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TRUE TILLANDSIAS MISPLACED IN *VRIESEA* (BROMELIACEAE: TILLANDSIOIDEAE)

Jason R. Grant

Department of Botany, University of Maryland, College Park, Maryland 20742-5815 U.S.A.

ABSTRACT

The genus *Tillandsia*, as I define it, is restricted to three species groups of *Tillandsia* subgenus *Tillandsia* sensu Gardner (1989), *Tillandsia* subgenus *Pseudalcantarea* sensu Smith & Downs (1977), and the twenty-six taxa I here remove from *Vriesea* and transfer or replace in *Tillandsia*. Ten new combinations are necessary: **Tillandsia andreettae** (Rauh) J.R. Grant, **T. boeghii** (Luther) J.R. Grant, **T. curvispica** (Rauh) J.R. Grant, **T. drewii** (L.B. Smith) J.R. Grant, **T. limonensis** (Rauh) J.R. Grant, **T. olmosana** (L.B. Smith) J.R. Grant, **T. olmosana** (L.B. Smith) J.R. Grant var. **pachamamae** (Rauh) J.R. Grant, **T. penduliscapa** (Rauh) J.R. Grant, **T. strobelii** (Rauh) J.R. Grant, and **T. tillandsioides** (L.B. Smith) J.R. Grant. In addition, four new names are proposed: **Tillandsia peruviana** J.R. Grant to replace *Vriesea sagasteguii* L.B. Smith (1968), non *Tillandsia sagasteguii* L.B. Smith (1963), **Tillandsia porphyrocraspeda** J.R. Grant to replace *Vriesea cylindrica* L.B. Smith (1951), non *Tillandsia cylindrica* S. Watson (1891), **Tillandsia werneriana** J.R. Grant to replace *Vriesea rauhii* L.B. Smith (1958), non *Tillandsia rauhii* L.B. Smith (1958), and **Tillandsia yaconorensis** J.R. Grant to replace *Vriesea koideae* Rauh (1992), non *Tillandsia koideae* Rauh & E. Gross (1991).

KEY WORDS: Bromeliaceae, Tillandsioideae, *Tillandsia*, *Vriesea*

The presence or absence of petal appendages has historically weighted heavily in delineating generic limits in the Bromeliaceae. Several genera are circumscribed and distinguished from another on this basis alone. It is in fact the primary character used to separate *Vriesea* from *Tillandsia* in Smith & Downs (1977). In preparation for a complete overview and reevaluation of generic limits in the Tillandsioideae, a number of species currently attributed to *Vriesea*

are hereby transferred to or replaced in *Tillandsia* as the circumscription of the latter is broadened in some respects while restricted in others.

It has been recognized that the circumscription of genera based on the single character of petal appendages is flawed (Gardner 1989; Brown & Terry 1992). Though there are a number of "good" genera formed entirely of species with appendages (e.g., *Portea*, *Steyerbromelia*, and *Mezobromelia*), and without appendages (e.g., *Connellia*, *Catopsis*, and *Racinaea*), there are also several quite distinct genera having species both with and without petal appendages, notably the large genera *Pitcairnia* and *Puya* (Brown & Terry 1992). Using this model, I believe there is adequate evidence for the inclusion of species with petal appendages in the traditionally non-petal-appendaged genus *Tillandsia*.

If the petal appendage character is removed in a taxonomic evaluation of the *Tillandsia-Vriesea* complex, a number of species attributed to *Vriesea* are morphologically more aligned to *Tillandsia* subgenus *Tillandsia*. These twenty-six taxa were placed in *Vriesea* only due to their possession of petal appendages. They in fact show no real affinities to *Vriesea*, or to the several satellite groups treated within the genus by Smith & Downs (1977). With exception to petal appendages, the twenty-six taxa here removed from *Vriesea* share all the characters for which *Tillandsia* subgenus *Tillandsia* was circumscribed in Smith & Downs (1977) and Gardner (1989). These characters especially include stamens and pistil that equal or are exserted from the corolla, petal blades that are narrow, spatulate or ligulate-shaped, and leaves which are often linear-triangular in outline and densely covered in trichomes. *Vriesea* has leaves that are only broad, ligulate shaped, and with few trichomes.

In summary, the genus *Tillandsia* is restricted taxonomically to three species groups of *Tillandsia* subg. *Tillandsia* sensu Gardner (1989), *Tillandsia* subg. *Pseudalcantarea* sensu Smith & Downs (1977), and the twenty-six petal-appendaged taxa here removed from *Vriesea*. An expanded description and circumscription of *Tillandsia* will appear in a forthcoming analysis. In regard to the five other subgenera of *Tillandsia* accepted by Smith & Downs (1977), *Pseudocatopsis* was elevated to the generic rank as *Racinaea* (Spencer & Smith 1993), while the relationships of *Allardtia*, *Anoplophytum*, *Diaphoranthema* (*Dendropogon*), and *Phytarrhiza* to one another are currently in study and will be discussed later. A complete list of species for both *Tillandsia* and *Vriesea* will be reported in an overview of those genera.

Tillandsia andreettae (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea andreettae* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 43:88. 1983. TYPE: ECUADOR. Azuay: Paßhöhe, Pachamama, Straße Santa. Isabel-Pasaje, *Rauh 38140* (HOLOTYPE: HEID).

Tillandsia arpocalyx André, *Enum. Bromel.* 7. 1888. TYPE: ECUADOR.

Chimborazo: south of Riobamba, *André 4474* (HOLOTYPE: K). *Vriesea arpocalyx* (André) L.B. Smith, Contr. U.S. Natl. Herb. 29:445. 1951.

Tillandsia barclayana Baker, Jour. Bot. London 25:239. 1887. TYPE: ECUADOR. Guayas: Valdivia, *Barclay 622* (HOLOTYPE: BM). *Vriesea barclayana* (Baker) L.B. Smith, Contr. U.S. Natl. Herb. 29:517. 1951.

Tillandsia boeghii (Luther) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea boeghii* Luther, Nord. J. Bot. 12(2):221. 1992. TYPE: ECU-ADOR. Loja: Parque Nacional Podocarpus, near "Centro de Información", 79° 10′ W, 04° 05′ S, *A. Bøgh 86549* (HOLOTYPE: SEL; Isotypes: AAU, QCA,QCNE,LOJA).

Tillandsia castaneo-bulbosa Mez & Wercklé *in* Mez, Bull. Herb. Boiss. II. 3:140. 1903. TYPE: COSTA RICA. Cartago: Cartago, *Wercklé 16189* (HOLOTYPE: B). *Vriesea castaneo-bulbosa* (Mez & Wercklé) J.R. Grant, J. Bromeliad Soc. 42(1):14. 1992.

Tillandsia cereicola Mez, Repert Nov. Sp. 3:34. 1906. TYPE: PERU. Ancash: near Caraz, *Weberbauer 3025* (HOLOTYPE: B). *Vriesea cereicola* (Mez) L.B. Smith, Phytologia 6:194. 1958.

Tillandsia curvispica (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea curvispica* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 42:53. 1983. TYPE: PERU. Amazonas: Río Marañón, *Rauh 52835* (HOLOTYPE: HEID).

Tillandsia drewii (L.B. Smith) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea drewii* L.B. Smith, Phytologia 5:401. 1956. TYPE: ECUADOR. Imbabura: La Floresta, near Sigsipamba, *Drew E-284* (HOLOTYPE: US).

Tillandsia harmsiana L.B. Smith, Contr. Gray Herb. 98:16. 1932. TYPE: PERU. Huánuco: Mito, *Macbride 3272* (HOLOTYPE: F; Isotype: GH). *Vriesea harmsiana* (L.B. Smith) L.B. Smith, Contr. U.S. Natl. Herb. 29:447. 1951.

Tillandsia hitchcockiana L.B. Smith, Contr. Gray Herb. 89:10. 1930. TYPE: ECUADOR. Loja: El Tambo to La Toma, *Hitchcock 21323* (HOLOTYPE: GH; Isotype: US). *Vriesea hitchcockiana* (L.B. Smith) L.B. Smith, Contr. U.S. Natl. Herb. 29:446. 1951.

Tillandsia incurva Grisebach, Nachr. Ges. Wiss. Gött. "1864":15. 1865. TYPE: VENEZUELA. Aragua: 6 miles southeast of Colonia Tovar, *Fendler 1524* (HOLOTYPE: GOET; Isotype: GH). *Vriesea incurva* (Grisebach) R.W. Read, Phytologia 16:458. 1968.

Tillandsia limonensis (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea limonensis* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 43:85. 1983. TYPE: ECUADOR. Azuay: Bergwald bei Limon (Indanza), zwischen Paute und Mendez, *Rauh 53092* (HOLOTYPE: HEID).

Tillandsia olmosana (L.B. Smith) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea olmosana* L.B. Smith, Phytologia 13:113. 1966. TYPE: PERU. Cajamarca: Valley of Olmos, *Rauh P-333* (HOLOTYPE: US).

Tillandsia olmosana (L.B. Smith) J.R. Grant var. **pachamamae** (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea olmosana* L.B. Smith var. *pachamamae* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 43:29. 1983. TYPE: ECUADOR. Azuay: Paßhöhe Pachamama der Straße Santa. Isabel, *Rauh 38139* (HOLOTYPE: HEID).

Tillandsia patula Mez, Repert. Nov. Sp. 3:35. 1906. TYPE: PERU. Junín: Huacapistana, Tarma, *Weberbauer 2012* (HOLOTYPE: B). *Vriesea patula* (Mez) L.B. Smith, Phytologia 5:288. 1955.

Tillandsia penduliscapa (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea penduliscapa* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 18:21. 1976. TYPE: ECUADOR. Azuay: between Limon and Indanza, *Rauh 37955* (HOLOTYPE: HEID; Isotype: US).

Tillandsia pereziana André, *Enum. Bromel.* 7. 13 Dec 1888. TYPE: COLOMBIA. Cundinamarca: Río Funza near Tequendama Falls, *André 1348* (HOLOTYPE: K; Isotype: F). *Vriesea pereziana* (André) L.B. Smith, Contr. U.S. Natl. Herb. 29:444. 1951.

Tillandsia peruviana J.R. Grant, *nom. nov.*, Based on: *Vriesea sagasteguii* L.B. Smith, Phytologia 16:82. 1968, non *Tillandsia sagasteguii* L.B. Smith, Phytologia 8:503. 1963. TYPE: PERU. Cajamarca: Catache to Santa Cruz, Santa Cruz, *López & Sagástegui 5175* (HOLOTYPE: US; Isotype: TRP).

Tillandsia petraea L.B. Smith, Contr. U.S. Natl. Herb. 29:497. 1951. TYPE: ECUADOR. El Oro: Llanos Payama, Chepel, northeast of Zaruma, *Espinosa E-2002* (HOLOTYPE: US). *Vriesea petraea* (L.B. Smith) L.B. Smith, Phytologia 20:168. 1970.

Tillandsia porphyrocraspeda J.R. Grant, *nom. nov.*, Based on: *Vriesea cylindrica* L.B. Smith, Contr. U.S. Natl. Herb. 29:445. 1951, non *Tillandsia cylindrica* S. Watson, Proc. Amer. Acad. Arts 26:155. 1891. TYPE:

ECUADOR. Esmeraldas, Santo Domingo, *Foster 2643* (HOLOTYPE: US).

The epithet derives from the Greek, *porphyro-*, purple, and *craspeda*, margin, to reflect the distinct purple margins on the chartreuse petals.

Tillandsia robusta Grisebach, Nachr. Ges. Wiss. Gött. "1864":15. 1865. TYPE: VENEZUELA. Aragua: near Biscaina, *Fendler 1525* (HOLOTYPE: GOET). *Vriesea robusta* (Grisebach) L.B. Smith, Phytologia 7:4. 1959.

Tillandsia strobelii (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea strobelii* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 18:17. 1976. TYPE: ECUADOR. Azuay: Río Paute near Cuenca, *Rauh 37936* (HOLOTYPE: HEID).

Tillandsia tequendamae André, *Enum. Bromel.* 8. 13 Dec 1888. TYPE: COLOMBIA. Cundinamarca: Falls of Tequendama, *André 1355* (HOLOTYPE: K). *Vriesea tequendamae* (André) L.B. Smith, Contr. U.S. Natl. Herb. 29:444. 1951.

Tillandsia tillandsioides (L.B. Smith) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea tillandsioides* L.B. Smith, Phytologia 9:256. 1963. TYPE: PERU. Piura: near Huancabamba, *Rauh P-304* (HOLOTYPE: US).

Tillandsia werneriana J.R. Grant, *nom. nov.*, Based on: *Vriesea rauhii* L.B. Smith, Phytologia 6:194. 1958, non *Tillandsia rauhii* L.B. Smith, Bromel. Soc. Bull. 8:44. 1958. TYPE: PERU. Cajamarca: woods near Jaen, *Rauh P-330* (HOLOTYPE: US).

This new name, like both *Vriesea rauhii* and *Tillandsia rauhii*, honors Prof. Dr. Werner Rauh, Institut für Systematische Botanik und Pflanzengeographie, Ruprecht-Karls-Universität, Heidelberg, Germany.

Tillandsia yaconorensis J.R. Grant, *nom. nov.*, Based on: *Vriesea koideae* Rauh, J. Bromeliad Soc. 42(4):148. 1992, non *Tillandsia koideae* Rauh & E. Gross, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 79:19. 1991. TYPE: PERU. Cajamarca: on rocks at Lago Seco, near the river Chonta, 6 km south of Yaconora, *Koide 8802142* (HOLOTYPE: HEID).

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