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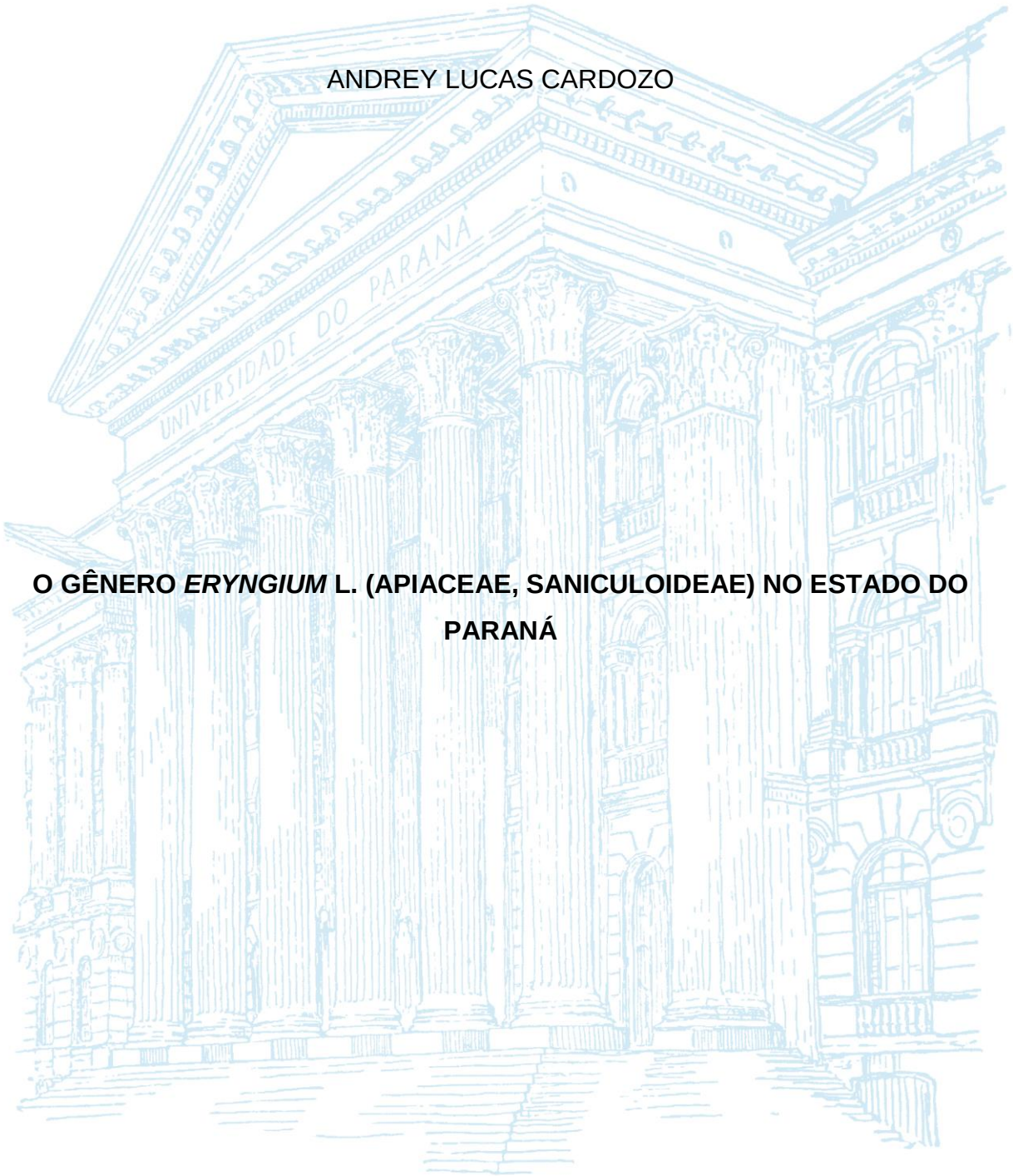

O GÊNERO *ERYNGIUM* L. (APIACEAE, SANICULOIDEAE) NO ESTADO DO PARANÁ

CURITIBA

2017

ANDREY LUCAS CARDOZO

O GÊNERO *ERYNGIUM* L. (APIACEAE, SANICULOIDEAE) NO ESTADO DO PARANÁ

Dissertação apresentada como requisito parcial à obtenção do grau de Mestre em Botânica, no Curso de Pós-Graduação em Botânica, do Setor de Ciências Biológicas da Universidade Federal do Paraná.

Orientador: Prof. Dr. Paulo Henrique Labiak Evangelista
Coorientador: Prof. Dr. Pedro Fiaschi
Coorientador: Prof. Dr. Renato Goldenberg

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Ata de Julgamento da Dissertação de Mestrado do pós-graduando **Andrey Lucas Cardozo.** Aos 18 dias do mês de maio do ano de 2017, às quatorze horas, na presença da Comissão Examinadora, composta pelo Dr. Paulo Henrique Labiak Evangelista, pelo Dr. Eric de Camargo Smidt e pelo Dr. Fabrício Meyer como titulares, foi aberta a sessão de julgamento da Dissertação intitulada: **"O GÊNERO *ERYNGIUM* L. (APIACEAE, SANICULOIDEAE) NO ESTADO DO PARANÁ".** Após a apresentação, perguntas e esclarecimentos acerca da Dissertação, a Comissão Examinadora **APROVA O TRABALHO DE CONCLUSÃO do(a) aluno(a) Andrey Lucas Cardozo**. Nada mais havendo a tratar, encerrou-se a sessão da qual foi lavrada a presente ata, que, após lida e aprovada, foi assinada pelos componentes da Comissão Examinadora.

Dr. Paulo Henrique Labiak Evangelista (UFPR)

Dr. Eric de Camargo Smidt (UFPR)

Dr. Fabrício Meyer (UPCB)

UNIVERSIDADE FEDERAL DO PARANÁ

Setor de Ciências Biológicas
Programa de Pós-Graduação em Botânica

"O GÊNERO *ERYNGIUM* L. (APIACEAE, SANICULOIDEAE) NO ESTADO DO PARANÁ".

por

ANDREY LUCAS CARDOZO

Dissertação aprovada como requisito parcial para obtenção do grau de Mestre no Programa de Pós-Graduação em Botânica, pela Comissão formada pelos doutores

Dr. Paulo Henrique Labiak Evangelista (UFPR)

Dr. Eric de Camargo Smidt (UFPR)

Dr. Fabrício Meyer (UPCB)

Curitiba, 18 de maio de 2017.

UNIVERSIDADE FEDERAL DO PARANÁ

Setor de Ciências Biológicas
Programa de Pós-Graduação em Botânica

Título: **Mestre em Ciências Biológicas - Área de Botânica.**
Dissertação: **"O GÊNERO *ERYNGIUM* L. (APIACEAE, SANICULOIDEAE) NO ESTADO DO PARANÁ".**

Candidato: Andrey Lucas Cardozo

Comissão Examinadora:

Dr. Paulo Henrique Labiak Evangelista (UFPR) – (Presidente/Orientador)
Dr. Eric de Camargo Smidt (UFPR) – (Membro Titular)
Dr. Fabrício Meyer (UPCB) – (Membro Titular)

Parecer: A Comissão Examinadora, reunida nesta data, nas dependências do Setor de Ciências Biológicas, da Universidade Federal do Paraná, analisando o conteúdo, a forma, a apresentação e a defesa da Dissertação, APROVA O TRABALHO DE CONCLUSÃO do(a) aluno(a) ANDREY LUCAS CARDOZO. É de parecer que constitui um trabalho científico e recomenda a sua publicação, após as correções sugeridas.

O candidato tem 60 (sessenta) dias para as correções propostas pela Comissão, para que se possa dar continuidade ao processo.

Curitiba, 18 de maio de 2017.

Dr. Paulo Henrique Labiak Evangelista (UFPR)

Dr. Eric de Camargo Smidt (UFPR)

Dr. Fabrício Meyer (UPCB)

Ciente Candidato

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RESUMO

Eryngium pertence à família Apiaceae e possui cerca de 220 espécies, ocorrendo em regiões temperadas e tropicais de todos os continentes. O gênero possui ampla distribuição no Brasil, está presente em todos os Estados, com cerca de 60 espécies. Os indivíduos desse gênero são geralmente ervas eretas ou rasteiras, glabras, de folhas aculeadas agrupadas em roseta basal. As inflorescências geralmente possuem coloração alva, azuil ou roxa. *Eryngium* é facilmente distinguido dos outros membros de Apiaceae pelas inflorescências do tipo capítulo e por possuír uma única bráctea por flor. Espécies de *Eryngium* podem ser perenes ou bienais, ocorrendo em substratos terrícolas, rupícolas ou aquáticos. O presente estudo apresenta o primeiro tratamento taxonômico para o referido gênero no Paraná. O trabalho foi realizado a partir de análise de exsicatas de herbários e coletas para complementação das informações sobre espécies pouco coletadas. Foram catalogadas 24 espécies para o estado. Destas, sete são endêmicas do Brasil, incluindo *E. ombrophilum* que é endêmica do Paraná. *E. aloifolium* e *E. stenophyllum* var. *corymbosum* correspondem a novos registros para o Paraná e para o Brasil, respectivamente. As áreas de campos naturais presentes no estado apresentaram-se como as mais ricas para o gênero (nelas ocorrem 75% das espécies), isso por combinar extensas áreas abertas e elevadas altitudes, características que favorecem a maioria das espécies de *Eryngium.* As manchas de Cerrado presentes no estado, apesar de não apresentarem um grande número de espécies de *Eryngium,* merecem destaque, pois *E. rochei* ocorre somente em um pequeno fragmento deste tipo de vegetação, tornando-a criticamente ameaçada no estado. São apresentadas chaves de identificação, descrições, mapas de distribuição, ilustrações e avaliação do status de conservação das espécies.

Palavras-chave: Apiales. Biodiversidade. Mata Atlântica. Taxonomia. Umbelliferae.

ABSTRACT

Eryngium belongs to the Apiaceae. It has about 220 species distributed in temperate and tropical regions of all continents. In Brazil the genus is represented by 60 species, being widely distributed and present in all states. Its species are usually erect or creeping herbs, glabrous throughout, with aculeate leaves grouped in basal rosette and inflorescences that vary from white to bluish or purplish. *Eryngium* is easily distinguished from other members of Apiaceae by its head type inflorescences, and by having a single bract per flower. Species of *Eryngium* can be perennials or biennials, occurring as terrestrial, aquatic or epipetric. This study is the first taxonomic treatment for the genus in Paraná state, and it is based on collections available in several herbaria and additional collections that were carried out in the main vegetation types of the state. In total, 24 species were recorded. Of these, seven are endemic to Brazil, including *E. ombrophilum*, endemic to Paraná. *E. aloifolium* and *E. stenophyllum* var. *corymbosum* are new records for Paraná and for Brazil, respectively. The areas of Native Grasslands, combining extensive open areas and high altitudes, were the richest for the genus (occur 75% of the species). The fragments of Savannah, although they do not present a large number of species of *Eryngium*, deserve special attention, because *E. rochei* occur only in a small fragment of this type of vegetation, making it critically endangered in the state. Identification key, descriptions, images, distributions maps, taxonomic comments and evaluation of the conservation status.for the species from Paraná are provided.

Key words: Apiales. Atlantic Forest. Biodiveristy. Taxonomy. Umbelliferae.

SUMÁRIO

1 INTRODUÇÃO

Eryngium L. é um gênero nativo no Brasil pertencente à Apiaceae Lindl., família cosmopolita abundante em áreas montanhosas temperadas e relativamente mais rara nas latitudes tropicais (PIMENOV e LEONOV, 1993; CORRÊA e PIRANI, 2005). A família contém cerca de 450 gêneros e 3.700 espécies, reunidos em quatro subfamílias: *Apioideae* Lindl., *Saniculoideae* Drude, *Mackinlayoideae* G.M.Plunkett & Lowry e *Azorelloideae* G.M.Plunkett & Lowry (PLUNKETT *et al.,* 2004; NICOLAS e PLUNKETT, 2014).

A família tem grande valor econômico, por possuir espécies comestíveis, condimentares, bem como utilizadas em perfumaria ou como essências em bebidas alcoólicas. Além da importância gastronômica, essas plantas são fontes de gomas e resinas de grande uso medicinal como sedativos, antiespasmódicos, estimulantes, e até venenos (CORRÊA e PIRANI, 2005).

Eryngium é composto de espécies herbáceas que colonizam preferencialmente substratos terrícolas, rupícolas e aquáticos. No mundo, *Eryngium* está predominantemente distribuído em regiões temperadas de todos os continentes (CALVIÑO *et al*., 2008). Compreende cerca de 220 espécies (WÖRZ, 2011), sendo o maior da família Apiaceae e perfazendo aproximadamente três quartos da diversidade da subfamília Saniculoideae (CALVIÑO *et al.*, 2008). O gênero possui aproximadamente 100 espécies nativas das Américas (CORRÊA e PIRANI, 2005), está amplamente distribuido no Brasil, presente em todos os estados (CORRÊA e PIRANI, 2005; FIASCHI e COTA, 2017) com cerca de 60 espécies (FIASCHI e COTA, 2017). Dessas, são estimadas para o estado do Paraná 26 (KAEHLER *et al*., 2014) e 27 espécies (FIASCHI e COTA, 2017).

Atualmente, estudos filogenéticos realizados por Calviño *et al.* (2008; 2010) dividiram *Eryngium* em dois subgêneros monofiléticos, reonhecendo: *Eryngium* subg. *Eryngium* e *Eryngium* subg. *Monocotyloidea* Wörz. O primeiro inclui as espécies nativas da Europa, Norte da África e Sudoeste da Ásia, enquanto o segundo abrange as espécies das Américas e da Austrália. Wörz (2005; 2011) reconhece também dois grandes clados, mas, por outro lado, divide as espécies das Américas, Austrália e Região Mediterrânea em seis subgêneros, resultando na seguinte classificação subgenérica: *Eryngium* subg. *Eryngium* (Ásia, Europa e Norte da

África) e *Eryngium* subgg. *Monocotyloidea* Wörz*, Semiaquatica* Wörz*, Foetida* Wörz*, Lessonia* Hook. & Arn. e *Ilicifolia* Wörz (Américas, Austrália e Região Mediterrânea).

A riqueza de espécies de *Eryngium* é repartida de forma desigual entre e dentro dos hemisférios oriental e ocidental. Em cada hemisfério, dois centros de diversidade são reconhecidos: no ocidental há maior riqueza de espécies no centro-oeste do México e no sudeste da América do Sul (sul do Brasil, nordeste da Argentina e Uruguai); no ocidental destacam-se a região do Mediterrâneo (sul da Europa e norte da África) e o sudoeste da Ásia (TURMEL, 1948). Cerca de dois terços das espécies de *Eryngium* estão distribuídos pelas Américas do Sul, Central e do Norte (CALVIÑO *et al.*, 2008).

O gênero é extremamente variável quanto ao hábito e tamanho, podendo ser ervas prostradas e possuírem apenas alguns centímetros, ou serem eretas e atingirem até cerca de três metros de altura (MATHIAS *et al*., 1972; CALVIÑO *et al*., 2008). Os indivíduos de *Eryngium* são geralmente ervas aculeadas, de caules eretos a rasteiros, glabros, perenes ou bienais. Suas folhas basais são sésseis, frequentemente coriáceas, simples, lobadas ou variadamente divididas, geralmente aculeadas, nervação desde reticuladas a paralelinérveas e com aspecto semelhante ao de monocotiledôneas. O limbo às vezes é septado (MATHIAS *et al*., 1972). As inflorescências podem ser alvas, azuis ou roxas e os representantes do gênero diferem dos outros membros de Apiaceae pelas inflorescências do tipo capítulo e por possuírem uma única bráctea por flor.

São raros os estudos recentes relacionados ao grupo no Brasil, sendo os principais trabalhos realizados voltados à flora de Apiaceae: Flora Ilustrada do Rio Grande do Sul (IRGANG, 1974), 29 espécies; Flora Ecológica das Restingas do Sudeste do Brasil (ORMOND *et al*., 1970), Flora Ilustrada Catarinense (MATHIAS *et al*., 1972), 30 espécies; Flora Fanerogâmica do Estado de São Paulo (CORRÊA e PIRANI, 2005), 24 espécies; Flora da Serra do Cipó, Minas Gerais: Umbelliferae (Apiaceae) (CORRÊA e PIRANI, 1999), 5 espécies; e Flora dos Estados de Goiás e Tocantins – Coleção Rizzo (COTA e PROENÇA, 2009), 20 espécies.

Para outros países, alguns autores têm trabalhado com a família, ou mais especificamente com o gênero, em trabalhos taxonômicos e/ou filogenéticos, sendo eles: Wörz (2004; 2005; 2011), Calviño e Downie (2007) Calviño *et al.* (2008; 2010), Liu *et al.* (2012) e García-Ruiz (2013).

A Região Sul do Brasil é um importante centro de diversidade de *Eryngium* na América do Sul (TURMEL, 1948). Entre os estados da esta Região Sul, apenas o Paraná ainda não possui um estudo taxonômico para o gênero, apesar da existência de levantamentos preliminares que apontam a ocorrência de 26 spp. (KAEHLER *et al.,* 2014) ou 27 spp. (FIASCHI e COTA, 2017) de *Eryngium* no estado. Assim, o objetivo principal deste estudo foi realizar o primeiro levantamento florístico e tratamento taxonômico das espécies de *Eryngium* nativas e/ou naturalizadas no estado do Paraná, apresentando uma chave de identificação das espécies, descrições morfológicas detalhadas, imagens das espécies, mapas de distribuição geográfica para o gênero e comentários taxonômicos sobre as espécies encontradas.

2 CAPÍTULO 1. O gênero *Eryngium* L. (Apiaceae, Saniculoideae) no estado do Paraná.

Andrey Lucas Cardozo, Pedro Fiaschi, Renato Goldenberg e Paulo Labiak.

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The genus *Eryngium* (Apiaceae, Saniculoideae) in the state of Paraná, Brazil

Abstract

Eryngium comprises about 220 species mostly distributed in subtropical and temperate regions of all continents. With about 60 species, the genus is widely distributed in Brazil, being present in all states. The species are glabrous erect or creeping herbs, with rosulate leaves and white, blue or purple flowers. The genus is easily distinguished from other members of Apiaceae for its capitulate inflorescences and by having a single bract per flower. They can be perennials or biennials and preferentially colonize terrestrial, aquatic and rocky substrates. We present the first taxonomic treatment for the genus in Paraná state, which is based on herbarium collections and fieldwork across the state. In total, 24 species were recorded. Of these, seven are endemic to Brazil, including *E. ombrophilum*, endemic to Paraná. *E. aloifolium* and *E. stenophyllum* var. *corymbosum* are new records for Paraná and for Brazil, respectively. The areas of Native Grasslands, combining extensive open areas and high altitudes, were the richest for the genus. The fragments of Savannah, although they do not present a large number of species of *Eryngium* in Paraná, deserve special attention, because the specie *E. rochei* occur only in a small fragment of this type of vegetation, making it critically endangered in the state. An identification key, descriptions, images, distributions maps, taxonomic comments and evaluation of the conservation status for the species from Paraná are provided.

Key words: Apiales, Biodiversity, South America, Taxonomy, Umbelliferae.

Introduction

Eryngium L. (1753: 232) belongs to the Apiaceae Lindl. (1836: 4) (nom. alt.: Umbelliferae Juss. (1789: 218)), a family that, although cosmopolitan, is more abundant in subtropical and temperate mountainous areas and relatively rare in tropical latitudes (Pimenov & Leonov 1993, Corrêa & Pirani 2005). The family contains about 435 genera and 3,780 species (Chase 2017), grouped into four subfamilies: *Apioideae* Drude., *Saniculoideae* Drude, *Mackinlayoideae* G.M. Plunkett & Lowry (2004: 379) and *Azorelloideae* G.M. Plunkett & Lowry (2004: 379) (Plunkett *et al.* 2004, Nicolas & Plunkett 2014). Included in the Saniculoideae, *Eryngium* is the largest genus of the Apiaceae with about 220 (Wörz 2011) to 250 (Calviño *et al.* 2008) species, making up about three quarters of this subfamily diversity (Calviño *et al.* 2008).

Eryngium has a wide distribution, being present in West Eurasia, North Africa, North and South America, and Australia (Wörz 2011), and it is predominantly distributed in temperate regions of all continents (Calviño *et al*. 2008). In the American Continent there are approximately 100 species of *Eryngium* (Corrêa & Pirani 2005), 60 of which are known to occur in Brazil (Fiaschi & Cota 2017). The species richness, however, is unevenly distributed

between and within the eastern and western hemispheres. In each hemisphere, two centers of diversity are recognized: west-central Mexico and southeastern South America (southern Brazil, northeastern Argentina and Uruguay); and western Mediterranean and southwestern Asia (Turmel 1948). About half and two-thirds of the species of *Eryngium* are distributed throughout the South, North and Central Americas (Calviño *et al.* 2008).

The genus, however, is extremely variable in habit, from prostrate herbs of only a few centimeters to erect plants up to three meters tall (Mathias *et al*. 1972, Calviño *et al*. 2008). Species of *Eryngium* are usually perennial or biennial herbs, with upright to creeping inflorescences, and leaves that are aculeate and glabrous. The basal leaves are often sessile, coriaceous, simple, lobed or divided in various ways (usually aculeate). The venation varies from reticulate to parallel, resembling those of some monocots (Mathias *et al*. 1972). *Eryngium* can be distinguished from other members of Apiaceae by its capitulate inflorescences and by having a single bract per flower. The flowers vary from white to blue or purple.

Wolff (1913) recognized two large informal groups in *Eryngium*: "Species gerontogeae" and ''Species americanae and australienses", the first representing 12 sections in the Old World, and the last with 22 New World sections in the Americas and Australia. Currently, Calviño *et al.* (2008, 2010) tested the subgeneric classification by Wolff (1913) using molecular phylogenetic analyses. They recognized the two previously cited groups as monophyletic subgenera: *Eryngium* subg. *Eryngium* ("Species gerontogeae"), represented by species from Europe and Southwest Asia, and *Eryngium* subg. *Monocotyloidea* (''Species americanae and australienses"), comprising species from the Americas and Australia. Based on cladistic analyses compared to previous molecular phylogenies, Wörz (2011) recovered the same two clades of Calviño *et al.* (2008, 2010). However, he further divided the species from Américas, Austrália and Mediterranean in five subgenera (*E.* subg. *Monocotyloidea* Wörz (2005: 256), *E.* subg. *Semiaquatica* Wörz (2005: 257), *E.* subg. *Foetida* Wörz (2005: 258), *E.* subg. *Lessonia* Hook. & Arn. (1833: 351), and *E.* subg. *Ilicifolia* Wörz (2011: 79)).

In the Americas, several papers have been published on *Eryngium*, most of them describing new species: Chamisso & Schlechtendal (1826), Urban (1879), Malme (1904), Dusén (1910), Wolff (1910) and Mathias & Constance (1954, 1958, 1971). More comprehensive taxonomic studies or regional floras were published by Rambo (1957), Mathias & Constance (1959, 1962), Pontirolli (1965), Ormond *et al*. (1970), Irgang (1974), Mathias *et al*. (1972), Corrêa & Pirani (1999, 2005), Cota & Proença (2009) and García-Ruiz (2013).

Even though these studies enriched the taxonomic knowledge of *Eryngium*, they also resulted in a confusing infrageneric classification of the genus, mainly due to some recombination and generalizations of names that ended up creating complexes of species where it was imagined that they were only morphological variations. This occurs, in part, because of the wide geographic distribution of some species. As a result, there is a considerable morphological variation and integrating features, which makes it difficult to access their relationships based only on morphology. Furthermore, the group can show different levels of ploidy and natural hybrids, making it difficult to deal with species delimitation based only on morphology (Calviño *et al.* 2008).

Although some studies dealing with the taxonomy of *Eryngium* have been published in the last decades, the genus still lacks a comprehensive study in the state of Paraná. Considering that, among the states of south Brazil, it presents the highest diversity of environments that are suitable for *Eryngium*, such as savannahs and high grasslands, it is expected that several species are present in Paraná, including endemics and endangered species. Thus, the main goal of this study is to present a taxonomic treatment of *Eryngium* from Paraná, including detailed morphological descriptions, illustrations, distribution map and an identification key.

Materials and methods

Study Area

The state of Paraná is about 199,300 km^2, including a narrow coastal plain and a large area of escarpments and plateaus, with elevations ranging from zero to 1877 m. The plateaus of Paraná belong to southern Brazilian highlands, and occupy the largest area of the state. They are divided in three compartments locally known, from the coast to the interior, as First, Second and Third plateaus or, respectively, plateaus of Curitiba, Ponta Grossa and Guarapuava (Labiak 2014). The coastal region is separated from the plateaus of the interior by the escarpments of Serra do Mar, the largest mountain range of Paraná (Labiak 2014). These differences in elevation and distance from the ocean, in addition to other factors, mean that Paraná presents, in general, three different climatic types: subtropical, in the coastal region and Serra do Mar, temperate, in the higher regions of the plateaus (above 500 meters), and tropical, in the lower regions of the third plateau (Caviglione *et al.* 2000, Labiak 2014).

According to Fundação SOS Mata Atlântica and the Instituto Nacional de Pesquisas Espaciais (INPE) (2014), the forests of Paraná represent three subtypes of the main Atlantic

Rain Forest domain: the Atlantic Rain Forest *sensu stricto*, along the Serra do Mar mountains; the Araucaria Forest, in the first and second plateaus; and the Seasonal Forest, in the third plateau, on the North and West portions of the State (Roderjan *et al*. 2002, IBGE 2012). Native grasslands are also an important component of the vegetation in Paraná (Roderjan *et al*. 2002), occupying an area of about 14% of the state. Also noteworthy is the occurrence of relicts of the central Brazilian savannahs (Cerrado domain), which contributes with several species that are typical to this more seasonal vegetation (Labiak 2014).

Methods

Specimens from the following herbaria were analyzed: CESJ, CNUP, EFC, FLOR, FUEL, HCF, HNUP, HUCP, HUEFS, HUEM, ICN, IRAI, MBM, MBML, NY, PACA, and UPCB (acronyms following Thiers 2016).

We also conducted field trips to the main vegetation types in Paraná, in order to study the populations in the field, as well as to locate rare or poorly sampled species. A complete set of collections was deposited in the herbarium UPCB and duplicates, when available, were sent to MBM and FLOR.

For morphological analysis we used both herbarium specimens and our own collections. We analyzed dry material for vegetative structures, whereas flowers and fruits were rehydrated. Descriptions of vegetative and reproductive structures followed Mathias *et al*. (1972), Irgang (1974), and Corrêa & Pirani (2005), using terminology from Radford *et al.* (1976) and Gonçalves & Lorenzi (2011). Geographic distribution data were obtained from herbarium labels, and the maps were made with DIVA-GIS software (Hijmans *et al.* 2005). Descriptions were standardized with Open DELTA software (Dallwitz *et al*. 2015). The conservation status of each taxon was inferred with the help of GeoCAT online software (Bachman *et al.* 2011) and categorized according to IUCN criteria (2012a, 2012b). The infrageneric classification followed Wörz (2011).

Results and discussion

We recognize 24 species of *Eryngium* native to Paraná, corresponding to about 40% of the Brazilian species of the genus (Fiaschi & Cota 2017). Among those, *E. aloifolium* Mart. ex Urb. (1879: 309), *E. canaliculatum* Cham. & Schltdl. (1826: 238), *E. corallinum* Mathias & Constance (1958: 257), *E. koehneanum* Urb. (1879: 323), *E. ombrophilum* Dusén & H.

Wolff (1911: 2), *E. pohlianum* Urb. (1879: 336) and *E. subinerme* (H. Wolff) Mathias & Constance (1971: 49) are endemic to Brazil.

Previous estimates for *Eryngium* in Paraná state recorded 26 species (Kaehler *et al.* 2014) and 27 species (Fiaschi & Cota 2017). These differences are not only in the numbers, but also in the species that compose the listings. These differences are probably due to errors of determination in similar species. Another important factor is the classification followed by each author. For instance, the species *E. chamissonis* Urb. (1879: 315) and *E. pandanifolium* Cham. & Schltdl. (1826: 336) are considered as different species by Kaehler *et al.* (2014) and Fiaschi & Cota (2017). We however, consider *E. chamissonis* as a variety of *E. pandanifolium*, following the recombination proposed by Mathias & Constance (1971). The species *E. eurycephalum* Malme (1904: 12), *E. mesopotamicum* Pedersen (1997: 252) and *E. paniculatum* Cav. & Dombey ex F.Delaroche (1808: 26) were also cited for the state by Fiaschi & Cota (2017). We are excluding these names for the flora of Paraná because the first was a wrong determination, we found no voucher for *E. mesopotamicum*, and *E. paniculatum* (*sensu* Flora Brasiliensis (Urban 1879)) is considered a synonym of *E. horridum* Malme (1904: 15).

Eryngium ebracteatum Lam. (1798: 759), *E. eburneum* Decne. (1873: 23), *E. elegans* Cham. & Schltdl. (1826: 248), *E. floribundum* Cham. & Schltdl. (1826: 245) and *E. horridum* Malme (1904: 15) are the most common and widespread species of *Eryngium* in Paraná, whereas *Eryngium aloifolium* Mart. ex Urb., *E. corallinum* Mathias & Constance, *E. juncifolium* (Urb.) Mathias & Constance (1971: 50), *E. koehneanum* Urb., *E. ombrophilum* Dusén & H. Wolff (1911: 2), *E. regnellii* Malme (1904: 9), *E. rochei* Constance (1979: 365) and *E. stenophyllum* var. *corymbosum* Urb. (1879: 330) are represented by just a few collections, or present very restrict distributions.

Despite the various vegetation types of Paraná, grasslands proved to be the most important environments for the genus diversity, harboring 15 species (about 60% of species from Paraná). Most of the species that occur in Paraná prefer high and open areas, with rare exceptions of species that occur only within forests (*E. ekmanii* H. Wolff (1910: 414) in seasonal forest, *E. ombrophilum* in rain forests and *E. foetidum* L. (1753: 232) in both vegetations). The Savannah fragments present in the state, although they do not present a large number of species of *Eryngium*, some species are exclusively found in these areas. For instance, *E. rochei* occur only in a small fragment of this type of vegetation, in Campo Mourão, making them critically endangered in the state (Figure 1).

Taxonomic Treatment

Eryngium L., Sp. Pl. 1: 232 (1753).

Herbs, erect or prostrated, slender or robust, prickly or unarmed. Basal leaves simple, sessile; rosulate or distichous; pendulous, assurgent or declinate; oblanceolate, linear or linear-triangular, rarely narrowly elliptic; flat or canaliculated; apex acuminate or acute, rarely apiculate, mucronate, obtuse (*E. eriophorum*) or retuse; margin aculeate, aculeate-doble-serrate, fimbriate, serrate or entire, rarely pinnatifid (*E. corallinum*), prickles or fimbriae solitary or grouped; venation reticulodromous, parallelodromous, or parallelodromous in the median region and reticulodromous toward margins (*E. elegans* and *E. floribundum*); sheath triangular, oblong, lanceolate or linear, varying in width, margin usually entire, but also aculeate or fimbriate. Inflorescence axis cylindrical, multi-striated or multi-furrowed, fistulose or medullary; proximal branches usually present or occasionally absent (*E. canaliculatum, E. corallinum, E. ekmanii, E. foetidum, E. ombrophilum, E. sanguisorba* and *E. subinerme*). Distal branches usually present or occasionally absent (*E. sanguisorba*); cauline leaves alternate, rarely opposite, verticillate or absent, lanceolate, oblanceolate, linear, narrowly triangular or ovate, aculeate, aculeate-doble-serrate, fimbriate, serrate or entire, erect, pendulous, reflexed or patent, the proximal longer than distal. Capitula white, green, blue, or vinaceous, cylindrical or ovoid; central capitula usually larger than lateral capitula (rarely absent); involucral bracts glabrous or pulverulent, lanceolate, ovate, triangular, linear or oblanceolate, entire, fimbriate or with at least one tooth in each margin. apex acuminate, acute, cuspidate, mucronate, or trifid (*E. elegans*), free or connate in the base; bracteoles glabrous or pulverulent, usually similar to involucral but never fimbriate. Flowers white, blue, or vinaceous. Sepals glabrous or pulverulent, ovate, obovate, lanceolate, eliptic, or oblong, apex acuminate, acute, apiculate, mucronate, or obtuse; petals glabrous or pulverulent, lanceolate, oblong, elliptic, ovate, obovate, oblanceolate, apex always inflexed, entire to fimbriate. Fruits ovate to obovate, when mature divided or not into two mericarps; ribs sometimes present; scales homomorphic (globose, fusiform, or cylindric) or heteromorphic, dorsal scales usually reduced, globose, cylindric, fusiform or absent, lateral scales lanceolate to ovate or oblanceolate, sometimes oblong, free, connate in the base or fused together to form two lateral wings, calycinal scales usually lanceolate.

Identification key

1. Basal leaves with venation reticulodromous, except near midrib 2
- Basal leaves with venation parallelodromous 7
2. Basal leaves strongly attenuate above the sheath; fruits with homomorphic scales 3
- Basal leaves slightly attenuate above the sheath; fruits with heteromorphic scales 6
3. Plants creeping ..... 15. *E. ombrophilum*
- Plants erect 4
4. Basal leaves with margin pinnatifíd-aculeate; sheath margin fimbriate ……..... 2. *E. corallinum*
- Basal leaves with margin serrate or crenate; sheat margin entire 5
5. Bracteoles 1.9–2.7 mm long ..... 10. *E. foetidum*
- Bracteoles 2.8–3.7 mm long ..... 6. *E. ekmanii*
6. Bracteoles with the apex 3-5-fid ..... 7. *E. elegans*
- Bracteoles with the apex acute, mucronate …….....… 9. *E. floribundum*
7. Basal leaves lanceolate, oblanceolate or narrowly elliptic …..... 8
- Basal leaves linear or linear-triangular …….....**.** 11
8. Capitula blue, purple or vinaceous; basal leaves rosulate 9
- Capitula white or green; basal leaves distichous 10
9. Capitula cylindric; fruits with homomorphic scales ..... 4. *E. ebracteatum*
- Capitula ovoid; fruits with heteromorphic scales ..... 21. *E. sanguisorba*
10. Basal leaves with sheath densely aculeate ..... 14. *E. koehneanum*
- Basal leaves with sheath entire ..... 24. *E. subinerme*
11. Basal leaves 1–4.9 cm wide ……..…… 12
- Basal leaves 0.1–0.6 cm wide 18
12. Basal leaves distichous ..... 19. *E. regnelii*
- Basal leaves rosulate 13
13. Cauline leaves reflexed 14
- Cauline leaves erect or pendulous …..... 15
14. Basal leaves with prickles solitary ..... 20. *E. rochei*
- Basal leaves with prickles 2-grouped ..... 11. *E. horridum*
15. Central capitula 5.7–10.1 mm wide, can be vinaceous 16
- Central capitula 10.5–16.8 mm wide, always white or green 17

16 Basal leaf with prickles less than 1 mm to 9.1 mm long; capitula can be vinaceous

..... 16. *E. pandanifolium*

- Basal leaf with prickles 4.4–25.3 mm long; capitula always white or green ..... 1. *E. aloifolium*

17. Involucrais bracts glabrous ..... 5. *E. eburneum*

- Involucrais bracts pulverulent ..... 23. *E. stenophylum var. corymbosum*

18. Basal leaves distichous 19

- Basal leaves rosulate 20

19. Basal leaves entire, fimbriate at base, the fimbriae longer than blade width; capitula blue ..... 8. *E. eriophorum*

- Basal leaves ciliate, seta smaller than blade width; capitula white or vinaceous ..... 17. *E. pohlianum*

20. Basal leaf blades flat ..... 18. *E. pristis*

- Basal leaf blades canaliculate 21

21. Capitula blue or vinaceous 22

- Capitula white or green 23

22. Cauline leaves densely aculeate; capitula vinaceous ..... 2. *E. canaliculatum*

- Cauline leaves entire or fimbriate; capitula blue ..... 12. *E. junceum*

23. Basal leaves densely fimbriate, fimbriae larger than the blade width and 4-grouped ..... 22. *E. scirpinum*

- Basal leaves slightly fimbriate or aculeate, smaller than the blade width and solitary …… 13. *E. juncifolium*

1 ***Eryngium aloifolium*** Mart. ex Urb., Fl. Bras. (Martius) 11 (1): 309 (1879). Figure 2.

Plants erect, ca. 175 cm tall, robust, prickly. Basal leaves rosulate, assurgent; blade 118.5 × 4.9 cm, linear-triangular, flat, apex acuminate, margin aculeate, prickles 4.37–25.33 mm long, 2-grouped, longer in the median portion; venation parallelodromous; sheath ca. 4.7 cm wide, oblong, margin entire. Inflorescence axis ca. 153 cm long, ca. 5 mm diam., erect, cylindric, multi-striated, fistulose; proximal branches ca. 14.7 cm long; distal branches 14.6–15.5 cm long; cauline leaves alternate, similar to basal ones, aculeate, pendulous, the proximal ca. 100 cm long, the distal ca. 5 cm long; bracts of distal branches 2.4–3.1 cm long, lanceolate, margin aculeate. Capitula white or green, ovoid; central capitula 9.8–10.4 × 9.4–10.1 mm, peduncle 2.6–2.8 cm long; lateral capitula 8.4–9.8 × 7.1–8.6 mm, peduncle 1.4–1.5 cm long; involucral bracts 6–7, free, 3.5–4.8 mm long, glabrous, lanceolate, entire, apex acuminate;

bracteoles 3.9–4.2 mm long, longer than the flowers, glabrous, lanceolate or ovate, entire, apex acuminate or cuspidate. Flowers white; sepals pulverulent, widely ovate, apex cuspidate; petals pulverulent, ovate, apex bifid. Fruits 2.6–3 × 2.8–3.8 mm, narrowly obloid, separating in two mericarps when mature, ribs absent, scales heteromorphic, dorsal scales reduced, globose, lateral scales fused together to form two lateral wings, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: São José dos Pinhais, 25 December 1951, *G. Hatschbach 2788* (MBM).

Distribution and habitat: This species is endemic to Brazil (Zuloaga *et al.* 2008), found in the states of Minas Gerais, Rio de Janeiro, São Paulo and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first plateau, at about 900 m elevation, in grasslands and marshes (Figure 3).

Phenology: Fertile plants collected mainly in December.

Conservation status: Extent of occurrence (EOO): < 100.000 km² (CR B1a; D). Area of occupancy (AOO): < 10.000 km² (CR B2a; D).

Comments: The occurrence of *E. aloifolium* in Paraná represents a new record. The only known specimen was previously identified as *E. pandanifolium* var. *lasseauxii*, from which *E. aloifolium* can be distinguished by prickles as long or longer than blade width (vs. always smaller than blade width in *E. pandanifolium* var. *lasseauxii*).

2 *Eryngium canaliculatum* Cham. & Schltdl., Linnaea 1: 238 (1826). Figure 4.

Plants erect, 86–148 cm tall, slender, prickly. Basal leaves rosulate, declinate or assurgent; blade 16–52.6 × 0.1–0.6 cm, linear, canaliculate, apex acuminate, margin aculeate or entire, when aculeate with prickles 1–9.7 mm long, 2-grouped, uniform in size throughout the margin; venation parallelodromous; sheath 0.5–1.6 cm wide, triangular, oblong or narrowly oblong, margin entire. Inflorescence axis 84–143 cm long, 4.3–7.5 mm diam., erect, cylindrical, multi-striated or multi-furrowed, fistulose; proximal branches 1–4.5 cm long, occasionally absent; distal branches 1.5–5.3 cm long; cauline leaves alternate, lanceolate, linear or linear-triangular, aculeate, erect or patent, the proximal 10.5–26.9 cm long, the distal 2.3–4.7 cm long; bracts of distal branches 1–2 cm long, lanceolate or narrowly triangular, margin aculeate. Capitula vinaceous, broadly ovoid or very broadly ovoid; central capitula 6.2–8.9 × 6.4–8 mm, peduncle 1.5–3.8 cm long; lateral capitula 5.2–7.5 × 4.8–7 mm, peduncle 1–1.9 cm long; involucral bracts 8–11, basally connate, 2.2–4 mm long, glabrous, lanceolate, ovate or narrowly triangular, entire, apex acuminate, mucronate; bracteoles 2.5–

3.4 mm long, longer than the flowers, glabrous, lanceolate to widely ovate or obovate, entire, apex acuminate, cuspidate or mucronate. Flowers vinaceous; sepals glabrous, depressed obovate or depressed ovate, apex obtuse, mucronate or mucronulate; petals glabrous, elliptic or obovate, apex fimbriate. Fruits 1.9–3 × 1.6–3.1 mm, obovoid or broadly obovoid, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales 3–4, free, lanceolate to ovate or oblanceolate, calycinal scales lanceolate or ovate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 14 January 2006, *C. Kozera 3241* (UPCB). Lapa, 17 March 1966, *G. Hatschbach 14032* (MBM). Mandirituba, 10 February 1982, *G. Hatschbach 44572* (MBM). Palmeira, 29 March 1959, *G. Hatschbach 5579* (MBM). Ponta Grossa, 19 March 2016, *A.L. Cardozo 138* (UPCB). Rio Branco do Sul, 10 January 1978, *G. Hatschbach 40709* (MBM). Sengés, 19 February 1972, *G. Hatschbach 29274* (MBM). Tibagi, 28 November 2013, *M.G. Caxambu. 4937* (HCF, MBM).

Distribution and habitat: This species is endemic to Brazil (Zuloaga *et al.* 2008), found in the states of Minas Gerais, São Paulo, Paraná, and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and second plateaus, between 623 and 1094 m, in grasslands, sometimes growing among rock outcrops, usually in dry places (Figure 3).

Phenology: Fertile plants collected mainly from November to March.

Conservation status: Extent of occurrence (EOO): 13,509.503 km² (NT). Area of occupancy (AOO): 40.000 km² (VU B2ab(i,ii,iii,iv)).

Comments: In Paraná, this species presents some variation regarding the margins of the leaves. In one of them the margins of the basal leaves are densely prickly, whereas in the other leaves are almost entire. The former appears to have a wider distribution, whereas the latter is restricted to the boundaries of the municipalities of Balsa Nova and Palmeira.

This species is similar to *Eryngium pohlianum*, which can be distinguished by the basal leaves rosulate and cauline leaves reflexed and aculeate (vs. basal leaves distichous and cauline leaves erect and entire or ciliate in *E. pohlianum*).

3 *Eryngium corallinum* Mathias & Constance, Bull. Torrey Bot. Club 85: 257 (1958). Figure 5.

Plants erect, 13–38 cm tall, slender, prickly. Basal leaves rosulate, assurgent, blade 5.1–12.9 × 0.2–0.4 cm, oblanceolate, strongly attenuate above the sheath, narrowing generally longer than the rest of blade, flat, apex acute, margin pinnatipartite-aculeate, prickles 1.4–5.1 mm

long, solitary, longer in the median portion; venation reticulodromous; sheath 0.2–0.6 cm wide, triangular or narrowly triangular, margin fimbriate. Inflorescence axis 10–26 cm long, 0.7–2.1 mm diam., erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches absent or 1.5–5.5 cm long; distal branches 1–6 cm long; cauline leaves absent; bracts of distal branches 0.5–1.7 cm long, lanceolate or linear-triangular, margin aculeate or fimbriate at base. Capitula white or green, ovoid; central capitula 7.9–11.1 × 6–8.9 mm, peduncle 1.8–3.4 cm long; lateral capitula 6–8.3 × 5.2–7.9 mm, peduncle 1.3–2.6 cm long; involucral bracts 5–9, free, 2.2–4.9 mm long, glabrous, lanceolate or linear-triangular, entire, apex acuminate; bracteoles 2.7–3.9 mm long, smaller than the flowers, glabrous, linear-triangular or lanceolate, entire, apex acuminate. Flowers white or green; sepals glabrous, lanceolate, apex acuminate or cuspidate; petals glabrous, oblanceolate, apex fimbriate. Fruits 2–2.8 × 1.8–2.9 mm, depressed ovoid, separating in two mericarps when mature, ribs absent, scales homomorphic, cylindric.

Selected material:—BRAZIL. Paraná: Candói, 12 December 2013, *E.D. Lozano 2297* (MBM). Guarapuava, 21 October 1960, *G. Hatschbach 7396* (MBM). Mangueirinha, 20 October 1966, *G. Hatschbach 15156* (MBM).

Distribution and habitat: This species is endemic to Brazil (Zuloaga *et al.* 2008), where it occurs in the states of Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it was found in the third plateau, between 921 and 1120 m elevation, usually growing in humid places of rocky grasslands (Figure 3).

Phenology: Fertile plants collected from September to December.

Conservation status: Extent of occurrence (EOO): 2,427.411 km² (EN B1ab(i,ii,iii,iv)). Area of occupancy (AOO): 20.000 km² (EN B2ab(i,ii,iii,iv)).

Comments: This specis is rare in Paraná, with a very restricted distribution in the municipality of Guarapuava. It is the smallest species of *Eryngium* that occurs in the state, and can be recognized by pinnatipartite-aculeate basal leaves with a fimbriate sheath.

4 *Eryngium ebracteatum* Lam., Encycl. [J. Lamarck & al.] 4 (2): 759 (1798). Figure 6.

Plants erect, 61.5–180 cm tall, slender, unarmed. Basal leaves rosulate, declinate or arched, blade 7.5–98.4 × 0.5–2.3 cm, oblanceolate, strongly attenuate above the sheath, narrowing generally longer than the rest of blade, flat, apex acuminate or acute, margin entire or with fimbriae 1.6–20.1 mm long, solitary, longer in the base; venation parallelodromous; sheath 1–6 cm wide, triangular or narrowly triangular, margin entire. Inflorescence axis 52–145 cm

long, 1.2–11.9 mm diam., erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 10.8–16.6 cm long; distal branches 5–15 cm long; cauline leaves alternate, oblanceolate or linear, entire or with fimbriae, erect, the proximal 4.6–41.8 cm long, the distal 3–11.4 cm long; bracts of distal branches 0.5–1.2 cm long, lanceolate or narrowly triangular, margin aculeate or with at least one pair of teeth. Capitula vinaceous, cylindric; central capitula 10.7–15.1 × 2.6–5.2 mm, peduncle 3.5–7 cm long; lateral capitula 6.7–13.3 × 2.9–3.7 mm, peduncle 1.8–5.9 cm long; involucral bracts 6–8, free, 0.8–1.5 mm long, glabrous, ovate or widely ovate, entire, apex cuspidate; bracteoles 1.2–1.7 mm long, about as long as the same size of the flowers, glabrous, narrowly triangular or triangular, entire, apex acute, inflexed, mucronate. Flowers vinaceous; sepals glabrous, widely ovate or widely depressed ovate, apex obtuse, mucronulate; petals glabrous, obovate, apex bifid. Fruits 0.9–1.5 × 1–1.6 mm, obloid or transversely ellipsoid, not separating in two mericarps when mature, ribs absent, scales homomorphic, cylindric.

Selected material:—BRAZIL. Paraná: Balsa Nova, 21 November 2005, *C. Kozera 2576* (MBM). Cianorte, 15 November 2005, *M.G. Caxambu 922* (HCF). Curitiba, 12 December 1992, *A. Bidá* (UPCB 23008). Dois Vizinhos, 06 December 1968, *G. Hatschbach 20531* (MBM, UPCB). Guaira, 16 September 1981, *Buttura 671* (MBM). Guarapuava, 23 January 2007, *J. Cordeiro 416* (MBM). Jaguariaíva, 23 November 2005, *A.C. Cervi 3250* (UPCB). Palmas, 14 December 2011, *J.M. Silva 8124* (MBM). Palmeira, 26 October 1982, *G. Hatschbach 45725* (MBM). Piraquara, 22 December 1992, *A. Bufrem 47* (MBM). Ponta Grossa, 20 November 1996, *A.C. Cervi 6246* (MBM). Tibagi, 28 November 2013, *M.G. Caxambu 4947* (HCF).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay and Uruguay (Zuloaga *et al.* 2008). In Brazil, *E. ebracteatum* occurs in the states of Bahia, Pernambuco, Distrito Federal, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, it occurs in the three plateaus, between 220 and 1370 m, in grasslands, rocky fields, savannah, marshes and river banks, usually in humid places (Figure 7).

Phenology: Fertile plants collected mainly from October to February.

Conservation status: Extent of occurrence (EOO): 94,892.359 km² (LC). Area of occupancy (AOO): 52.000 km² (NT).

Comments: *Eryngium ebracteatum* is very common in Paraná, with several records in herbaria. This species can be distinguished from other species of the genus, from Paraná, by its vinaceous and cylindric capitula.

5 ***Eryngium eburneum*** Decne., Bull. Soc. Bot. France 20: 23 (1873). Figure 8.

Plants erect, 86.8–250 cm tall, robust, prickly. Basal leaves rosulate, assurgent; blade 55.5–93.5 × 1.1–2.8 cm, linear or linear-triangular, flat, apex acuminate, margin aculeate, prickles 1.4–20.1 mm long, 2-grouped, longer in the base; venation parallelodromous; sheath 1.4–3.7 cm wide, oblong, margin entire. Inflorescence axis 76–185 cm long, 6.4–22.6 mm diam, erect, cylindric, multi-striated, fistulose, proximal branches 4–11.7 cm long; distal branches 4.3–9.8 cm long; cauline leaves alternate, lanceolate or linear-triangular, aculeate, erect, the proximal 24.2–112 cm long, the distal 4.1–8.5 cm long; bracts of distal branches 1.5–4.8 cm long, lanceolate, margin aculeate or entire. Capitula white or green, ovoid or ellipsoid; central capitula 14.8–20.8 × 11.8–16.8 mm, peduncle 1.9–7.8 cm long; lateral capitula 13.2–19.9 × 10.6–13.8 mm, peduncle 1–5 cm long; involucral bracts 6–8, free, 3.7–14.5 mm long, glabrous, lanceolate, entire or aculeate, apex acuminate; bracteoles 5.7–8.2 mm long, longer than the flowers, glabrous, lanceolate, entire, apex acuminate. Flowers white; sepals pulverulent on midrib, ovate, apex acute or obtuse, mucronate or mucronulate; petals pulverulent on midrib, ovate, apex fimbriate. Fruits 3.5–5.2 × 2.5–4 mm, obovoid or oblanceoloid, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales 4–5, basally connate, lanceolate, calycinal scales lanceolate or oblanceolate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 29 March 2005, *C. Kozera 2087* (MBM). Campina Grande do Sul, 19 March 2016, *A.L. Cardozo 142* (UPCB). Candói, 07 April 2005, *A.C. Fontana 106* (HNUP). Curitiba, 01 March 2016, *A.L. Cardozo 134* (UPCB). Guarapuava, 12 March 1976, *J.C. Lindeman 4804* (ICN). Palmeira, 01 October 1980, *L.T. Dombrowski 13753* (MBM). São José dos Pinhais, 29 April 2005, *D. Palma 13* (MBM). São Mateus do Sul, 24 February 1987, *R.M. Britez 1322* (MBM). Turvo, 27 February 2009, *M.G. Caxambu 2507* (HCF).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay, Uruguay (Zuloaga *et al.* 2008) and Venezuela. In Brazil, it occurs in the states of São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná state, it is found in the three plateaus, between 800 and 1270 m, in grasslands and marshes, usually in humid places (Figure 7).

Phenology: Fertile plants collected mainly from January to April.

Conservation status: Extent of occurrence (EOO): 18,964.756 km² (NT). Area of occupancy (AOO): 80.000 km² (VU B2b(iii)).

Comments: *Eryngium eburneum* is one of the largest species in the state, commonly reaching two meters high. It is commonly confused with *E. horridum* (other large specie of the genus from Paraná) can be distinguished by their large and usually ovoid capitula (that reaches 20.8 mm long) and by the cauline leaves erect (vs. lower capitula, max 14.4 mm long, and cauline leaves reflexed in *E. horridum*).

6 *Eryngium ekmanii* H. Wolff, Repert. Spec. Nov. Regni Veg. 8: 414 (1910). Figure 9.

Plants erect, 26–100 cm tall, slender, unarmed. Basal leaves rosulate, assurgent, blade 7.3–24.5 × 1.4–3.1 cm, oblanceolate, strongly attenuate above the sheath, narrowing generally shorter than the rest of blade, flat, apex acute, margin serrate; venation reticulodromous; sheat 0.7-1.7 cm wide, triangular or lanceolate, margin entire. Inflorescence axis 8–54 cm long, 3.5–11.27 mm diam., erect, cylindric, multi-striated or multi-furrowed, fistulose or medullary; proximal branches absent; distal branches 4.2–18.5 cm long; cauline leaves usually absent, when present opposite, similar to basal ones, the proximal ca. 1.5 cm long, the distal 2.5–4.1 cm long; bracts of distal branches 3.8–27.5 cm long, oblanceolate, margin serrate. Capitula white or green, cylindric or ovoid; central capitula 8.5–15.2 × 5–9.8 mm, peduncle 0.7–1.8 cm long; lateral capitula 7.8–12 × 4.9–7 mm, peduncle 0.6–1.6 cm long; involucral bracts 6–10, free, 3.5–40.8 mm long, glabrous, linear, entire or aculeate, apex acuminate or acute; bracteoles 2.8–3.7 mm long, longer than the flowers, glabrous, linear-triangular, entire, apex acuminate. Flowers white; sepals glabrous, ovate or widely ovate, apex obtuse, mucronulate; petals glabrous, elliptic, apex bifid. Fruits 1.3–1.6 × 1.3–1.8 mm, obloid, not separating in two mericarps when mature, ribs absent, scales homomorphic, globose.

Selected material:—BRAZIL. Paraná: Capitão Leônidas Marques, 25 June 2004, *P. Labiak 3292* (MBM). Foz do Iguaçu, 06 December 1969, *G. Hatschbach 23140* (MBM). Guaíra, 16 October 1962, *G. Hatschbach 9330* (UPCB). Icaraíma, 22 January 1966, *G. Hatschbach 15837* (ICN, MBM). Porto Rico, 17 December 1997, *K.K. Kita 169* (MBM, HNUP, HUEM). Santa Helena, 08 December 1977, *G. Hatschbach 40518* (MBM). Santo Inácio, 12 December 1987, *G. Hatschbach 51703* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina and Paraguay (Zuloaga *et al.* 2008). In Brazil, it occurs in the states of Paraná, Rio Grande do Sul and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs only in the third plateau, between 174 and 385 m, in Seasonal Forest and marshes, usually in humid places (Figure 7).

Phenology: Fertile plants collected mainly from June to January.

Conservation status: Extent of occurrence (EOO): 43,179.046 km² (NT). Area of occupancy (AOO): 40.000 km² (VU B2b(iii)).

Comments: *Eryngium ekmanii* is one of the few species of *Eryngium* from Paraná that occurs only on the third plateau, and the only one occurring only at low altitudes (below 400 m), unlike most of the species of the genus in the state that occurring at high altitudes.

Together with *E. foetidum* and *E. ombrophilum*, it is one of three members of *Eryngium* sect. *Foetida* H.Wolff (1913: 61) from the state of Paraná. This section is characterized by leafy plants and that occur in areas shaded and with enough humidity. It differs from these two by the erect habit (vs. creeping habit in *E. ombrophilum*) and bracteoles larger and more evident, 2.8–3.7 mm long (vs. 1.9–2.7 mm long in *E. foetidum*).

7 *Eryngium elegans* Cham. & Schltdl., Linnaea 1: 248 (1826). Figure 10.

Plants erect, 37–119 cm tall, slender, prickly. Basal leaves rosulate, declinate; blade 8.3–47 × 0.7–3.3 cm, oblanceolate, slightly attenuate above the sheath, narrowing generally longer than the rest of blade, flat, apex acuminate, margin aculeate double-serrate, prickles 1–13.4 mm long, solitary, longer in the base; venation parallelodromous near midrib, reticulodromous toward margins; sheath 0.8–2.9 cm wide, oblong or narrowly oblong, margin entire. Inflorescence axis 31–77 cm long, 2–10.7 mm diam., erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 6.7–12.7 cm long; distal branches 3.3–15.8 cm long; cauline leaves alternate, lanceolate, aculeate double-serrate, erect, the proximal 2.3–12.1 cm long, the distal 1.3–4.5 cm long; bracts of distal branches 0.8–1.9 cm long, lanceolate or ovate, margin aculeate. Capitula white or green, very broadly ovoid; central capitula 7.1–9.5 × 7.6–9.4 mm, peduncle 0.9–1.7 cm long; lateral capitula 6.6–9.5 × 6.4–8.2 mm, peduncle 0.5–1.6 cm long; involucral bracts 6–8, free, 2.7–4.8 mm long, glabrous, lanceolate, aculeate, apex trifid; bracteoles 3–5.1 mm long, longer than the flowers, pulverulent, lanceolate, entire, apex 3–5-fid. Flowers white; sepals pulverulent, ovate, apex obtuse or truncate, mucronate; petals pulverulent, ovate, apex fimbriate. Fruits 1.8–2.7 × 1.7–2.2 mm, obovoid or narrowly oblong, not separating in two mericarps when mature, ribs absent, scales heteromorphic, dorsal scales globose or cylindric, lateral scales 4–5, free, lanceolate or ovate, calycinal scales lanceolate or oblanceolate.

Selected material:—BRAZIL. Paraná: Araucária, January, *H.M. Filho 90* (UPCB). Balsa Nova, 05 January 2006, *C. Kozera 3193* (UPCB). Campina Grande do Sul, 15 December 1961, *G. Hatschbach 8715* (UPCB). Curitiba, 17 December 1996, *C. Kozera 433* (UPCB, MBM). Foz do Iguaçu, 15 October 1962, *G. Hatschbach 9418* (MBM, UPCB). Harmonia, 16 December 1951, *A. Mattos 4763* (UPCB). Lapa, 14 December 1959, *R. Braga 163* (UPCB). Palmeira, 23 January 2016, *A.L. Cardozo 130* (UPCB). Piraquara, 05 January 1972, *N. Imaguire 2708* (MBM). Ponta Grossa, 01 January 1980, *L. Krieger 20478* (UPCB). São José dos Pinhais, 16 May 2005, *A.C. Martins 106* (UPCB). Sengés, 18 November 1989, *G. Hatschbach 53623* (MBM). Tibagi, 30 January 1959, *G. Hatschbach 5489* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay, Uruguay (Zuloaga *et al.* 2008) and Bolívia. In Brazil, occurs in the states of Goiás, Mato Grosso do Sul, Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, it occurs in the three plateaus, between 160 and 989 m, in grasslands, Savannah, marshes, river banks and degraded areas, in humid and dry places (Figure 11).

Phenology: Fertile plants collected mainly from August to May.

Conservation status: Extent of occurrence (EOO): 67,849.688 km² (LC). Area of occupancy (AOO): 68.000 km² (NT).

Comments: Another of the most common species in the state, with large amount of herbarium material. It is easily recognized by its aculeate-doble-serrate basal leaves and its trifid bractoles. See comments from *E. floribundum*.

8 *Eryngium eriophorum* Cham. & Schltdl., Linnaea 1: 242 (1826). Figure 12.

Plants erect, 46–73 cm tall, slender, unarmed. Basal leaves rosulate, assurgent; blade 15–44 × 0.1–0.3 cm, linear, canaliculate, apex rounded, margin entire, fimbriate at base, fimbriae 2.5–27 mm, solitary or several-grouped, longer in the base; venation parallelodromous; sheath 0.6–1 cm wide, narrowly triangular, margin fimbriate. Inflorescence axis 44–70 cm long, 1.5–2.7 mm diam., erect, cylindric, multi-striated, medullary; proximal branches absent; distal branches 0.8–3.9 cm long; cauline leaves alternate, linear or linear-triangular, entire or fimbriate at base, erect, the proximal 9.2–28.5 cm long, the distal 1.8–6 cm long; bracts of distal branches 1.2–3.6 cm long, narrowly triangular, margin fimbriate at base. Capitula blue, globose or ovoid; central capitula 12.3–16.6 × 11.1–17 mm, peduncle 1.5–6.2 cm long; lateral capitula 7.9–13 × 9.3–11.7 mm, peduncle 0.6–3.2 cm long; involucral bracts 5–8, free, 5–20.4

mm long, glabrous, lanceolate, fimbriate, apex acuminate; bracteoles 5.3–6.9 mm long, longer than the flowers, glabrous, lanceolate, entire, apex acuminate. Flowers blue; sepals glabrous, eliptic or ovate, apex mucronate; petals glabrous, elliptic, apex bifid. Fruits 2.6–3.7 × 1.7–2.6 mm, obovoid, not separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales 3, free, lanceolate, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 23 March 2009, *M. Selusniaki 2532* (MBM). Curitiba, 16 March 1995, *O.S. Ribas 799* (MBM). Jaguariaiva, 27 March 1974, *R. Kummrow 446* (MBM). Ponta Grossa, 08 March 2009, *B.O. Andrade 358* (UPCB). Sengés, 28 February 1972, *G. Hatschbach 29258* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina and Uruguay (Zuloaga *et al.* 2008). In Brazil, occurs in the states of São Paulo, Paraná, Santa Catarina and Rio Grande do Sul. In Paraná, it occurs in the first and second plateaus, between 600 and 1100 m, in grasslands, usually in dry places (Figure 11).

Phenology: Fertile plants collected mainly from February to March.

Conservation status: Extent of occurrence (EOO): 11,645.908 km² (NT). Area of occupancy (AOO): 36.000 km² (VU B2ab(i,ii,iii,iv)).

Comments: This species can be easily distinguished from the others by presenting blue capitula, and have long, thin fimbriae clusters mainly in the sheath of basal leaves and in the base of cauline leaves.

This species is similar to *Eryngium sanguisorba*, which can be distinguished by the linear basal leaves (vs. oblanceolate or narrowly elliptic in *E. sanguisorba*).

9 *Eryngium floribundum* Cham. & Schltdl., Linnaea 1: 245 (1826). Figure 13.

Plants erect, 118.5–200 cm tall, robust, prickly. Basal leaves rosulate, declinate; blade 23.5–75.7 × 1.5–4.9 cm, oblanceolate, slightly attenuate above the sheath, flat, apex acuminate or acute, margin aculeate double-serrate, prickles 1.7–28 mm long, solitary, longer in the base; venation parallelodromous near midrib, reticulodromous toward margins; sheath 2–3.8 cm wide, oblong, margin entire. Inflorescence axis 105–178 cm long, 5.3–10.7 mm diam., erect, cylindric, multi-striated or multi-furrowed, fistulose, proximal branches 11.9–25.8 cm long; distal branches 8.5–20 cm long; cauline leaves alternate, lanceolate, aculeate double-serrate, erect; the proximal 6.3–12 cm long, the distal 3–5.1 cm long; bracts of distal branches 1–2.3 cm long, lanceolate or ovate, margin aculeate double-serrate. Capitula white or vinaceous;

ovoid; central capitula 8.2–10.4 × 6.2–8.7 mm, peduncle 1–1.4 cm long; lateral capitula 7.1–9.1 × 5.4–7.5 mm, peduncle 0.8–1.2 cm long; involucral bracts 7–8, 1.8–3 mm long, pulverulent, lanceolate or ovate, entire, apex acuminate; bracteoles 2.9–3.7 mm long, longer than the flowers, pulverulent, ovate, entire, apex acute, mucronate. Flowers white or vinaceous; sepals pulverulent, widely ovate or widely elliptic, apex obtuse, mucronulate; petals pulverulent, obovate, apex bifid. Fruits 1.9–2.5 × 1.4–2.4 mm, obovoid, not separating in two mericarps when mature, ribs absent, scales heteromorphic, dorsal scales reduced, globose, lateral scales 4–5, free, lanceolate or ovate, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 01 November 2005, *C. Kozera 2472* (UPCB). Campo Mourão, 23 January 2004, *A.C. Ferreira* (HCF 748). Curitiba, 08 October 2015, *A.L. Cardozo 118* (UPCB). Jaguariaíva, 08 October 2000, *L. Von Linsingen 84* (MBM). Laranjeiras do Sul, 06 February 1994, *T.M. Pedersen 15960* (MBM). Palmas, 14 December 1966, *G. Hatschbach 15453* (MBM). Pinhais, 23 October 2009, *A. Dunaiski Jr. 3831* (MBM). São José dos Pinhais, 22 December 1950, *Tessmann* (MBM 005337). Tijucas do Sul, 06 October 2015, *A.L. Cardozo 116* (UPCB).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay and Uruguay (Zuloaga *et al.* 2008). In Brazil, occurs in the states of Distrito Federal, Goiás, Mato Grosso do Sul, Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul. In Paraná, it occurs in the three plateaus, between 585 and 1035 m, in grasslands and marshes, usually in humid places (Figure 14).

Phenology: Fertile plants collected mainly from October to February.

Conservation status: Extent of occurrence (EOO): 70,640.097 km² (NT). Area of occupancy (AOO): 36.000 km² (VU B2ab(i,ii,iii,iv)).

Comments: One of the most common species for the state, occurring in most of the marshes with herbaceous vegetation. This species is similar to *Eryngium elegans*, which can be distinguished by bracteoles, where in *E. elegans* they have apex 3-5-fid and in *E. floribundum* they are acute. Mathias *et al.* (1972) quotes, to the Santa Catarina state, the existence of a hybrid between the two species (*E. floribundum* x *elegans*) which presents these two types of braceotoles in the same capitula. This also occurs in Paraná, in the municipalities of Curitiba (*A.L. Cardozo 152*), Lapa (*G. Hatschbach 14038*) and Laranjeiras (*G. Hatschbach 34508*). Apparently this hybrid occurs naturally in places where plants coexist, having a more approximate appearance of *E. floribundum*, but with smaller size.

10 ***Eryngium foetidum*** L., Sp. Pl. 1: 232 (1753). Figure 15.

Plants erect, 17–60 cm tall, slender, unarmed. Basal leaves rosulate, declinate or pendulous, blade 7.1–9.6 × 1.3–1.7 cm, oblanceolate, strongly attenuate above the sheath, narrowing generally smaller than the rest of the blade, flat, apex acute, margin serrate; venation reticulodromous; sheath 4.4–5.9 cm wide, narrowly oblong or lanceolate, margin entire. Inflorescence axis 10–34 cm long, 2.1–2.5 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches absent; distal branches 4–7.3 cm long; cauline leaves absent; bracts of distal branches bracts 2.7–8.7 cm long, oblanceolate, margin aculeate or serrate. Capitula green, cylindric; central capitula 12.2–15.4 × 3.4–4.7 mm, peduncle 1.3–1.8 cm long; lateral capitula 9.7–12.1 × 3.3–4.7 mm, peduncle 0.8–1.1 cm long; involucral bracts 5–6, free, 25.2–45.1 mm long, glabrous, lanceolate or oblanceolate, entire or aculeate, apex acuminate or apiculate; bracteoles 1.9–2.7 mm long, longer than the flowers, glabrous, lanceolate, entire, apex acute. Flowers green; sepals glabrous, lanceolate, apex acute or apiculate; petals glabrous, elliptic or ovate, apex retuse or rounded. Fruits 1–1.9 × 1.4–1.8 mm, obloid, not separating in two mericarps when mature, ribs absent, scales homomorphic, globose.

Selected material:—BRAZIL. Paraná: Antonina, 25 March 1997, *R.X. Lima 445* (UPCB). Querência do Norte, 20 January 1999, *I. Tanaka 06* (CNUP).

Distribution and habitat: Cosmopolitan species found in North, Central and South America, Europe, Asia and Africa. In Brazil, occurs in all states of the country (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and third plateaus, between 338 and 500 m, present in Rain and Seasonal Forest, marshes and sometimes degraded areas, usually in humid places (Figure 14).

Phenology: Fertile plants collected mainly from January to March.

Conservation status: NE.

Comments: Its wide dispersion in Brasil is probably related to the fact that this species is edible. The plant has properties anti-hydropic, antispasmodic, aphrodisiac, emenagogue and febrile, it can also be used as a condiment (Corrêa & Pirani 2005). Despite their wide dispersion, in Paraná there are only two records in herbaria, and these do not explain much their distribution, because one is in the east and the other in the west of the state. Therefore, its occurrence in the state is probably recent and is due to the fact that the plant is usually grown in small gardens. See comments from *E. ekmanii*.

11 ***Eryngium horridum*** Malme, Ark. Bot. 3(13): 15 (1904). Figure 16.

Plants erect, 100–200 cm tall, robust, prickly. Basal leaves rosulate, assurgent, blade 54–79.8 × 1.3–3.6 cm, linear-triangular, flat, apex acuminate or apiculate, margin aculeate, prickles 2–17.6 mm long, 2-grouped, longer in the base; venation parallelodromous; sheath 1.8–3.8 cm wide, oblong, margin entire. Inflorescence axis 84–179 cm long, 12.1–23.1 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 2.5–14 cm long; distal branches 6.2–15 cm long; cauline leaves alternate, lanceolate or ovate, aculeate, reflexeded, the proximal 35–53.5 cm long, distal 6.6–10.2 cm long; bracts of distal branches 1.7–3 cm long, ovate, margin aculeate. Capitula white or green, very broadly ovoid or spheroid; central capitula 10.6–14.4 × 10.5–14.5 mm, peduncle 1.7–2.6 cm long; lateral capitula 9.3–13.1 × 9.5–13.1 mm, peduncle 1.1–1.9 cm long; involucral bracts 5–8, 3–5.2 mm long, free, pulverulent, lanceolate or ovate, entire, apex acute, mucronulate, free; bracteoles 3.5–4.3 mm long, longer than the flowers, pulverulent, lanceolate or narrowly triangular, entire, apex acute, mucronate. Flowers white; sepals pulverulent, widely ovate, apex obtuse, mucronulate; petals pulverulent, ovate, apex fimbriate. Fruits 2–3.1 × 2.2–3.3 mm, oblong, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales reduced, vesicular, lateral scales 4–5, free, oblanceolate, calycinal scales lanceolate or oblanceolate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 21 November 2005, *C. Kozera 2642* (MBM). Campo Largo, 18 November 1962, *G. Hatschbach 9632* (MBM). Curitiba, 13 December 2016 *A.L. Cardozo 155* (UPCB). Guarapuava, 06 February 1968, *G. Hatschbach 21003* (MBM). Jundiaí do Sul, 10 March 2001, *J. Carneiro 1103* (MBM). Lapa, 22 November 1991, *O. Guimarães* (UPCB 19028). Ponta Grossa, 09 October 2012, *G. Felitto 400* (MBM). São José dos Pinhais, 19 October 1995, *J. Cordeiro 1244* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay and Uruguay (Zuloaga *et al.* 2008). In Brazil, occurs in the states of Bahia, Goiás, Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, it occurs in the three plateaus, between 520 and 1098 m, in grasslands, sometimes degraded areas, usually in dry places (Figure 14). *Eryngium horridum* is probably the most common species in the State, occurring in several types of open environments, even in the most anthropized ones, and in forest borders.

Phenology: Fertile plants collected mainly from October to March.

Conservation status: Extent of occurrence (EOO): 37,408.175 km² (LC). Area of occupancy (AOO): 76.000 km² (NT).

Comments: *Eryngium horridum* can be confused with the others large species that occur in the state (for instance, *E. eburneum*), but is easily distinguished from these because it presents the cauline leaves strongly reflexed, different from others that are usually ascending or pendulous.

This species is similar to *Eryngium rochei*, which can be distinguished by your basal leaves with prickles 2-grouped (vs. in *E. rochei* they are solitary). See comments from *E. eburneum*.

12 *Eryngium junceum* Cham. & Schltdl., Linnaea 1: 241 (1826). Figure 17.

Plants erect, 25–105 cm tall, slender, unarmed. Basal leaves rosulate, assurgent or pendulous, blade 12–50.5 × 0.1–0.2 cm, linear, canaliculate, apex acuminate, margin ciliate or fimbriate, fimbriae or seta solitary, longer in the base; venation parallelodromous; sheath 0.3–0.8 cm wide, linear-triangular or linear, margin entire. Inflorescence axis 23–100 cm long, 1.1–4.2 mm diam, erect, cylindric, multi-striated, medullary; proximal branches occasionally absent, 1.5–4.7 cm long; distal branches 1–6.8 cm long; cauline leaves alternate, mostly similar to the basal leaves, erect, the proximal 8.6–32.5 cm long, distal 1.6–4.5 cm long; bracts of distal branches 1–3.3 cm long, lanceolate or linear-triangular, margin ciliate or fimbriate. Capitula blue, very broadly ovoid or broadly depressed ovoid; central capitula 5.9–9.1 × 5.7–10.2 mm, peduncle 0.5–2.2 cm long; lateral capitula 5.2–7.9 × 6–8 mm, peduncle 0.6–1.3 cm long; involucral bracts 7–8, basally connate, 3.3–7.2 mm long, glabrous, lanceolate, entire or aculeate, apex acuminate; bracteoles 3.3–4.5 mm long, longer than the flowers, glabrous, lanceolate or ovate, entire, apex acuminate, mucronate. Flowers blue; sepals glabrous, widely ovate, apex acute, apiculate; petals glabrous, oblong or ovate, apex fimbriate. Fruits 1.9–2.7 × 1.4–2.6 mm, obovoid, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales 3, free, lanceolate or ovate, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 09 March 2006, *C. Kozera 3084* (UPCB). Campo Largo, 12 March 1999, *R. Goldenberg 476* (UPCB). Colombo, 14 March 1984, *A. Bidá 369* (UPCB). Curitiba, 28 March 1950, *G. Tessmann* (MBM 005334). Jaguariaíva, 02 March 1966, *J.C. Lindeman 1446* (ICN). Lapa, 17 March 1966, *G. Hatschbach 14033* (UPCB). Palmeira, 23 February 2016, *A.L. Cardozo 132* (UPCB). Ponta Grossa, 19 March 2012, *J.M. Silva 8277* (MBM).

Distribution and habitat: This species is also found in Brazil (Zuloaga *et al.* 2008) and Paraguay. In Brazil, occurs in the states of Goiás, Mato Grosso do Sul, Minas Gerais, São Paulo, Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and second plateaus, between 826, and 1160 m, in field and rocky grasslands, usually in dry places (Figure 18).

Phenology: Fertile plants collected mainly from January to May.

Conservation status: Extent of occurrence (EOO): 4,852.632 km² (VU B1b(i,ii,iii,iv)). Area of occupancy (AOO): 60.000 km² (VU B2ab(i,ii,iii,iv)).

Comments: Species with not very wide distribution, but with a large number of collections. This is probably due to its inflorescence all tinged with blue, not only the capitula, which makes it very showy, highlighting it in the state's grasslands.

This species is similar to *Eryngium juncifolium*, which can be distinguished by your blue inflorescence (vs. white or green in *E. juncifolium*).

13 *Eryngium juncifolium* (Urb.) Mathias & Constance, Sellowia 23: 50 (1971). Figure 19.

Plants erect, 83–167 cm tall, slender, prickly or unarmed. Basal leaves rosulate, assurgent or pendulous, blade 25–69.5 × 0.1–0.3 cm, linear, canaliculate, apex acuminate, margin ciliate or fimbriate, fimbriae or seta less than 1 mm to 4.2 mm, solitary or 2–4-grouped, longer in the base; venation parallelodromous; sheath 6.8–10.1 cm wide, narrowly triangular or narrowly oblong, margin entire. Inflorescence axis 81–158 cm long, 2.3–4.7 mm diam, erect, cylindric, multi-striated, medullary; proximal branches 1.1–4 cm long; distal branches 1.2–9.2 cm long; cauline leaves alternate, mostly similar to the basal leaves, erect, the proximal 16–24.2 cm long, distal 1.6–3.1 cm long; bracts of distal branches 1–2 cm long, lanceolate, margin ciliate or fimbriate. Capitula white or green, spheroid or broadly depressed ovoid; central capitula 9.2–13 × 9.5–13.9 mm, peduncle 1–3.5 cm long; lateral capitula 7.9–9.8 × 7.4–9.8 mm, peduncle 1.2–2 cm long; involucral bracts 10–11, basally connate, 3.2–6.1 mm long, glabrous, lanceolate, entire, apex acuminate; bracteoles 3.8–6.4 mm long, longer than the

flowers, glabrous, lanceolate or ovate, entire, apex acuminate, cuspidate mucronulate. Flowers white; sepals glabrous, widely eliptic or widely oblong, apex obtuse or retuse, apiculate; petals glabrous, obovate, apex bifid or trifid. Fruits 2.4–3.3 × 2.1–2.8 mm, obovoid or oblanceoloid more than, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales fused together to form two lateral wings, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Araucária, 10 February 1959, *R.B. Lange 1290* (UPCB). Campo Mourão, 01 March 2017, *A.L. Cardozo 171* (MBM, UPCB). Curitiba, 18 February 2016, *A.L. Cardozo 128* (UPCB). Guarapuava, 07 February 1969, *G. Hatschbach 21013* (MBM). Jaguariaiva, 18 January 1965, *G. Hatschbach 12286* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay (Zuloaga *et al.* 2008) and Venezuela. In Brazil, occurs in the states of Distrito Federal, Goiás, Mato Grosso do Sul, Minas Gerais, São Paulo, Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, occurs in the three plateaus, between 585 and 1098 m, in Savannah and grasslands, in dry places (Figure 18).

Phenology: Fertile plants collected mainly from January to March.

Conservation status: Extent of occurrence (EOO): 37,156.301 km² (NT). Area of occupancy (AOO): 20.000 km² (EN B2ab(i,ii,iii)).

Comments: See comments from *E. junceum.*

14 ***Eryngium koehneanum*** Urb., Fl. Bras. (Martius) 11(1): 323 (1879). Figure 20.

Plants erect, 76–100 cm tall, slender, prickly. Basal leaves distichous, declinate, blade 39.4–113.8 × 1.4–4.9 cm, oblanceolate or narrowly elliptic, attenuate above the sheath, narrowing generally smaller than the rest of the blade, flat, apex acuminate, margin aculeate, prickles 2.2–19.2 mm long, 2–4-grouped, longer in the sheath; venation parallelodromous; sheath 31.3–54.8 cm wide, triangular, margin densely aculeate. Inflorescence axis 62–87 cm long, 6.1–10.3 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 3.2–11.7 cm long; distal branches 4.8–17.7 cm long; cauline leaves alternate, lanceolate or oblanceolate, aculeate, erect, the proximal 36–46 cm long, distal 8.9–20.7 cm long; bracts of distal branches 2.7–12.4 cm long, lanceolate, margin aculeate. Capitula white, depressed ovoid; central capitula 6.5–9.1 × 7.5–11 mm, peduncle 0.6–1.6 cm long; lateral capitula 5.5–8.3 × 7.4–9.4 mm, peduncle 0.5–1.4 cm long; involucral bracts 6–8, basally connate, 5.1–11 mm long, glabrous, lanceolate or ovate, entire, apex acute; bracteoles 3.7–6.3

mm long, longer than the flowers, glabrous, lanceolate or ovate, entire, apex acute, mucronate. Flowers white; sepals pulverulent, ovate, apex acute or obtuse, mucronulate; petals pulverulent, obovate, apex fimbriate. Fruits 2.3–3.9 × 2–4.3 mm, obovoid or oblanceoloid more than, separating in two mericarps when mature, ribs present, scales fused into a single membrane that covers the fruit and forms two lateral wings.

Selected material:—BRAZIL. Paraná: Antonina, 25 January 1993, *G. Hatschbach 58532* (MBM). Campina Grande do Sul, 06 February 2010, *E.D Lozano 213* (MBM). Morretes, 23 February 1967, *J. Linderman 4642* (ICN, MBM).

Distribution and habitat: This species is endemic to Brazil (Zuloaga *et al.* 2008) and found in the states of Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, occurs in the mountain range that separates the coastal region from other plateaus, between 800 and 1950 m, in Elevation Rain Forest and elevation fields, sometimes in rocky faces, always in humid places (Figure 18).

Phenology: Fertile plants collected mainly from January to August.

Conservation status: Extent of occurrence (EOO): 239.566 km² (EN B1ab(iii,iv); D). Area of occupancy (AOO): 20.000 km² (EN B2ab(iii,iv); D).

Comments: Endemic species of the mountain peaks of Brazil, in regions of quite cloudiness. Found in areas of high humidity and shallow soils, often in small substrate blocks on rocks or even in small pools of water. The margin of the hem of the basal leaves densely covered by spines and the involucral bracts inflexed makes it easy to differentiate it from other species of the genus. See comments from *E. pohlianum*.

15 ***Eryngium ombrophilum*** Dusén & H. Wolff, Ark. Bot. 10(5): 2 (1911). Figure 21.

Plants creeping, 56–94 cm long, slender, unarmed. Basal leaves rosulate, assurgent, blade 16–34 × 2.5–4.2 cm, oblanceolate, strongly attenuate above the sheath, narrowing generally longer than the rest of blade, flat, apex acuminate or mucronate, margin serrate; venation reticulodromous; sheath 0.9–1.8 cm wide, triangular or narrowly triangular, margin entire. Inflorescence axis 54–78 cm long, 2.7–4 mm diam, prostrate, cylindric, multi-striated or multi-furrowed, medullary; proximal branches usually absent, when present 6.3–18.6 cm long; distal branches 1.4–10.5 cm long; cauline leaves verticillate, 3–7 per node, mostly similar to basal ones, usually one at each node different from the others and lacking a narrow base, pendulous, the proximal 4.5–24.4 cm long, the distal 2.6–16.4 cm long; bracts of distal branches 1–4.9 cm long, lanceolate or narrowly triangular, margin serrate or crenulate.

Capitula white or green, cylindric; central capitula 11.3–13.8 × 5.5–7.3 mm, peduncle 1.5–4.4 cm long; lateral capitula 7.9–12.3 × 5–7.6 mm, peduncle 0.6–3 cm long; involucral bracts 5-8, free, 3.2–10.4 mm long; glabrous, lanceolate, with at least one pair of teeth, apex acuminate, free; bracteoles 3.1–3.6 mm long, longer than the flowers, glabrous, linear-triangular or lanceolate, with at least one pair of teeth, apex acuminate. Flowers white or green, sepals glabrous, linear or narrowly triangular, apex cuspidate or mucronate; petals glabrous, narrowly oblong, apex entire with a single lateral-apical fimbria. Fruits 1.1–1.8. × 1–1.6 mm, broadly ovoid, not separating in two mericarps when mature, ribs present, scales homomorphic, globose.

Selected material:—BRAZIL. Paraná: Campina Grande do Sul, 25 December 1958, *G. Hatschbach 5383* (MBM). Morretes: 09 January 1969, *G. Hatschbach 20700* (MBM, UPCB). Quatro Barras: 13 March 2016, *A.L. Cardozo 140* (UPCB).

Distribution and habitat: This species is endemic to Brazil and endemic to Paraná (Zuloaga *et al.* 2008), occurring only in the Serra do Mar mountains, between 700 and 940 m, in rain forests and marshes, in humid places (Figure 22).

Phenology: Fertile plants collected mainly from December to March.

Conservation status: Extent of occurrence (EOO): 36.000 km² (CR B1ab(iii,iv); D). Area of occupancy (AOO): 16.000 km² (EN B2ab(iii,iv); D).

Comments: Species rare for Paraná, being found only within the forests of the Serra do Mar mountains. It occurs in places of intense shading, in hydromorphic soils and in close relation with water bodies. Only species of the state that presents creeping habit. See comments from *E. ekmanii*.

16 ***Eryngium pandanifolium*** Cham. & Schltdl., Linnaea 1: 236 (1826). Figure 23.

Plants erect, 100–250 cm tall, robust, prickly. Basal leaves rosulate, assurgent or pendulous, blade 53.8–171.8 × 1.9–4.6 cm, linear or linear-triangular, flat, apex acuminate, margin slightly aculeate or aculeate, prickles less than 1 mm to 9.1 mm long, solitary or 2-3-grouped, longer in the base or uniform in size throughout margin; venation parallelodromous; sheath 1.3–6.3 cm wide, narrowly oblong to oblong, or lanceolate, margin entire. Inflorescence axis 120–235 cm long, 21–33 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 6.3–26.5 cm long; distal branches 8.8–17 cm long; cauline leaves alternate, similar basal, oblong or lanceolate, slightly aculeate or aculeate, erect or pendulous, the proximal 73.1 cm long; distal 6.5–49.8 cm long; bracts of distal branches 2.4–9.1 cm long,

lanceolate to ovate, or linear-triangular, margin aculeate or entire. Capitula white, green, or vinaceous, ovoid to broadly ovoid, or cylindric; central capitula 7.3–11.2 × 5.7–10.1 mm, peduncle 0.7–2.8 cm long; lateral capitula 6.9–9.9 × 5.3–9.9 mm, peduncle 0.5–1.6 cm long; involucral bracts 5–8, free, 2–4.8 mm long, glabrous or pulverulent, lanceolate, entire, apex acuminate, mucronate; bracteoles 2.8–4.3 mm long, +/- the same size of flowers or longer than the flowers, glabrous, pulverulent or pulverulent only in the midrib, lanceolate to widely ovate, entire, apex acuminate or acute, cuspidate or mucronate. Flowers white or vinaceous; sepals glabrous, pulverulent or pulverulent on midrib, ovate or widely ovate, apex acute or obtuse, mucronate or mucronulate; petals pulverulent or pulverulent on midrib, ovate to widely ovate, or obovate, apex bifid or fimbriate. Fruits 2–3.5 × 1.9–3.9 mm, oblanceoloid more than to obovoid, or narrowly oblong to oblong, When mature divided or not into two mericarps, ribs present or absent, scales heteromorphic, dorsal scales absent or reduced vesicular or globose, lateral scales 3–4, free or basally connate, lanceolate, calycinal scales lanceolate to ovate, or narrowly oblong.

Selected material:—BRAZIL. Paraná: Campo Mourão, 05 February 1962, *G. Hatschbach 9110* (MBM). Curitiba, 22 October 1986, *S. Goetzke 59* (MBM). General Carneiro, 10 February 1966, *G. Hatschbach 13656* (MBM). Guarapuava, 06 February 1969, *G. Hatschbach 20996* (MBM). Piraquara, 29 August 2008, *M. Fritsch 266* (UPCB). Ponta Grossa, 02 February 2009, *B.O. Andrade 228* (MBM). São José dos Pinhais, 14 January 1975, *G. Hatschbach 35740* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay and Uruguay (Zuloaga *et al.* 2008). In Brazil, occurs in the states of Distrito Federal, Mato Grosso do Sul, Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, occurs in the three plateaus, between 585 and 1098 m, in grasslands, marshes and river banks, always in humid places (Figure 22).

Phenology: Fertile plants collected mainly from August to March.

Conservation status: Extent of occurrence (EOO): 44,196.337 km² (LC). Area of occupancy (AOO): 52.000 km² (VU B2b(i,ii,iii,iv)).

Comments: Mathias & Constance (1971) attributed three varieties for this species, and all occur in Paraná. The following are the identification key and a brief diagnosis for the varieties.

Identification key for varieties of *E. pandanifolium*

1. Capitula vinaceous …….. var. *pandanifolium*
- Capitula white or green ……..… 2
2. Basal leaves clearly aculeate, prickly generally larger than 1 cm and 2-3-grouped ……...… var. *lasseauxii*
- Basal leaves imperceptibly aculeate, prickly less than 1 cm and solitary ……...… var. *chamissonis*

16.1 ***Eryngium pandanifolium*** Cham. & Schltdl. var. ***pandanifolium*** Mathias & Constance, Sellowia 23: 50 (1971)

Plants erect, 100–200 cm tall. Basal leaves ca. 117–160 × 1.8–4 cm, aculeate, prickles lass than 1mm to–2.1 mm long, solitary. Capitula central vinaceous, 9.1–11.3 × 5.7–8.1 mm.

16.2 ***Eryngium pandanifolium*** Cham. & Schltdl. var. ***chamissonis*** (Urb.) Mathias & Constance, Sellowia 23: 50 (1971)

Plants erect, 180–250 cm tall. Basal leaves 53.8–171.8 × 2–4.2 cm, aculeate, prickles 2.6–7 mm long, solitary. Capitula central white or green, 7.3–10 × 6.8–8.6 mm.

16.3 ***Eryngium pandanifolium*** Cham. & Schltdl. var. ***lasseauxii*** (Decne) Mathias & Constance, Sellowia 23: 50 (1971)

Plants erect, 170–250 cm tall. Basal leaves 108.4–110.2 × 3.7–4.2 cm, aculeate, prickles 4–9.1 mm long, 2-3-grouped. Capitula central white or green, 8.8–10.6 × 8.4–10 mm.

17 ***Eryngium pohlianum*** Urb., Fl. Bras. (Martius) 11 (1): 336 (1879). Figure 24.

Plants erect, 103–118 cm tall, slender, unarmed. Basal leaves distichous, pendulous, blade 37–118.1 × 0.2–0.5 cm, linear, canaliculate, apex acuminate, margin ciliate, seta less than 1 mm to 2 mm, solitary, longer in the base; venation parallelodromous; sheath 1.6–3.3 cm wide, narrowly triangular or lanceolate, margin entire. Inflorescence axis 92–110 cm long, 3.4–7.5 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 3–

12.5 cm long; distal branches 5.1–13.5 cm long; cauline leaves alternat, similar basal, erect, the proximal 33.2–59 cm long, distal 4.2–10.2 cm long; bracts of distal branches 1–2.4 cm long, lanceolate or linear-triangular; margin entire or ciliate. Capitula white or vinaceous, ovoid to very broadly ovoid; central capitula 8.9–12.3 × 8.5–11.5 mm, peduncle 1.4–2.5 cm long; lateral capitula 6.9–10 × 4.9–9.5 mm, peduncle 0.8–1.9 cm long; involucral bracts 7–9, free 1.9–3.3 mm long, glabrous, lanceolate or ovate, entire, apex acuminate, mucronulate; bracteoles 2.9–4.3 mm long, +/- the same size of flowers, glabrous, obovate or widely obovate, entire, apex acute, mucronate. Flowers white or vinaceous; sepals glabrous, depressed ovate, apex obtuse, mucronulate; petals glabrous, elliptic or obovate, apex bifid or fimbriate. Fruits 2.3–3.2 × 2.2–3.1 mm, obovoid, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales 3, free, ovate, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Jaguariaiva, 13 October 1968, *Hatschbach 20056* (MBM). Palmeira, 07 November 2004, *M.G. Caxambu 624* (MBM, HCF). Pirai do Sul, 17 November 1970, *G. Hatschbach 25425* (MBM). Tibagi, 29 March 1953, *G. Hatschbach 3073* (MBM). Ventania, 17 September 2005, *D.A. Estevan 942* (MBM).

Distribution and habitat: This species is endemic to Brazil (Zuloaga *et al*. 2008) and found in the states of Goiás, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and second plateaus, between 748 and 1036 m, in field and rocky grasslands, in dry or humid places (Figure 22).

Phenology: Fertile plants collected mainly from September to March.

Conservation status: Extent of occurrence (EOO): 6,763.566 km² (VU B1b(i,ii,iii,iv)). Area of occupancy (AOO): 24.000 km² (EN B2b(i,ii,iii,iv)).

Comments: It differs from the other species of *Eryngium* mainly due to the presence of basal leaves distichous with lightly ciliated margin, practically entire. The species *E. koehneanum*, *E. subinerme* and *E. regnelii* also show distichous leaf distribution, but they are not confused with this species since the first one presents densely aculeate sheath, the second has few chapters and is much larger in size, and the third has much more visible long seta in the leaf. See coments from *E. canaliculatum.*

18 ***Eryngium pristis*** Cham. & Schltdl., Linnaea 1: 237 (1826). Figure 25.

Plants erect, 38–120 cm tall, slender, prickly. Basal leaves rosulate, assurgent declinate, blade 7–26 × 0.1–0.4 cm, linear, flat, apex acuminate, margin aculeate, prickles 1.6–20.4 mm long, solitary or 2–3-grouped, longer in the base or uniform in size throughout margin; venation parallelodromous; sheath 3.3–6.3 cm wide, narrowly triangular to triangular or oblong, margin entire or fimbriate. Inflorescence axis 36–109 cm long, 1.7–8.4 mm diam, erect, cylindric, multi-striated, usually medullary; proximal branches 2–10 cm long; distal branches 1.5–9.4 cm long; cauline leaves alternate, lanceolate or linear, aculeate or fimbriate, erect, the proximal 3.7–11.9 cm long, distal 1.3–4.5 cm long; bracts of distal branches 0.7–1.7 cm long, lanceolate, margin aculeate or fimbriate. Capitula white, broadly ovoid or broadly depressed ovoid; central capitula 6–7.7 × 5.2–8.5 mm, peduncle 0.5–1.7 cm long; lateral capitula 5.4–7.4 × 5.7–8.1 mm, peduncle 0.4–1.6 cm long; involucral bracts 7–9, basally connate, 3.1–5.3 mm long; pulverulent, lanceolate or ovate, entire or sometimes with some teeth, apex acuminate, mucronate or cuspidate; bracteoles 3.3–4.9 mm long, longer than the flowers, pulverulent, lanceolate or ovate, entire, apex acuminate. Flowers white; sepals pulverulent, ovate to very widely ovate, apex acuminate, mucronate or mucronulate. Petals pulverulent, ovate or obovate, apex fimbriate. Fruits 1.8–3.3 × 1.8–2.8 mm, oblanceoloid more than to broadly obovoid, not separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent or reduced globose, lateral scales 4–5, free, lanceolate, oblanceolate or narrowly oblong, calycinal scales lanceolate or narrowly oblong.

Selected material:—BRAZIL. Paraná: Balsa Nova, 09 March 2006, *C. Kozera 3083* (UPCB). Campo do Tenente, 10 February 1982, *R. Kummrow 1725* (MBM). Curitiba, 03 March 2016, *A.L. Cardozo 137* (UPCB). Jaguariaíva, 01 January 1965, *G. Hatschbach 12182* (MBM). Lapa, 15 February 1967, *G. Hatschbach 15968* (MBM). Palmeira, 29 March 1959, *G. Hatschbach 5577* (MBM). Ponta Grossa, 02 March 1962, *G. Hatschbach 8974* (UPCB). São Jerônimo da Serra, 24 February 1957, *G. Hatschbach 3633* (MBM). Tuneiras do Oeste, 28 February 2013, *M.G. Caxambu 4572* (MBM, HCF). Ventania, 02 May 2000, *J. Carneiro 947* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay, Uruguay (Zuloaga *et al.* 2008) and Bolivia. In Brazil, occurs in the states of Tocantins, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, it occurs in the three

plateaus, between 600 and 1100 m, in Savannah and grasslands, usually in dry or humid places (Figure 26).

Phenology: Fertile plants collected mainly from September to May.

Conservation status: Extent of occurrence (EOO): 42,781485 km² (LC). Area of occupancy (AOO): 56.000 km² (VU B2b(iii)).

Comments: Malme (1904) and Wolff (1913) have designated three varieties for this species. Two of these occur in Paraná, *E. pristis* Cham. & Schltdl. var. *pristis* H.Wolff (1913: 259) and *E. pristis* Cham. & Schltdl. var. *abbreviatum* H.Wolff (1913: 260). The following are the identification key and a brief diagnosis for the varieties.

Identification key for varieties of *E. pristis*

1. Very narrow basal leaves, 1-2 mm, with prickles much larger than the blade width and 2-3-grouped …… var. *pristis*
- Wider basal leaves, 2-4.2 mm, with spines slightly larger than blade width and solitary ……..… var. *abbreviatum*

18.1 *E. pristis* Cham. & Schltdl. var. ***pristis*** H.Wolff, Pflanzenr. (Engler) 4 (228): 259 (1913).

Plants erect, 57.4–120 cm tall. Basal leaves 11.3–26 × 0.1–0.2 cm, aculeate, prickles 1.6–20.4 mm long, 2-3-grouped. Capítula central white or green, 6.5–7.4 × 5.2–8.5 mm.

18.2 *E. pristis* Cham. & Schltdl. var. ***abbreviatum*** H.Wolff, Pflanzenr. (Engler) 4 (228): 260 (1913).

Plants erect, 37.8–93.6 cm tall. Basal leaves 7–23.9 × 0.2–0.4 cm, aculeate, prickles 2.2–6.9 mm long, solitary. Capítula central white or green, 5.5–7.7 × 6.1–7.4 mm.

19 *Eryngium regnellii* Malme, Ark. Bot. 3 (13): 9 (1904). Figure 27.

Plants erect, 150 cm tall, slender, unarmed. Basal leaves distichous, assurgent, blade 43.5–60.5 × 1–1.4 cm, linear, flat, apex acuminate, margin fimbriate, fimbriae 1.2–16.27 mm, solitary or 2-grouped, longer in the base or in the sheath apex; venation parallelodromous; sheath 1.4–1.7 cm wide, linear, margin fimbriate. Inflorescence axis 140 cm long, 5.5 mm

diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches 4.5–8.5 cm long; distal branches 5–6.5 cm long; cauline leaves alternate, mostly similar to the basal leaves, the proximal 42.5 cm long, distal 11.2 cm long; bracts of distal branches 1.1–1.8 cm long, lanceolate, margin aculeate. Capitula white or green, very broadly ovoid or ellipsoid; central capitula 7.7–8.3 × 6–6.8 mm, peduncle 1.6–1.8 cm long; lateral capitula 6.6–7.7 × 5.1–5.8 mm, peduncle 1–1.1 cm long; involucral bracts 6, free, 2–2.8 mm long, pulverulent, ovate, entire, apex acuminate; bracteoles 3.1–3.5 mm long, longer than the flowers, pulverulent, ovate, entire, apex acuminate or mucronate, midrib prominent on abaxial face. Flowers white; sepals pulverulent, ovate or widely ovate, apex acute or obtuse, mucronate; petals pulverulent, elliptic, apex fimbriate. Fruits 1.9–2.4 × 1.9–2.8 mm, obovoid or ellipsoid, not separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales reduced, globose, lateral scales 4, free, lanceolate or ovate, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Rio Negro, 13 December 1951, *G. Hatschbach 2635* (MBM).

Distribution and habitat: This species is found in Brazil, Argentina and Uruguay (Zuloaga *et al.* 2008). In Brazil, it is found in the states of Distrito Federal, Goiás, Minas Gerais, Paraná, Santa Catarina and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, occurs only in the first plateau, at about 780 m, in grasslands, in dry places (Figure 26).

Phenology: Fertile plant collected mainly in December.

Conservation status: Extent of occurrence (EOO): < 100.000 km² (CR B1a; D). Area of occupancy (AOO): < 10.000 km² (CR B2a; D).

Comments: Species rare in the state, found only in the municipality of Rio Negro, and with only one exsicata in herbarium. Commonly cited as epipetric (Mathias & Constance 1972). See comments from *E. pohlianum*.

20 *Eryngium rochei* Constance, Brittonia 31 (3): 365 (1979). Figure 28.

Plants erect, 107.5–140 cm tall, robust, prickly. Basal leaves rosulate, assurgent; blade 46–69.5 × 11.4–17 cm, linear, flat, apex acuminate, margin aculeate, prickles 1.5–4.6 mm long, solitary, longer above the sheath or in the median portion, venation parallelodromous; sheath 1.7–2.2 cm wide, linear, margin entire. Inflorescence axis 112–128 cm long, 7.1–9.4 mm diam, erect, cylindric, multi-striated or multi-furrowed, medullary, proximal branches 1–8.5 cm long; distal branches 5.5–10 cm long; cauline leaves alternate, linear or lanceolate,

aculeate, reflexed, the proximal 35–50 cm long, the distal 3.5–5 cm long; bracts of distal branches 1.2–2 cm long, lanceolate, margin aculeate. Capitula white or green, ovoid or depressed ovoid; central capitula 12.6–15 × 13.5–15.7 mm, peduncle 1.6–2.2 cm long; lateral capitula 11.2–12.8 × 12.5–14 mm, peduncle 1.3–1.9 cm long; involucral bracts 6–11, free, 6.5–9 mm long, pulverulent, lanceolate, entire or aculeate, apex acuminate or acute; bracteoles 6–6.6 mm long, longer than the flowers, pulverulent, lanceolate, entire, apex acuminate. Flowers white; sepals pulverulent, ovate, apex acuminate; petals pulverulent, oblong, apex fimbriate. Fruits 3.2–3.8 × 2.5–3.3 mm, obovoid, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scale 5–6, lanceolate, free, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Campo Mourão, 01 March 2017, *A.L. Cardozo 172* (FLOR, MBM, UPCB).

Distribution and habitat: This species is found in Paraguay (Constance 1979) and Brazil, in the states of Mato Grosso do Sul and Paraná (Brazilian Flora 2020, in construction). In Paraná, occurs only in the third plateau, at about 600 m, in savannah, in dry places (Figure 26).

Phenology: Fertile plant collected mainly from January to March.

Conservation status: Extent of occurrence (EOO): < 100.000 km² (CR B1ab(i,ii,iii,iv,v); D). Area of occupancy (AOO): < 10.000 km² (CR B2ab(i,ii,iii,iv,v); D).

Comments: A rare plant in the state, found only in a small fragment of savannah present in the municipality of Campo Mourão. The only record that existed from this plant dates back to 1967 (*G. Hatschbach 15928*), and during this study the plant was rediscovered. See comments for *E. horidum*.

21 ***Eryngium sanguisorba*** Cham. & Schltdl., Linnaea 1: 239 (1826). Figure 29.

Plants erect, 69–102 cm tall, slender, unarmed. Basal leaves rosulate, declinate, blade 6–44.5 × 0.9–1.8 cm, oblanceolate or narrowly elliptic, generally attenuate above the sheath, flat, apex acute, margin entire, slightly aculeate or ciliate, prickles or seta less than 1 mm to 1.2 mm long, solitary, uniform in size throughout margin; venation parallelodromous; sheath 0.7–2.1 cm wide, triangular or narrowly triangular, margin entire. Inflorescence axis 59–75 cm long, 1.8–8.4 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches occasionally absent, 5.8–25.7 cm long; distal branches occasionally absent, 4–19.5 cm long; cauline leaves usually only one per axis, lanceolate or oblanceolate, entire, slightly

aculeate or ciliate, erect, 0.9–6 cm long; bracts of distal branches 0.6–1.7 cm long, lanceolate or ovate, margin entire or aculeate. Capitula blue or vinaceous, ovoid or broadly ovoid; central capitula 15.3–20.5 × 14.2–19.5 mm, peduncle 9–20.7 cm long; lateral capitula occasionally absent, 12.8–17.2 × 10.1–14.9 mm, peduncle 3.8–10.7 cm long; involucral bracts 8–13, free, 3.8–12.9 mm long, glabrous, lanceolate, entire, apex acuminate, mucronate or trifid; bracteoles 4.4–7.3 mm long, longer than the flowers, glabrous, lanceolate, narrowly triangular, or triangular, entire, apex acuminate, mucronate. Flowers blue or vinaceous; sepals glabrous, ovate, apex acute or obtuse, mucronate or cuspidate. Petals glabrous, narrowly elliptic or lanceolate, apex bifid. Fruits 2.6–4.1 × 2–2.9 mm, oblong or ellipsoid, not separating in two mericarps when mature, ribs absent, scales heteromorphic, dorsal scales globose or fusiform, lateral scales 5, free, lanceolate or oblanceolate, calycinal scales lanceolate or oblanceolate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 19 March 2005, *A. Dunaiski Jr. 2704* (MBM). Colombo, 08 February 1984, *A. Bidá 366* (UPCB). Curitiba, 03 March 2016, *A.L. Cardozo 136* (UPCB). Lapa, 13 November 1999, *J. Cordeiro 1613* (MBM). Palmeira, 23 February 2016, *A.L. Cardozo 133* (MBM). Piraquara, 03 June 1972, *N. Imaguire 3083* (MBM). Ponta Grossa, 13 January 1987, *A. Krapovickas* (MBM 132364).

Distribution and habitat: This species is found in Brazil, Argentina, Paraguay and Uruguay (Zuloaga *et al.* 2008). In Brazil, occurs in the states of Mato Grosso do Sul, Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and second plateaus, between 865 and 1183 m, in grasslands, always in dry places (Figure 26).

Phenology: Fertile plants collected mainly from November to June.

Conservation status: Extent of occurrence (EOO): 1,697.720 km² (VU B1b(i,ii,iii)). Area of occupancy (AOO): 40.000 km² (VU B2b(i,ii,iii)).

Comments: Species easily distinguished from the others by their large capitula, generally blue, with rare exceptions vinaceous (*J. Cordeiro 1613*), and large and reflexed involucral bracts. Species with large numbers of collections, probably due to their showy colors, which highlights it in the grasslands of the state. See comments from *E. eriophorum.*

22 *Eryngium scirpinum* Cham., Linnaea 8: 324 (1833). Figure 30.

Plants erect, 33–85 cm tall, slender, unarmed. Basal leaves rosulate, assurgent or declinate, blade 11.1–48.5 × 0.1–0.3 cm, linear, canaliculate, apex acuminate, margin fimbriate,

fimbriae 1.3–10.5 mm, 2–4-grouped, longer above the sheath or in the median portion; venation parallelodromous; sheath 0.4–1.4 cm wide, triangular or narrowly triangular, margin entire. Inflorescence axis 26–72 cm long, 1.7–4.4 mm diam, erect, cylindric, multi-striated, medullary; proximal branches 5.3–13.3 cm long; distal branches 3.3–9.6 cm long; cauline leaves alternate, mostly similar to the basal leaves, erect, the proximal 4.4–14.7 cm long, distal 2.6–6.4 cm long; bracts of distal branches 0.5–2.4 cm long, lanceolate, margin fimbriate. Capitula white or green, broadly depressed ovoid; central capitula 6.1–8.5 × 6.7–9.3 mm, peduncle 1.2–4.5 cm long; lateral capitula 5.4–8.4 × 6.1–7.4 mm, peduncle 1.5–2.6 cm long; involucral bracts 8–12, basally connate, 2.8–5.3 mm long, glabrous, ovate, entire, apex acuminate; bracteoles 3.4–4.3 mm long, longer than the flowers, pulverulent, lanceolate or ovate, entire, apex acuminate or acute. Flowers white or green; sepals pulverulent, very widely ovate, apex obtuse, mucronulate. Petals pulverulent, obovate, apex fimbriate. Fruits 1.9–2.9 × 1.5–2.5 mm, narrowly oblong or ellipsoid, separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, lateral scales 3–5, free, lanceolate or ovate, calycinal scales lanceolate or ovate.

Selected material:—BRAZIL. Paraná: Balsa Nova, 22 January 2014, *J. Cordeiro 5122* (MBM). Campina Grande do Sul, 14 November 2003, *M.B. Scheer 638* (UPCB). Campo Largo, 12 March 1999, *R. Goldenberg 478* (UPCB). Palmeira, 15 January 1951, *A. Mattos* (UPCB 2163). Ponta Grossa, 28 December 1970, *L. Krieger 9790* (UPCB). Tibagi, 28 November 2013, *M.G. Caxambu 4931* (MBM, HCF).

Distribution and habitat: This species is found in Brazil, Argentina (Zuloaga *et al.* 2008) and Paraguay. In Brazil, occurs in the states of São Paulo, Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and second plateaus, between 748 and 1690 m, in elevation grasslands, usually in dry places (Figure 31).

Phenology: Fertile plants collected mainly from October to March.

Conservation status: Extent of occurrence (EOO): 7,438.600 km² (VU B1ab(i,ii,iii)). Area of occupancy (AOO): 28.000 km² (EN B2b(i,ii,iii)).

Comments: It is a small species, rarely exceeding 50 cm, which has as its main diagnostic feature its narrow and canaliculate basal leaves with usually 4-grouped fimbriae. These are the main characteristics that distinguish it from *E. pristis*, Species similar to it when vegetative, but which presents flat basal leaves, with rigid and solitary prickles (or at most 3-grouped).

23 *E. stenophyllum* var. *corymbosum* Urb., Fl. Bras. (Martius) 11(1): 330 (1879). Figure 32.

Plants erect, 117–200 cm tall, robust, prickly. Basal leaves rosulate, assurgent; blade 34.7–50 × 0.6–0.9 cm, linear, flat, apex acuminate, margin aculeate, prickles 1.2–5.4 mm long, solitary, longer above the sheath or in the median portion; venation parallelodromous; sheath 1–1.4 cm wide, oblong, margin entire. Inflorescence axis 101–168 cm long, 7.5–9.5 mm diam., erect, cylindric, multi-striated or multi-furrowed, medullary; proximal branches 3.2–8.3 cm long; distal branches 7.2–9.5 cm long; cauline leaves alternate, linear or lanceolate, aculeate, erect, the proximal 29–34.5 cm long, the distal 4–5.4 cm long; bracts of distal branches 1.1–1.7 cm long, lanceolate, margin aculeate. Capitula white or green, depressed ovoid; central capitula 11.3–12.9 × 10.8–12 mm, peduncle 1.6–2 cm long; lateral capitula 8.7–10.1 × 8.7–9.2 mm, peduncle 1.1–1.9 cm long; involucral bracts 8–9, basally connate, 3.5–4.2 mm long, pulverulent, lanceolate or ovate, entire, apex acuminate, apiculate; bracteoles 4.3–5 mm long, about as long as the flowers, pulverulent, lanceolate or ovate, ciliate above the apex, apex acuminate, apiculate. Flowers white; sepals pulverulent, widely ovate, apex acute, mucronate; petals pulverulent, ovate or obovate, apex fimbriate. Fruits 3–3.8 × 2.5–3.2 mm, obovoid. separating in two mericarps when mature, ribs present, scales heteromorphic, dorsal scales absent, sateral scales 4, lanceolate, free, calycinal scales lanceolate.

Selected material:—BRAZIL. Paraná: Curitiba, 18 January 2016, *A.L. Cardozo 129* (UPCB).

Distribution and habitat: This species is found in Uruguauy (Urban 18793). The occurrence of *E. stenophyllum* var. *corymbosum* in Paraná represents a new record to state and to country. In Paraná, it occurs in the first plateau, about 900 m, in grasslands, usually in dry places (Figure 31). The plant is rare in the state, found only in a small fragment of grasslands that existed in Curitiba, transplanted to the Botanical Garden of the municipality.

Phenology: Fertile plants collected mainly from January to March.

Conservation status: Extent of occurrence (EOO): < 100.000 km² (CR B1a; D). Area of occupancy (AOO): < 10.000 km² (CR B2a; D).

Comments: Note that its classification as a variety of *Eryngium stenophyllum* is probably wrong, since the plant appears to be morphologically closer to *E. eburneum*. Further analysis is needed to propose a new combination for this species.

24 *Eryngium subinerme* (H. Wolff) Mathias & Constance, Sellowia 23: 49 (1971). Figure 33.

Plants erect, 60–131 cm tall, slender, unarmed. Basal leaves distichous, assurgent, blade 11.4–62 × 6.5–18.4 cm, oblanceolate or linear, strongly attenuate above the sheath, generally smaller than the rest of the blade, flat, apex acuminate, margin aculeate or entire, when aculeate, prickles less than 1mm to 15.9 mm long, solitary or 2-grouped, longer in the base or in the median portion; venation parallelodromous; sheath 1.6–4.2 cm wide, triangular, margin entire. Inflorescence axis 40–116 cm long, 2.2–5.7 mm diam, erect, cylindric, multi-striated or multi-furrowed, fistulose; proximal branches usually absent, when present 12 cm long; distal branches 3.6–16.8 cm long; cauline leaves alternate, lanceolate, oblanceolate or ovate, aculeate or entire, erect, the proximal 4.3–26.3 cm long, distal 1.3–13.8 cm long; bracts of distal branches 0.9–6.2 cm long, lanceolate or ovate, margin aculeate or entire. Capitula white or green, broadly ovoid or spheroid; central capitula 14.1–21.5 × 12.6–18.1 mm, peduncle 4.2–8.1 cm long; lateral capitula 13.7–18.1 × 12.6–18.1 mm, peduncle 4.2–8.1 cm long; involucral bracts 6–10, free, 4.9–18.3 mm long, glabrous, lanceolate, entire, apex acuminate, mucronate; bracteoles 5.2–8.1 mm long, longer than the flowers, glabrous, lanceolate, entire, apex acuminate, mucronate. Flowers white; sepals glabrous, widely ovate or very widely ovate, apex acute or obtuse, mucronate. Petals pulverulent on midrib, elliptic, apex acuninate. Fruits 3.9–5.4 × 2.8–4 mm, oblanceoloid more than or ovoid, not separating in two mericarps when mature, ribs present, scales fused into a single membrane that covers the fruit and forms two lateral wings.

Selected material:—BRAZIL. Paraná: Balsa Nova, 22 January 2014, *J. Cordeiro 5130* (MBM). Curitiba, 20 January 1989, *J. Cordeiro 607* (UPCB). Jaguariaíva, 04 December 1964, *G. Hatschbach 11973* (MBM). Lapa, 15 February 1967, *G. Hatschbach 15974* (MBM). Ponta Grossa, 02 February 2009, *B.O. Andrade 217* (MBM). Quatro Barras, 19 March 2016, *A.L. Cardozo 139* (MBM). Tijucas do Sul, 14 February 1978, *R. Kummrow 1212* (MBM).

Distribution and habitat: This species is endemic to Brazil (Zuloaga *et al*. 2008) and found in the states of Goiás, São Paulo, Paraná and Santa Catarina (Brazilian Flora 2020, in construction). In Paraná, it occurs in the first and second plateaus, between 820 and 1183 m, in grasslands and marshes, usually in humid places (Figure 31).

Phenology: Fertile plants collected mainly from December to February.

Conservation status: Extent of occurrence (EOO): 12,155.788 km² (NT). Area of occupancy (AOO): 44.000 km² (VU B2b(iii)).

Comments: Relatively common plant at high altitudes, being easily recognized by its practically defenseless basal leaves, mostly of the time, and by its few large capitula (13.7–21.5 × 12.6–18.1 mm), white and with also large involucral bracts (4.9–18.3 mm long). See comments from *E. pohlianum*.

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List of exsiccatae

Anderson, W.R. 11767 (12); **Andrade, B.O.** 169 (16), 173 (24), 217 (24), 228 (16), 358 (8); **Barbosa, E.** 847 (21), 1756 (3); **Barboza, I.F.** s/n (12); **Bianek, A.E.** 265 (13); **Bidá, A.** s/n (4), 366 (21), 369 (12), 702 (4); **Brade, A.C.** 19550 (4); **Braga, R.** 163 (7), 1504 (12); **Britez, R.M.** 570 (5), 1322 (5); **Brotto, M.L.** 905 (21), 908 (12); **Bueno, J.** 61 (16); **Bufrem, A.** 47 (4); **Buttura** 177 (6), 671 (4); **Cardozo, A.L.** 109 (7), 116 (9), 117 (7), 118 (9), 119 (9), 120 (7), 124 (5), 126 (11), 127 (21), 128 (13), 129 (23), 130 (7), 131 (7), 132 (12), 133 (21), 134 (5), 135 (5), 136 (21), 137 (18), 138 (2), 139 (24), 140 (15), 141 (5), 142 (5), 148 (5), 151 (7), 153 (14), 154 (7), 155 (11), 156 (14), 157 (24), 158 (14), 159 (21), 160 (20), 161 (13), 162 (4), 163 (21), 164 (12), 165 (22), 166 (2), 167 (7), 168 (17), 169 (8), 170 (2), 171 (13), 172 (20), 173 (16), 174 (17), 175 (5), 176 (12), 177 (22), 178 (4), 179 (24); **Carneiro, J.** 403 (17), 947 (18), 1103 (11); **Caxambu, M.G.** 624 (17), 627 (22), 922 (4), 1063 (12), 2507 (5), 3668 (5), 3685 (14), 3744 (7), 3748 (2), 3771 (12), 3780 (18), 4572 (18), 4931 (22), 4937 (2), 4947 (4); **Cervi, A.C.** 3250 (4), 4071 (12), 6246 (4); **Cordeiro, J.** 607, 1244 (11), 1491 (24), 1613 (21), 1980 (18), 5122 (22), 5126 (4), 5130 (24), 5139 (12); **Cure, J.R.** s/n (7), s/n (21); **de Souza, N.L.** 66 (14); **do Amaral, W.** 09 (12); **Dombrowski, L.T.** 13753 (5); **Dunaiski Jr.,**

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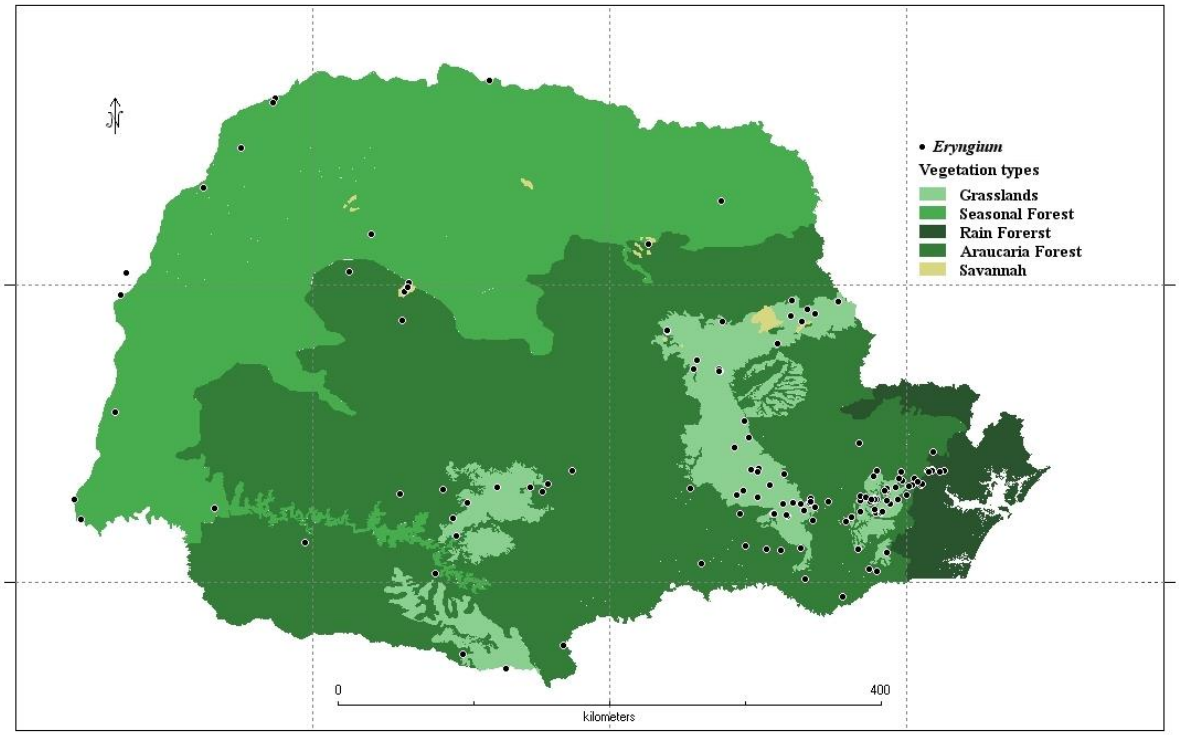

FIGURE 1. Distribution map of *Eryngium* L. in Paraná.

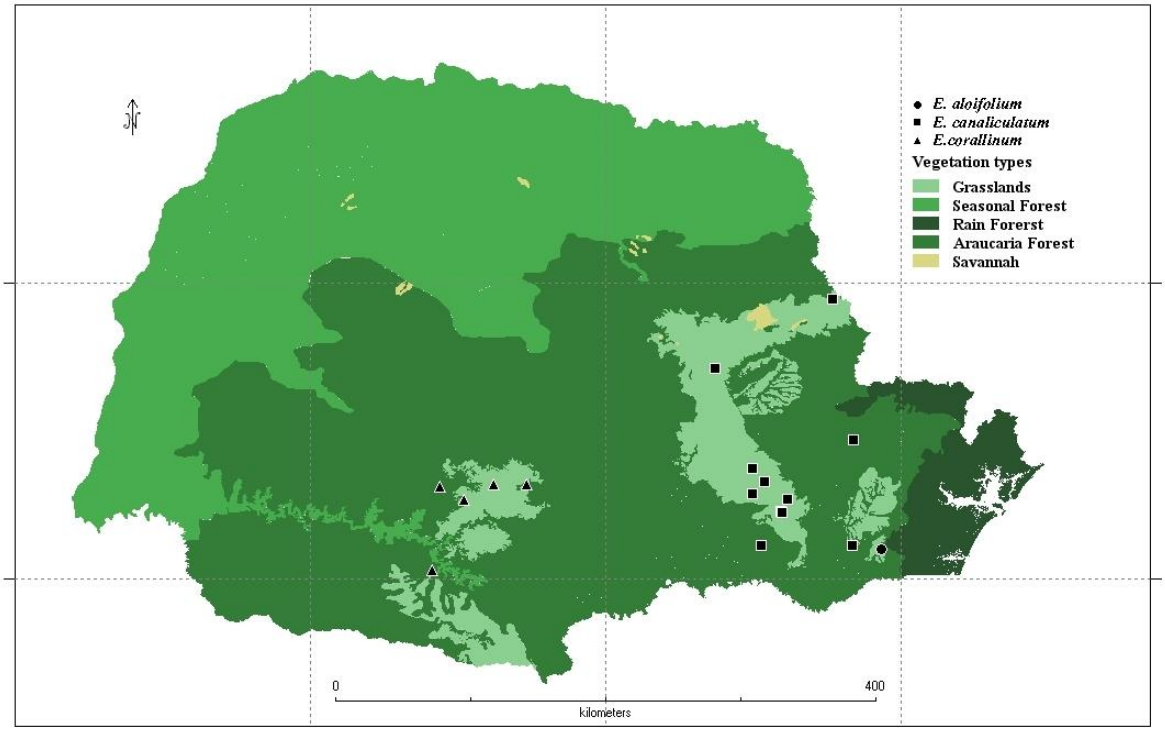

FIGURE 3. Distribution map of *Eryngium aloifolium, E.canaliculatum* and *E. corallinum.*

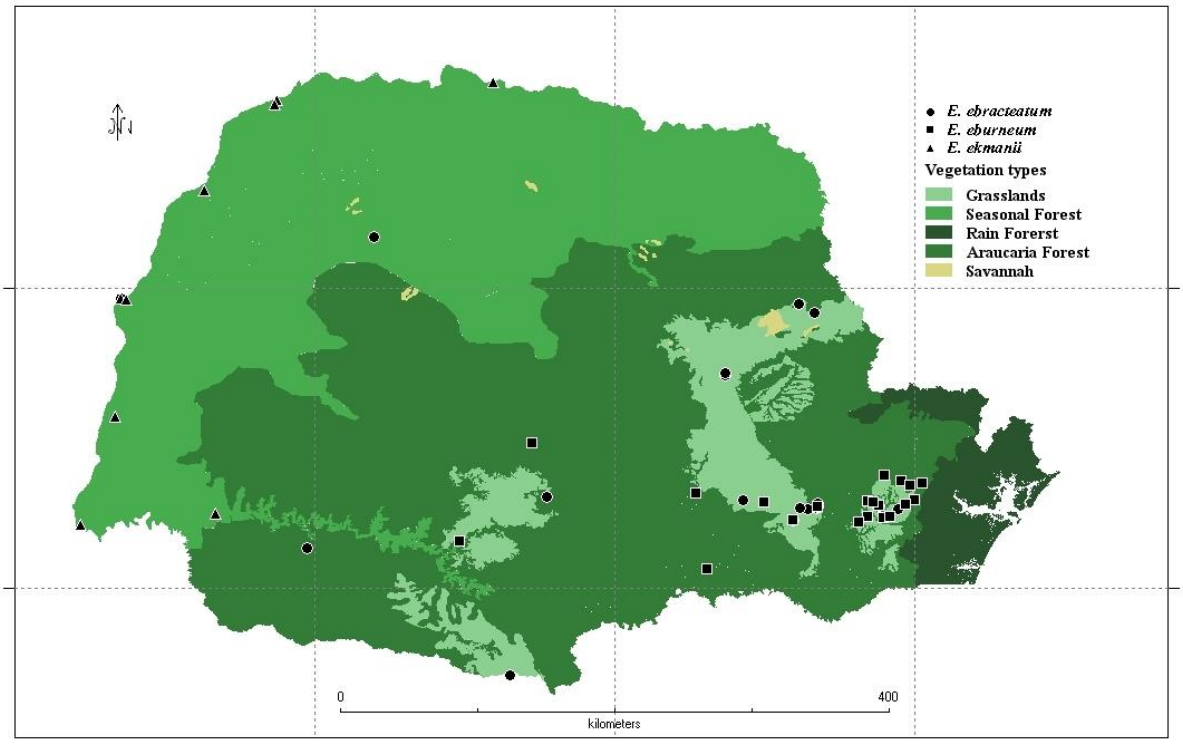

FIGURE 7. Distribution map of *Eryngium ebracteatum*, *E. eburneum* and *E. ekmanii*

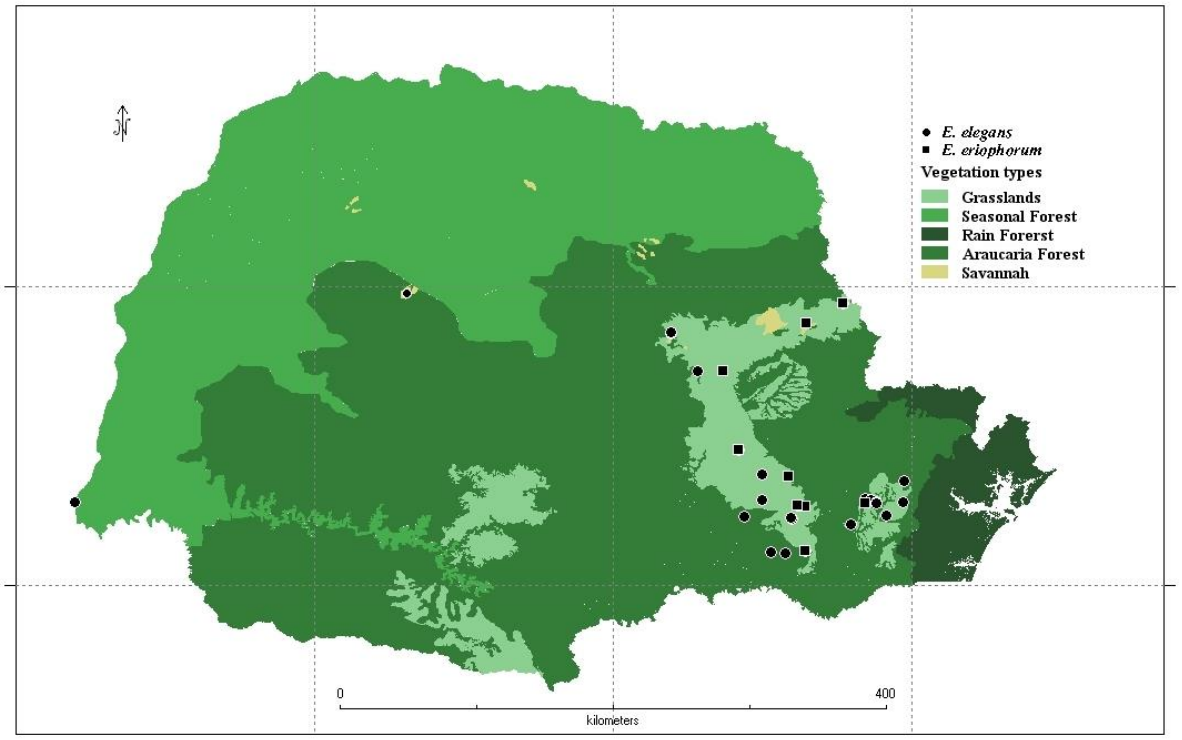

FIGURE 11. Distribution map of *Eryngium elegans* and *E. eriophorum*.

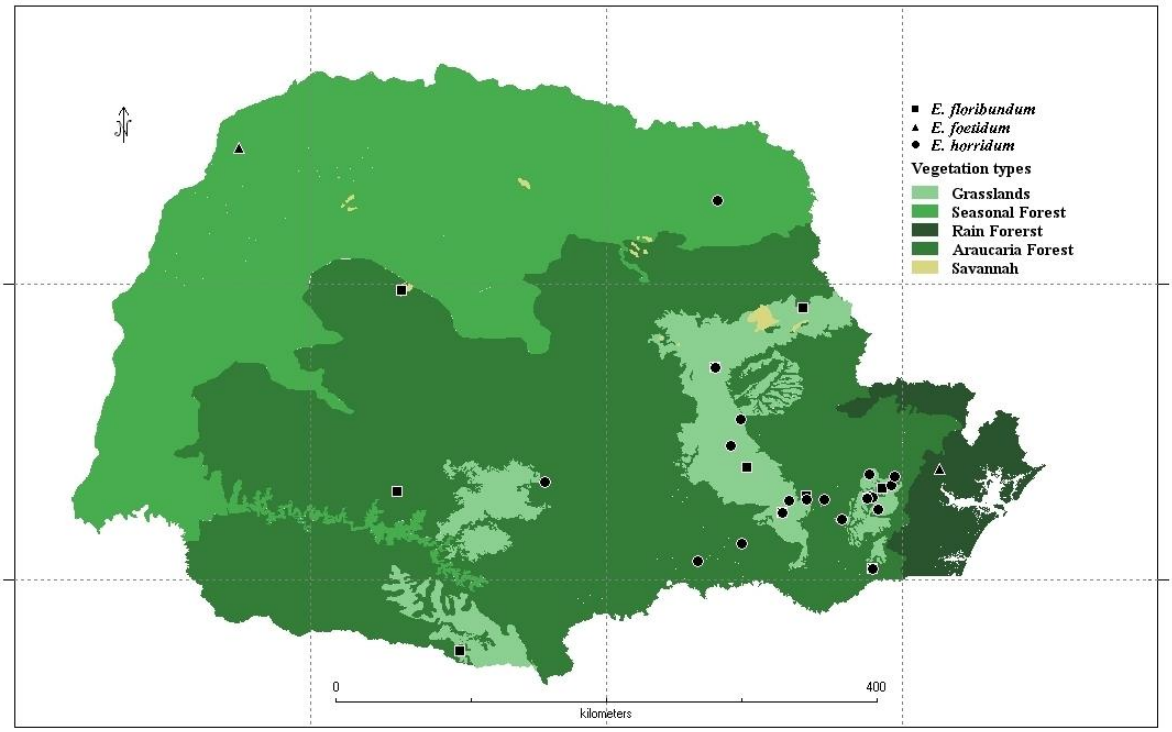

FIGURE 14. Distribution map of *Eryngium floribundum*, *E. foetidum* and *E. horridum.*

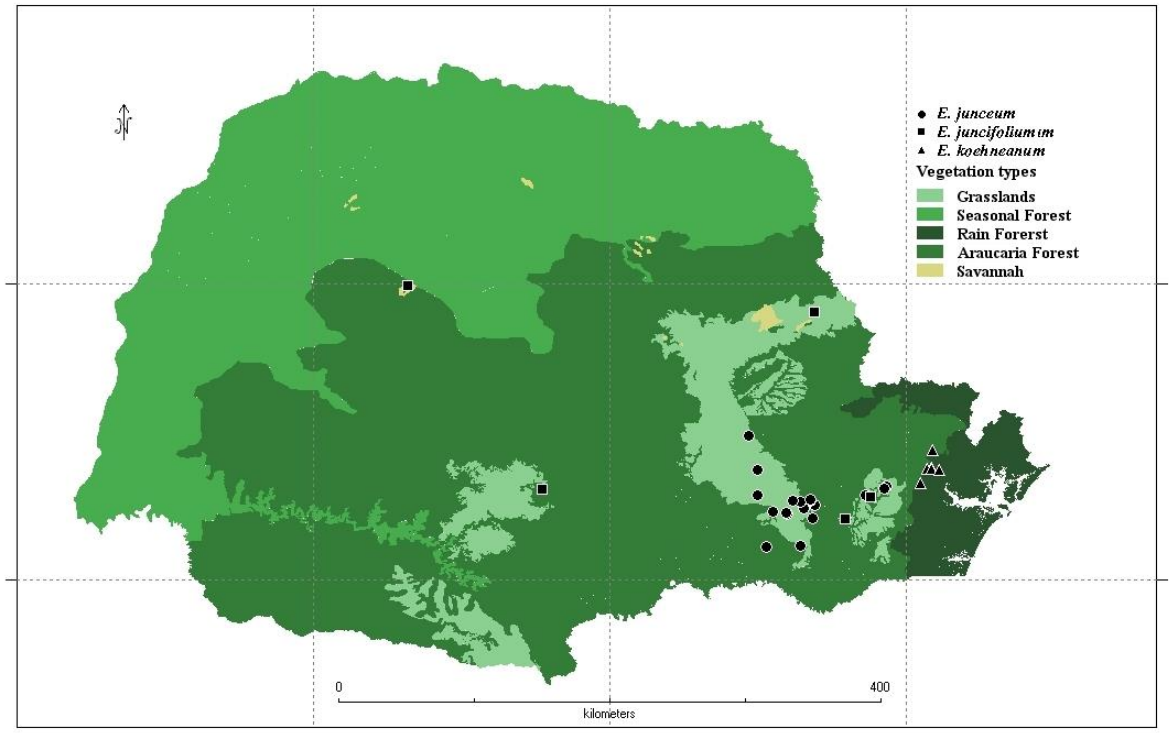

FIGURE 18. Distribution map of *Eryngium junceum*, *E. juncifolium* and *E. koehneanum*

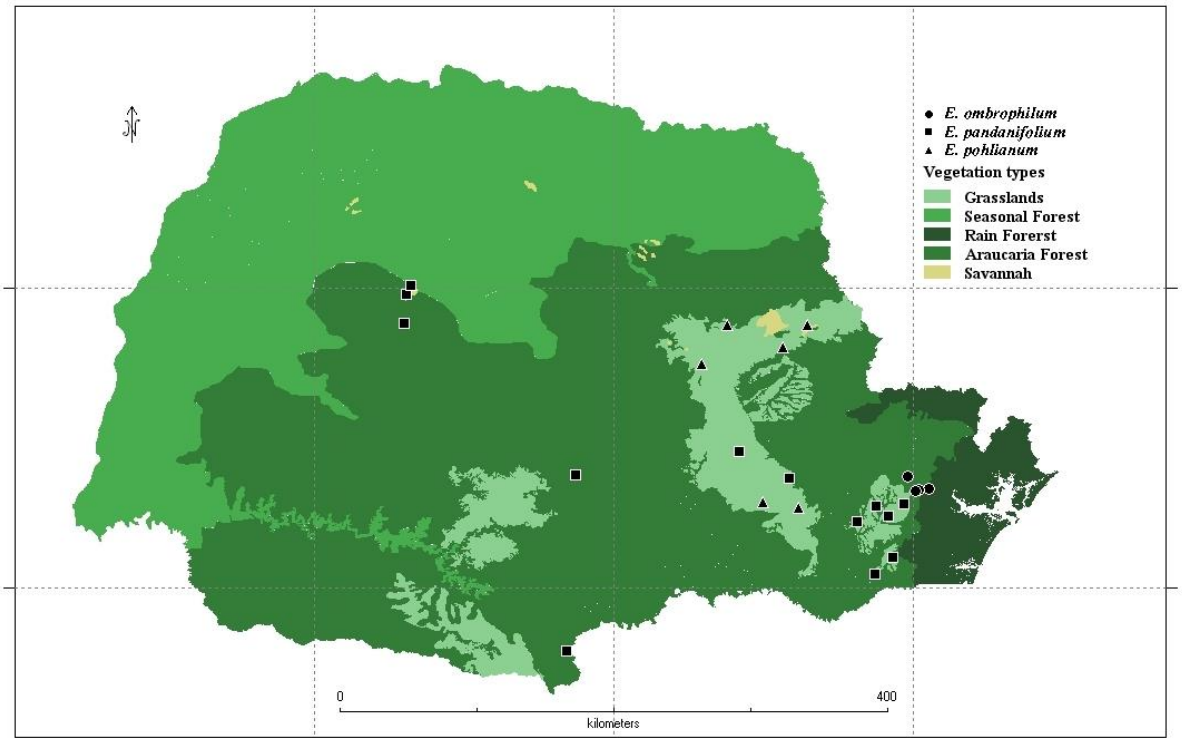

FIGURE 22. Distribution map of *Eryngium ombrophilum*, *E. pandanifolium* and *E. pohlianum.*

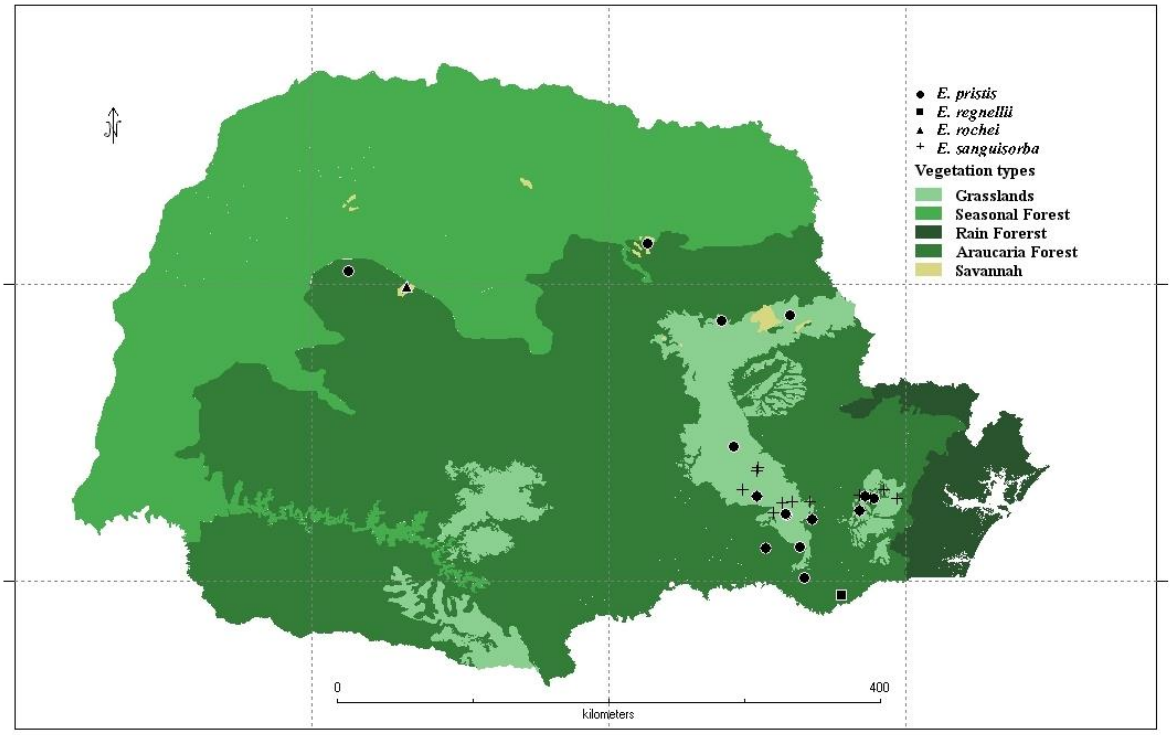

FIGURE 26. Distribution map of *Eryngium pristis*, *E. regnellii*, *E. rochei* and *E. sanguisorba.*

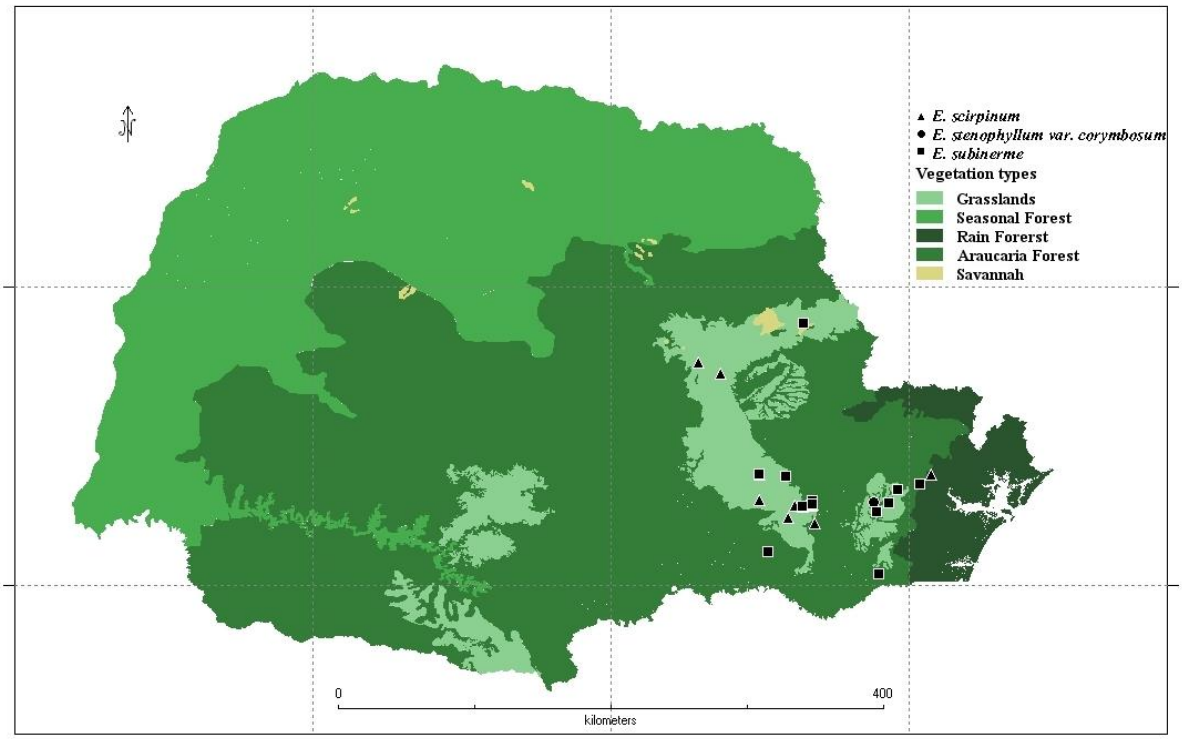

FIGURE 31. Distribution map of *Eryngium scirpinum, E. stenophyllum* var. *corymbosum* and *E. subinerme.*

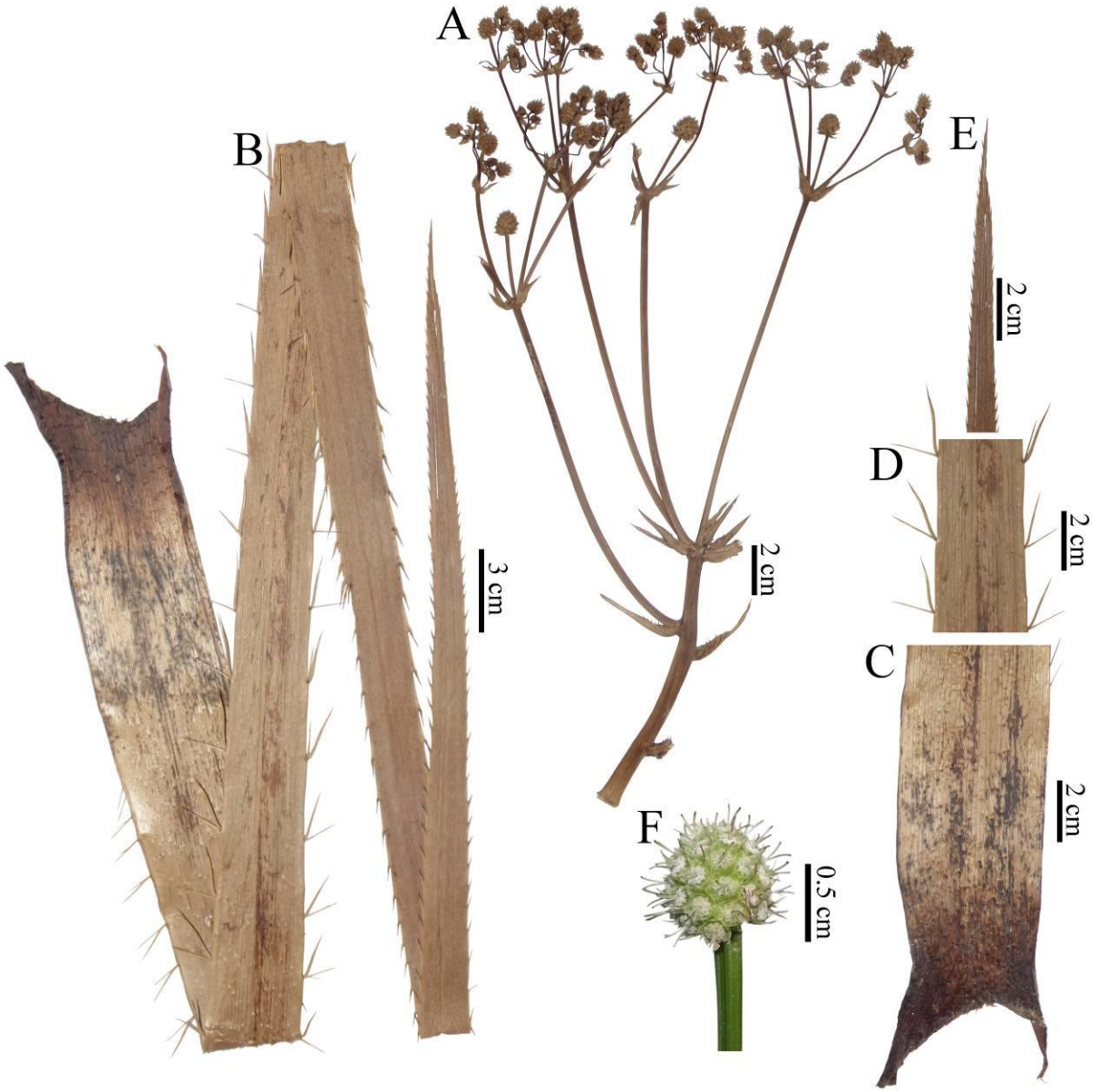

FIGURE 2. *Eryngium aloifolium*. A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula. (A from E. *G. Hatschbach 2788*; F. *Schwirkowski, P.874* (Fototeca Paulo Schwirkowski)).-

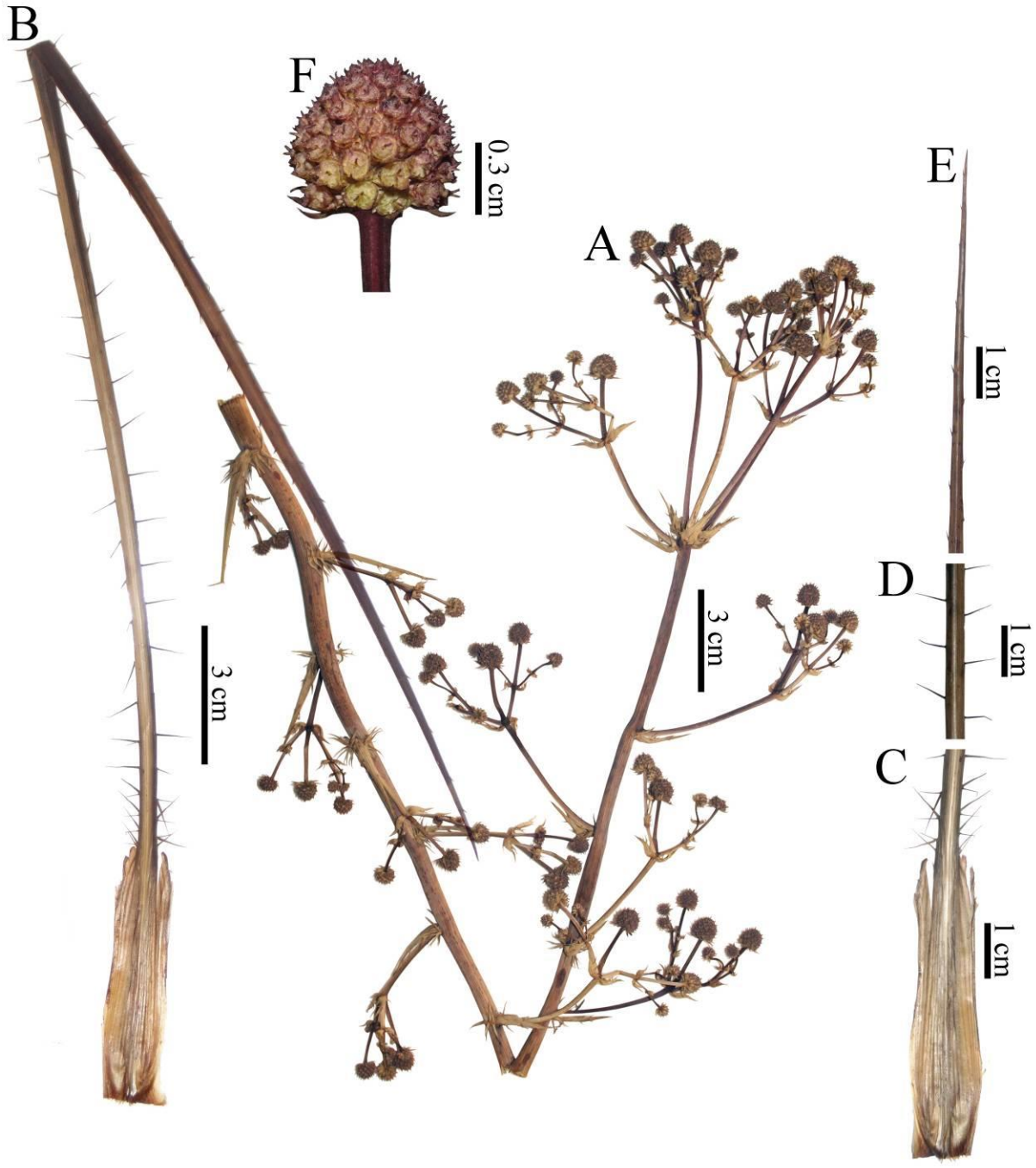

FIGURE 4. *Eryngium canaliculatum*. A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula. (A from F. *A.L. Cardozo 138*).

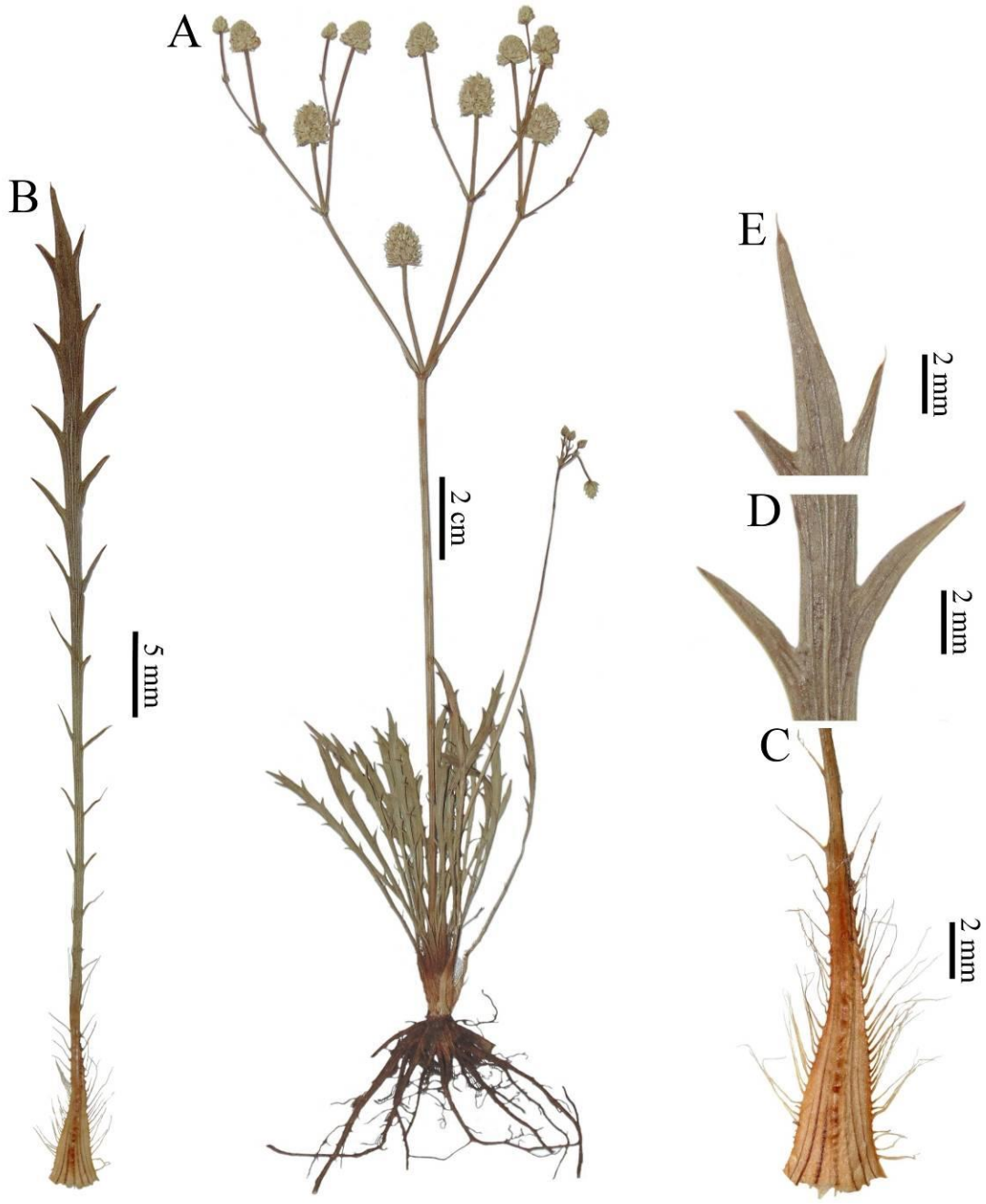

FIGURE 5. *Eryngium corallinum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf.

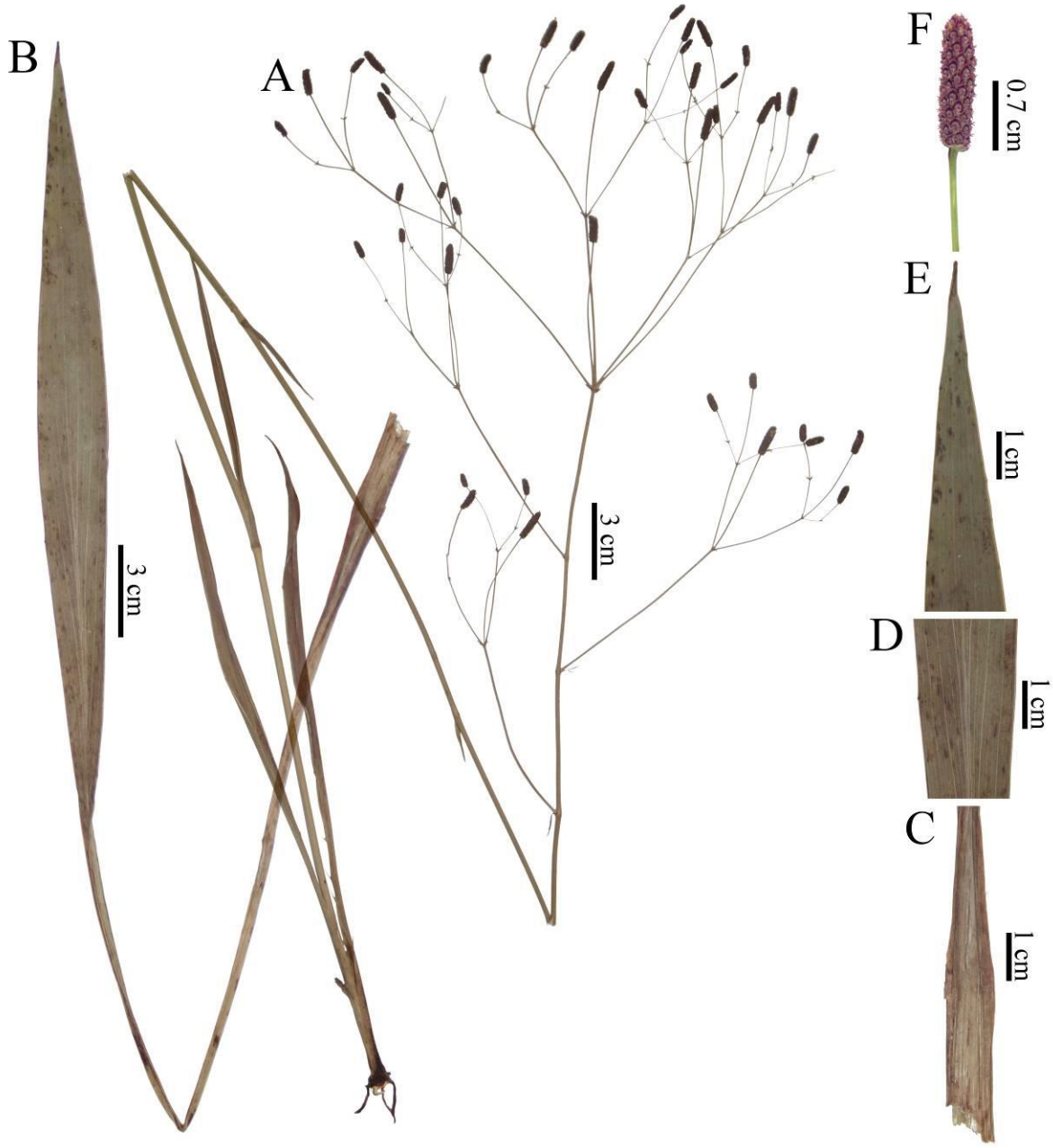

FIGURE 6. *Eryngium ebracteatum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

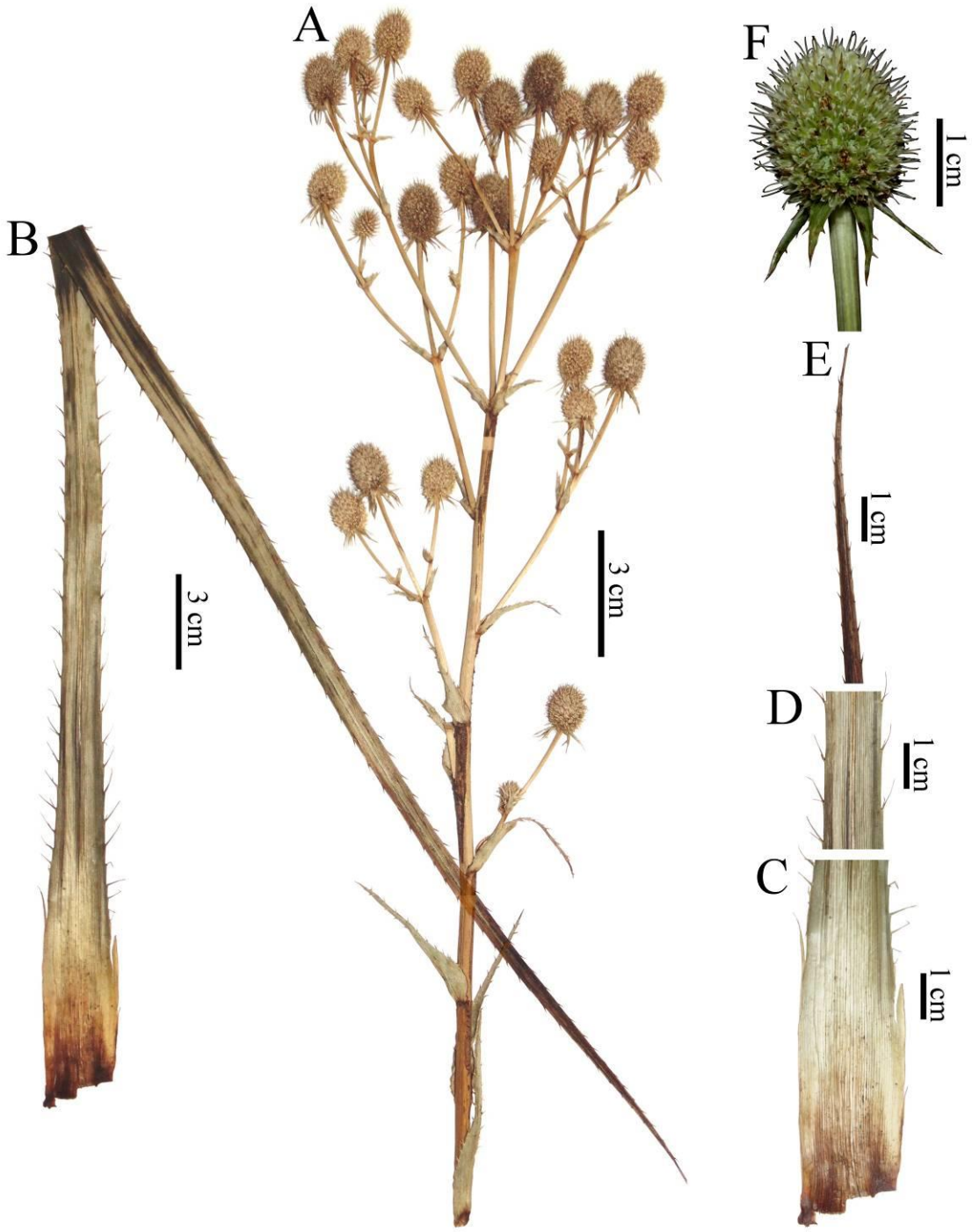

FIGURE 8. *Eryngium eburneum.* A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

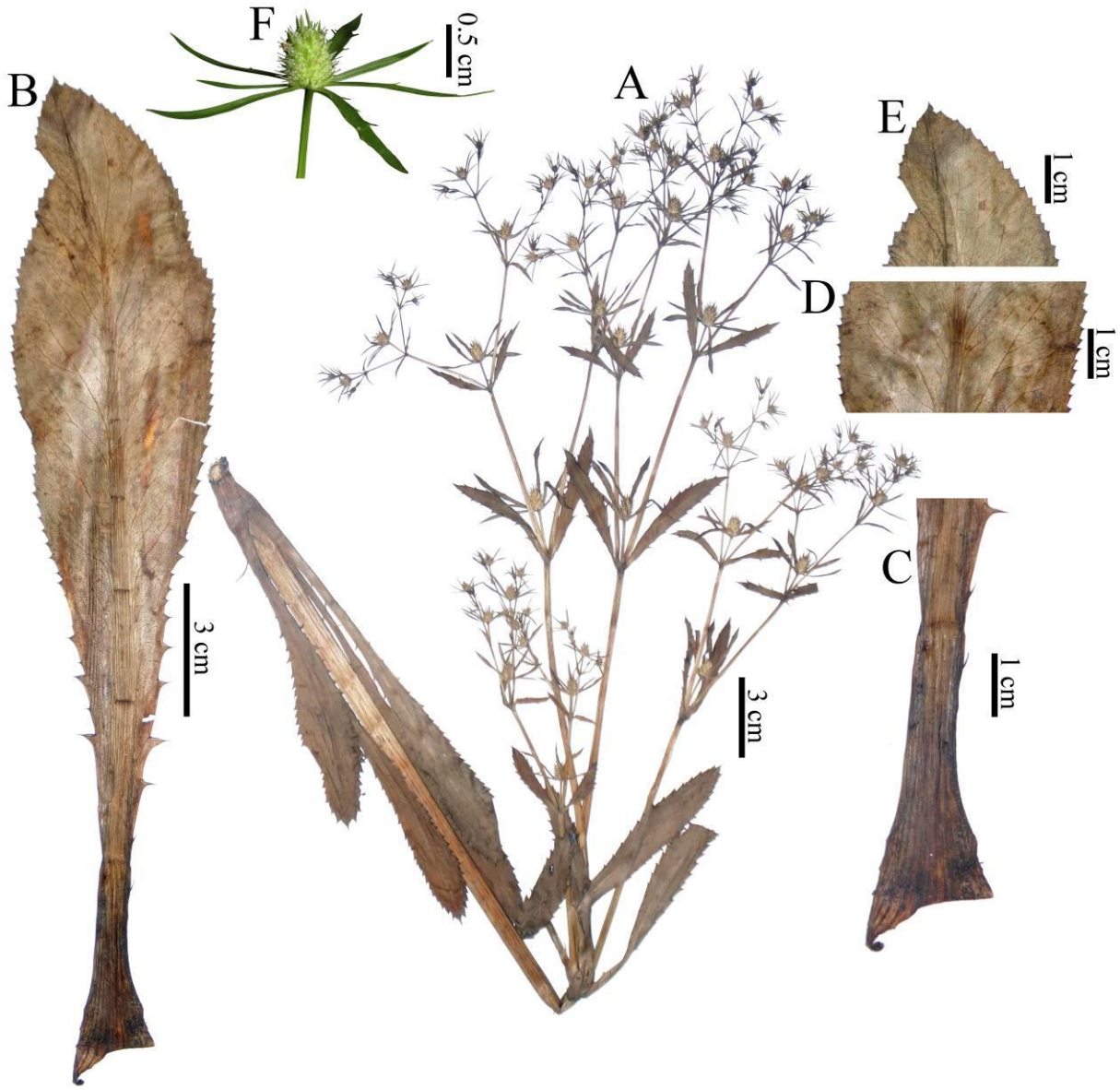

FIGURE 9. *Eryngium ekmanii.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

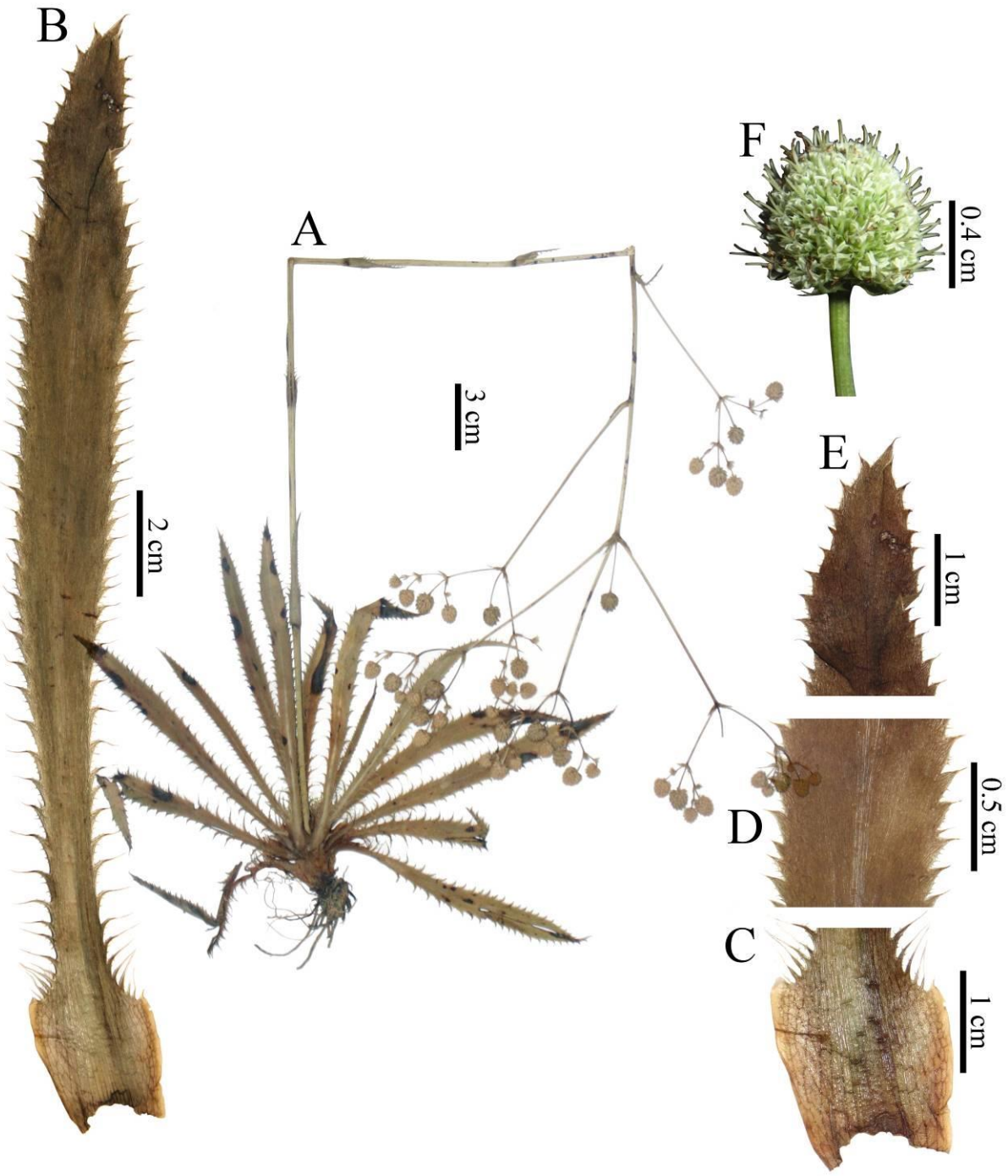

FIGURE 10. *Eryngium elegans.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

FIGURE 12 *Eryngium eriophorum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

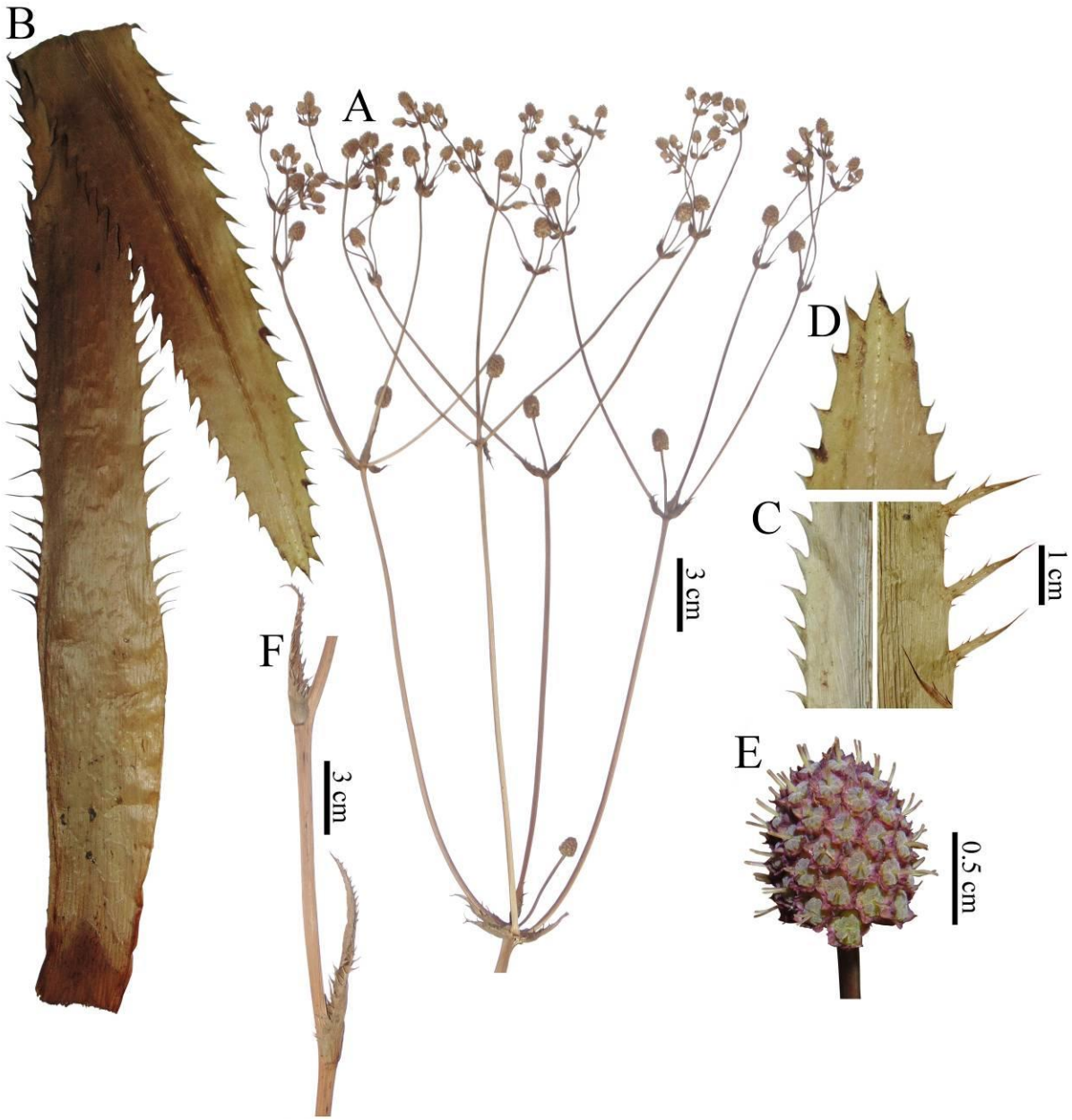

FIGURE 13. *Eryngium floribundum.* A. Inflorescence. B. Basal leaf. C. Basal leaf margin variation. D. Apex of the basal leaf. E. Capitula. F. Detail from cauline leaves.

FIGURE 15. *Eryngium foetidum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf.

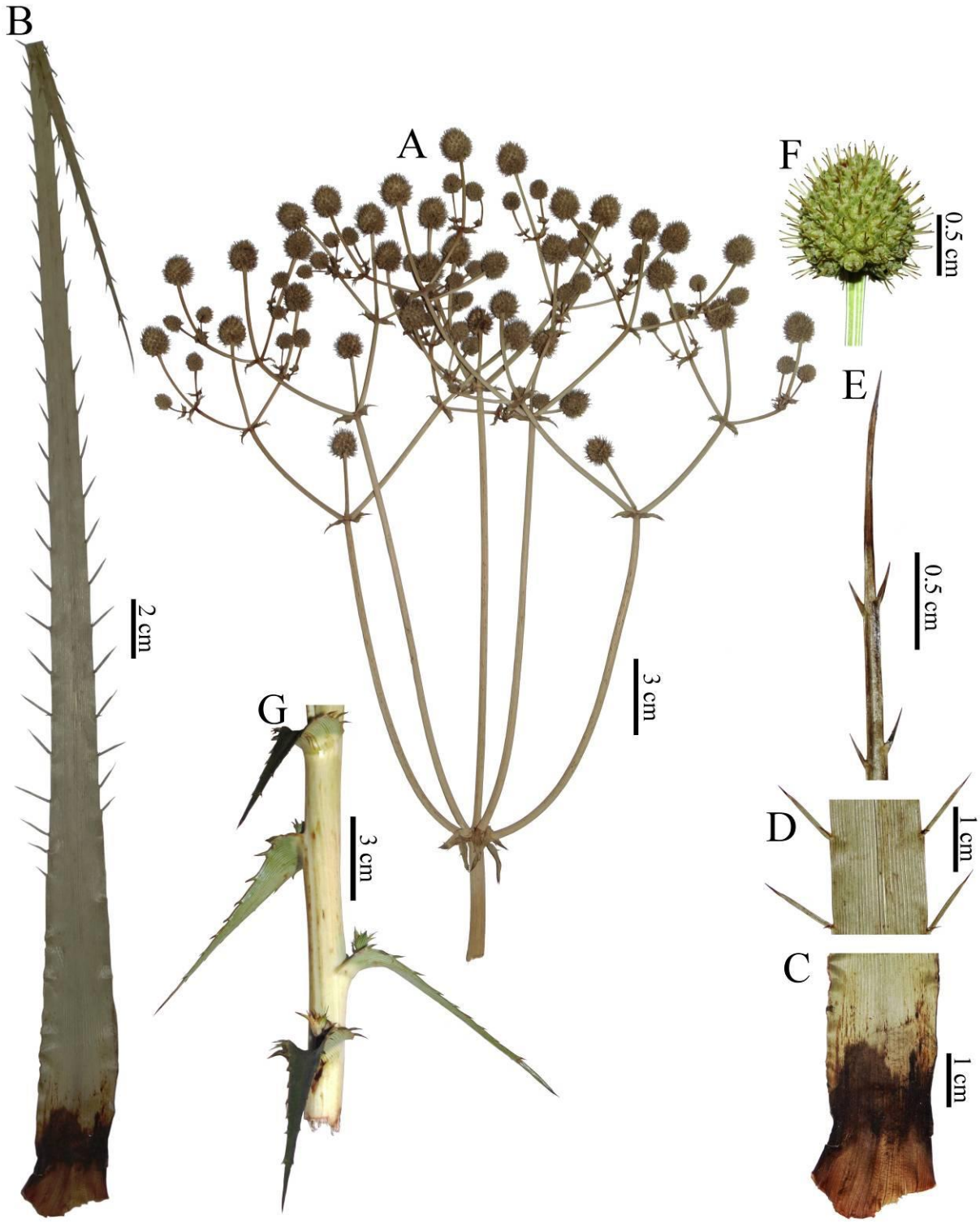

FIGURE 16. *Eryngium horridum.* A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula. G. Detail from cauline leaves.

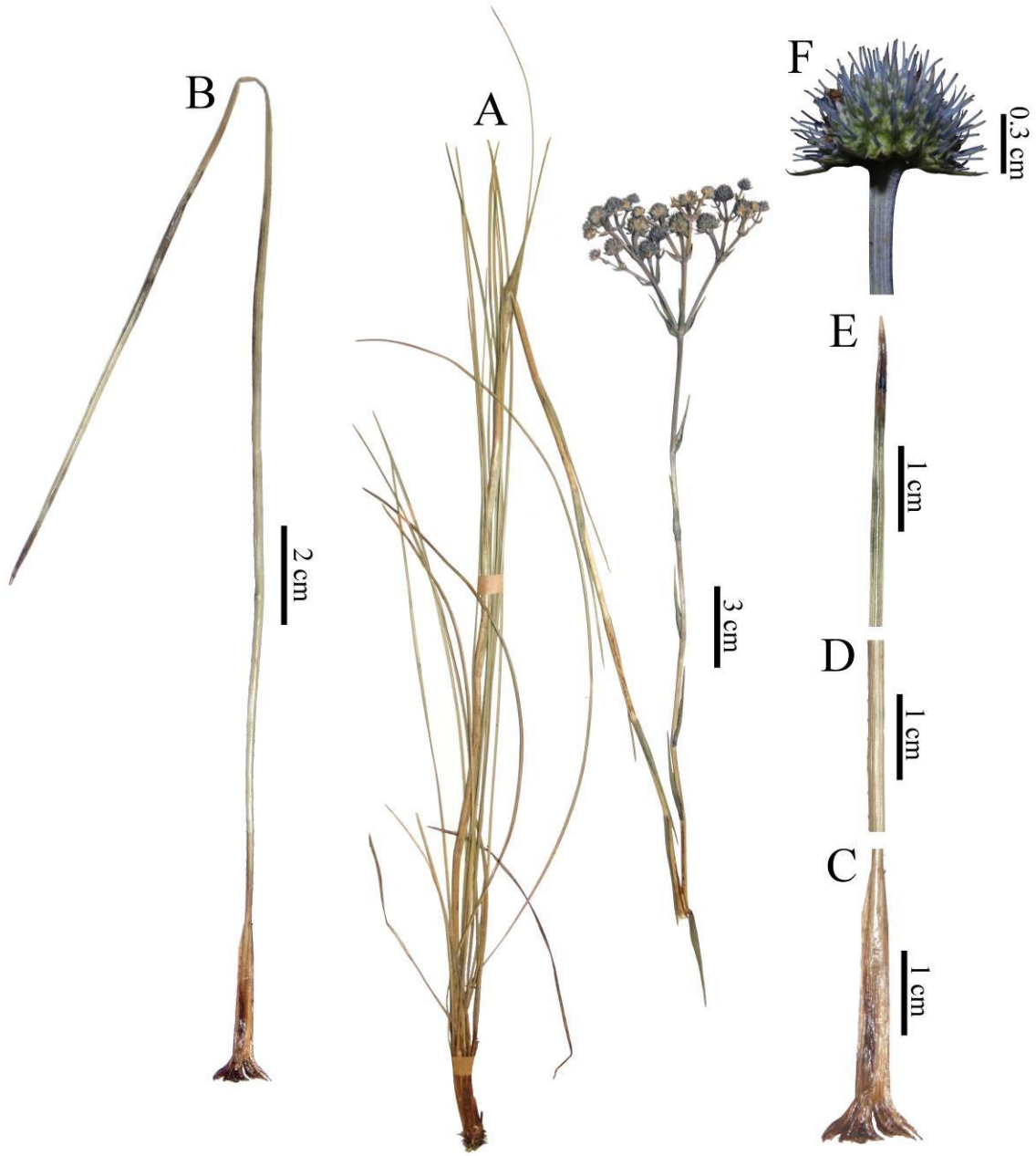

FIGURE 17. *Eryngium junceum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

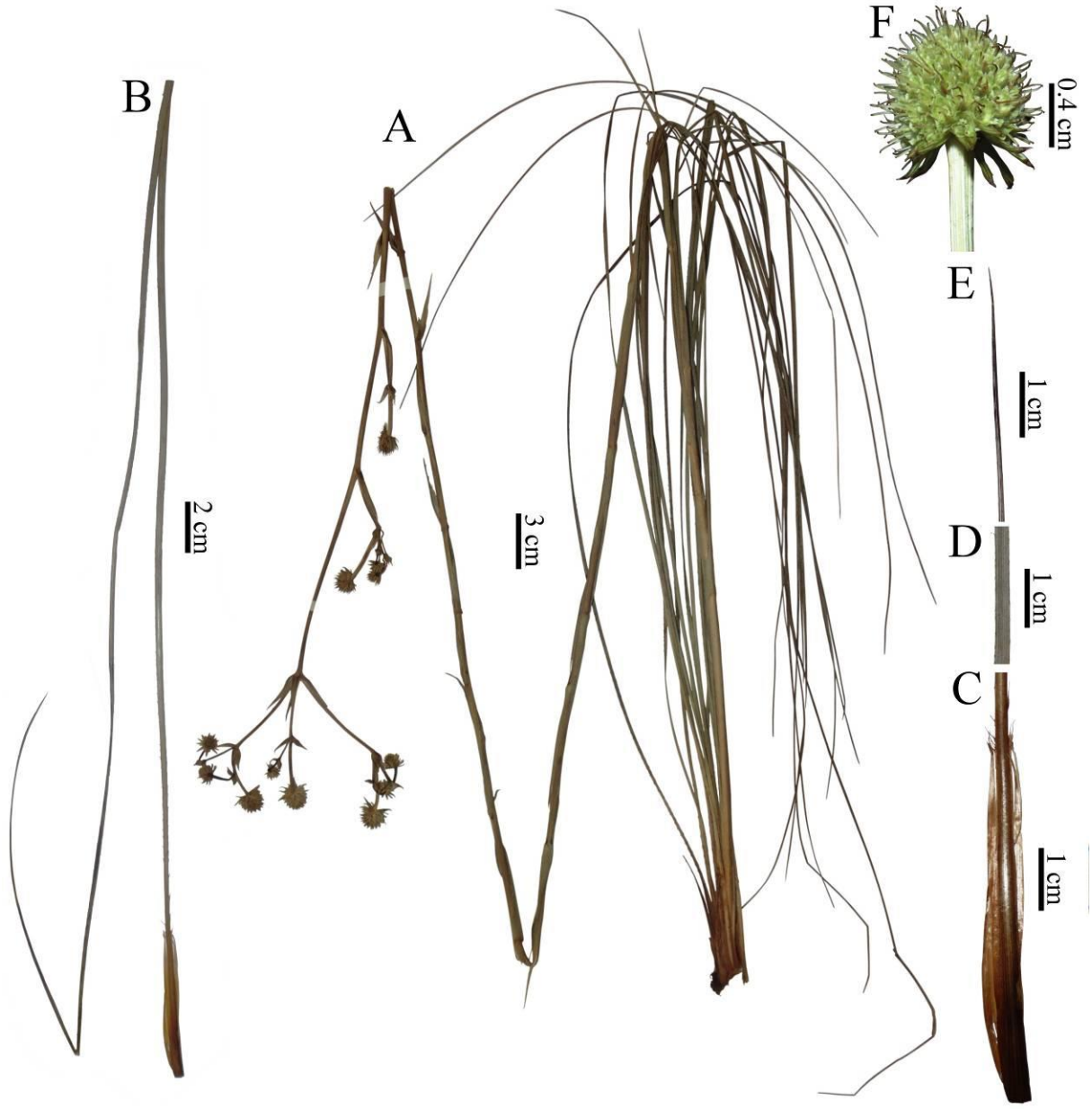

FIGURE 19. *Eryngium juncifolium.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

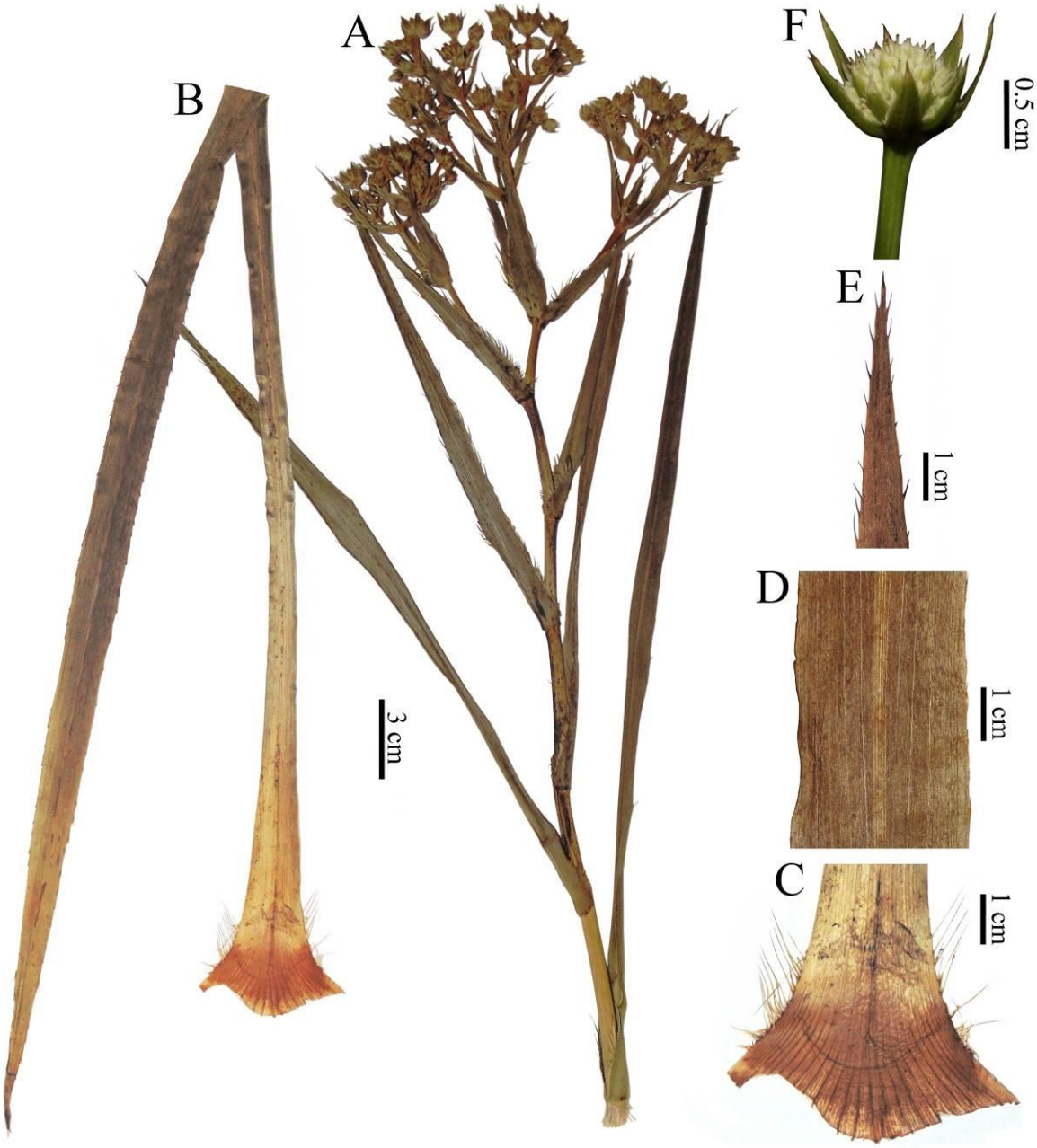

FIGURE 20. *Eryngium koehneanum.* A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

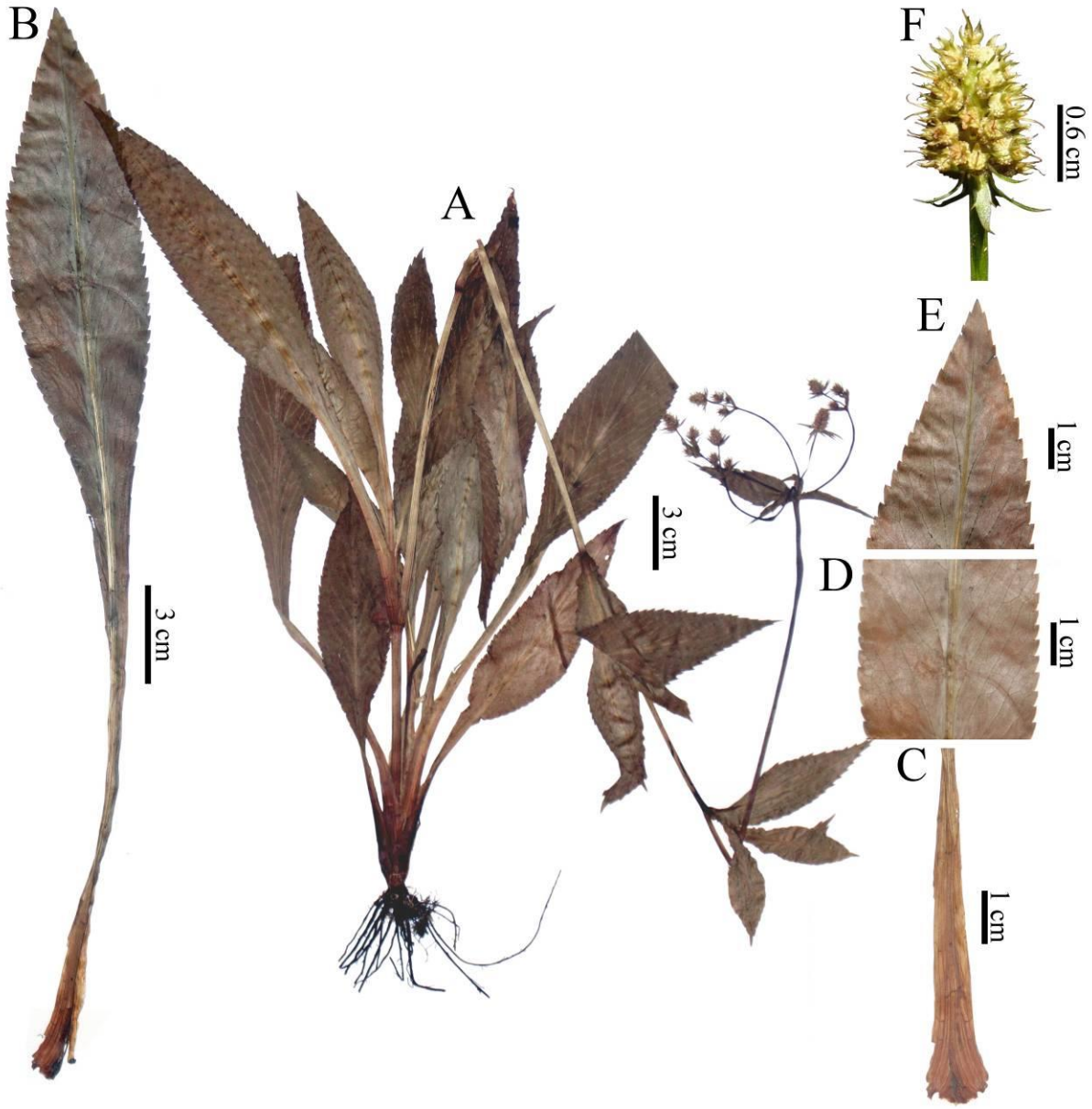

FIGURE 21. *Eryngium ombrophilum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

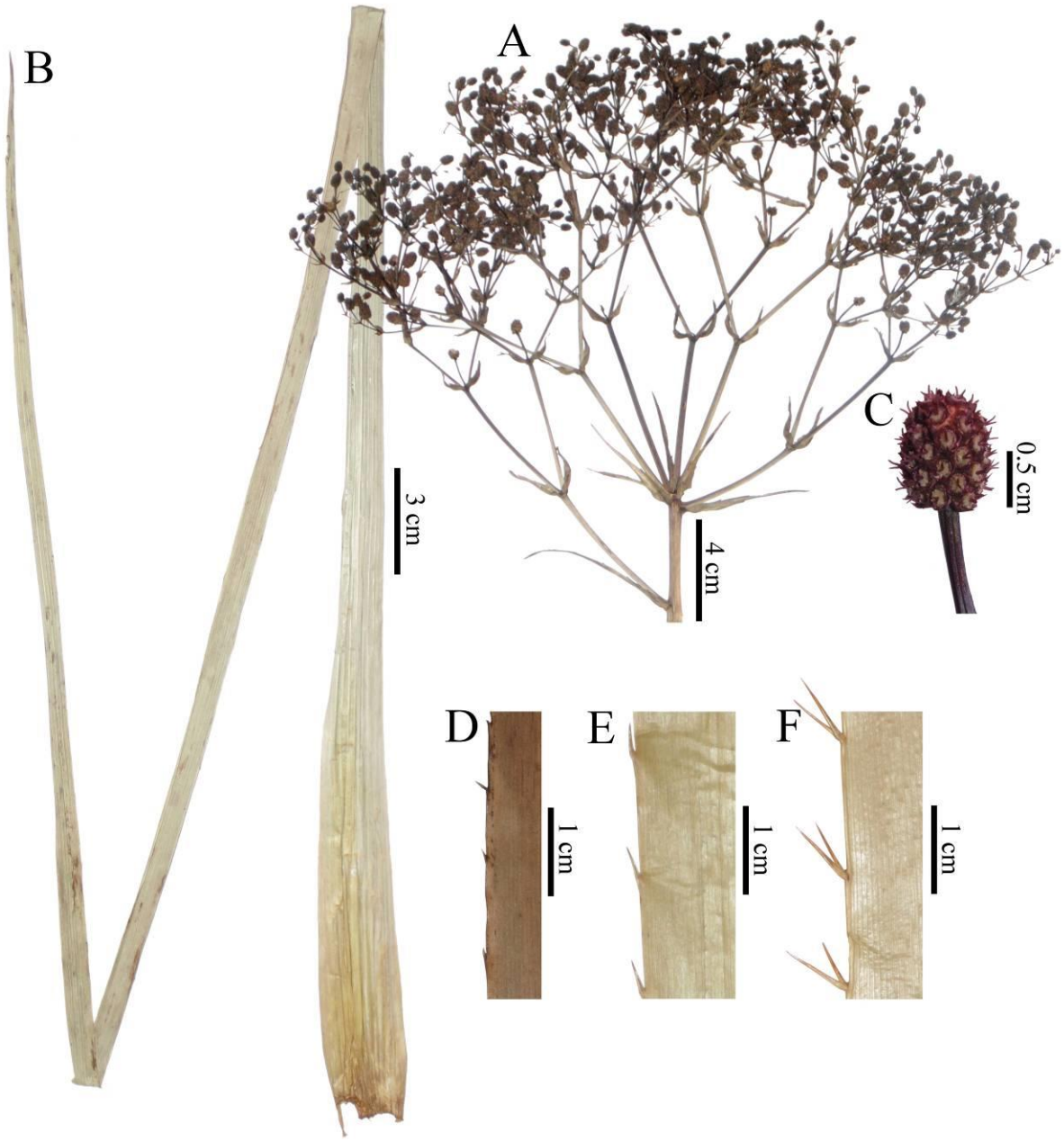

FIGURE 23. *Eryngium pandanifolium* var. *pandanifolium.* A. Inflorescence. B. Basal leaf. C. Capitula. D. Margin of the basal leaf. *Eryngium pandanifolium* var. *chamissonis*. E. Margin of the basal leaf. *Eryngium pandanifolium* var. *lasseauxii*. F. Margin of the basal leaf.

FIGURE 24. *Eryngium pohlianum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf.

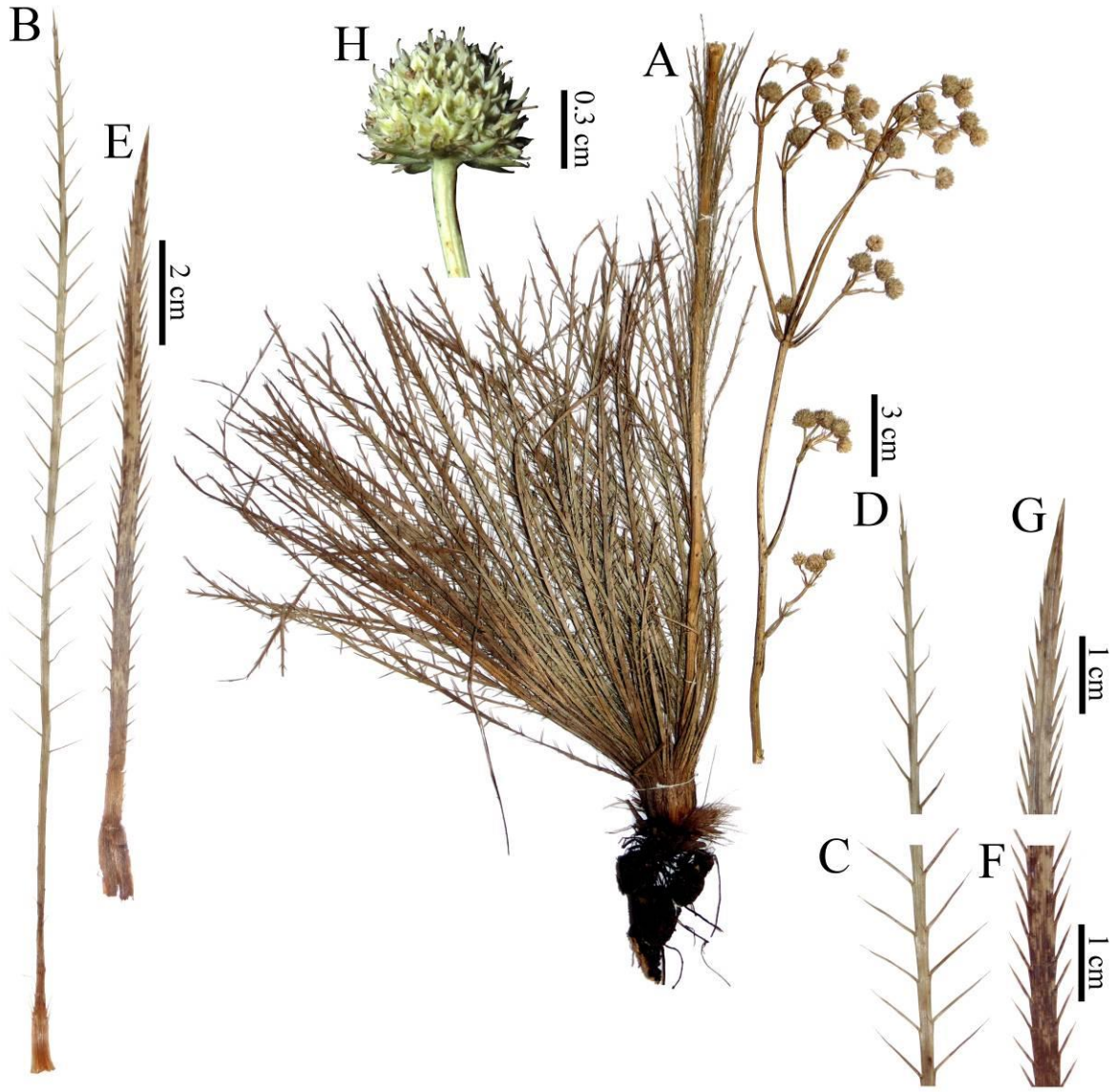

FIGURE 25. *Eryngium pristis* var. *pristis.* A. Habit. B. Basal leaf. C. Median portion of the basal leaf. D. Apex of the basal leaf. *Eryngium pristis* var. *abbreviatum*. E. Basal leaf. F. Median portion of the basal leaf. G. Apex of the basal leaf. H. Capitula.

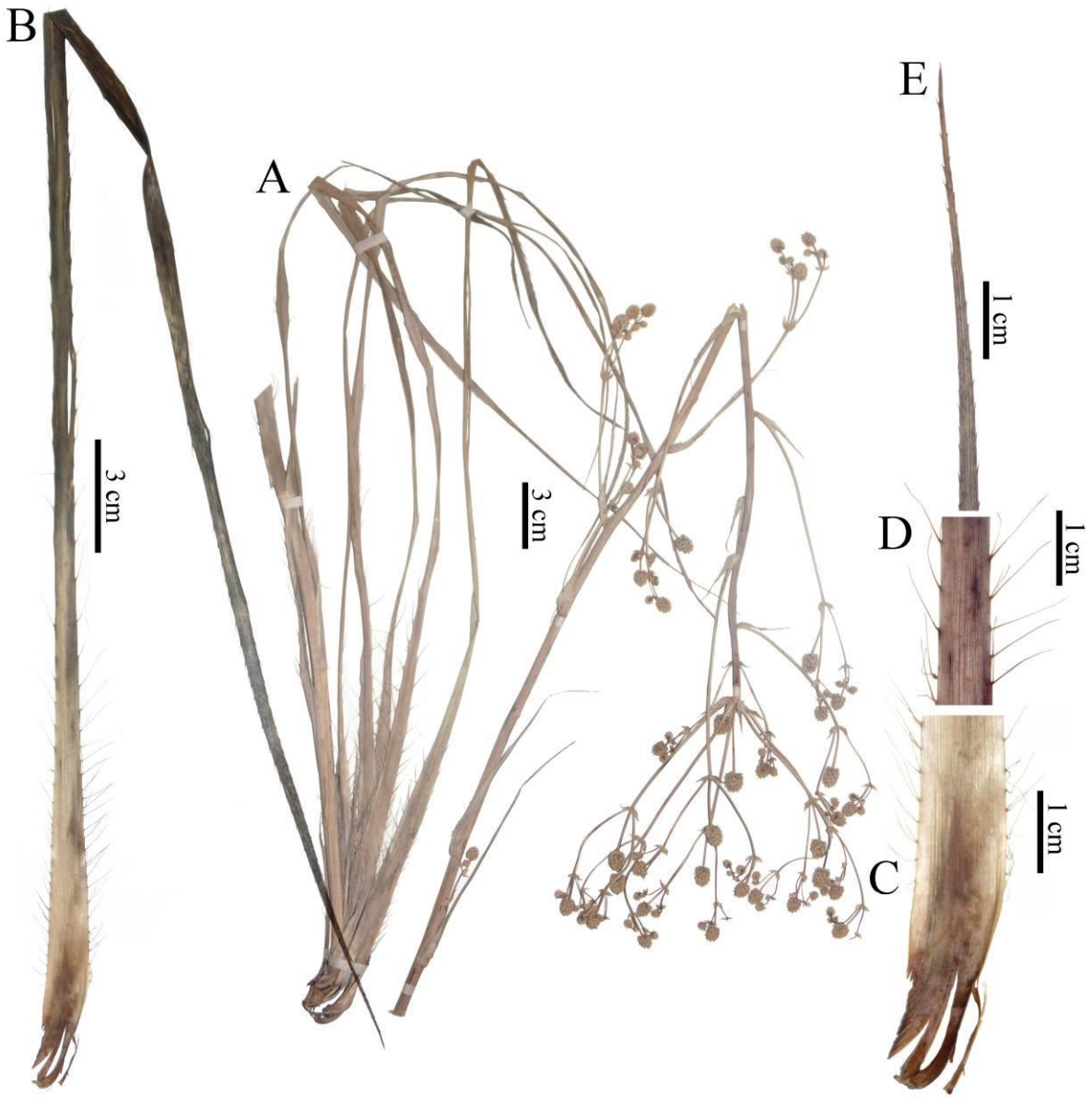

FIGURE 27. *Eryngium regnellii*. A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf.

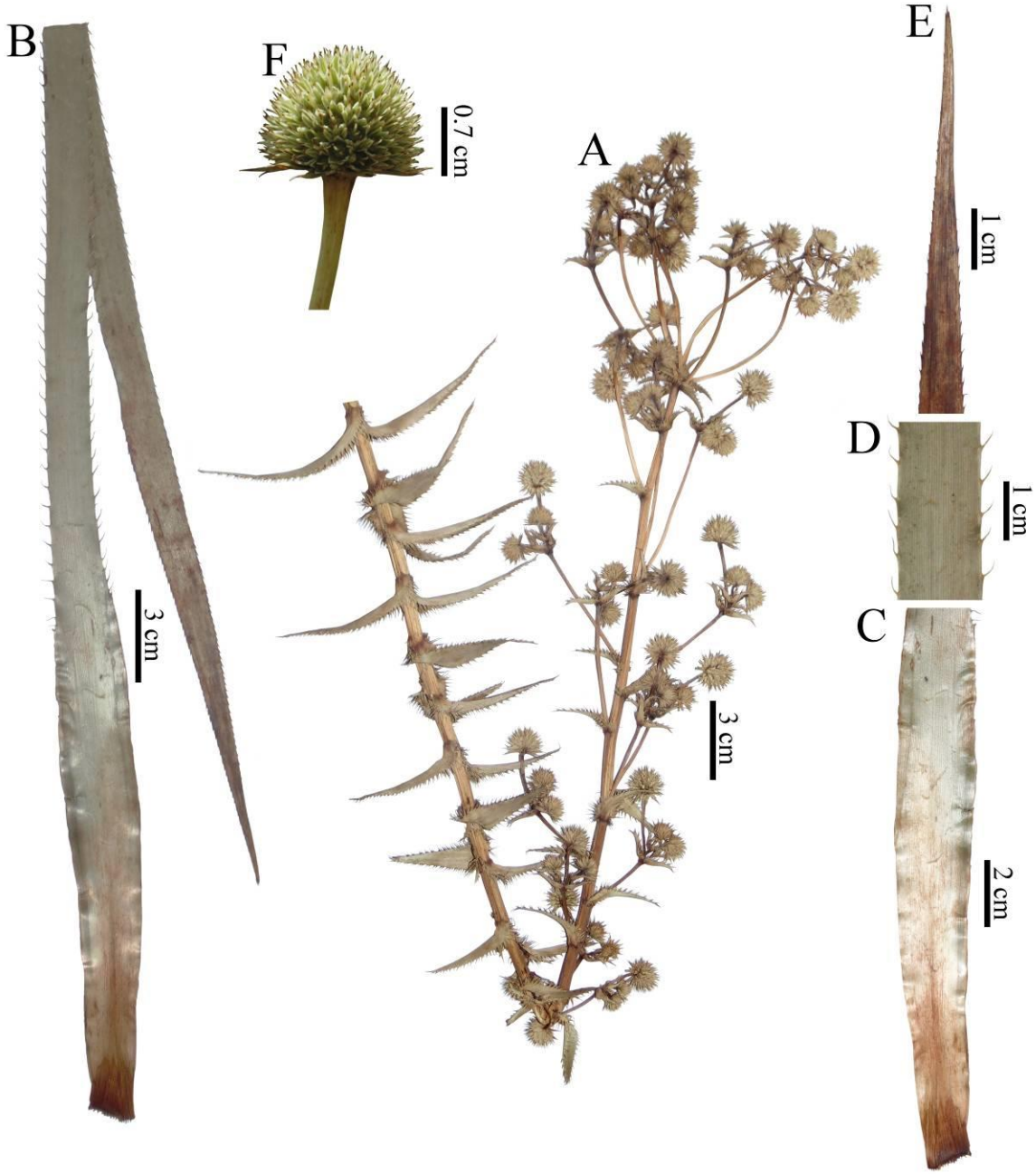

FIGURE 28. *Eryngium rochei.* A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

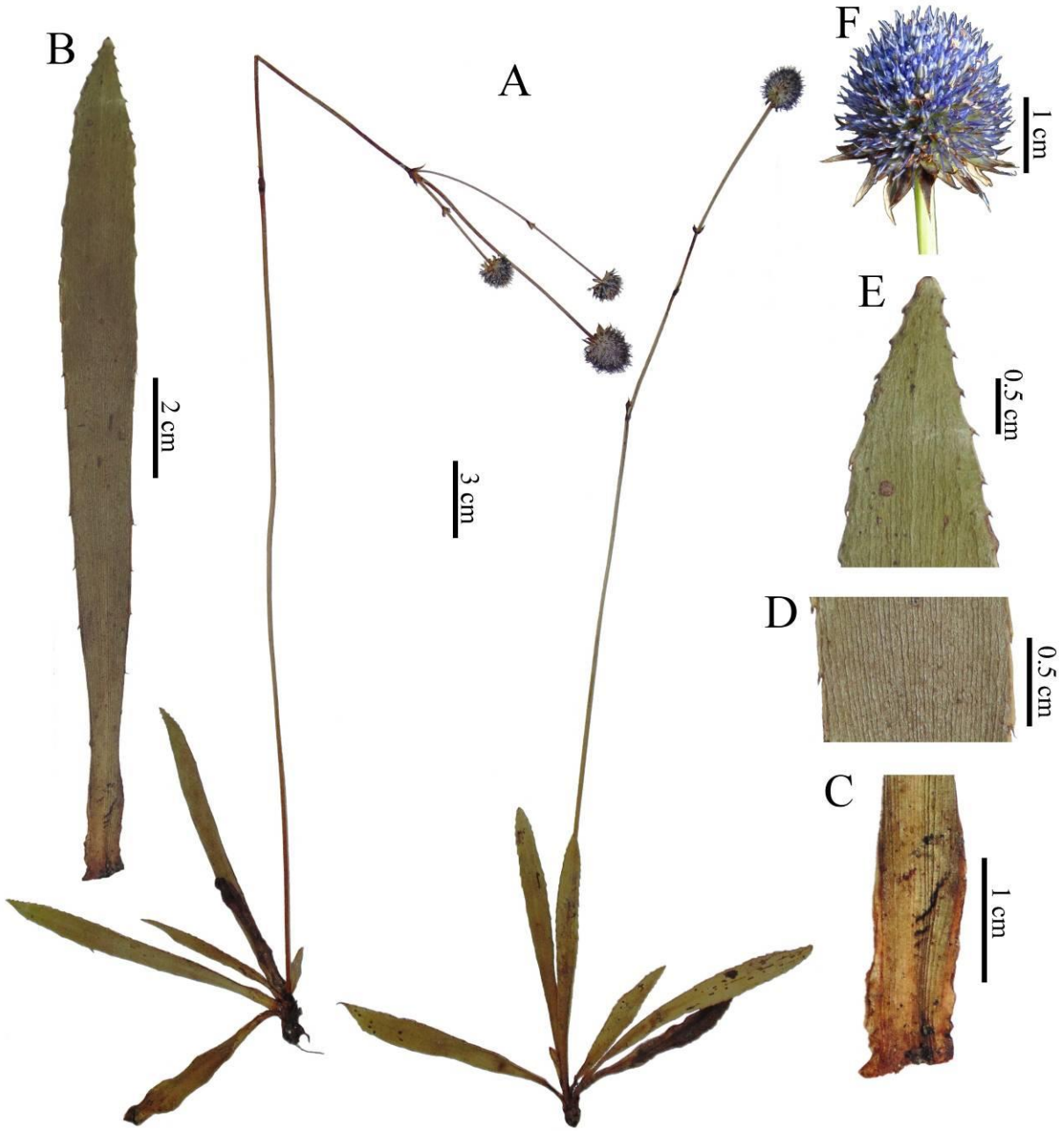

FIGURE 29. *Eryngium sanguisorba.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

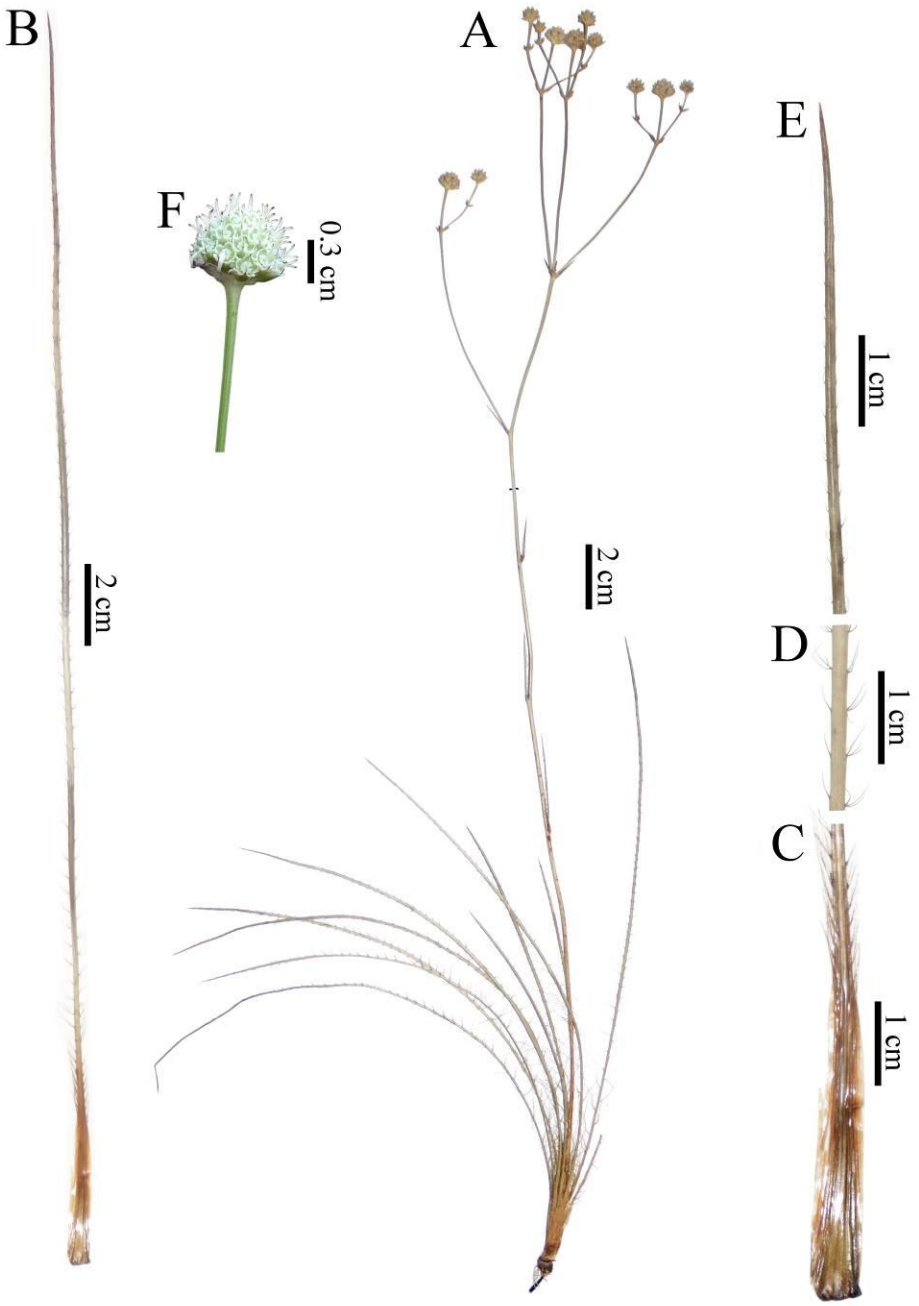

FIGURE 30. *Eryngium scirpinum.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

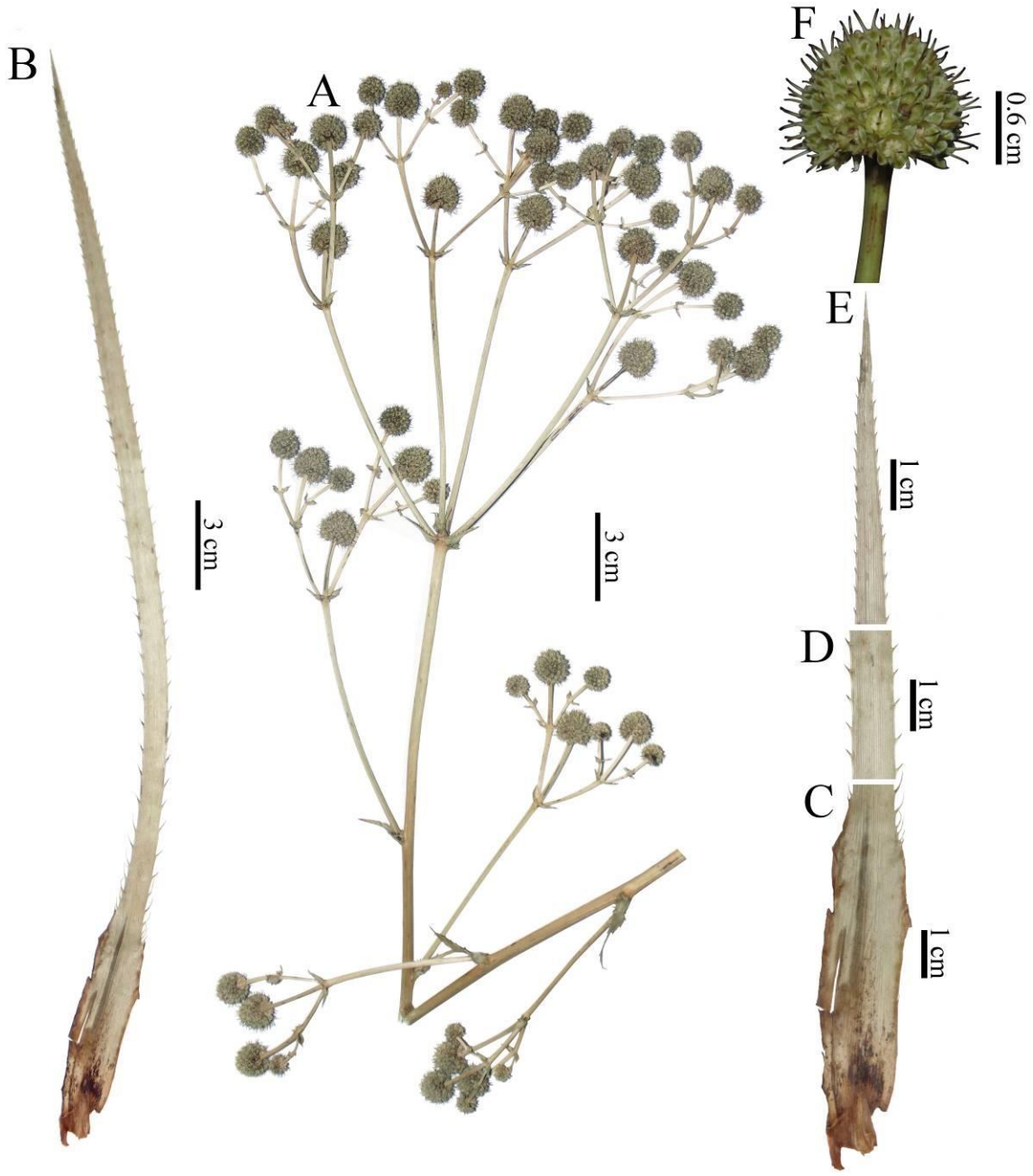

FIGURE 32. *E. stenophyllum* var. *corymbosum.* A. Inflorescence. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

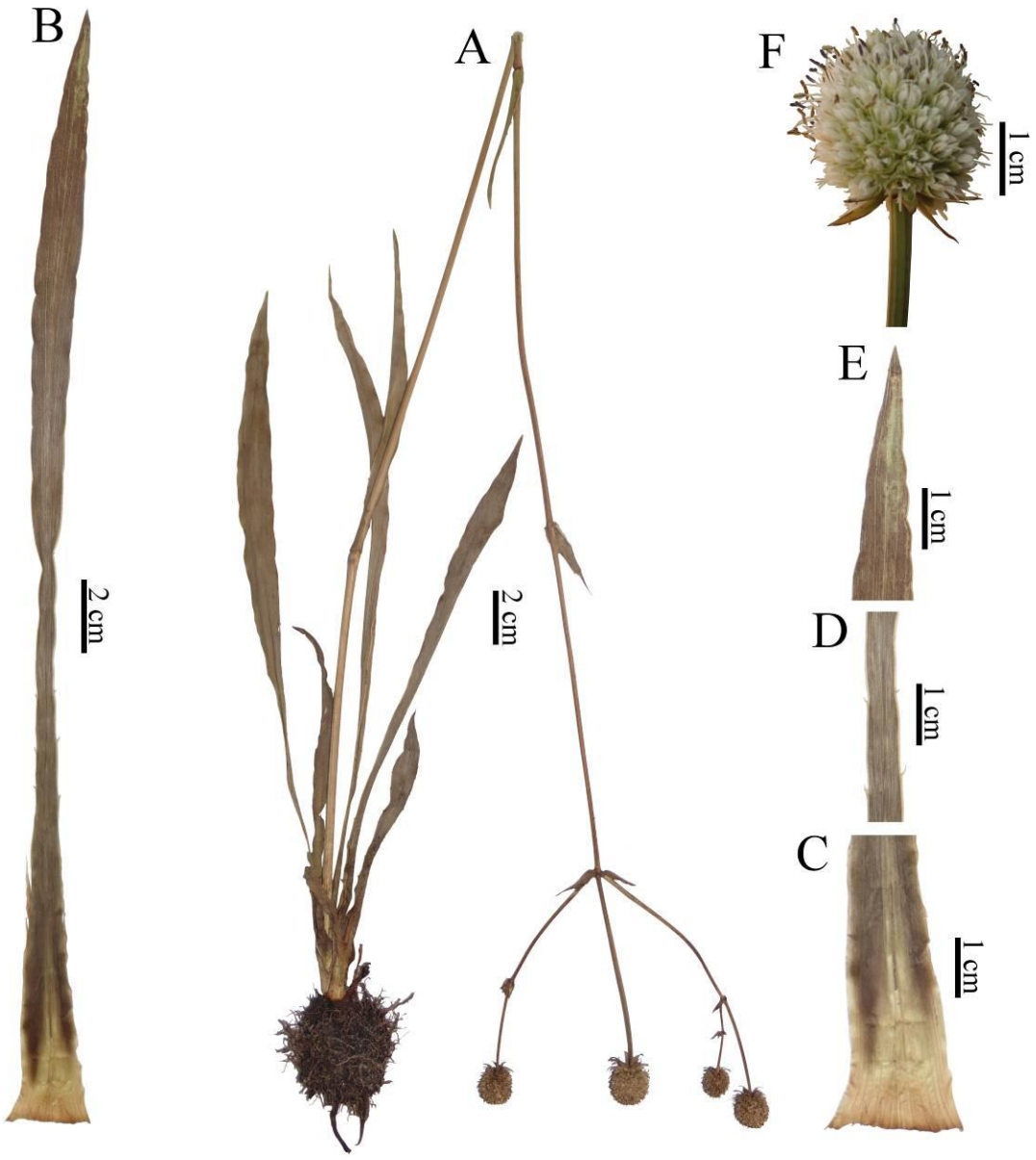

FIGURE 33. *Eryngium subinerme.* A. Habit. B. Basal leaf. C. Sheath of the basal leaf. D. Median portion of the basal leaf. E. Apex of the basal leaf. F. Capitula.

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