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## Flora of Espírito Santo, Brazil

# Flora of Espírito Santo: Winteraceae

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**Abstract**

Winteraceae (Canellales) is represented by the genera *Drimys*, *Pseudowintera*, *Takhtajania*, *Tasmannia*, and *Zygogynum*, corresponding to approximately 100 species. Only *Drimys* occurs in Brazil, with three species: *Drimys angustifolia*, *D. brasiliensis* and *D. roraimensis*. The present work was based on consultations in national and international herbaria, mainly of online collections. The description, comments, distribution map, and photographs of *D. brasiliensis*, the only species registered in the state of Espírito Santo, are provided.

**Key words**: Atlantic forest, *Drimys*, taxonomy.

**Resumo**

Winteraceae (Canellales) é representada pelos gêneros *Drimys*, *Pseudowintera*, *Takhtajania*, *Tasmannia* e *Zygogynum* que correspondem a aproximadamente 100 espécies. No Brasil é encontrado apenas o gênero *Drimys* com três espécies: *Drimys angustifolia*, *D. brasiliensis* e *D. roraimensis*. O presente trabalho foi baseado em consultas a herbários nacionais e internacionais, sobretudo coleções *online*. Para o estado do Espírito Santo, apenas *D. brasiliensis* é registrado, sendo aqui apresentados descrição, comentários, mapa de distribuição e fotografias para esta espécie.

**Palavras-chave**: Mata Atlântica, *Drimys*, taxonomia.

## Introduction

Winteraceae belongs to the order Canellales, along with the family Canellaceae (APG IV 2016). It is represented by two subfamilies: Takhtajanoideae (with the only genus *Takhtajania*) and Winteroideae (with *Drimys*, *Pseudowintera*, *Tasmannia*, and *Zygogynum*), which together account for approximately 100 species distributed across Central and South America, Madagascar, and Australasia (Vink 1993; Feild *et al.* 2002; Van Der Ham & Van Heuven 2002; APWeb 2021). The main morphological characteristics of the family are the presence of a tracheid-based xylem lacking vessel elements and plicate carpels (Van Tieghem 1900; Bailey & Thompson 1918; Bailey & Swamy 1951; Takhtajan 1980; Cronquist 1988).

*Drimys* is the only genus registered in the Neotropics and, in Brazil, is represented by three species: *Drimys angustifolia* Miers (1858: 46), found in the states of Rio Grande do Sul and Santa Catarina; *D. brasiliensis* Miers (1858: 47), occurring in southeastern and southern states, Bahia and Goiás an in the Distrito Federal; and *D. roraimensis* (ACSm.) Ehrendorfer, Silberbauer-Gottsberger & Gottsberger (1979: 72) found in Amazonas and Roraima (Cabral

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& Mello-Silva 2021). Among these species, *D. brasiliensis* presents three subspecies currently recognized in the country: *D. brasiliensis* var. *brasiliensis* Miers (1858: 47), *D. brasiliensis* subsp. *subalpina* Ehrendorfer, Silberbauer-Gottsberger & Gottsberger (1979: 75) and *D. brasiliensis* subsp. *sylvatica* (A.St.-Hil.) Ehrendorfer, Silberbauer-Gottsberger & Gottsberger (1979: 73) (BFG 2015; Cabral & Mello-Silva 2021). However, although these authors indicate some morphological differences mainly related to the shape of the leaves and number of flowers, these infra-specific categories still have controversies and need further studies (Cabral & Mello-Silva 2021).

Among the investigations conducted in the last decades in Brazil with Winteraceae, the most relevant from the taxonomic point of view are the regional studies on the Flora of Santa Catarina (Trinta & Santos 1997), Bahia (Santos *et al.* 2016), Rio Grande do Sul (Hertzog *et al.* 2016), Serra do Cipó (Akemi-Borges & Pirani 2016), Serra da Mantiqueira (Santos-Silva *et al.* 2019), and Flora of Brasil (Cabral & Mello-Silva 2021). In view of the richness of species already documented in the Atlantic Forest and particularly in Espírito Santo, where more than 6,350 species occur (Dutra *et al.* 2015), this work is part of the Flora do Espírito Santo Project and aims to expand the taxonomic knowledge of the family Winteraceae in the state. This work presents the morphological description, comments, a geographic distribution map, and photographs of the registered species.

## Material and Methods

Taxonomic descriptions and phenological data were based on samples from the physical or online collections (indicated with *) of: CEPEC*, ICN*, MBML, RB*, UEC*, UPCB*, US* and VIES* (herbaria acronyms according to Thiers, continuously updated).

The identification of the species was based on the main identification keys available in the literature for Brazilian species (Hertzog *et al.* 2016; Santos *et al.* 2016; Santos-Silva *et al.* 2019; Cabral & Mello-Silva 2021) and it was confirmed with the original description of the species (Miers 1858). The morphological terminology followed Hickey (1973), Ehrendorfer *et al.* (1979) and Harris & Harris (2001).

The software Quantum-GIS 2.12 (Quantum Gis Development Team 2015) was used to build the geographic distribution maps of the species.

## Results and Discussion

**1. *Drimys brasiliensis*** Miers, Ann. Mag. Nat. His. ser. 3(2) 47, 1858. Lectotype: BRAZIL. MINAS GERAIS: *St. Hilaire* (NY23514!), designated by A.C. Smith, J. Arnold Arbor. 24: 27 (1943). Fig. 1

Trees or small trees 3–11 m tall. Leaves simple, opposite, coriaceous, elliptical-obovate to obovate, glabrous, 5.73–18.72 × 1.88–5.33 cm, apex acute to obtuse, base cuneate, margin entire; petioles 0.45–2.40 mm long, glabrous. Inflorescence terminal, rarely axillary, 1–3 flowered. Flowers 2.28–3.07 cm in diameter, glabrous. Pedicel 0.8–5.2 cm; Sepals, 2(–3), 0.45–0.66 × 0.35–0.73 cm, oval, persistent in fruits. Petals 8–17, 2 series, 0.76–3.07 × 0.17–0.49 cm, oblong to lanceolate. Stamens 21–32, 2–4 series, filaments 1.2–2.1 × 0.5–1 mm, anthers ca. 1 mm long. Carpels 3–12, stigma lateral, 1–2.4 × 0.6–1.5 mm. Fruits in carpids, 4.7–11.5 × 4–7.2 mm, glabrous. Seeds 2–12 per carpid, reniform, 2.3–4.6 × 1.3–3.8 mm, smooth, black.

**Material examined**: Alfredo Chaves, Alto de Santa Maria, 6.XI.1996, fl., *A.P. Chautems & M.F. Peixoto 274* (CEPEC, US). Castelo, Caixe Frio, 23.V.2014, fl., *J.P.F. Zorzanelli 1025* (VIES); Parque Estadual do Forno Grande, localidade Balança. 15.X.2008, fr., *P.H. Labiak et al. 4971* (MBML!, RB); 9.IV.2009, fr., *A.M. Amorim 7801* (CEPEC, UPCB). Ibitirama, Santa Marta, 12.VI.2012, fl., *H.M. Dias et al. 736* (VIES). Iúna, Serra do Valentim, XII.2011, fl., *J.P.F. Zorzanelli et al. 458* (VIES). Santa Teresa, Estação Biológica de Santa Lúcia, 4.VIII.2004, fl., *F.Z. Saiter 150* (MBML!); Reserva Biológica Augusto Ruschi, 16.X.2001, fl. and fr., *L. Kollmann et al. 4845* (CEPEC, ICN, MBML!); 19.IX.2001, fl. and fr., *L. Kollmann et al. 4689* (CEPEC, ICN, MBML!); 21.VIII.2002, fl., *R.R. Vervloet et al. 714* (MBML!, UEC); 30.I.2002, fr., *L. Kollmann et al. 5399* (CEPEC, ICN, MBML!); São Lourenço, Country Club, 6.V.1999, fr., *W.P. Lopes et al. 645* (ICN, MBML!); 22.II.1999, fr., *L. Kollmann et al. 1971* (ICN, MBML!).

The known geographic distribution of *Drimys brasiliensis* in Brazil comprises the Atlantic Forest, Caatinga, and Cerrado, including all states of the Southeast and South regions, the states of Bahia and Goiás an in the Distrito Federal (Cabral & Mello-Silva 2021). Among Brazilian species, *D. brasiliensis* differs from *D. roraimensis* by the stipitate stigma (*vs*. sessile in *D. roraimensis*), and from *D. angustifolia* by the leaves with cuneate base (*vs*. narrow-cuneate in *D. angustifolia*) (Hertzog *et al.* 2016; Cabral & Mello-Silva 2021). Although Ehrendorfer *et al.* (1979) and Cabral & Mello-Silva (2021) have listed the occurrence of *D.*

*brasiliensis* subsp. *sylvatica* in Espírito Santo, we chose not to use this infra-specific delimitation, due to the inconsistency of the diagnostic characters for the infraspecific characterization (Trinta & Santos 1997; Akemi-Borges & Pirani 2016; Hertzog *et al.* 2016), requiring studies more detailed (Cabral & Mello-Silva 2021).

*Drimys brasiliensis* is found mainly in municipalities in the central mountainous and south regions of Espírito Santo (Fig. 2), at altitudes ranging from 650 to 1,700 m. Flowering specimens were registered at intervals that go from February to November, and fruiting specimens, from January to November. Immature fruits are generally present all


**Figure 1** – *Drimys brasiliensis* – a. branch with flowers; b. flower; c. detail of carpels (arrow indicates a lateral stigma); d. carpids. (Images: a. Marcio Verdi - IFFSC (Inventário Florístico Florestal de Santa Catarina); b-c. Valquíria F. Dutra; d. Susana Dreveck & Marcio Verdi).

year round, with overlapping green and ripe fruits, which makes this species an important component for bird feeding (Mariot *et al.* 2014).

The species is popularly known as "casca-d'anta", "cataia", "copororoca-picante", "carne-de-anta", "melambo", "paratudo", "pau-para-tudo", "casca-de-anta", "canela-amarga", "pau-casca-de-anta" and "cataeira" and in Tupi-Guarani it is called "caá-tuya", which means "árvore-para-velho" (Schultz 1975; Barroso 1978; Lorenzi 1992; Longhi 1995). *Drimys brasiliensis* is used in folk medicine as antispasmodic, aromatic, antidiarrheal, antifebrile agent, with applications against uterine hemorrhage, scurvy, anemia, digestive system disorders, and diseases of the respiratory system in humans and horses, being the object of research for its antinociceptive, antifungal, antiviral and anti-inflammatory properties (Simões *et al.* 1988; Trinta & Santos 1997; Malheiros *et al.* 2005; Lago *et al.* 2010). Despite the popular use of the plant, mainly of its bark, studies have shown that the species has a high capacity for regeneration that favors its sustainable management (Mariot *et al.* 2014). The species has also been studied by Embrapa Florestas regarding silvicultural aspects as vegetative propagation, survival rate and growth patterns and rate (Radomski *et al.* 2013; Mariot *et al.* 2014). The species was considered as Least Concern by the National Center for Plant Conservation (CNCFlora 2012). Although it was recorded only in two conservation units in Espírito Santo (Parque Estadual do Forno Grande and Reserva Biológica Augusto Ruschi), seven of the 14 samples (50%) were found in protected areas.

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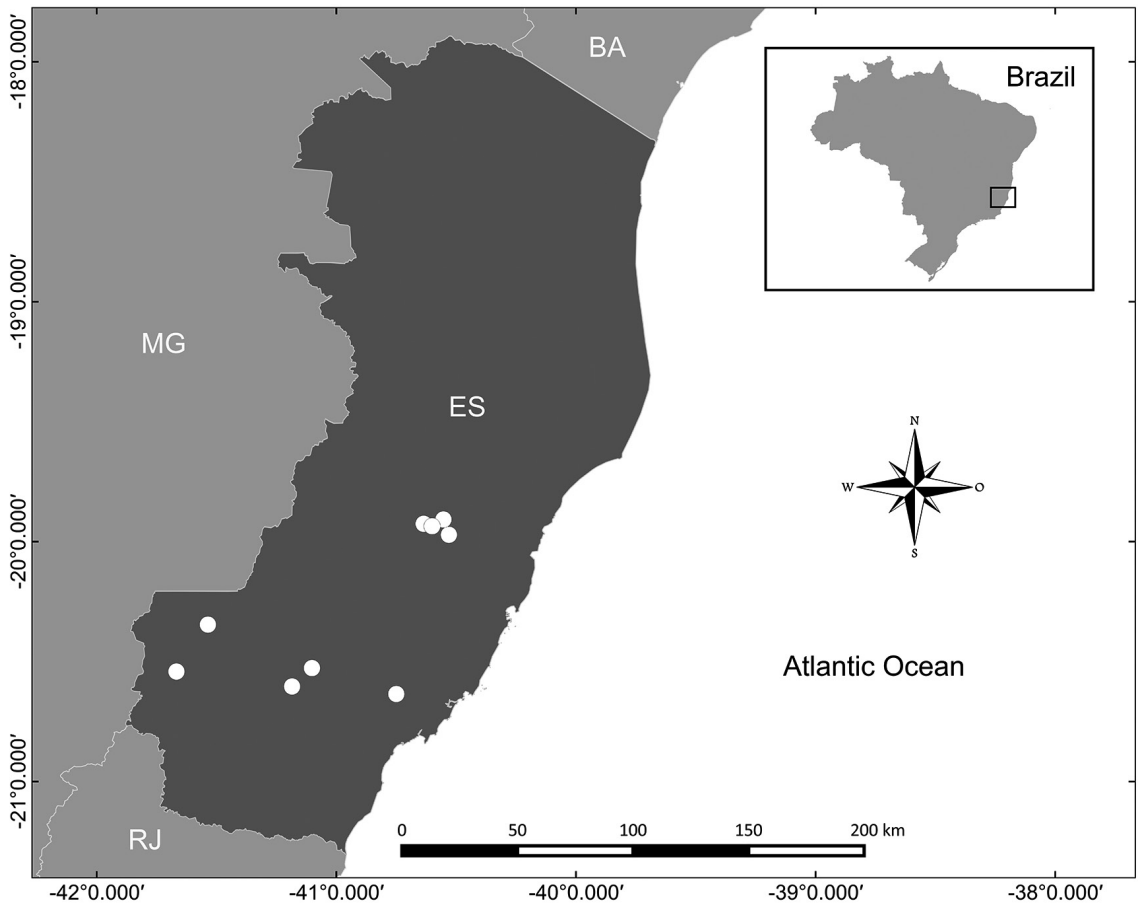


**Figure 2** – Distribution map of *Drimys brasiliensis* in the state of Espírito Santo.

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