

## Stigma characterization in different genera of Bromeliaceae

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Bromeliaceae is a large family of over 3,086 species in 56 genera widely distributed in the New World mainly in Brazil where 650 species are endemic [1]. Bromeliads play an important role in the Atlantic Forest due to their peculiar structural and functional traits. Many species have a high ornamental and commercial value and are under uncontrolled extractivism. The taxonomy of Bromeliaceae, however, is currently in flux and certain aspects of classification are being refined [2]. The understanding of floral morphology and pollination biology is one of the prerequisites to lead to a correct classification of genus and species [3, 4]. The present work aimed to characterize the stigma morphology in thirteen species of bromeliads (*Aechmea bicolor* L. B. Sm., *A. bromeliifolia* (Rudge) Baker, *A. distichantha* Lem., *A. fasciata* (Lindl.) Baker, *A. nudicaulis* (L.) Griseb, *Alcantarea nahoumii* (Leme) J.R.Grant, *Ananas comosus* var. *ananassoides* (Baker) Coppens & F. Leal, *Vriesea carinata* Wawra, *V. friburgensis* Mez, *V. michaelii* W. Weber, *V. paraibica* Wawra, *V. simplex* Vell. and *V. unilateralis* Baker) in order to contribute to the taxonomy of the bromeliaceae family. Stigmas were fixed in paraformaldehyde (4%), dehydrated through an ethanol series, critical point dried, mounted on stubs and sputter coated with gold. Samples were examined using a SEM. The morphometric data and the stigma type are presented in Table 1 and Figure 1. Two types of stigma were observed: *Aechmea*, *Alcantarea* and *Ananas* presented a conduplicate-spiral (CS) stigma and *Vriesea* presented a convolute-blade type, according to stigma descriptions in the literature for other bromeliad species [3, 4]. Length and diameter of stigma and style showed the highest values for *Alcantarea nahoumii* (stigma/style with 91.75 mm in length and 4.59 mm in diameter). In *Vriesea* species the results varied from 19.42 (*V. unilateralis*) to 33.88 mm (*V. simplex*) and in *Aechmea* species from 4.19 mm (*A. bromeliifolia*) to 15.65 mm (*A. fasciata*). The morphometric characteristics of different species can directly interfere with their crossability due to its direct correspondence with pollen tube growth.

### References

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TABLE 1. Stigma and style length and diameter and stigma types in Bromeliaceae

Species	Stigma (mm)		Style (mm)		Type
	Length	Diameter	Length	Diameter	
<i>Aechmea bicolor</i>	1.07 ± 0.12	0.70 ± 0.06	4.06 ± 0.05	0.72 ± 0.02	CS
<i>A. bromeliifolia</i>	0.61 ± 0.07	0.52 ± 0.02	3.58 ± 0.07	0.50 ± 0.03	CS
<i>A. distichantha</i>	1.40 ± 0.09	0.84 ± 0.02	6.26 ± 0.18	0.46 ± 0.02	CS
<i>A. fasciata</i>	1.63 ± 0.10	1.23 ± 0.04	14.03 ± 0.15	0.49 ± 0.05	CS
<i>A. nudicaulis</i>	1.13 ± 0.07	0.42 ± 0.04	9.12 ± 0.16	0.40 ± 0.04	CS
<i>Alcantarea nahoumii</i>	1.75 ± 0.25	4.59 ± 0.09	89.99 ± 0.71	1.49 ± 0.05	CS
<i>Ananas comosus</i> var. <i>ananassoides</i>	1.48 ± 0.19	1.71 ± 0.07	5.08 ± 0.10	0.92 ± 0.05	CS
<i>Vriesea carinata</i>	1.61 ± 0.17	2.55 ± 0.09	27.97 ± 0.24	0.69 ± 0.03	CB
<i>V. friburgensis</i>	0.83 ± 0.07	1.76 ± 0.04	22.38 ± 0.45	0.50 ± 0.03	CB
<i>V. michaelii</i>	1.05 ± 0.14	1.47 ± 0.05	20.56 ± 0.15	0.44 ± 0.02	CB
<i>V. paraibica</i>	1.81 ± 0.16	2.75 ± 0.07	25.99 ± 0.25	0.74 ± 0.03	CB
<i>V. simplex</i>	1.98 ± 0.14	3.42 ± 0.08	31.90 ± 0.38	0.84 ± 0.02	CB
<i>V. unilateralis</i>	0.57 ± 0.08	1.84 ± 0.20	18.85 ± 0.41	1.39 ± 0.22	CB

CS = conduplicate-spiral; CB = convolute-blad

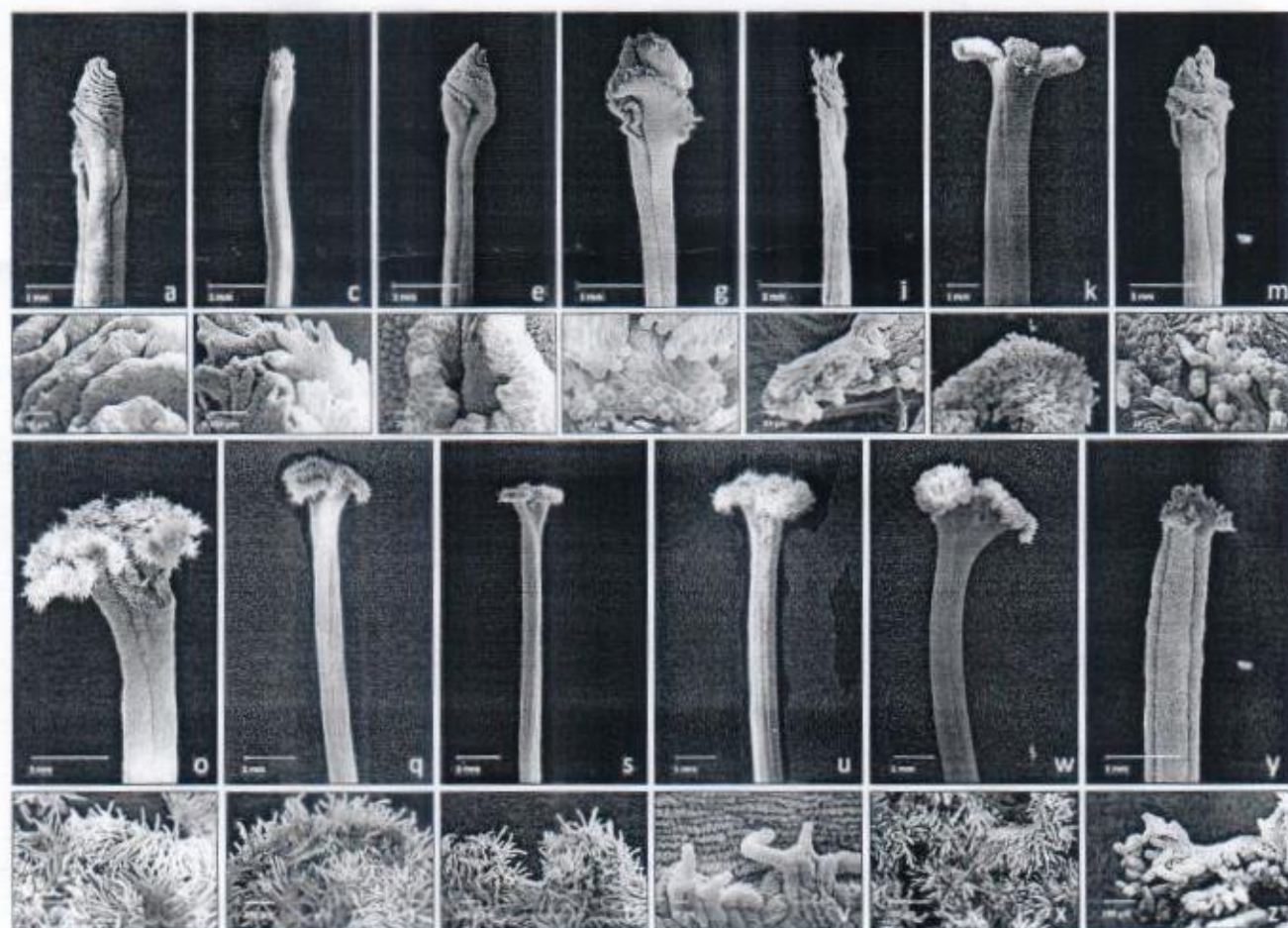


FIG. 1. Stigma morphology in Bromeliaceae. a-n) Conduplicate-spiral in *Aechmea*, *Alcantarea* e *Ananas*. o-z) Convolute-blad in *Vriesea*. a, b) *Aechmea bicolor*, c, d) *A. bromeliifolia*, e, f) *A. distichantha*, g, h) *A. fasciata*, i, j) *A. nudicaulis*, k, l) *Alcantarea nahoumii*, m, n) *Ananas comosus* var. *ananassoides*, o, p) *Vriesea carinata*, q, r) *V. friburgensis*, s, t) *V. michaelii*, u, v) *V. paraibica*, w, x) *V. simplex* e y, z) *V. unilateralis*.