

Tofieldiaceae Takht.

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This treatment is composed of the following taxa: Tofieldiaceae, *Harperocallis*.

HOW TO CITE

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DESCRIPTION

Herbs, perennial, rhizomatous. Roots fibrous, coarse. Rhizome short. Stem inconspicuous, covered by the persistent leaf sheaths. Leaves distichously-alternate, unifacial, strongly ribbed, sometimes falcate, margin tomentose or hirsutulous. Inflorescence terminal; main florescence a pedunculate thyrses; inflorescence bract leaf-like; peduncle elongate, elongating in fruit, glabrous; peduncle bracts 3–19, leaf-like or bracteose, but the basal 1–2 generally leaf-like; cyme bracts bracteose, 1-nerved; cymes alternate, sessile to long-pedunculate, contracted, rarely elongate, 1-flowered, rarely many-flowered; bracteoles scarious. Flowers hermaphrodite, actinomorphic, chasmogamous, flat or cup-shaped; each flower subtended by a calyculus of 3 distinct bracts, deltoid to ovate, acute to cuspidate; pedicel erect, rarely pendulous during anthesis, pre-anthesis and post-anthesis; perianth basally connate into a shallow cup; tepals 6, subequal, erect or patent, narrowly elliptic to narrowly obovate, prominently 5–9-veined, persistent in fruit; stamens 6, equal, filaments epipetalous, attached at top of tepalar cup, straight or connivent to the gynoecium, flattened or filiform, glabrous, base 2/5–3/5 the width of the tepal, anthers oblongoid or ovoid or sagittate, apex mucronulate, basifixed, rimose, latrorse; ovary superior, ovoid to pyriform, smooth to tuberculate, glabrous, 3-locular, locules equal, multi-ovulate, ovules biseriolate, styles 3, adherent near apex, straight, apex usually truncate, stigmas 3, capitate. Capsules septicidal, 3-valvate, body enclosed by tepals, style frequently exerted, mid- and marginal veins of each carpel developing into prominent ribs, the latter visible only after dehiscence, lateral veins well developed, carpels divided almost to base at dehiscence, styles dividing at dehiscence. Seeds exarillate, fusiform, testa reticulate and finely striate, golden brown to deep red, appendaged; appendage white on the chalazal end, decurrent along the side to the funicular end, rarely incomplete along the side.

COMMENTS

Tofieldiaceae is a small Monocot family of four genera (i.e., *Harperocallis* McDaniel, *Pleea* Michx., *Tofieldia* Huds., and *Triantha* Baker) and ca. 30 species. Tofieldiaceae has an extremely convoluted classification history, having been associated with Liliaceae, Melanthiaceae, Natherciaceae, and finally recognized as its own family. Currently, Tofieldiaceae is unambiguously recognized as a distinct, monophyletic, and an early-diverging family placed in the order Alismatales. Finally, the family can be differentiated from the morphologically similar but distantly related Natherciaceae by its distinct root anatomy, presence of a calyculus, and the absence of floral and/or ovary glandular hairs (which are characteristic of Dioscoriales).

Life Form

Herb

Substrate

Aquatic, Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Rock outcrop vegetation

Geographic DistributionConfirmed occurrences

North (Amazonas, Roraima)

REFERENCE

- Ambrose J.D. 1980. A re-evaluation of the Melanthioideae (Liliaceae) using numerical analyses. in Brickell C.D. (ed.) Petaloid monocotyledons: horticultural and botanical research. Academic Press, London, pp 65–81.
- Azuma H., Tobe H. 2011. Molecular phylogenetic analyses of Tofieldiaceae (Alismatales): Family circumscription and intergeneric relationships. *Journal of Plant Research* 124(3): 349–357.
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- Mosyakin A.S., Bezusko A.G., Tsybalyuk Z.M. 2009. Palynomorphological peculiarities of representatives of the family Tofieldiaceae (Liliopsida) and *Isidrogavia*: Evolutionary aspects. *Naukovy Zapiski, Biologiya ta Ecologiya* 93: 16–22.
- Remizowa MV, Sokoloff DD, Rudall PJ (2010) Evolutionary history of the monocot flower. *Annals of the Missouri Botanical Garden* 97(4): 617–645.
- Tamura M.N., Fuse S., Azuma H., Hasebe M. 2004. Biosystematic studies on the family Tofieldiaceae I. Phylogeny and circumscription of the family inferred from DNA sequences of *matK* and *rbcL*. *Plant Biol* 6: 562–567.
- Zomlefer W.B. 1997. The genera of Tofieldiaceae in the southeastern United States. *Harvard Papers in Botany* 2(2): 179–194.

Harperocallis McDaniel

This treatment is composed of the following taxa: *Harperocallis*, *Harperocallis neblinae*, *Harperocallis paniculata*, *Harperocallis penduliflora*, *Harperocallis schomburgkiana*.

HOW TO CITE

Pellegrini, M.O.O. Tofieldiaceae in **Flora do Brasil 2020**. Jardim Botânico do Rio de Janeiro. Available at: <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB130156>.

DESCRIPTION

Herbs, perennial, rhizomatous. Roots fibrous, coarse. Rhizome short. Stem inconspicuous, covered by the persistent leaf sheaths. Leaves distichously-alternate, unifacial, strongly ribbed, sometimes falcate, margin tomentose or hirsutulous. Inflorescence terminal; main florescence a pedunculate thyrses; inflorescence bract leaf-like; peduncle elongate, elongating in fruit, glabrous; peduncle bracts 3–19, leaf-like or bracteose, but the basal 1–2 generally leaf-like; cyme bracts bracteose, 1-nerved; cymes alternate, sessile to long-pedunculate, contracted, rarely elongate, 1-flowered, rarely many-flowered; bracteoles scarious. Flowers hermaphrodite, actinomorphic, chasmogamous, flat or cup-shaped; each flower subtended by a calyculus of 3 distinct bracts, deltoid to ovate, acute to cuspidate; pedicel erect, rarely pendulous during anthesis, pre-anthesis and post-anthesis; perianth basally connate into a shallow cup; tepals 6, subequal, erect or patent, narrowly elliptic to narrowly obovate, prominently 5–9-veined, persistent in fruit; stamens 6, equal, filaments epipetalous, attached at top of tepalar cup, straight or connivent to the gynoecium, flattened or filiform, glabrous, base 2/5–3/5 the width of the tepal, anthers oblongoid or ovoid or sagittate, apex mucronulate, basifixed, rimose, latrorse; ovary superior, ovoid to pyriform, smooth to tuberculate, glabrous, 3-locular, locules equal, multi-ovulate, ovules biseriate, styles 3, adherent near apex, straight, apex usually truncate, stigmas 3, capitate. Capsules septicial, 3-valvate, body enclosed by tepals, style frequently exerted, mid- and marginal veins of each carpel developing into prominent ribs, the latter visible only after dehiscence, lateral veins well developed, carpels divided almost to base at dehiscence, styles dividing at dehiscence. Seeds exarillate, fusiform, testa reticulate and finely striate, golden brown to deep red, appendaged; appendage white on the chalazal end, decurrent along the side to the funicular end, rarely incomplete along the side.

COMMENTS

Similarly to family limits, generic limits have also been historically convoluted in Tofieldiaceae. At some point, all genera currently accepted in the family were included in *Tofieldia* s.lat., despite morphological differences and biogeographical incongruences. In recent years, most authors have accepted five genera in the family, recognizing *Harperocallis* McDaniel and *Isidrogalvia* Ruiz & Pav. as distinct entities. Nonetheless, molecular and morphological studies have shown the need to recognize a single genus. Furthermore, Campbell & Dorr (2013) have shown that the name *Isidrogalvia* is actually a superfluous name for *Tofieldia*, which left all the South American species of Tofieldiaceae without a generic allocation. Thus, Campbell & Dorr (2013) all the necessary combinations, transferring the names from *Isidrogalvia* to *Harperocallis*.

Life Form

Herb

Substrate

Aquatic, Rupicolous, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas, Roraima)

IDENTIFICATION KEY

1. Inflorescence peduncle not surpassing the leaves, peduncle bracts foliaceous, secondary branches many-flowered; calyculus bracts with conspicuous midvein, tepals cuspidate at apex, anthers sagittate.. ***H. paniculata* (L.M.Campb.) L.M.Campb. & Dorr**
- 1'. Inflorescence peduncle much longer than the leaves, peduncle bracts scarious, secondary branches 1-flowered; calyculus bracts with all veins conspicuous, tepals cucullate at apex, anthers oblongoid to ovoid.. 2
2. Inflorescence with main axis conspicuous (lax), bracteoles amplexicaulous; calyculus bracts deltoid (i.e., as wide as long), flowers pendulous, perianth infundibuliform at anthesis, calyculus bracts veins not reaching the apex, filaments flattened, lacking a brown apex.. ***H. penduliflora* (L.M.Campb.) L.M.Campb. & Dorr**
- 2'. Inflorescence with main axis inconspicuous (congested), bracteoles not amplexicaulous; calyculus bracts ovate-deltoid (i.e., wider than long), flowers erect, perianth rotate at anthesis, calyculus bracts with the midvein reaching the apex, filaments terete, brown at apex.. 3
3. Leaves 6.0–7.0 mm wide; inflorescences with 3–4 peduncle bracts; tepals externally green to olive-yellow, internally cream, stamens clasping the pistil, anthers 2.0–2.5 mm long, ovoid; dehisced capsules with persistent style splitting in 3.. ***H. neblinae* (Steyerm. ex L.M.Campb.) L.M.Campb. & Dorr**
- 3'. Leaves 3.0–6.5 mm wide; inflorescences with 3–8(–10) peduncle bracts; tepals externally greenish-yellow with orange apex, internally yellow, stamens pointing outwards to the flower and not touching the pistil, anthers 1.2–1.8 mm long, oblongoid; dehisced capsules with persistent style undivided.. ***H. schomburgkiana* (Oliv.) L.M.Campb. & Dorr**

REFERENCE

- Ambrose J.D. 1980. A re-evaluation of the Melanthioideae (Liliaceae) using numerical analyses. in Brickell C.D. (ed.) *Petaloid monocotyledons: horticultural and botanical research*. Academic Press, London, pp 65–81.
- Azuma H., Tobe H. 2011. Molecular phylogenetic analyses of Tofieldiaceae (Alismatales): Family circumscription and intergeneric relationships. *Journal of Plant Research* 124(3): 349–357.
- Campbell L.M. 2010. Four new species of *Isidrogalvia* (Tofieldiaceae) from the Guayana Highlands. *Harvard Papers in Botany* 15(1): 51–62.
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- Cruden R.W. 1991. A revision of *Isidrogalvia* (Liliaceae): Recognition for Ruíz & Pavón's genus. *Systematic Botany* 16(2): 270–282.
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- McDaniel S. 1968. *Harperocallis*, a new genus of the Liliaceae from Florida. *Journal of the Arnold Arboretum* 49(1): 35–40.
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- Remizowa M.V. 2007. A new variety of *Isidrogalvia schomburgkiana* (Oliver) Cruden (Tofieldiaceae) from Venezuela. *Byulleten' Moskovskogo Obshchestva Ispytatelei Prirody. Otdel Biologicheskii. Moscow [Bulletin of Moscow Society of Naturalists, Biological Series]* 112(4): 73–75. [In Russian, with English summary].
- Remizowa M.V., Sokoloff D.D., Campbell L.M., Stevenson D.W., Rudall P.J. 2011. *Harperocallis* is congeneric with *Isidrogalvia* (Tofieldiaceae, Alismatales): Evidence from comparative floral morphology. *Taxon* 60(4): 1076–1094.
- Remizowa MV, Sokoloff DD, Rudall PJ (2010) Evolutionary history of the monocot flower. *Annals of the Missouri Botanical Garden* 97(4): 617–645.

Harperocallis neblinae (Steud.) L.M.Campb. & Dorr

DESCRIPTION

Inflorescence: bract(s) of the peduncle reduced; shoot secondary uniflorous. **Flower:** bracteole(s) of the calycle form ovate deltoid; bracteole(s) of the calycle venation veins conspicuous; **flower stance** erect; **perianth stance on the anthesis** open; **perianth colour** white to cream internally green to olivaceous externally; **stamen stance** connivent to gynoeceum; **filament form** filiform; **filament colour** white with blotch brown; **anther form** ovoid. **Fruit:** capsule style completely divided in 3.

Life Form

Herb

Substrate

Aquatic, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types


Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas)

HERBARIUM MATERIAL

C. Farney, 841, RB, 236613,  (RB00628618), Amazonas

Harperocallis paniculata (L.M.Campb.) L.M.Campb. & Dorr

Has as synonym

basionym *Isidrogalvia paniculata* L.M.Campb.

DESCRIPTION

Inflorescence: bract(s) of the peduncle foliaceous; shoot secondary multiflorous. **Flower:** bracteole(s) of the calycle form ovate deltoid; bracteole(s) of the calycle venation only the midrib conspicuous; flower stance erect; perianth stance on the anthesis open; perianth colour white to cream internally yellowish externally; stamen stance erect; filament form flattened; filament colour white with blotch brown; anther form sagittate. **Fruit:** capsule style completely divided in 3.

Life Form

Herb

Substrate

Aquatic, Rupicolous

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas)

HERBARIUM MATERIAL

B. Maguire, 60463, NYBG, 1477334,  (NY01477334), Amazonas, **Typus**

Harperocallis penduliflora (L.M.Campb.) L.M.Campb. & Dorr

Has as synonym

basionym *Isidrogalvia penduliflora* L.M.Campb.

heterotypic *Isidrogalvia schomburgkiana* var. *patula* Remizowa

DESCRIPTION

Inflorescence: bract(s) of the peduncle reduced; shoot secondary uniflorous. **Flower:** bracteole(s) of the calycle form deltoid; **bracteole(s) of the calycle venation** veins conspicuous; **flower stance** pendulous; **perianth stance on the anthesis** open; **perianth colour** white to cream internally tepal(s) external with the midrib yellow greenish; **stamen stance** connivent to gynoeceium; **filament form** filiform; **filament colour** white; **anther form** oblongoid/ovoid. **Fruit:** capsule style completely divided in 3.

Life Form

Herb

Substrate

Aquatic, Terrestrial

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Amazonas)

HERBARIUM MATERIAL

M.A. Moraes, 230, RB,  (RB01000327), Amazonas

Harperocallis schomburgkiana (Oliv.) L.M.Campb. & Dorr

Has as synonym

basionym *Tofieldia schomburgkiana* Oliv.

homotype *Isidrogalvia schomburgkiana* (Oliv.) Cruden var. *schomburgkiana*

homotype *Isidrogalvia schomburgkiana* (Oliv.) Cruden

heterotypic *Isidrogalvia guianensis* Klotzsch

heterotypic *Tofieldia guianensis* (Klotzsch) R.Schulze

DESCRIPTION

Inflorescence: bract(s) of the peduncle reduced; shoot secondary uniflorous. **Flower:** bracteole(s) of the calycle form ovate deltoid; bracteole(s) of the calycle venation veins conspicuous; flower stance erect; perianth stance on the anthesis enveloping the flower; perianth colour white to cream internally yellowish externally; stamen stance erect; filament form flattened; filament colour white; anther form oblongoid. **Fruit:** capsule style of the some capsule persistent.

Life Form

Herb

Substrate

Aquatic, Rupicolous

DISTRIBUTION

Native, Not endemic to Brazil

Phytogeographic Domains

Amazon Rainforest

Vegetation Types

Rock outcrop vegetation

Geographic Distribution

Confirmed occurrences

North (Roraima)

HERBARIUM MATERIAL

E. Ule, 8562, K (K001244413), Roraima

E. Ule, 8562, K (K001244413), Roraima

G.H.H. Tate, 378, NY,  (NY02428817), Roraima