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## Current List of the Native Bromeliads of Soconusco, Chiapas, Southeast Mexico

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**Abstract:** In Central America, native bromeliads are an alternative for productive diversification in coffee plantations; however, first, a census in each area should be carried out and inventories must be up-dated. During 2004 and 2005, field explorations were carried out in the Soconusco region, on the Mexico/Guatemala border, in order to collect live specimens and to create a reference collection of plants in the University (UNACH, Universidad Autónoma de Chiapas, Tapachula). To verify if the collected species were native or not, an ethnobotanical study was carried out, with semi-structured interviews applied to people from the visited communities; the information was then compared with the literature. The study revealed few uses of native bromeliads. To date, we have 186 accessions which had been characterized and classified in 6 genera and 29 species. This number of species comprises only 22.8% of the bromeliads of Chiapas, but represents a high density of species (3.113 species/1000 km<sup>2</sup>). Most of the accessions are from middle altitudes (500-1500 m.a.s.l.). We present the first inventory of the flora Bromeliaceae for the region of Soconusco.

**Key words:** Bromeliaceae, Soconusco, chiapas, mexico, *aechmea*, *bromelia*, *catopsis*, *pitcairnia*, *tillandsia*, *werauhia*

### INTRODUCTION

For many rural communities in Central America, including those belonging to the Mexican state of Chiapas, bromeliads and other vascular epiphytic plants are of great importance from the ecological, economical and cultural points of view (Breedlove and Laughlin, 1993; Mazariegos *et al.*, 2004). This family of plants is exclusively American-with the exception of the African species *Pitcairnia feliciana* (A. Chevalier) Harms-with more than 2,700 reported species (Luther and Sieff, 1998), mainly found in the tropical zone of the continent.

There are 22 genera of Bromeliaceae recorded from Mexico, comprising 326 species, with *Tillandsia*, *Hechtia* and *Pitcairnia* being the genera with the greatest number of species (Espejo-Serna and López-Ferrari, 1998). There is a lot of information about the vegetation of the state of Chiapas, but in the case of bromeliads, the data are insufficient and inconsistent. The pioneer study of Matuda (1952) reported 52 species grouped into 10 genera. Later, Breedlove (1986) mentioned 126 species, while Espejo-Serna and López-Ferrari (1998) and Espejo *et al.* (2004), in the most recent checklists of Mexican bromeliads, reported 19 genera and 124 species for Chiapas.

Unfortunately, the bromeliads from Soconusco region, situated on the southeastern side of Chiapas on the Mexico-Guatemala border, have been poorly studied, apart from the previously mentioned study by Matuda. Utley (1994) mentioned 20 species inhabiting the lowlands of Chiapas and 43 species from intermediate altitudes, some of which could be natives of the Soconusco region because of its altitudinal gradient (from the sea level on the coastal zone to ca. 4000 m.a.s.l. on the peak of volcano Tacaná). However, there is no inventory of the bromeliaceae exclusive for this region.

The aim of this study was to elaborate a current list of species of native bromeliads from the Soconusco region.

### MATERIALS AND METHODS

**Study site:** During 2004 and 2005, field explorations in several selected sites from the Soconusco region were made to collect living specimens of bromeliads. After a preliminary tour, we selected ten rural communities in the region situated at municipalities of Cacahoatán, Escuintla, Tapachula, Tuxtla Chico, Tuzantán and Unión Juárez (Fig. 1), the main criterion for including a community was an abundance of epiphytic bromeliads growing in natural o semi-natural conditions. Sites covered five different

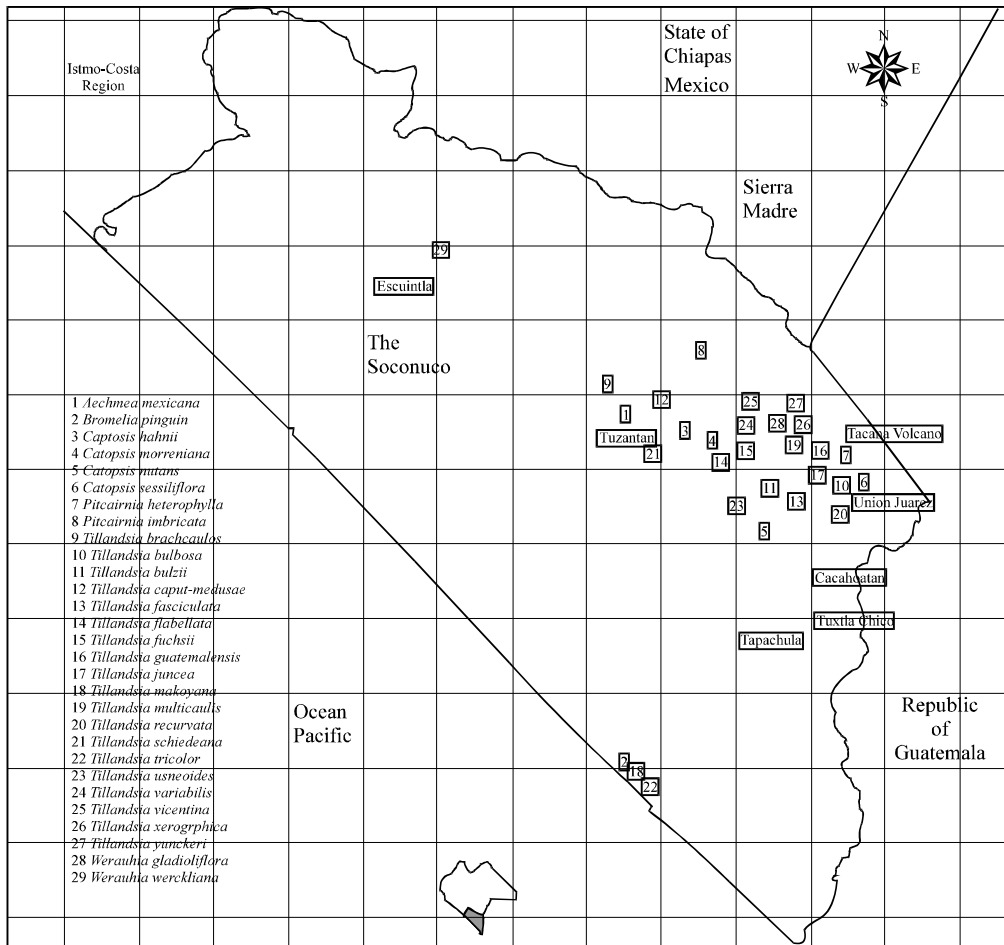


Fig. 1: Distribution of species of native bromeliads in the region of the Soconusco, Chiapas, Southern Mexico.

vegetation types according to Miranda (1942, 1957) and Breedlove (1981): coastal plain (low xerophytic forest), tropical rain forest, montane rain forest, pine-oak forest and shaded coffee agroecosystems. Sites were georeferenced (latitude, longitude and altitude) with the aid of Garmin™ GPS equipment and plotted using the software OziExplorer© version 3.95.3g1.

**Collection of bromeliads:** Each community was visited at least twice a year to collect living plants, inflorescences, capsules and seeds. To find out whether the collected species were natives or not, and information about the cultural and agronomic significance of the plants, semi-structured interviews were applied to people from the visited communities. Questions explored the local knowledge about the plants, their uses and, principally, if these species of bromeliads were plants that have always existed there (natives) in accordance with oral history, or if they had been introduced into the community. The information obtained was compared with bibliographic

references (Smith, 1958; Breedlove, 1981; Uteley, 1994) and so corroborated or discarded.

**Classification and data analysis:** Specimens were transported to the Department of Biotechnology of the Universidad Autónoma de Chiapas in Tapachula, where a collection of labeled plants in pots and a seed collection were established. At the same time, herbarium specimens were prepared and deposited at Herbarium of the University of the Valley of Guatemala. Accessions were characterized and the classification was made using taxonomic keys (Smith, 1958; Uteley, 1994; Butcher, 2000). A photographic catalogue of the collected species (in flowering and/or in vegetative phase) was also made. Data on the number of genera and species were analyzed and compared with bibliographic information. In order to observe the distribution of species, sites were plotted on a regional map (Center of Geographic Information for Soconusco of El Colegio de la Frontera Sur, ECOSUR).

RESULTS AND DISCUSSION

To date, we have 186 accessions belonging to six genera (*Aechmea*, *Bromelia*, *Catopsis*, *Tillandsia*, *Pitcairnia* and *Werauhia*) and 29 species (plus 1 *forma* of *P. heterophylla*, giving a total of 30 taxa, Table 1). The cultivated genus *Ananas* was not taken into account. This number of species represents only a 22.8% of the maximum number of bromeliads reported for Chiapas; nevertheless, if this region were a state it would occupy the 9th place out of the 33 states in Mexico in terms of the number of genera, the 12th place in number of species and the 4th place in density of species (3.113 species/1000 km<sup>2</sup>), comparing our data with those of Espejo-Serna and López-Ferrari (1998).

In the ethnobotanical study, local people identified all their bromeliads as natives, which was corroborated by the literature. Most species had no particular use and were even considered parasites of cultivated plants such as coffee and cocoa; however, some were mentioned as ornamentals, for example *T. guatemalensis* and *T. usneoides*, which are sold at local markets during

Table 1: Current list of bromeliads native to the Soconusco, Chiapas, Mexico

Species
<i>Aechmea mexicana</i> Baker
<i>Bromelia pinguin</i> Linnaeus*
<i>Catopsis hahnii</i> Baker
<i>Catopsis morreniana</i> Mez
<i>Catopsis nutans</i> (Swartz) Grisebach
<i>Catopsis sessiliflora</i> (Ruiz and Pavon) Mez
<i>Pitcairnia heterophylla</i> (Lindley) Beer
<i>Pitcairnia heterophylla</i> (Lindley) Beer var. <i>heterophylla</i> forma <i>albiflora</i> Standley and Smith <sup>1</sup>
<i>Pitcairnia imbricata</i> (Brongniart) Regel* <sup>1</sup>
<i>Tillandsia brachycaulos</i> Schlechtendal
<i>Tillandsia bulbosa</i> Hooker
<i>Tillandsia butzii</i> Mez
<i>Tillandsia caput-medusae</i> E. Morren
<i>Tillandsia fasciculata</i> Swartz var. <i>tricolor</i>
<i>Tillandsia flabellata</i> Baker
<i>Tillandsia fuchsii</i> W. Till
<i>Tillandsia guatemalensis</i> L. B. Smith
<i>Tillandsia juncea</i> (Ruiz and Pavon) Poirlet
<i>Tillandsia makoyana</i> Baker
<i>Tillandsia multicaulis</i> Steudel
<i>Tillandsia recurvata</i> Linnaeus
<i>Tillandsia schiedeana</i> Steudel
<i>Tillandsia tricolor</i> Schlechtendal and Chamisso var. <i>melanocrater</i> (L.B. Smith) L.B. Smith
<i>Tillandsia usneoides</i> Linnaeus
<i>Tillandsia variabilis</i> Schlechtendal
<i>Tillandsia vicentina</i> Standley
<i>Tillandsia xerographica</i> Rohweder**
<i>Tillandsia yuncikeri</i> L. B. Smith
<i>Werauhia gladioliflora</i> (Wendland) J. R. Grant
<i>Werauhia werckleana</i> (Mez) J. R. Grant

\*Terrestrial species.\*\*Species referenced *in situ*, but not collected because of limited population.<sup>1</sup>Specimens growing in the Botanical Garden "El Soconusco" (ECOSUR)

December. In some areas, *T. usneoides* is exploited annually in large numbers for Nativity displays at Christmas. This is similar to the reports by Breedlove and Laughlin (1993) for other regions of Chiapas. Was also mentioned that *B. pinguin* is used to make "pineapple flavored", fresh beverages, roasting the center of suckers as food and for edging garden and agricultural plots. These uses were also mentioned for the coast of Chiapas and by Orellana *et al.* (2004) for the coast of Guatemala.

Table 2: Comparison between bromeliads of the Soconusco collected in 2004-2005 and those reported by Matuda (1952) and for the Department of San Marcos, Guatemala, C. A.

Species	This study	Matuda (1952)	Department of San Marcos, Guatemala*
<i>A. magdalenae</i>	-	+	-
<i>A. matudai</i>	-	-	-
<i>A. mexicana</i>	+	-	+
<i>B. karatas</i>	-	+	+
<i>B. pinguin</i>	+	+	+
<i>C. hahnii</i>	+	-	+
<i>C. morreniana</i>	+	-	-
<i>C. nutans</i>	+	+	+
<i>C. sessiliflora</i>	+	-	-
<i>C. triticea</i>	-	+	-
<i>Lindmania micrantha</i>	-	+	-
<i>P. densiflora</i>	-	+	-
<i>P. hemsleyana</i>	-	+	+
<i>P. heterophylla</i>	+	+	-
<i>P. imbricata</i>	+	-	-
<i>P. lymanii</i>	-	+	-
<i>P. tabulaeformis</i>	-	+	-
<i>T. acostae</i>	-	-	+
<i>T. argentea</i>	-	+	+
<i>T. brachycaulos</i>	+	-	+
<i>T. bulbosa</i>	+	-	-
<i>T. butzii</i>	+	+	+
<i>T. capitata</i>	-	+	+
<i>T. caput-medusae</i>	+	+	-
<i>T. deflexa</i>	-	-	+
<i>T. dasyliiriflora</i>	-	+	-
<i>T. fasciculata</i>	+	+	-
<i>T. flabellata</i>	+	+	+
<i>T. fuchsii</i>	+	-	+
<i>T. grandis</i>	-	-	+
<i>T. guatemalensis</i>	+	+	+
<i>T. juncea</i>	+	+	-
<i>T. makoyana</i>	+	-	-
<i>T. multicaulis</i>	+	-	+
<i>T. polystachya</i>	-	+	-
<i>T. ponderosa</i>	-	+	-
<i>T. punctulata</i>	-	-	+
<i>T. recurvata</i>	+	+	-
<i>T. schiedeana</i>	+	+	-
<i>T. tricolor</i>	+	-	+
<i>T. usneoides</i>	+	+	+
<i>T. variabilis</i>	+	-	-
<i>T. vicentina</i>	+	-	+
<i>T. xerographica</i>	+	-	-
<i>T. yuncikeri</i>	+	-	+
<i>W. gladioliflora</i>	+	+	-
<i>W. werckleana</i>	+	-	-
Total species: 46	29	27	22

+ Present, - Absent, \*Data from: Smith (1958) and revision of the Herbarium of UVG (Guatemala, C. A.)\*\**W. gladioliflora* was reported by Matuda as *Vriesia gladioliflora*

The main references used in this study are Matuda's list and the records for the Department of San Marcos, Guatemala, which is adjacent to Soconusco region and for that reason a comparison of the three lists is provided (Table 2). We have only 13 of the 27 species collected by Matuda in Soconusco before 1950, probably because some species are now locally extinct or their populations are reduced. Since the first half of the twentieth century, there have been many changes to the landscape of Soconusco as a result of changes in land use due to urbanization, and changes in preferred crops and agricultural practices, which along with other complex factors could have contributed to local extinctions of some bromeliads as have been suggested for Soconusco orchids (Ovando *et al.*, 2005). Records from the Department of San Marcos Guatemala are scarce and only 14 species in common with Soconusco region are mentioned, probably as a result of an under exploration of the Bromeliaceae in that Department, despite the fact that, in general, Guatemalan Bromeliads has been well studied (e.g., Smith, 1958). However, if we sum the bromeliads in the three references, the Soconusco region could have 46 species.

In the Fig. 1 the distribution of sites on a regional map is shown. Most of records are in middle altitudes (500-1500 m.a.s.l.), corresponding to vegetation types of tropical rain forest, montane rain forest and shaded coffee agroecosystems.

In this manner, a current list of bromeliads native to the region of the Soconusco, Southeast Mexico was elaborated, complementing the inventory of vascular epiphytes native to Chiapas.

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