

Bringing Bromeliaceae Back to Homeland Botany by Uwe Scharf & Eric J. Gouda in J Brom Soc 58(3): 123-9. 2008

Summary

The terms used by Mez (1896, 1934), and Smith & Downs (1974, 1977, 1979), such as "bi-/tripinnate"; ".scape" and "inflorescence "for example, in ways that deviate from those proposed by Linnaeus, and other terms used in a non-Linnaean tradition in Bromeliaceae literature (anterior, posterior, actinomorph, zygomorph, irregular, imbricate) are presented together with their use in general botany. Furthermore, a catalogue of all parts of a bromeliad plant (Gouda 2007) is published as a guideline to describe, for example, specimens of a new taxon. Definitions of differently understood organs (inflorescence, scape, bi-/tri pinnate) are given. This article was previously published in German language in *Die Bromelie* 2007(2): 68-73.

Throughout its history, descriptive botany acquired its value by always using the same terms for the same organs. This consistent terminology is the base for a broad and immediate understanding of species descriptions, especially descriptions of new species, and transmits effectively the knowledge from the author to the reader.

Modern descriptive terminology is mainly based on the works of Linnaeus (1707-1778). His perfect drawings are still used as illustrations, e.g. in Stearn (2004: 309, fig. 1). In Germany Johann Wolfgang von Goethe (1749-1832) from Weimar, and Wilhelm Troll (1897-1978), who mainly worked in Halle/Saale and Mainz, developed descriptive botany in the Linnaean tradition towards becoming a finely detailed science (the studies of W Troll concerning comparative morphology were based on the tradition of von Goethe and thus still on Linnaeus).

While Baker (1889 still used the general morphological terms, with Mez (1934) Bromeliad terminology was led onto a path deviating from that of the main plant terminology.

Obviously, some terms were misinterpreted, misunderstood, misused, or even wrongly used by him. Afterwards, the terminology of Mez was copied and used on a broad scale by Smith & Downs (1974, 1977, 1979) for their important monograph of all then known species of Bromeliaceae. Subsequently, these terms were extensively used and multifariously copied by gardeners, bromeliad lovers, enthusiasts, amateurs, and even scientists who based their work on the monograph of Smith & Downs e.g., Gouda (1989).

For bromeliad specialists, these terms do not raise any uncertainties as long as the specialist stays in this field. However, for botanists working in other plant families, the terms of Mez and Smith & Downs cause considerable confusion, because the same terms are used to name different morphological details in other families. Mez and Smith & Downs used terms in botanical Latin and English despite the fact that descriptive botany was undertaken in Germany long before English-speaking scientists entered the field.

For Bromeliaceae, the basic importance of Linnaean-based works and treatments (Linnaeus 1751, 1789-1791); (Troll 1937-1943, 1954-1957, 1964-1967); (Von Goethe 1790, 1984) is frequently overlooked in recent times due to the presence of the monograph of Smith & Downs.

World communities are coming closer together, and the different fields of botany are interacting more intensively than ever before. The exchange of information takes place much faster than a few decades ago. Therefore, it is very important to speak a common language to avoid the misunderstanding and misinterpretation of genuinely correct information.

In the meantime, some bromeliad specialists have again started to use the main plant terms in their original sense e.g., Gouda (1997), and the first articles explaining why and how the terms are used have appeared e.g., Gouda (2002). In 1998 a provisional catalogue was published by E.J. Gouda on a webpage. Since then, many improvements and replacements have taken place, from which finally the recent version has resulted (Gouda 2007). This

catalogue of all parts of a bromeliad plant is a guideline to describe, for example, specimens of a new taxon.

For a description of a bromeliad the same terms should be used as for a description of plants of other families. The following can be considered the main organs: 1. roots; 2. stem; 3. (vegetative) innovation zone, stolons/runners with bracts, addorsed prophyll; 4. leaf, 4a. leaf sheath, 4b. leaf blade, lamina, 4c. leaf margin (with marginal teeth); 5. inflorescence, floral region, 5a. peduncle, basal/ sterile/unbranched part of the inflorescence with peduncle bracts, 5b. apical/fertile/branched part of the inflorescence with 5b1. bracts along main axis/rachis in branched part (spike bracts), 5b2. side-branches = spikes (of first, second, ... order), 5b3. floral bracts; 6. flower, 6a. sepals (forming the calyx), 6b. petal with 6b1. claw (part of the petals that is covered by the sepals), 6b2. throat, 6b3. blade of petal, 6c. stamen with 6c1. filament and 6c2. anther, 6d. pistil with 6d1. ovary (inferior: develops mostly into a berry, superior: develops mostly into a capsule), 6d2. style, and 6d3. stigma (with stigmatic lobes); 7. fruit (capsule or berry); 8. seeds.

In the following table, the terms used by Mez (1896, 1935) and Smith & Downs (1974, 1977, 1979) in a deviating way (bi-/tripinnate, scape, inflorescence) and other incorrect uses in Bromeliaceae are explained and presented together with their use in general botany.

Definitions of differently understood organs (inflorescence, scape, bi-/ tri-pinnate) are given after the table. **Details in the table have been transferred to Butcher's Glossary**

An inflorescence consists of all parts of the plant that are genuinely connected with the sexual organs or fruits and developed for their presentation during anthesis (for pollination) and fructification (for distribution of the seeds). In contrast to a vegetative plant (bearing roots, stems, leaves, vegetative innovation zones only) a fertile plant bears an inflorescence, which comprises a sterile part (peduncle, flower stalk), branches within the inflorescence (if present), reduced leaf like structures (bracts), and flowers or fruits - in addition to the vegetative parts.

In bromeliads inflorescences are constructed of spikes (flowers sessile) or racemes (flowers on a stalk) or compound structures of them (panicle) or reduced to 1-flowered spikes. The arrangement of the flowers along the axis (or rhachis) is usually spirostichous (spirally arranged) or distichous (two rows, opposite to each other). Rarely organs are arranged polystichously (in rows above each other, seen from the top), like in the leaves of *Tillandsia pentasticha* Rauh & Wulfingh. or *T. tomekii* L. Hrom. This was confused frequently. Mostly spirostichous was meant when e.g., Smith & Downs wrote "polystichous".

A scape is the part of an inflorescence between a (more or less clearly visible) leaf rosette and the (clustered) flowers. The character of a scape is the absence of nodes and therefore, necessarily the absence of leaves and bracts. Well known examples are, e.g., onion, garlic, leek and their relatives (*Allium*), the African Lily (*Agapanthus*), Snowdrops (*Galanthus*), Daffodils (*Narcissus*), Knight's Star (*Hippeastrum*, traded under the wrong name "Amaryllis"), and Hyacinth (*Hyacinthus*).

Word combinations with "...pinnate" are terms used for the description of compound leaves. With pinnate (= feather-like, with feathers) a leaf-axis (rhachis or rachis) with leaflets at both sides is described, no matter, if this axis is terminated with a terminal leaflet or not. Examples are:

pinnate: False Acacia or Black Locust (*Robinia pseudoacacia*), Vetches (*Vicia* spp.);

bipinnate: Male Fern (*Dryopteris filix-mas*);

tripinnate: Lady Fern (*Athyrium filix-femina*).

A further use of pinnate is to describe venation patterns, e.g., the leaf of the banana (*Musa*) or the Bird-of-Paradise Flower (*Strelitzia*) is pinnately veined.

The correct way to describe compound inflorescences is to count the order of the side branches. Bromeliad inflorescences are always a spike or a raceme (only main axis) or

represent a compound inflorescence (panicle, with side branches). Examples: (unbranched) spike/raceme (e.g., *Vriesea splendens*, *Tillandsia xiphioides*), panicle with side branches 1st order (*Tillandsia grandis*, *T. oerstediana*), panicle with side branches up to 2nd order (e.g., *Tillandsia extensa*, *T. samaipatensis*.) The term "imbricate" includes that the described organs overlap each other clearly, other organs below these imbricate structures (e.g., the peduncle or rhachis) are completely covered and conclusions about their structure and look-alike are impossible without removing the imbricately arranged organs. Examples are e.g., the floral bracts in the fertile part of the inflorescence in *Vriesea splendens* and the cataphylls along the stolons of *Aechmea distichantha*.