



## *Cypella cruenta* (Iridaceae), the blood-stained *Cypella*

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**Resumo.** *Cypella cruenta* (Iridaceae), a *Cypella* manchada de sangue. É descrita uma nova espécie de *Cypella* conhecida até o momento para a região da bacia do rio Camaquã, no sudeste do estado do Rio Grande do Sul, Brasil. A nova espécie, nomeada *Cypella cruenta*, pertence a seção *Cypella*, sendo morfológicamente similar a *Cypella Alonsoana*, *C. exilis* e *C. fucata*. Entretanto, *C. cruenta* é facilmente reconhecida por suas tépalas com a porção côncava e metade proximal da lâmina intensamente manchada de vermelho sangue, pela forma e dimensões dos estames e estilete com ramos mais curtos e com cristas menores, quando comparada com os táxons relacionados. Informações sobre distribuição geográfica, ecologia, conservação, usos e relações taxonômicas são fornecidas. Adicionalmente, são providenciadas ilustrações e uma tabela distintiva entre *C. cruenta* e suas espécies afins. Com a descrição da nova espécie, *Cypella* passa a compreender 32 espécies, 17 delas pertencentes a seção *Cypella*.

Palavras-chave: campos, nova espécie, Pampa, Tigrídiaceae.

**Abstract.** *Cypella cruenta* (Iridaceae), the blood-stained *Cypella*. A new species of *Cypella* is described for the region of Camaquã river basin, in southeastern Rio Grande do Sul state, Brazil. The new species, named *Cypella cruenta* belongs to the section *Cypella*, being morphologically similar to the following species: *Cypella Alonsoana*, *C. exilis* and *C. fucata*. However, *C. cruenta* is easily recognized by its tepals with the concave portion and proximal half of the blade intensely painted in blood red, by the shape and size of the stamens and style with brief branches and with shorter crests, when compared with its similar taxa. Information on geographic distribution, ecology, conservation, uses and taxonomic relationships is provided. In addition, illustrations and a distinctive table among *C. cruenta* and its related species is presented. With the description of the new species, the genus *Cypella* now comprises 32 species, 17 of them belonging at section *Cypella*.

Key words: grasslands, new species, Pampa, Tigrídiaceae.

In a recent collection trip, carried out in the Camaquã River basin region, in southeastern Rio Grande do Sul state, Brazil, three populations of a very peculiar *Cypella* were identified. Even with visible differences in the shape of the flowers and the color pattern of the tepals, these populations were initially linked to well-known *C. exilis* Ravenna (1981a: 492). After, with more accurate analysis of this material, jointly with the study of different individuals of *C. exilis* in southern Brazil and Uruguay, it was possible to recognize significant differences in the size and shape of stamens and style between these populations and *C. exilis*. Thus, it is necessary to describe herein a new species for the genus *Cypella*, belonging to the section *Cypella*. The new species is described, illustrated and separated from its related species,

and data on geographic distribution, ecology and conservation is also provided.

### Taxonomic treatment

*Cypella cruenta* Deble, *sp. nova* Typus: BRAZIL. Rio Grande do Sul: Bagé, Pedra Grande, 28 October 2018, L.P.Deble & M.I.Paz-Deble 18899 (Holotypus: PACA!). Figures 1, 2.

Planta gracilis, 15–50 cm alta. Bulbus subglobosus, 8–13 mm longum et 10–14 mm latum; tunicis castaneis vestitas et in pseudocollum usque 5 cm longum. Folia basalia ad anthesis absenti vel pauca; lamina plicata, convoluta, anguste linearia, 15–55 mm longa et 0.05–0.3 cm lata. Folia caulinarum anguste linearia 11–38 cm longa et 0.05–0.3 cm lata. Caulis floriferus 11–42 cm longis, simplex vel superne bifurcatis vel trifurcatis, bracteis 1-2 instructis rhipidiis pedunculatis originantes. Spatha 1-2, rare 3, uniflora, 3.2–4.6 cm longa et 0.2–0.3 cm lata. Valva externa 1.8–2.6 cm longa, interiora convoluta

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3.2–4.4 cm longa. Pedicellus valva interiora haud excedens, saepe valde brevior. Ovarium obovato-oblongum, 6–7 mm longum. Perigonium luteo-aurantiacum vel aurantiacum conspicue cruento-maculatum, circa 40–50 mm latum. Tepala exteriora oblonga, pandurata, 26–30 mm longa, inferiora unguicula dense cruenta maculata. Tepala interiora arcte geniculata et recurvato-reflexa, 9–10 mm longa et 6–7 mm lata, unguicula patentia, fusco-purpureo-striolata; lamina nigro-purpureo vel brunneo-purpureo-striolata. Filamenta 1.8–2.2 mm longa, obclavata, purpurata, ad base distincte incrassatam, breve connata. Antherae oblongae, 5–5.5 mm longae et 2–2.5 mm latae, connectivo crassiusculo, 2–2.3 mm lato. Stylus pallide aurantiacum, 8.5–9.5 mm longus. Styli rami ascendenti erectisve, 2–2.5 mm longi, basi connati. Cristae adaxiales breves, falcatae, 1.5–2.8 mm longae, abaxiali minuta. Capsula obovato-oblonga, 10–15 mm longa et 3.5–5 mm lata. Semina angulata, obovate, circa 2 mm longa, epidermis minute faveolatis.

*Description*— Herb 15–50 cm tall, underground stems 2–7 cm long. Bulb subglobose, small, 8–13 × 10–14 mm, prolonged in a collar 2–5 cm long; cataphylls dark-brown, broadly ovate-lanceolate, apex long acuminate. Basal leaves at anthesis absent or up to 4, blades narrowly linear, plicate, convolute, 15–55 × 0.05–0.3 cm. Cauline leaf narrowly linear, 11–38 × 0.05–0.3 cm, base attenuate. Flowering stems 11–42 cm long, unbranched or 2–3-branched in distal half. Spathes 1–2 (3) per branch, 3.2–4.6 × 0.2–0.3 cm, herbaceous, pallid-green, bivalved, one-flowered, pedunculate, peduncles 2–4.5 cm long; outer valve 1.8–2.6 cm long, the inner 3.2–4.4 cm long, both obtuse at the top, apiculate, with membranous and hyaline margin; edges with purple parallel grooves and with greenish-brown or purplish-brown macula; pedicel filiform, 3–4.5 cm long. Flowers 40–50 mm diameter, predominately golden-yellow or orange, shiny, the concave part reddish-brown painted, with a macula dark-purple in the proximal part; central concavity 15–22 mm diameter, and 6–8 mm deeper. Tepal whorls notably dissimilar. Outer tepals oblong, 26–30 mm long, golden-yellow or orange, orange or reddish-orange veined, concave at the base for ca. 10 mm; blades golden-yellow or orange, reddish-brown painted in the proximal third, 16–20 × 14–16 mm, slightly patent or revolute, apices truncate or rounded, apiculate; claws cuneate, 8–9 mm long, 2.5–3 mm wide at the base, and 8–9.5 mm wide at the apex, reddish-brown, with a central stripe dark reddish-brown at the base. Inner tepals geniculate-recurved, 9–10 × 6–7 mm long, the proximal half patent, slightly inclinate, then curved upward,

the distal one-third incurved and strongly reclinate; blades yellow, with a white-cream central depression densely covered with golden-yellow or bright-yellow one-celled lipid trichomes at the base (carpet of elaiophores), surrounded by a lateral high part, with purplish-brown parallel stripes and few stains; claws cuneate, 7–7.5 mm long, ca. 2 mm wide at the base, and 3.5–4 mm wide at the apex, reddish-brown, with dark-purple stripes. Filaments obclavate 1.8–2.2 mm long, erect, reclined at top, purple, base thickened, purple or reddish-brown, attached for 0.1–0.2 mm; anthers broadly oblong 5–5.5 × 2–2.5 mm; connective pallid yellowish-orange, 1.8–2.3 mm wide, thecae darker, pollen golden-yellow. Ovary obovate-oblong, pallid-green, 6–7 × 1.5–2 mm. Style golden-yellow or orange become whitish-cream towards at the base, 8.5–9.5 mm long. Style branches channeled, almost erect, 2–2.5 mm long, connate in proximal half, with transverse stigmatic surface of the abaxial crest extending one in the each other crest at the apex, translucent and orange, adaxial crests falcate, 1.5–2.8 mm long, abaxial crest deltate, at apex slightly acute, 0.5–1.3 mm long. Capsule obovate-oblong, 10–15 × 3.5–5 mm. Seeds obconic, ca. 2 mm, angled, reddish-brown, epidermis minutely faveolate.

*Etymology*— The epithet *cruenta* means bloody or covered in blood, and refers to the perigone color, which is conspicuously stained of reddish-brown.

*Additional specimens examined (paratypes)*— BRAZIL. Rio Grande do Sul: Bagé, Passo do Cassão, em afloramento rochoso, associado a arbustos, 04 November 2018, L.P.Deble & M.I.Paz-Deble 18901 (PACA!). Caçapava do Sul, em afloramento rochoso, na orla da vegetação arbustiva, próximo ao rio Camaquã, 28 October 2018, L.P.Deble & M.I.Paz-Deble 18900 (PACA!).

*Geographic distribution and habitat*— *Cypella cruenta* was found in humid rocky outcrops, close to shrub formations in the Camaquã River basin, between the municipalities of Bagé and Caçapava do Sul, in the southeastern Rio Grande do Sul state, Brazil. Only three populations were found, in an extension of occurrence less than 500 km<sup>2</sup>. Although having few records, this species may be more common in the region, considering that the said site is one of the best preserved in the state of Rio Grande do Sul, and most of this region



Figure 1. *Cypella cruenta*. Habit, Detail of inflorescence, and Spathe with mature fruit. Lower right, Flower with tepals removed, and inner tepals, frontal and lateral view. Lower left, Fruit. Left, Seed. All from material cultivated from the Holotype.

is sparsely populated, composed mainly of family ranchers (Borba & Trindade 2009, Borba 2016), and many of the places that result in the preferred habitat of *C. cruenta*, are steep and difficult to access.

*Ecology, size of populations and natural history*—*Cypella cruenta* is a very rare species, growing in cracks of humid rocky outcrops, under diffuse light, on the edge of shrub-tree formations associated to rocky environments. The majority of the species of *Cypella* grow in full sun, inhabiting from dry and rocky places, to small streams and moist soils; however, according Deble & Alves (2017a) there are few species that grow in half shade, either associated with trees or small shrubs, among them *Cypella Alonsoana* Deble & Alves (2017: 2) and *C. magnicristata* Deble in Deble et al. (2012: 63) or on the edge of forest formations, as *Cypella parviflora* Ravenna ex Deble & Alves (2017: 6). *C. cruenta* is only the fourth species of the genus that has this preferred habitat. Only three populations of *C. cruenta* are known, all of them containing less than 30 individuals. The species blooms and bears fruit during the spring, its flowers open only once, in the early morning and wither in the early afternoon. The specimens bloom intensely and produce fruits and seeds abundantly. During our field activities was observed species of bee (Meliponinae) and hoverfly (Syrphidae) hovering or nectaring at flowers. Other species of Iridaceae occurring in the same region are *Cypella exilis* Ravenna (1981a: 492), *C. fucata* Ravenna (1981b: 18), *C. pusilla* (Link & Otto 1828: 125) Jackson (1893: 689), *Herbertia lahue* (Molina 1810: 110) Goldblatt (1978: 379), *H. caerulea* (Herbert 1840: pl. 3779) Herbert (1841: pl. 3862), *H. pulchella* Sweet (1829: pl. 222), *H. zebrina* Deble (2010: 93), *Kelissa brasiliensis* (Baker 1877: 134) Ravenna (1981c: 106) and *Sisyrinchium* spp.

*Conservation*—*Cypella cruenta* is exclusive in humid rocky outcrops, close to shrub formations, and seemingly restrict to the Camaquã River basin, between the municipalities of Bagé and Caçapava do Sul, in the southeast Rio Grande do Sul state, Brazil. Only three populations were found, in an extension of occurrence less than 500 km<sup>2</sup>. These populations contain less than 30 individuals and the total of mature specimens known is smaller than 100. The sites of occurrence of *C. cruenta* are difficult to access and are well preserved,

considering the current use only for grazing. Nevertheless, the strong advance of economic activities such as mining puts at risk the quality of habitat and the conservation of this species and the others species that are also restricted to the region. Based on the criteria of IUCN (2017) as extension of occurrence, number of populations, quality of habitat, and threats observed *C. cruenta* should be considered Endangered (EN B1+B2a, b(i, ii, iii, iv) + D).

*Uses*—*Cypella cruenta* proves to be suitable for use as an ornamental plant. Its flowers are beautifully stained with blood-red, and the species adapts well to growing in pots, in half shade, with a substrate rich in organic matter.

*Discussion*—*Cypella cruenta* is morphologically similar to *Cypella exilis*, being easily separated by its narrower leaves, 0.05–0.3 cm wide (vs. 0.15–0.6 cm wide), flowers with central depression entirely reddish-brown painted (vs. golden-yellow with a purple basal stain, and irregular spots along the concavity), base of the blade densely reddish-brown stained (vs. with a narrow central band, reddish-brown or purple that extends to the middle of the blade), narrower inner tepals (6–7 mm width vs. 8–10 mm width), stamens with filaments of 1.8–2.2 mm long (vs. 2.5–4.5 mm long) and anthers smaller (5–5.5 mm vs. 5.5–7 mm) with connective of 1.8–2.3 mm width (vs. 0.7–1.2 mm width), and shorter adaxial crests of style (1.5–2.8 mm vs. 3–5 mm). *C. cruenta* shows relationship with *C. Alonsoana*, due to the size and color of the flowers, the shape and color of the stamens and the shape of the style. However, *C. cruenta* can be easily separated from *C. Alonsoana* by its one-flowered spathe (vs. two-flowered), by its inner tepals with 6–7 mm wide (vs. 10–11 mm), and by the obclavate shape of the filaments (vs. strap-like shaped). *C. cruenta* is also similar to *C. fucata*, considering the habit, size and shape of the flowers, and the appearance of the stamens and style. However, *C. cruenta* differs from *C. fucata* by its flowers with central concavity entirely reddish-brown stained (vs. ochraceous-yellow, with a smaller purple stain towards the base), stamens with slender filaments, which are purple or reddish-brown colored for the most part of its length (vs. thicker filaments, pale-pinkish or pale-yellowish, with some lines and purple marks only at the base), bigger anthers (5–5.5 vs. 3.2–4.5), and style with shorter crests (1.5–2.8 mm vs. 3.5–5.3 mm).





Figure 2. Local of occurrence, and details of flowers of *Cypella cruenta* (A-G). **A.** Locality of Pedra Grande, north Bagé municipality. **B.** Flower, frontal view. **C.** Flower, lateral view. **D.** Flower, inclined view. **E.** Flower frontal view. **F.** Flower, frontal view. **G.** Flower, tepals removed. (B-D, G from Holotype, E and F from *L.P.Deble & M.I.Paz-Deble 18900, 18901*).

Table 1. Characteristics to distinguish *Cypella cruenta* from its allies

Character/Species	<i>C. cruenta</i>	<i>C. Alonsoana</i>	<i>C. exilis</i>	<i>C. fucata</i>
Plant height (cm)	15–50	38–90	10–60	12–25
Size of spathes (cm)	3.2–4.6 × 0.2–0.3	3.1–4.5 × 0.4–0.6	4.1–5.8 × 0.3–0.4	2.8–3.4 × 0.2–0.3
Peduncles of spathes length (cm)	2–4.5	2.1–6.5	2.4–3.8	1.2–3
Flower per spathe	1	2	1	1
Perigone color, aspect and diameter (mm)	golden-yellow or orange, the concave part reddish-brown, 40–50	golden-yellow, the concave part with purple paints, 35–45	golden-yellow or orange, blade with dark-purple longitudinal strip, concave part with dark-purple paints, 42–60	dull-orange or ochraceous-orange, concave part with dark purple paints, 25–40
Central concavity size (mm)	15–22 × 6–8	18–23 × 5–6	15–20 × 7–9	10–12 × 5–6
Outer tepal shape and size (mm)	oblong, 26–30	oblong, 35–42 × 16–22	oblong or obovate-oblong, 26–40 × 16–25	obovate or obovate-oblong, 17–25 × 10–12
Inner tepal size (mm)	9–10 × 6–7	10–11 × 10–12	10–11 × 8–10	7.5–8 × 6–7
Anthers shape and size (mm)	broadly oblong 5–5.5 × 2–2.5	broadly oblong 5.5–6.3 × 2–2.6	oblong, 5.5–7 × 1.3–1.6	broadly oblong, 3.2–4.5 × 1.8–2.2
Connective width (mm)	1.8–2.3	1.8–2.4	0.7–1.2	1–1.4
Filaments color, shape and length (mm)	purple, obclavate 1.8–2.2	purplish-cream, tape-shaped, 2.2–2.8	pale-pinkish or pale-yellowish, purple stripes at base, obclavate, 2.5–4.5	pale-pinkish or pale-yellowish, obclavate, 1.8–2.1
Style length (including style branches and crests) (mm)	8.5–9.5	11.5–12.5	12.5–14.5	11–13.5
Style branches length (mm)	2–2.5	2–2.8	2.5–3.8	2–3 (often fused in its proximal half)
Adaxial crests shape and length (mm)	falcate, 1.5–2.8	falcate, 3.8–4.6	lanceolate, 3–5	lanceolate 3.5–5
Abaxial crest shape and length (mm)	deltate, 0.5–1.3	deltate, 1.8–2	deltate, 1–2	ovate at apex bifid, 0.5–1
Stigmatic portion color and aspect	ochraceous orange, extending for ca. 1mm, strongly patent	light-yellow, extending for ca. 0.5 mm, slightly patent	purplish-orange or purplish-brown, extending for ca. 1mm, strongly patente	ochraceous orange, extending for ca. 0.2–0.3 mm, slightly patent
Habitat	humid rocks, among tree and shrubby community	dry grasslands, among tree and shrubby community	grasslands	dry grasslands and rocky places
Geographic distribution	Southern Rio Grande do Sul, Brazil	Northern Uruguay	Southern Brazil (RS, SC), and Uruguay	Uruguay, northeast Argentina and Rio Grande do Sul, Brazil

*Comments about the type of Cypella exilis and the analysis of dry material of this species, C. cruenta and C. fucata—* The identity of *Cypella exilis* was addressed in several studies since its original description as *Polia gracilis* Klatt (1862: 545), which was based on collections made by Sellow in Rio Grande do Sul (Brazil) and Uruguay, to information later that ended up confusing the true identity of this species (Klatt 1871, Baker 1877, Baker 1892, Ravenna 1965). Baker (1877) transferred *Polia gracilis* to *Cypella*; however, under an illegitimate name, thus Ravenna (1981a) proposed the new name *C. exilis* for this taxon. However, it was only recently that the species was typified, based on the original collections analyzed by Klatt, and mentioned in 1862 (Deble & Alves 2017, Deble 2017). Deble & Alves (2017b)

when typifying *C. exilis* signposted the possible collection site, according to Urban (1893: 196) in which “the collection Sellow d.2077 was made between the current municipalities of Aceguá and Pelotas” the authors indicated that “three species of *Cypella* sect. *Cypella* occur within this area: *C. fucata*, *C. Herbertii* and *C. amplimaculata*”. Based on the analysis of the type of *C. amplimaculata* Chauveau & Eggers in Chauveau et al. (2014), they considered this species as conspecific with *C. exilis*, based on the darker central line of the outer tepals and the overlapping measures of the floral parts. Even with the lectotype being a complete exsiccate, Eggers et al. (2019) considered *C. exilis* doubtful, but Deble & Alves (2020) maintained this species as the valid name for *C. amplimaculata*. With the addition of a new species

for the same region of occurrence of *C. exilis*, a new analysis of the type of this species was necessary. For this, the images provided by Jstor (2020) were used, which have high resolution and have a very accurate measurement tool. Thus, it was verified that the lectotype of *C. exilis* displays anthers of 6.8 mm long, with connective of 0.9–1 mm, and staminal filaments with *ca.* 3 mm. The characteristics of the type of *C. exilis*, including the measurements of the floral parts, leave no doubt about the maintenance of *C. amplimaculata* as a synonym for *C. exilis*, as already indicated in previous works (Deble & Alves 2017b, Deble 2017, Deble & Alves 2020). *C. cruenta*, in turn, is a taxon of easy recognition, even in dry material, in view of the smaller size of the anthers, the broad connective and the appearance of the external tepals, which become violet in dry material. In *C. exilis* the tepals dry straw-colored, having a darker conspicuous longitudinal central line, whereas in *C. fucata* they also dry straw-colored, but the veins remain distinctly darker and the darker central line is absent.

### Considerations

*Cypella cruenta* is a new species for the section *Cypella*, related mainly to *C. exilis*, but which differs from this species by relevant morphological characteristics as the basal part of the blade, which is entirely reddish-brown stained, by the stamens with shorter filaments and smaller anthers, by the style with briefer branches and shorter crests, and by the different shape of the style crests. *C. cruenta* is also related to *Cypella Alonsoana* and *C. fucata*; however, it can be easily separated from the first-one species by its one-flowered spathes, while from *C. fucata* the new species can be readily recognized by the bigger anthers and shorter crests, and mainly by perigone with central concavity entirely reddish-brown stained. With the description of *Cypella cruenta* the genus *Cypella* now comprises 32 species, and the section *Cypella* currently encompasses 17 species, most of which are threatened and exclusive to the Campos eco-region (delimitation of the grasslands eco-regions following Azpiroz *et al.* 2012). *C. cruenta* occurs in clearing rocky sites among shrubby community and trees, and probably this species not occurs in full sun. The ecological data mentioned evidence that *C. cruenta* require specific habitat and its range of occurrence demonstrate that this species is exclusive in the region of Camaquã river basin,

in southeastern Rio Grande do Sul state, Brazil. As evidenced, *Cypella cruenta* is more one taxon endemic in the Campos eco-region of the complex ecosystems of Río de La Plata Grasslands (following the delimitation of Soriano *et al.* 1992, Bilenca & Miñarro 2004, Azpiroz *et al.* 2012), and reinforce the necessity of actions that subsidize the valuation and conservation of these environments.

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