

## Survey of orchidaceae from the State of Sergipe, Brazil

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**Abstract:** The state of Sergipe, located in the Northeast Region of Brazil, covers an area of 21,994 km<sup>2</sup> and is the smallest state in the country. The vegetation of this region is predominantly *caatinga*, but there are also mangroves, dunes, *restinga*, fragments of original Atlantic Forest (which are intermingled with pastures, secondary growth, and agricultural land) and *cerrado*. During intensive fieldwork in Sergipe, we observed various Orchidaceae species that had not been recorded for the state, which made it necessary to update the list of species for this region. Within the state, the family is represented by 63 species and 34 genera, of which *Habenaria* (10 spp.) *Epidendrum* (4 spp.) and *Encyclia* (4 spp.) are highlights. Orchidaceae species from this region are generally terrestrial and occur in grasslands (59%, 37 of 63 spp.). The remaining species are epiphytes (21 spp.) and hemiepiphytes (3 spp.). The majority of the species flower at the beginning of the rainy season. Of the 61 species that were recorded during this study, 34 species are new records for the state of Sergipe. This work includes a list of the species of Orchidaceae from Sergipe, and provides data about the phenology and habitat for each taxon.

**Keywords:** plants of the Northeast, inventory, plant biodiversity.

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**Resumo:** O estado de Sergipe, localizado na região Nordeste do Brasil, abrange uma área de 21.994 km<sup>2</sup>, sendo o menor da federação. A cobertura vegetal predominante do estado é representada pela Caatinga, mas encontra-se também vegetação de mangue, dunas, restingas, fragmentos florestais, originários da Mata Atlântica, entremeados por áreas de pastagens, capoeiras e áreas agrícolas, além de formações de Cerrado. A partir de um intenso trabalho de campo, observou-se a ocorrência de diversas Orchidaceae ainda não catalogadas para o estado, portanto, fazendo-se necessária a atualização na listagem das espécies ocorrentes em Sergipe. A família está representada no estado por 63 espécies subordinadas a 34 gêneros, dentre os quais se destacam: *Habenaria* (10 spp.) *Epidendrum* (4 spp.) e *Encyclia* (4 spp.). As espécies encontradas ocorrem principalmente nas formações campestres (59%, 37 de 63), o que explica a predominância da forma de vida terrestre. As demais espécies estão distribuídas em epífitas (21 spp.) e hemiepífitas (3 spp.). A maioria das espécies floresce no início do período chuvoso. Dentre as 63 espécies encontradas 34 são novas ocorrências para o estado de Sergipe. Este trabalho inclui listagem das espécies ocorrentes em Sergipe, assim como dados fenológicos e habitat.

**Palavras-chave:** plantas do nordeste, inventário, biodiversidade vegetal.

## Introduction

Orchidaceae comprise approximately 40% of the monocotyledons, and are considered by many authors as the largest family of angiosperms (Dahlgren et al. 1985, Atwood 1986, Dressler 1993). Atwood (1986) estimates that the family possesses 24,500 species worldwide, which are mostly native to tropical regions. The most significant revision of Brazilian Orchidaceae suggests that there are 2350 species in the country (Pabst & Dungs 1975, 1977); however, a recent publication lists 2419 species (Barros et al. 2010). According to Hoehne (1949), species of Orchidaceae can be found in every vegetation type in Brazil.

The majority of the floristic works about Orchidaceae of Brazil have concentrated on the Southern and Southeast regions of the country. For the Northeast Region, there are very few studies about the occurrence and distribution of the family, and for many states the only information available is in the last Brazilian checklist of Orchidaceae (Pabst & Dungs 1975, 1977).

For the state of Sergipe, the most recent information about native orchids can be found in the *Catálogo de Plantas e Fungos do Brasil* (Barros et al. 2010). This work is based on collections from the main herbaria in the country as well as lists of Orchidaceae that were previously compiled by specialists, and, for this reason, underestimates the number of species that occur in many states.

Although Sergipe is the smallest state in Brazil (21,918 km<sup>2</sup>), which primarily has a semi-arid climate, it possesses a diverse flora represented by different phytogeographies, for example, coastal vegetation, Atlantic Forest, *caatinga*, and savanna (Franco 1983). According to the checklists published by Pabst & Dungs (1975, 1977) and Barros et al. (2010), the number of orchids recorded for the state is six and 22, respectively. Besides these works, there are no other studies that include additional species.

Based on recent collections and specimens in local herbaria, it was discovered that the number of Orchidaceae species recorded for Sergipe was not accurate. Therefore, the goals of this study were to survey the Orchidaceae of Sergipe and to create an updated list of species that occur in the different vegetation types of this state.

## Materials and Methods

Sergipe occupies an area of 21,918 km<sup>2</sup>, and shares its border with Alagoas (to the north), Bahia (to the west and south), and the Atlantic Ocean (to the east). The vegetation cover in Sergipe is composed principally of steppe savanna (*caatinga*), seasonal semi-deciduous forest (secondary Atlantic Forest fragments), pioneer formations (*restinga* and mangroove), grasslands (*cerrado*), and areas of ecological transition (steppe savanna/seasonal forest, savanna/seasonal forest and savanna/steppe savanna); however, the majority of the vegetation cover in the state has been altered by agricultural activities and other human disturbances (classification based on Instituto... 1992). Although IBGE (Instituto Brasileiro de Geografia e Estatística) provides a comprehensive map of the vegetation cover of Brazil, the classification used in the map does not include some regional formations, such as open formations with white-sand soils, which occur in Parque Nacional da Serra de Itabaiana, in Sergipe, and are in transition areas with seasonal, semi-deciduous forest. The white-sand formations have sedimentary, yellowish white, sandy soils with an herb-shrub to shrub-tree vegetation that occurs at lower

elevations than the grasslands (Dantas & Ribeiro 2010). In addition, the IBGE map does not include (for the state of Sergipe) the islands of montane, seasonal, semi-deciduous forest that are in the areas of *caatinga*. In the Northeast Region of Brazil, the wet, high altitude forests are enclaves of humid Atlantic Forest that are in the middle of the semi-arid region (Tabarelli & Santos 2004), commonly known as *brejos de altitude*. This forest type is encountered in the Serra da Guia, in the municipality of Poço Redondo, in the northeastern part of the state (Machado, W. dados não publicados).

The inventory of Sergipe was conducted via random monthly samples at different times of the year, from December 2008 to December 2010, and surveyed the major vegetation types in the municipalities visited (Figure 1). As a result of human disturbance and exploitation of the land, the vegetation in Sergipe is in an advanced stage of degradation. For this reason, the municipalities selected for this study were those with remnants of original vegetation that were well preserved.

In addition, specimens were examined from herbaria at the Universidade Federal de Sergipe (ASE), Universidade Estadual de Feira de Santana (HUEFS), Universidade Federal da Bahia (ALCB), IBGE (HRB – RADAMBRASIL-BA) and Companhia Hidro-Elétrica do São Francisco (Herbário Xingó, which is not listed in Index Herbariorum), and the collections of the Universidade Federal de Minas Gerais (BHCB) and Universidade Federal do Ceará (EAC) were searched using Species-link do Centro de Referências em Informação Ambiental (CRIA). During fieldwork, plants were collected and information was recorded about their life form (according to Bechtel et al. 1998), phenology and the habitat where they grow. Sterile species were collected and cultivated (until they flowered) in the garden of the Departamento de Biologia at the Universidade Federal de Sergipe. All specimens, including those that flowered in cultivation, were deposited in ASE.

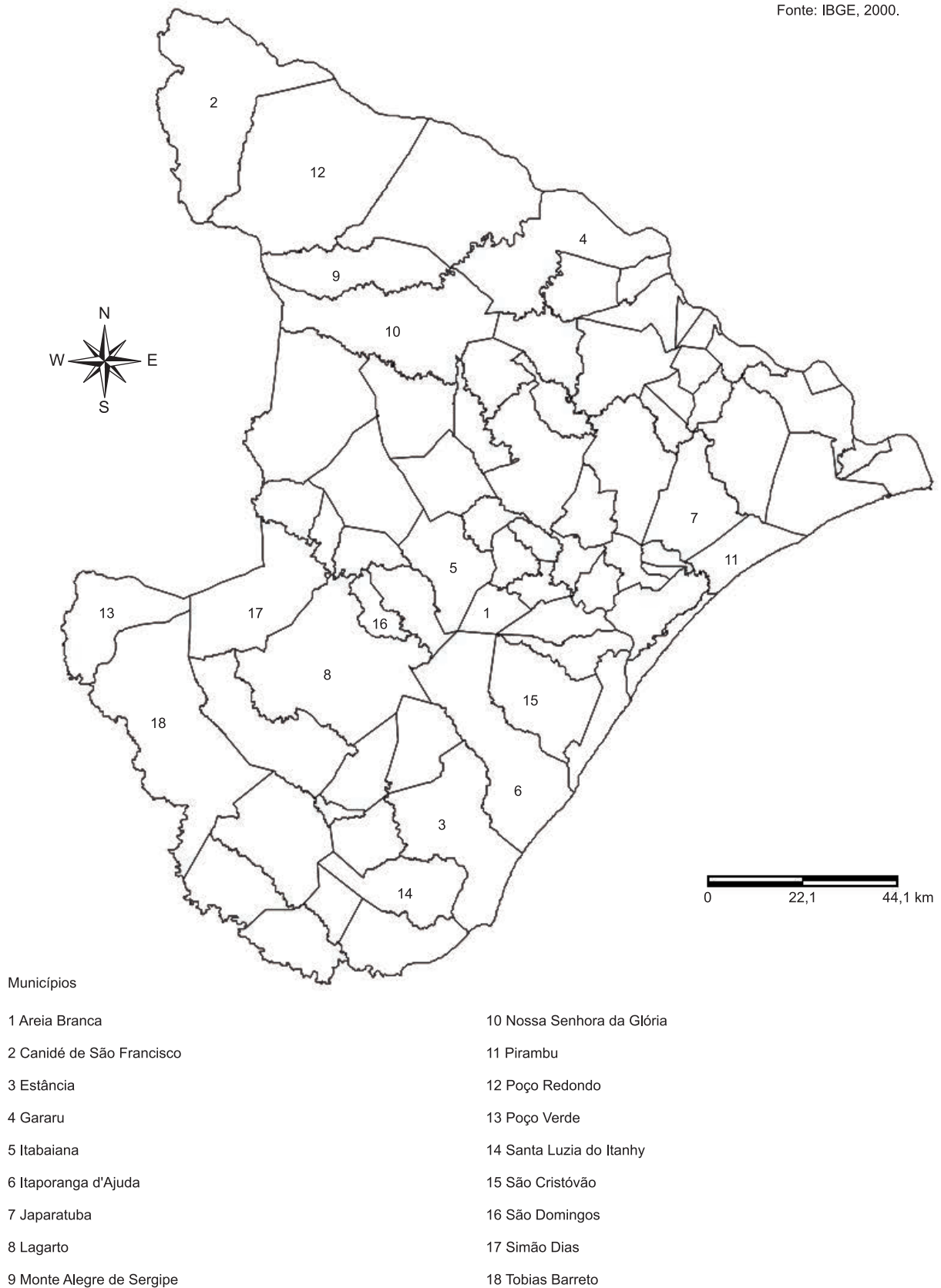
To identify the species, specialists in the family and Pabst & Dungs (1975, 1977), Cogniaux (1893-1896, 1898-1902, 1904-1906), Hoehne (1940, 1942, 1945, 1949, 1953), and Toscano-de-Brito & Cribb (2005) were consulted. The subfamilies and subtribes recognized in this work are based on Chase et al. (2003).

## Results and Discussion

This inventory recorded 63 species of Orchidaceae (Table 1, Figure 2-3), distributed in three subfamilies, 11 subtribes and 34 genera. Vanilloideae, with four species in two genera, represented 7% of the total species. Orchidoideae, with 18 species in seven genera and three subtribes, represented 29% of the total species. Epidendroideae, with 41 species in 24 genera and eight subtribes, represented 64% of the total species. The main flowering periods were between January and March, and September and December, which corresponded to the beginning and end of the rainy season.

Of the species recorded, the predominant life form was terrestrial (37 spp., 59%), 37% were epiphytes (23 spp.) and 4% were hemiepiphytes (3 spp.). *Encyclia alboxanthina* Fowlie and *Brassavola tuberculata* Hook., were encountered as terrestrial/rupicolous and epiphytic/rupicolous, respectively. The high proportion of terrestrial species is probably because of the vast field formations (grasslands) found in the state, which are natural or the result of human activity. The genus with the most species was

Fonte: IBGE, 2000.



**Figure 1.** Map showing the municipalities visited during the Survey of Orchidaceae in Sergipe.

Table 1. Orchidaceae occurring in the state of Sergipe, Brazil.

Taxon	Life form	Habitat	Flowering	Subfamilie	Subtribe	Voucher
<i>Brassavola tuberculata</i> Hook	E, R	SSF	DEC	Epidendroideae	Laelinae	Santos, L.A.S. 140 (ASE)
* <i>Campylocentrum micranthum</i> (Lindl.) Rolfe	E	SSF	MAR	Epidendroideae	Angraecinae	Santos, L.A.S. 128 (ASE)
* <i>Campylocentrum neglectum</i> (Rchb.f. & Warm.)	E	SSF	AUG	Epidendroideae	Angraecinae	Nascimento-Júnior, J.E. 145 (ASE)
* <i>Catasetum</i> cf. <i>saccatum</i> Lindl.	E	N.I	SEP	Epidendroideae	Catasetinae	Lima, A.C. 626 (ASE)
* <i>Catasetum hookeri</i> Lindl.	E	SS	MAR	Epidendroideae	Catasetinae	Santos, L.A.S. 137 (ASE)
<i>Catasetum purum</i> Nees & Simming	E	SS	MAR	Epidendroideae	Catasetinae	Santos, L.A.S. 134 (ASE)
* <i>Catasetum discolor</i> Lindl.	T	SSF/R	NOV	Epidendroideae	Catasetinae	Carregosa-Silva, T. 100 (ASE)
* <i>Cattleya labiata</i> Lindl.	E	BA	MAR	Epidendroideae	Laelinae	Santos, L.A.S. 139 (ASE)
* <i>Cranichis candida</i> (Barb.Rodr.) Cogn.	T	BA	JUL	Orchidoideae	Cranichidinae	Machado, W.J. 454 (ASE)
* <i>Cyrtopodium brandonianum</i> Barb. Rodr.	T	N.I	APR	Epidendroideae	Catasetinae	Prata, A.P. 1200 (ASE)
* <i>Cyrtopodium flavum</i> Link & Otto ex Rchb.	T	WSF	JAN	Epidendroideae	Catasetinae	Santos, L.A.S. 62 (ASE)
* <i>Cyrtopodium holstii</i> L.C. Menezes	T	SS	MAR	Epidendroideae	Catasetinae	Santos, L.A.S. 138 (ASE)
* <i>Cyrtopodium parviflorum</i> Lindl.	T	GRA	DEC	Epidendroideae	Catasetinae	Carregosa-Silva, T. 206(ASE)
<i>Dichaea</i> cf. <i>panamensis</i> Lindl.	E	SSF	SEP	Epidendroideae	Zygopetalinae	M. Landim, 103 (ASE)
<i>Dimerandra emarginata</i> (G.Mey) Hoehne	E	SSF	SEP	Epidendroideae	Laelinae	Silva, A.C. 65 (ASE)
<i>Encyclia alboxanthina</i> Fowlie	T/R	WSF	JAN	Epidendroideae	Laelinae	Santos, L.A.S. 59 (ASE)
<i>Encyclia dichroma</i> (Lindl.) Schltr	T	WSF	JAN/MAR	Epidendroideae	Laelinae	Santos, L.A.S. 64 (ASE)
<i>Encyclia oncidioides</i> Lindl.	T	SSF	DEC	Epidendroideae	Laelinae	M.F. Landim, 1087 (ASE)
<i>Encyclia patens</i> Hook.	T	GRA	JAN	Epidendroideae	Laelinae	Santos, L.A.S. 58 (ASE)
<i>Epidendrum cinnabarinum</i> Salzm.	T	WSF/R	MAY	Epidendroideae	Laelinae	Carregosa-Silva, T. 117 (ASE)
<i>Epidendrum orchidiflorum</i> Salzm. ex Lindl.	T	WSF/R	FEB/FEB/MAR	Epidendroideae	Laelinae	Carregosa-Silva, T. 24 (ASE)
* <i>Epidendrum rigidum</i> Jacq.	E	BA	MAR	Epidendroideae	Laelinae	Santos, L.A.S. 129 (ASE)
<i>Epidendrum secundum</i> Jacq.	T	GRA	FEB	Epidendroideae	Laelinae	Carregosa-Silva, T. 25 (ASE)
<i>Epistephium lucidum</i> Cogn	T	GRA	DEC	Vanilloideae	Vanillininae	Santos, L.A.S. 448 (ASE)
* <i>Erycina pusilla</i> (L.) N.H. Williams & M.W. Chase	E	SS	APR	Epidendroideae	Oncidiinae	Carregosa-Silva, T. 44 (ASE)
<i>Galeandra montana</i> Barb. Rodr.	T	GRA	JUN	Epidendroideae	Catasetinae	Santos, L.A.S. 182 (ASE)
<i>Gomesa barbata</i> (Lindl.) M.W. Chase & N.H. Williams	E	APF	AUG	Epidendroideae	Oncidiinae	Santos, L.A.S. 06 (ASE)
<i>Habenaria fluminensis</i> Hoehne	T	GRA	JUN	Orchidoideae	Orchidinae	Santos, L.A.S. 183 (ASE)
* <i>Habenaria depressifolia</i> Hoehne	T	SS	MAY	Orchidoideae	Orchidinae	Viana, G. 1443 (ASE)
<i>Habenaria goyazensis</i> Cogn.	T	SS	JUL	Orchidoideae	Orchidinae	Viana, G. 1530 (ASE)
<i>Habenaria obtusa</i> Lindl.	T	GRA	JUN	Orchidoideae	Orchidinae	Santos, L.A.S. 184 (ASE)
* <i>Habenaria parviflora</i> Lindl.	T	SSF	FEB	Orchidoideae	Orchidinae	Santos, L.A.S. 170 (ASE)
<i>Habenaria petalodes</i> Lindl.	T	WSF/GRA	JUL	Orchidoideae	Orchidinae	Santos, L.A.S. 191 (ASE)
<i>Habenaria pratensis</i> (Lindl.) Rchb.f.	T	SSF	SEP	Orchidoideae	Orchidinae	Santos, L.A.S. 08 (ASE)

Life form: E = epiphyte, HE = hemiepiphytic, R = rupicolous, T = terrestrial. Habitat: BA = Brejo de altitude, SS = steppe savanna (caatinga), FES = seasonal semi-deciduous forest (secondary Atlantic Forest fragments), APF = Area of pasture to seasonal semi-deciduous forest, APS = Area of pasture to steppe savanna, GRA = grasslands (cerrado), R = Restinga, WSF = White sand field. Flowering period: JAN = January, FEB = February, MAR = March, APR = April, AUG = August, SEP = September, OCT = October, NOV = November, DEC = December. N.I. = No information. UFS—Universidade Federal de Sergipe. \* = New records.

Table 1. Continued...

Taxon	Life form	Habitat	Flowering	Subfamilie	Subtribe	Voucher
* <i>Habenaria rotundiloba</i> Pabst	T	APS	MAR/APR	Orchidoideae	Orchidinae	Nascimento-Júnior, J.E. 593 (ASE)
* <i>Habenaria schenckii</i> Cogn.	T	BA	AUG	Orchidoideae	Orchidinae	Santos, L.A.S. 194 (ASE)
<i>Habenaria trifida</i> Kunth	T	APF/GRA	SEP/MAY	Orchidoideae	Orchidinae	Costa, S.M. 594 (ASE)
* <i>Hapalorchis lineatus</i> (Lindl.) Schltr.	T	BA	OCT	Orchidoideae	Spiranthinae	Costa, S.M. 610 (ASE)
<i>Jacquinella globosa</i> (Jacq.) Schltr.	E	GRA	JAN	Epidendroideae	Laelinae	Mendes et al. 328 (UFP)
* <i>Ionopsis utricularioides</i> (Sw.) Lindl.	E	SSF	NOV	Epidendroideae	Oncidiinae	Santos, L.A.S. 54 (ASE)
* <i>Liparis loeselii</i> (L.) Rich.	T	GRA	JUL	Epidendroideae	Laelinae	Carregosa-Silva, T. 98 (ASE)
<i>Liparis nervosa</i> (Thunb.) Lindl.	T	SSF/GRA	MAY	Epidendroideae	Laelinae	Santos, L.A.S. 174 (ASE)
* <i>Lockhartia gaoyazensis</i> Rehb. f.	E	SSF	FEB	Epidendroideae	Oncidiinae	G. Viana, 1680 (ASE)
* <i>Nolyia barkeri</i> Lindl.	E	APS	DEC	Epidendroideae	Oncidiinae	Santos, L.A.S. 11 (ASE)
<i>Oeceoclades maculata</i> (Lindl.) Lindl.	T	SSF	OCT	Epidendroideae	Eulophiinae	Santos, L.A.S. 23 (ASE)
* <i>Prescottia plantaginea</i> Lindl.	T	SS	OCT	Orchidoideae	Cranichidinae	Machado, W. J. 784 (ASE)
* <i>Prosthechea aemula</i> (Lindl.) W.E. Higgins	E	N.I	APR	Epidendroideae	Laelinae	Grown in a greenhouse at the UFS
<i>Polystachya estrellensis</i> Rehb.f.	T	FES	OCT	Epidendroideae	Polystachyinae	Carregosa-Silva, T. 3 (ASE)
* <i>Sacoila lanceolata</i> (Aubl.) Garay	T	APS	MAR	Orchidoideae	Spiranthinae	Carregosa-Silva, T. 26 (ASE)
* <i>Sarcoglottis acaulis</i> (SM) Schltr.	T	APS	OCT	Orchidoideae	Spiranthinae	Carregosa-Silva, T. 2 (ASE)
* <i>Sarcoglottis curvisepala</i> Szlach. & Rutk.	T	GRA	SEP	Orchidoideae	Spiranthinae	Costa, S.M. 473 (ASE)
* <i>Sarcoglottis fasciculata</i> (Vell.) Schltr.	T	APS	AUG	Orchidoideae	Spiranthinae	Viana, G. 623 (ASE)
<i>Scaphyglottis fusiformis</i> (Griseb.) Schult.	E	SSF	JAN	Epidendroideae	Laelinae	Mendes et al. 327 (UFP)
<i>Scaphyglottis sickii</i> Pabst.	E	SSF	SEP	Epidendroideae	Laelinae	M. Landim 1029 (ASE)
<i>Sobralia liliastrium</i> Lindl.	T	WSF	JAN	Epidendroideae	Eulophiinae	Santos, L.A.S. 60 (ASE)
* <i>Trichocentrum cebolleta</i> (Jacq.) M.W. Chase & N.H. Williams	E	SSF	NOV	Epidendroideae	Oncidiinae	Santos, L.A.S. 53 (ASE)
* <i>Trichocentrum pulmilum</i> M.W. Chase & N.H. Williams	E	SSF	OCT	Epidendroideae	Oncidiinae	Carregosa-Silva, T. 01 (ASE)
<i>Trigonidium acuminatum</i> Batem. ex Lindl.	E	SSF	DEC	Epidendroideae	Maxillariinae	Grown in a greenhouse at the UFS
<i>Vanilla bahiana</i> Hoehne	HE	SSF	FEB	Vanilloideae	Vanillinae	Santos, L.A.S. 449 (ASE)
* <i>Vanilla planifolia</i> Jacks. ex Andrews	HE	SSF	APR	Vanilloideae	Vanillinae	Souza, C.A.S. 21 (ASE)
* <i>Vanilla palmarum</i> (Salzm. ex Lindl.) Lindl.	HE	APS	AUG	Vanilloideae	Vanillinae	Santos, L.A.S. 01 (ASE)
* <i>Veyretia rupicola</i> (Barb. Rodr.) F. Barros	T	GRA	DEC	Orchidoideae	Spiranthinae	Santos, L.A.S. 447 (ASE)
* <i>Zygostates</i> sp.	E	BA	MAR	Epidendroideae	Oncidiinae	Santos, L.A.S. 136 (ASE)

Life form: E = epiphyte, HE = hemiepiphytic, R = rupicolous, T = terrestrial. Habitat: BA = Brejo de altitude, SS = steppe savanna (caatinga), FES = seasonal semi-deciduous forest (secondary Atlantic Forest fragments), APF = Area of pasture to seasonal semi-deciduous forest, APS = Area of pasture to steppe savanna, GRA = grasslands (cerrado), R = Restinga, WSF = White sand field. Flowering period: JAN = January, FEB = February, MAR = March, APR = April, AUG = August, SEP = September, OCT = October, NOV = November, DEC = December. N.I. = No information. UFS = Universidade Federal de Sergipe. \* = New records.





**Figure 2.** Some species of orchids in Sergipe. a. *Catasetum hookeri*, b. *Catasetum purum*, c. *Cattleya labiata*, d. *Cyrtopodium holstii*, e. *Cyrtopodium polyphyllum*, f. *Dimerandra emarginata*, g. *Encyclia dichroma*, h. *Encyclia oncioides*, i. *Epidendrum cinnabarinum*, j. *Epidendrum orchidiflorum*. Photos: SHNM (a,b,e,g,h,j), LASS (c,d,i) e TCS (f).

*Habenaria* (10 spp.), which was very common in fields (Batista & Bianchetti 2003, Batista et al. 2005, Rocha & Waechter 2006).

Of the 63 species recorded, 29 have already been cited for the state (see Barros et al. 2010; Pessoa & Alves 2011). The remaining species (34 spp., see Table 1) are cited for the first time for Sergipe. *Encyclia advena* (Rchb.f.) Porto & Brade, *Encyclia bohnkiana* V.P.Castro & Campacci, *Encyclia osmantha* (Barb.Rodr.) Schltr., *Habenaria josephensis* Barb.Rodr., *Leochilus labiatus* (Sw.) Kuntze, *Liparis vexillifera* (Llave & Lex.) Cogn. and *Trichocentrum fuscum*

Lindl., cited in Barros et al. (2010) for Sergipe, were not encountered during the fieldwork of this study, the review of specimens, or during the search for taxa in the Species Link database. This is probably because some of the species listed by Barros et al. (2010) came from misidentified collections (which was observed during the current study) based on previously compiled lists.

The 34 species that are new records for the state of Sergipe demonstrate how significant floristic work can be to our understanding of the biological diversity of a region, and how this type of work can





**Figure 3.** Some species of orchids in Sergipe. a. *Epidendrum secundum*, b. *Erycina pusilla*, c. *Habenaria pratensis*, d. *Habenaria trifida*, e. *Ionopsis utricularioides*, f. *Gomesa barbata*, g. *Prosthechea aemula*, h. *Sobralia liliastrum*, i. *Trichocentrum cebolleta*, j. *Vanilla palmarum*. (Photos: SHNM (a,c,d,g,h), LASS (e,f,i,j) e TCS (b).

contribute to our knowledge about the species and distribution of a taxonomic group.

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