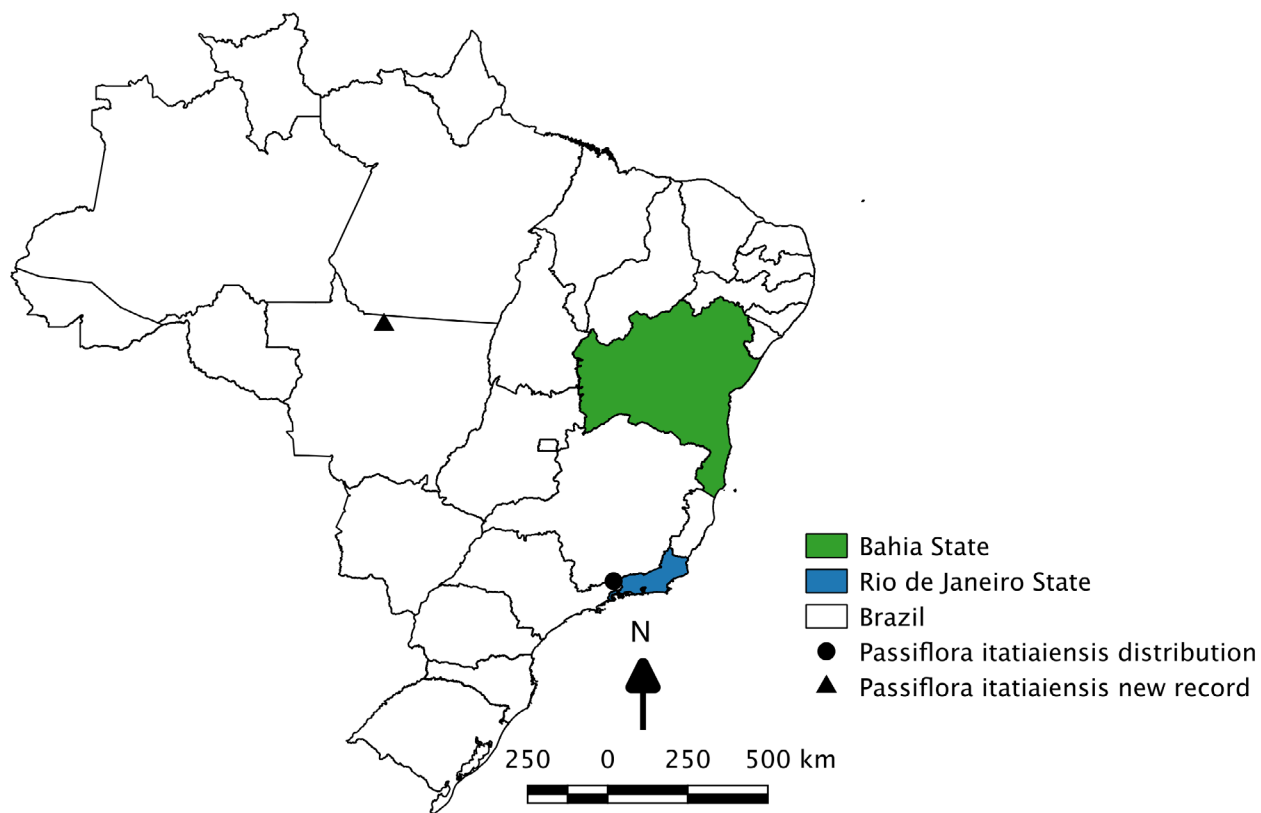


Figure 1. Map of Brazil, indicating Bahia and Rio de Janeiro States, and *Passiflora itatiaiensis* Vanderpl. distribution (●) and new record (▲).

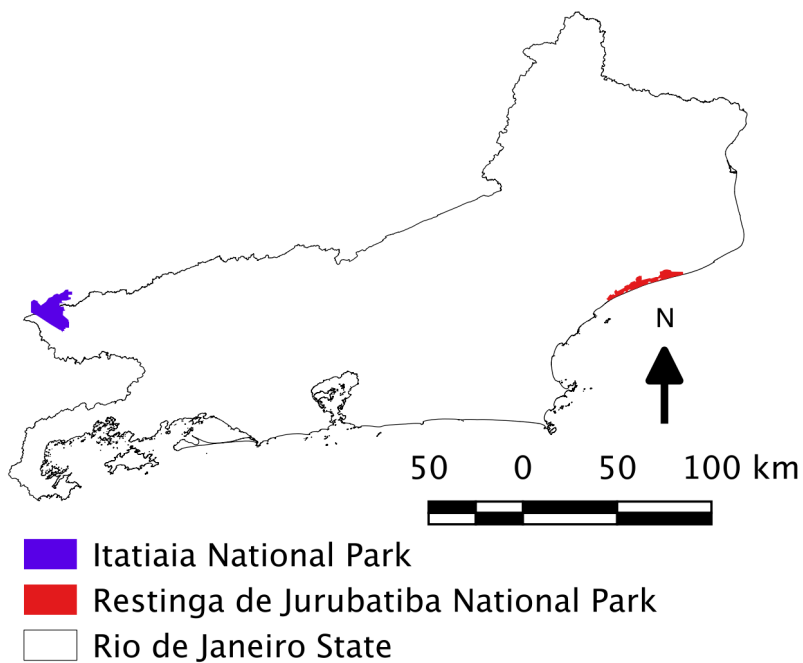


Figure 2. Map of Rio de Janeiro State, indicating Itatiaia National Park and Restinga de Jurubatiba National Park.

seems unlikely, as Vanderplank (2020) reports the species to occur between 700 and 900 m.a.s.l., and the Restinga de Jurubatiba National Park is located on a coastal plain (Instituto Chico Mendes de Conservação da Biodiversidade – ICMBIO, 2025) (Figure 2). It is important to note that even if the “Macaé” National Park refers to the Restinga de Jurubatiba National Park, both of which are located in Rio de Janeiro State, it is still located in a different region. Its vegetation has no connection or similarity to the vegetation types found in the Itatiaia National Park (Figure 2). Vanderplank (2020) also reported that *P. itatiaiensis* occurs in two ‘small parks’, although the Itatiaia National Park covers 28,084 hectares (Instituto Chico Mendes de Conservação da Biodiversidade – ICMBIO, 2013) and the Restinga de Jurubatiba National Park covers 14,9 hectares (Instituto Chico Mendes de Conservação da Biodiversidade – ICMBIO 2025), neither of which can be considered small.

The article by Vanderplank (2020) states that the type specimen of *P. itatiaiensis* originated from material collected by Mauro Peixoto, François Thuys, and Christian Houel, which has been cultivated since 2009, and they provided field data and cultivation notes. Vanderplank (2020) also reported that the species had been cultivated and sold in Europe for a long period, although it remains unclear when cultivation began or when the first plants arrived on the continent. This last situation could therefore represent a case of biopiracy, as it is not in accordance with Brazilian legislation n° 9605/1998 (Brasil, 1998 - Environmental Crimes Law), n° 13123/2015 (Brasil, 2015 - Biodiversity Statute) and decrees 8772/2016 (Brasil, 2016) and 10844/2021 (Brasil, 2021 - Sistema Nacional de Gestão do Patrimônio Genético e Conhecimento Tradicional Associado - SisGen), in addition to international agreements: the Convention on Biological Diversity (Ministério do Meio Ambiente – MMA, 2000) and the Nagoya Protocol (Ministério do Meio Ambiente – MMA, 2014).

Only two individuals of *P. itatiaiensis* are known to date to be deposited in Brazilian herbaria (Figure 1): *D.F. Silva et al.* 453 (Rio de Janeiro, Itatiaia, Parque Nacional de Itatiaia, Trilha dos Puris [RB]), collected in 2022 (after the publication of Vanderplank’s new species), and *D.A.T. Ferreira* 25 (Mato Grosso, Carlinda [VIES, duplicate MO]), an individual identified in 2023 by MacDougal and indicated here as a new occurrence record for the species, thus expanding the species’ range.

Thus, *P. itatiaiensis* occurs in the states of Mato Grosso (municipality of Carlinda) and Rio de Janeiro (municipality of Itatiaia), growing in rainforest vegetation in the Amazonia and Atlantic Forest phytogeographic domains (Figure 1). It can occur on plateaus, at approximately 265 m.a.s.l., in Mato Grosso, and up to 1,000 m.a.s.l. in the Mantiqueira mountain range. The distance between known individuals of the species raises the possibility that there may have been more individuals collected but listed as undetermined in herbaria, or simply misidentified, as in the case of the individual collected in Mato Grosso.

The second species, *P. pardifolia*, as described by Vanderplank (2006), also has an imprecisely defined locality. “*Passiflora pardifolia* was originally collected in the Minas region of Brazil...” (Vanderplank, 2006, p. 243). “Type: found wild in the Maranhao region of Brazil and then cultivated at the University of Texas in Austin, USA...” (Vanderplank, 2006, p. 244). The type collection was made in Maranhão State, but the article mentions Minas Gerais State as its area of occurrence. As these two states are quite distant from each other, this raises doubts regarding the species’ actual geographic range (Figure 3).

Beyond the uncertain collection location of the type material, the species was also described from specimens cultivated outside Brazil, with no record of its original collector, cultivator, or collection date.

The species description provided by Vanderplank (2006) mentions temperature tolerances that are unusual for a Brazilian plant. The type material, preserved in a greenhouse or nursery, was kept at an average temperature of 12 °C, indicating the species can survive low temperatures but not withstand temperatures above 30 °C. This limited heat tolerance could restrict its distribution, as the states of Minas Gerais and Maranhão, both very large, have wide climatic variations, with temperatures often exceeding 30 °C. In Minas Gerais, during the summer in the south of the state, the temperature varies from 18 °C to 28 °C, and in the northwest from 20 °C to 31 °C. In winter, the variation in the south corresponds to 11 °C to 25 °C and in the northwest from 16 °C to 29 °C (Reboita *et al.*, 2015). In Maranhão, the average temperature throughout the year varies from 25.4 °C to 33.6 °C (Pinheiro & Santos, 2025). This, of course, raises doubts about its true geographic distribution in Brazil. Could *P. pardifolia* occur in mountainous regions of southern Brazil that have average annual temperatures near 10 °C on their plateaus?

Additionally, according to Vanderplank (2006), the most closely related species to *P. pardifolia* are *P. alnifolia* Kunth and *P. tatei* Killip & Rusby. These species do not occur in Brazil but are found in countries such as Bolivia, Ecuador, and Colombia, geographically distant from the aforementioned Brazilian states. This contrasts with *P. porophylla* Vell. (named *P. organensis* Gardner in Vanderplank, 2006), a Brazilian species widely distributed in the southeastern and southern regions of the country (Milward-de-Azevedo *et al.*, 2012, Bernacci *et al.*, continuously updated). The species is considered only tenuously related to *P. pardifolia*, based on similar leaf shape and the presence of yellow spots (egg-mimic nectaries) on the leaf blades (Vanderplank, 2006). Additionally, both have the same distribution area (Minas Gerais State, not Maranhão).

Despite Vanderplank (2006) mentioning that *P. pardifolia* presents similarities with *P. porophylla*, studies carried out by Milward-de-Azevedo *et al.* (2010; 2012) demonstrated that the species have 6-colporate and 12-colporate pollen, respectively. Furthermore, according to the external morphology of the flowers, *P. pardifolia* has a biseriate corona



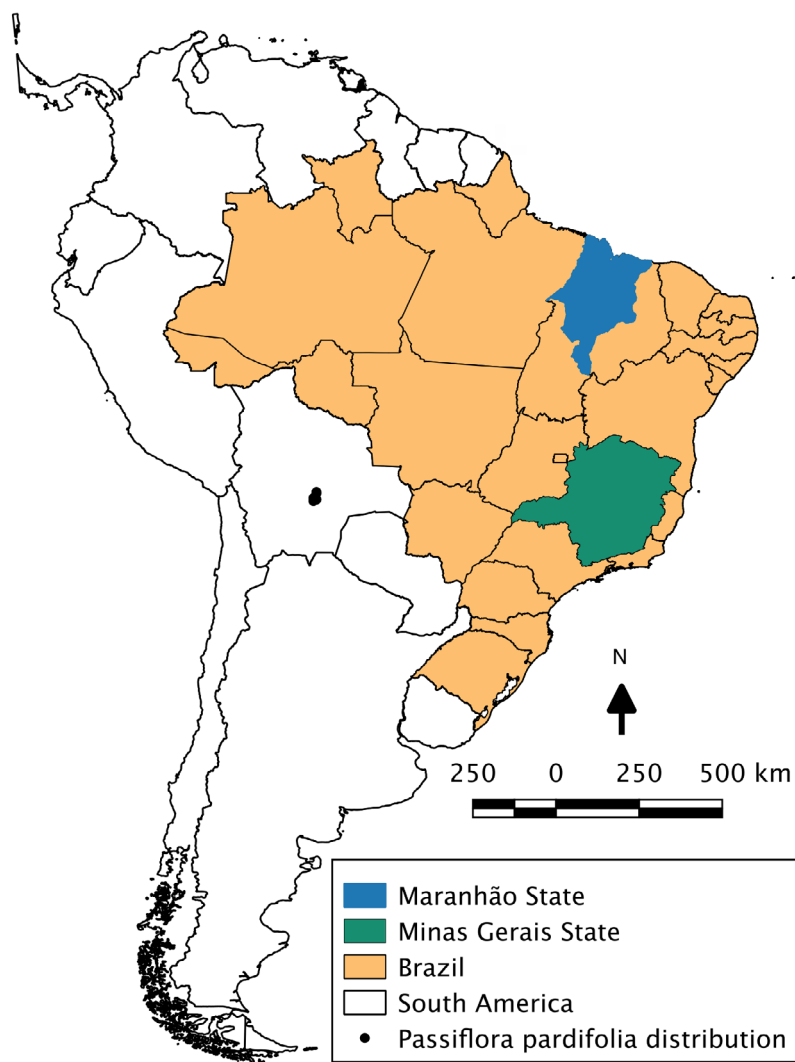


Figure 3. Map of South America, indicating Brazil, Maranhão, and Minas Gerais States, and *Passiflora pardifolia* Vanderpl. distribution in Bolivia.

with a filiform outer filament with an acute apex, while *P. porophylla* rarely presents a biseriate corona, with liguliform filaments with a dolabriform apex (Milward-de-Azevedo *et al.*, 2012), leaving no doubt that they are different species.

Milward-de-Azevedo *et al.* (2012) found no individuals of *P. pardifolia* during a review of *Passiflora* subgenus *Decaloba* for Brazil that evaluated only type material. The authors indicated that the species could occur in Atlantic Forest formations in Minas Gerais State, and not in Maranhão (Milward-de-Azevedo *et al.*, 2012). A survey of *P. pardifolia* in the SpeciesLink (<http://splink.cria.org.br/>) and Tropicos (<http://www.tropicos.org/>) repositories revealed individuals occurring in Bolivia at elevations above 1,800 m.a.s.l. (Figure 3), in humid evergreen forests known as Yungas.

According to the climatic conditions reported by Vanderplank (2006), as well as research conducted in

herbaria, there is no possibility of *P. pardifolia* occurring in Brazil, especially in the aforementioned states. Appropriate climatic conditions in Minas Gerais only occur in high-altitude fields, and the species does not exhibit morphological characteristics compatible with that vegetation type. Furthermore, the entire state of Maranhão never exceeds elevations of 800 m.a.s.l. (Dantas *et al.*, 2013), and average temperatures there are very high, making the survival of *P. pardifolia* nearly impossible.

The locations reported in the species descriptions, therefore, raise serious doubts about where *P. itatiaiensis* and *P. pardifolia* actually occur, and where and how they were collected. Furthermore, the descriptions do not identify the collectors in the wild, despite Vanderplank (2020) mentioning three possible collectors in the wild for *P. itatiaiensis*, but they did not include them in the holotype label.

In general, especially in terms of the Brazilian species, like *P. itatiaiensis* (as *P. pardifolia* does not occur in Brazil, as discussed here), Vanderplank (2020) did not indicate any collection permits for collecting plant specimens in Brazil (which must be issued by the Biodiversity Authorization and Information System [SISBIO] of the Brazilian government). This omission can generate several doubts for the reader. This is especially important because Vanderplank (2020) indicated that the collections were made in federally designated National Parks that require special authorization for the removal of any plant or animal specimens for scientific purposes, in accordance with Brazilian legislation (Law n° 9605/1998, Lei n° 13123/2015, Decree n° 8772/2016, Decree n° 10844/2021) (Brasil, 1998; 2015; 2016; 2021), and international agreements (Ministério do Meio Ambiente – MMA, 2014; 2000).

There are significant doubts concerning the information contained in the aforementioned articles: unreliable locations (considering that it is currently easy to confirm exact locations with mobile GPS devices); the lack of permits for the collection, transportation, or exportation of plant material (in violation of environmental legislation); and the identification of a Brazilian species without at least one isotype being officially deposited in a Brazilian herbarium.

The publication of descriptions of new species in a high-impact international journal that evidence inconsistencies regarding their actual geographic distributions, coupled with a lack of knowledge of the physical geography of Brazil and other South American countries, discredits the processes of manuscript evaluation by reviewers as well as the editorial team. It is also important that the journal requires mandatory legal permits to be cited.

It is also important to highlight how biological material currently leaves Brazil without any control, given that there are numerous national laws and international agreements that prohibit such transit. This harks back to the time of colonial Brazil, when the biodiversity of the country was freely harvested and deposited in European collections. This is especially concerning at a time when extensive efforts are currently underway in Brazil to restore the country's biological and historical heritage and repatriate collections made by visiting naturalists.

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Conflict of Interest

I declare that there is no conflict of interest in the submitted manuscript.

Data Availability

All data supporting the findings of this study are included in the article.

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