

THE GRASS GENUS LUZIOLA

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LUZIOLA Juss. ex Gmel., Syst. Nat. ed. 13. **2**: 637. 1791.

Arrozia Schrad. in Kunth, Enum. Pl. **1**: 11. 1833.

Caryochloa Trin., Gram. Pan. 248. 1826.

Monoecious, the staminate and pistillate spikelets in the same or usually in separate inflorescences, the staminate usually terminal, the pistillate from the middle and upper nodes; glumes wanting; lemma and palea nearly equal, thin, several- to many-nerved, the nerves prominent in the pistillate spikelets; stamens several; stigmas long, plumose; caryopsis free, subspherical, smooth or minutely striate.

- a. Pistillate inflorescence short, dense, glomerate, barely exerted from the lower sheaths.
 - b. Branches of pistillate inflorescence conspicuously scabrous, not terminating in a spikelet; lemma and palea of pistillate spikelet easily disintegrating, leaving the scabrous nerves like awns surrounding the caryopsis1. *L. spruceana*
 - bb. Branches of pistillate inflorescence glabrous or nearly so, terminating in a spikelet; lemma and palea of pistillate spikelet not readily disintegrating2. *L. subintegra*
- aa. Pistillate inflorescence expanded.
 - c. Pistillate and staminate spikelets in the same inflorescence, partly enclosed in the sheath.
 - d. Plants tufted; fruit 1.3-1.5 mm long, smooth or papillose; nerves of lemma and palea of pistillate spikelet very scabrous3. *L. caespitosa*
 - dd. Plants decumbent-spreading; fruit 2 mm long, smooth; nerves of lemma and palea of pistillate spikelet smooth.4. *L. brasiliensis*
 - cc. Pistillate and staminate spikelets in separate inflorescences.
 - e. Fruit smooth or papillose, not at all striate.5. *L. peruviana*
 - ee. Fruit definitely striate.
 - f. Pistillate inflorescence very inconspicuous, composed of two reflexed conjugate branches, each bearing 2-several short-pedicellate, appressed spikelets. Culms very slender, decumbent, forming dense tangled mats on water.6. *L. fragilis*
 - ff. Pistillate inflorescence composed of several to many plainly evident branches.
 - g. Pistillate spikelets 1 mm long, the nerves of the lemma and palea densely scabrous7. *L. gracillima*
 - gg. Pistillate spikelets 1.5 mm or more long, the nerves entirely smooth.
 - h. Pistillate spikelets ovate, the lemma and palea 2-3 times as long as the fruit.8. *L. bahiensis*
 - hh. Pistillate spikelets round or elliptic, the lemma and palea equalling the fruit or nearly so.
 - i. Pistillate spikelets green, mostly short-pedicellate, 1.5-2 mm long.
 - j. Pistillate spikelets 1.5 mm long, pyriforme.9. *L. pittieri*
 - jj. Pistillate spikelets mostly 2 mm. long.10. *L. doelliana*
 - ii. Pistillate spikelets purple, long-pedicellate, 2.5-3.5 mm long; panicles large, few-flowered.11. *L. divergens*

1. LUZIOLA SPRUCEANA Benth. ex Doell in Mart., Fl. Bras. **2**(2): 18. 1871.

Luziola spiriformis Anderss. ex Bal. & Poit, Bull. Soc. Hist. Nat. Toul. **12**: 232, t. 5. 1878.

HONDURAS: Lake Yojoa, *Edwards*. BRAZIL: AMAZONAS: Paraná do Urariá, *Kuhlmann* 1629. PARÁ: Maicurú, *Pires & Silva* 4281; Santarém, *Swallen* 3303, 3305; Boa Vista, Rio

Tapajos, Swallen 3146, 3152, 3153, 3154. PARAGUAY: Concepción, Rojas 2671; Central Paraguay, Morong 556.

2. **LUZIOLA SUBINTEGRA** Swallen, Ann. Missouri Bot. Gard. **30**: 165. 1943.

EL SALVADOR: San Vicente: Laguna Bruja, Fassett 28390; La Paz: El Rosario de La Paz, Fassett 28318. PANAMA: CANAL ZONE: Juan Mina, Bartlett & Lasser 16816 (type); Rio Chagres, Fairchild 2048. CUBA: HABANA: Laguna de Ariguanabo, Ekman 13436; Bro. León 4193. HAITI: Massif du Nord, Guillotin, Ekman H4802; Massif de la Hatte, Etang-Miragoane, Ekman H6471. SANTO DOMINGO: SANTO DOMINGO: Rio Ozama, Ekman 11589; Haina, Faris 266, 394. TOBAGO: Broadway 1626, 3100. COLOMBIA: Cauca: Cienega de Agua Blanca below Cali, Pittier 976. BRITISH GUIANA: Georgetown, Hitchcock 16537; Blairmont, Williams in 1942; Demerara, Harrison 1713; 20 mi SE of New Amsterdam, Little 16685; Jenman 1745, 4420, 4494. SURINAM: Nickeie, Semple 352; Forest of Zandery, Samuels; Coronie, Lanjouw 1127. BRAZIL: MARANHÃO: Monção, Froes 20307; PARÁ: Almeirim, Ducke; Cacaual Grande, Camargo. ECUADOR: Guayas: Guayaquil, Asplund 5845. PARAGUAY: Limpio, ROJAS 1664.

3. **LUZIOLA CAESPITOSA** Swallen, sp. nov.

Culmi erecti 25-42 cm alti; vaginae aequantes 15-20 cm longae; ligula decurrens 7-8 mm longa; laminae usque ad 40 cm longae, 1-1.5 cm latae, glabrae; paniculae 10-18 cm longae, 4-6 cm latae, ramis solitariis usque ad 5 cm longis; spiculae stamineae 2.5-3 mm longae; spiculae femineae 1.3-1.5 mm longae, virides, nervatae; fructus papillosus, lucidus.

Perennial?; culms erect, 25-42 cm tall; sheaths equitant, compressed, keeled, glabrous, soft and more or less spongy, mostly 15-20 cm long; ligule decurrent, 7-8 mm long, thin; blades as much as 40 cm long, 1-1.5 cm wide at the widest part, gradually narrowed toward each end, glabrous on both surfaces, the margins very scabrous; panicle partly enclosed in the sheath or shortly exerted, 10-18 cm long, 4-6 cm wide, the branches solitary, ascending, the lower as much as 5 cm long; staminate spikelets 2.5-3 mm long, the lemma and palea thin, faintly nerved, glabrous, readily falling; pistillate spikelets 1.3-1.5 mm long, green, strongly nerved, the nerves scabrous; fruit shining, yellowish, papillose-roughened.

Type in the U. S. National Herbarium, No. 1257165, collected in shallow water below little falls, north of Cachoeira, Bahia, Brazil, 225 m alt, by Agnes Chase (No. 8102). Also collected in Bahia, Brazil, by Lutzelburg, without locality (No. 2039), at Cruz das Almas, by G. Pinto (No. 0312), and Municipio de Serrinha, by Eiten & Eiten (No. 5013).

4. **LUZIOLA BRASILIENSIS** (Trin.) Swallen, comb. nov.

Caryochloa brasiliensis Trin., Gram. Pan 248. 1826.

Arrozia micrantha Schrad. in Kunth, Enum. Pl. **1**: 11. 1833. Based on *Caryochloa brasiliensis* Trin.

Luziola micrantha (Schrad.) Benth., J. Linn. Soc. **19**: 55. 1881.

BRAZIL: Rio de Janeiro, Kuhlmann 1916; Uhle 4971.

5. **LUZIOLA PERUVIANA** Gmel., Syst. Nat. **2**. 637. 1791.

Luziola mexicana H. B. K., Nov. Gen. & Sp. **1**: 199. 1816.

Milium natans Spreng., Syst. **1**: 250. 1825.

Luziola brasiliensis Moric, Pl. Nouv. Am. 94, t. 60. 1840.

Luziola leiocarpa Lindm., Kongl. So. Vet. Akad. Hand. **34**: 12, pl. 8a. 1900.

UNITED STATES: FLORIDA: Pensacola, Curtiss 6871; LOUISIANA: Plaquemines Parish, Langlois 5, 45, 98; New Orleans, Silveus 4234. MEXICO: Tlalnepantla, Pringle 11227;

Laguna del Negro, *Rovirosa* 555. GUATEMALA: JUTIAPA: Lago Retana, *Steyermark* 32019; Huehuetenango: Lago Ocubilá, *de Koninck* 120; JALAPA: E of Jalapa, *Steyermark* 32059; ALTA VERAPAZ: between Tactic and Tamahú, *Standley* 90686; San Cristobal, *Tuerckheim* 8480; Coban, *Tuerckheim* 1209, 2454. PERU: Lima, *Seeman* 866; *Ferreyra* 2048; *Anderson* 584. BRAZIL: RIO GRANDE DO SUL: Bagé, *Swallen* 7450; Pelotas, *Swallen* 9136, 9148; Uruguaiana, *Swallen* 7693; Rio Grande, *Lindman* A851; São Leopoldo, *Orth* 2517; Vila Oliva, *Rambo* 54926; Caí, *Rambo* 38802; Farroupilha, *Rambo* 40325; Cacoeira, *Lindman* A1213; SANTA CATARINA: Massiambú, *Reitz & Klein* 1323; Ibirama, *Klein* 2144; Itajaí, *Smith & Klein* 7286; *Klein* 1002; Piloés, *Smith & Klein* 7997; Serra da Boa Vista, *Smith, Reitz & Klein* 7963; Mun. Lajes, *Smith & Klein* 11348; RIO DE JANEIRO: Serra de Itatiaia, *Chase* 8367. PARAGUAY: N. PARAGUAY: *Fiebrig* 4940; CENTRAL PARAGUAY: *Morong* 195; Lake Ypacaray, *Hassler* 12473. ARGENTINA: CORRIENTES: Laguna Rincón, *Schwartz* 8537; *Parodi* 6357; TAFI: *Venturi* 2649; MONTERAS: *Venturi* 1429; CHACO: Margarita Belen, *Aguilar* 518, 1021; SALTA: Alvarado, *Parodi* 13485; MISIONES: Apostoles, *Parodi* 6949; TUCUMÁN: Vipos, *Lillo* 7933.

6. LUZIOLA **FRAGILIS** Swallen, sp. nov.

Culmi gracilissimi, decumbentes, implicati; ligula hyalina 2 mm longa; laminae 1-4.5 cm longae, 1-2 mm latae, supra scabrae; spiculae stamineae 4-5 mm longae; spiculae femineae 2 mm longae, brevipedicellatae, appressae in 2 racemis conjugatis reflexis dispositae.

Perennial?; culms very slender, branching, decumbent and becoming tangled together; lower sheaths much shorter than the internodes, bladeless, the ends of the culm rising above the water for about 5-10 cm, the internodes becoming shorter and the sheaths overlapping, pilose; ligule hyaline, about 2 mm long; blades 1-4.5 cm long, 1-2 mm wide, finely scabrous on the upper surface; staminate spikelets in a simple terminal raceme 1-1.5 cm long with 5 or 6 short-pedicellate appressed spikelets 4-5 mm long; pistillate inflorescence composed of 2 short reflexed racemes 5-10 mm long; pistillate spikelets 2 mm long, purple, short-pedicellate, appressed, 2-6 on each raceme; lemma and palea 1.5-2 mm long, several-nerved, glabrous; fruit about 1 mm long, dark brown, shining, striate.

Type in the U. S. National Herbarium, No. 1961009, collected in banhado, Aquidauana, Mato Grosso, Brazil, June 24, 1946, by *Jason R. Swallen* (No. 9538).

This species was very common in a banhado (swamp) where it formed dense mats on the surface of the water. It is very different from other species of *Luziola* in the inconspicuous inflorescences which are nearly hidden in the foliage. The pistillate inflorescences are very characteristic with the two reflexed racemes, rather than the typical panicle of *Luziola*. There is no difference, however, in the spikelets. It also superficially resembles *Hydrochloa*, but in that genus the pistillate spikelets are arranged on one simple raceme, almost entirely hidden in the sheath.

7. LUZIOLA GRACILLIMA Prodoehl, Bot. Archiv. Mez **1**: 241. 1922.

MEXICO: JALISCO: Guadalajara, *Pringle* 3867 (type collection); SONORA: Hermosillo, *Wiggins & Rollins* 118. PARAGUAY: CHACO: Loma Porá, *Rojas* 2761.

8. LUZIOLA BAHIENSIS (Steud.) Hitchc., Contr. U. S. Nat. Herb. **12**: 234. 1909.

Caryochloa bahiensis Steud., Syn. Pl. Glum. **1**: 5. 1854.

Luziola alabamensis Chapm., Fl. South. U. S. 584. 1860.

Luziola longivalvula Doell in Mart., Fl. Bras. **2**(2): 17. 1871.

Luziola striata Bal. & Poit., Bull. Soc. Hist. Nat. Toul. **12**: 231, t. 4, f. 2. 1878.

Luziola pusilla S. Moore, Trans. Linn. Soc. Bot. II. **4**: 507, pl. 37, f. 1-8. 1895.

Luziola contracta Hack., Osterr. Bot. Zeitschr. **52**: 8. 1902.

Luziola bahiensis var. *alabamensis* Prodoehl, Bot. Archiv. Mez **1**: 242. 1922.

UNITED STATES: ALABAMA: Conecuh Co.: Brooklyn, J. F. Beaumont; Mobile Co.: Mohr; Langdons Station, Mohr. HONDURAS: MORAZÁN: El Zamorano, Standley 28913; Quebrada de Santa Clara, Standley 22286. CUBA: ISLA DE PINOS: Nueva Gerona, Ekman 12383; San Pedro region, Killip 43688; Santa Fé, Britton, Britton & Wilson 15190; Ekman 12267; PINAR DEL RIO: between Remates and La Fé, Ekman 11315; Wright 3813. SANTO DOMINGO: LA VEGA: Jarabaroa, Ekman H14132; SANTO DOMINGO: Villa Altagraria, Ekman 11207; SAMANÁ: Sanchez, Ekman 15939. COLOMBIA: META: San Juan de Arama, Idrobo 493. VENEZUELA: BOLÍVAR: Gran Sabana, Steyermark 59219; Tamayo 2892; Salto de Pacairao, Steyermark 60492. PERU: LORETO: Iquitos, Killip & Smith 27181. BRAZIL: AMAZONAS: Rio Branco, Kuhlmann 3364; PARÁ: Moju River-Estate Conceição, Goeldi 157; Belém, Pires & Black 205; SAO PAULO: "Campos das Sete Lagoas," Eiten & Eiten 1971; BAHIA: Salzmann, type of *Caryochloa bahiensis* Steud.; MINAS GERAIS: Widgren; PARANÁ: Ponta Grossa, Swallen 8787; Guaratuba, Hatschbach 4012; Tijucas do Sul, Hatschbach 4320; SANTA CATARINA: Joaçaba: Campos dos Palmas, Smith & Reitz 9186; Lebon Regis, Reitz & Klein 11917; Fazenda da Laranja, Bom Jardim, S. Joaquim, Reitz & Klein 7893; RIO GRANDE DO SUL: Fazenda do Arroio Osorio, Rambo 45142; MATO GROSSO: Aquidauana, Chase 11032; GOIAS: Glaziou. PARAGUAY: Balansa 181 (type collection of *L. striata* Bal. & Poit.), 2956. ARGENTINA: Misiones: Posadas, Ekman 681.

9. LUZIOLA PITTIERI Lucas, J. Washington Acad. Sci. **32**: 159, f. 3. 1942.

VENEZUELA: GUARICO: Dos Caminos, Pittier 12530 (type collection); Sombrero, Pittier 12475; Parmana, Tamayo 4088; BARINAS: Barinas, Aristeguieta 2381.

10. LUZIOLA DOELLIANA Prodoehl, Bot. Archiv. Mez **1**: 240. 1922.

BRAZIL: PIAUI: Fazenda Nacional to Picos, Swallen 4215; Picos, Swallen 4222; CEARÁ: Iguatú, Swallen 4407; Cratheús, Swallen 4498; Sobral, Avelino & Black 115c; PERNAMBUCO: Antenor Navarro, Pickel 3810.

11. LUZIOLA **DIVERGENS** Swallen, sp. nov.

Culmi erecti ca 35 cm alti glabri; ligula decurrens hyalina 5 mm longa; laminae 15-25 cm longae, 2-3 mm latae, marginibus scabrae; paniculae stamineae terminales, 7-9 cm longae, spiculis 5 mm longis; paniculae femineae 10 cm longae ramis paucis divergentibus, paucispiculis, spiculis femineis 2.5 mm longis, purpureis.

Perennial; culms erect, about 35 cm tall, glabrous; sheaths elongate, much longer than the internodes, glabrous; ligule decurrent, hyaline, about 5 mm long; blades 15-25 cm long, 2-3 mm wide, the margins very scabrous, the upper surface scabrous but less so; staminate panicles terminal, 7-9 cm long, the spikelets 5 mm long; pistillate panicles from the lower sheaths, about 10 cm long, nearly as wide with a few widely spreading to reflexed, few-flowered branches; pistillate spikelets 2.5 mm long, spreading, long-pedicellate, the lemma and palea purple, many-nerved, the nerves smooth; caryopsis dark brown at maturity, about 2.2 mm long, definitely striate.

Type in the U. S. National Herbarium, No. 1982914, collected in lake, Santa Terezinha, Ituiutaba, Minas Gerais, Brazil, February 18, 1950, by A. Macedo (No. 2165). Also collected in the same locality by A. Macedo (No. 1658), but the plants differ in having pistillate spikelets 3.5 mm long. No other differences are apparent, the whole plant having the same appearance as No. 2165. The spikelets may be diseased.