

**A new genus, *Khasianthus*, from India, Myanmar, and China
(Vernonieae: Asteraceae)**

Harold Robinson* and John J. Skvarla

(HR) Department of Botany, MRC 166, National Museum of Natural History, P.O. Box 37012, Smithsonian Institution, Washington, D.C. 20013-7012, U.S.A., e-mail: robinsoh@si.edu;
(JJS) Department of Botany and Microbiology, and Oklahoma Biological Survey, University of Oklahoma, Norman, Oklahoma 73019-6131, U.S.A., e-mail: jskvarla@ou.edu

Abstract.—A new Asian genus of Vernonieae, *Khasianthus*, is named for *Vernonia subsessilis* DC. It is most closely related to the primarily African genus *Baccharoides* Moench.

The recognition that the genus *Vernonia* Schreb. is mostly North American (Robinson 1999a) means that most species formerly placed in that genus have to be reassigned. Species to be reassigned include all the Old World members of the tribe Vernonieae under the name *Vernonia*. Reassignment of paleotropical Vernonieae was begun by Robinson (1999b), but that treatment was incomplete and overly simplistic. More concise concepts have more recently been derived for members of the subtribe Gymnantheminae in Asia with the restoration of the genera *Monosis* DC. (Robinson & Skvarla 2006), *Strobocalyx* Blume ex DC. (Robinson et al. 2008), and the description of a new genus *Decaneuropsis* based on *Vernonia cumingiana* Benth. (Robinson & Skvarla 2007). Among the Erlangeine genera, the genus *Acilepis* D. Don, resurrected by Robinson (1999b), has been considerably enlarged and more precisely delimited (Robinson & Skvarla 2009). An additional element of the Asian Vernonieae is treated here, a new genus *Khasianthus*, which seems most closely related to the African genus *Baccharoides* Moench.

Materials and Methods

Pollen was removed from herbarium sheets from the U.S. National Herbarium in Washington, D.C. and treated with acetolysis solution (Erdtman 1960). Preparation for scanning electron microscopy (SEM) consisted of staining with osmium-thiocarbohydrazide and pulse sputter coating as described in detail in recent studies of Asian Vernonieae (Robinson & Skvarla 2006, 2007; Robinson et al. 2008). Examination was with JEOL 880, LEICA 440, and AMRAY 1810 scanning electron microscopes; all equipped with lanthanum hexaboride (LaB₆) electron sources. These microscopes were at the Samuel Roberts Microscopy Laboratory at the University of Oklahoma and the SEM laboratory of the United States National Museum of Natural History in Washington.

Discussion

Vernonia subsessilis DC. is a species from northern India, northern Myanmar, and southwestern China, that bears a superficial resemblance to certain species now placed in the genus *Acilepis* (Robinson & Skvarla 2009). Although described mostly as an undershrub, specimens on herbarium sheets can hardly be distinguished from the more herbaceous *Acile-*

* Corresponding author.

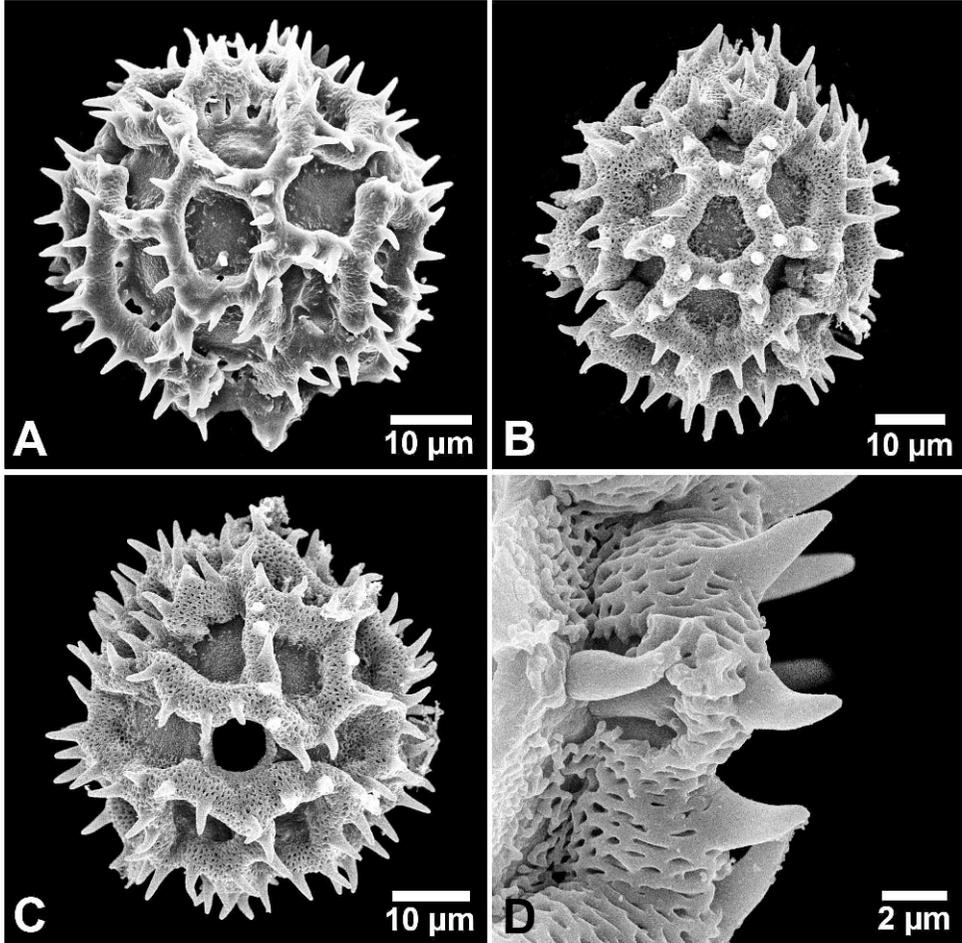


Fig. 1. Scanning electron micrographs of pollen of *Khasianthus subsessilis* (DC.) H. Rob. & Skvarla, India Orient., Khasia, s.d., *J. D. Hooker s.n.* [US, sheet #2492470]. A, Polar view showing 3 colpi and a polar lacuna; B, Intercolpar view; C, Colpar view; D, Partially broken grain showing columellae.

pis in habit. Furthermore, the involucre bracts in *Vernonia subsessilis* are narrowly attenuate in many series, as in many of the typical members of *Acilepis*. This resemblance to *Acilepis* drew our attention to the species treated below.

Macroscopic features that distinguish *Vernonia subsessilis* from *Acilepis* include leaf venation and habit. In *V. subsessilis*, the cuneate basal parts of the leaves have many widely spreading secondary veins, in contrast with the more ascending secondary veins of *Acilepis*. *Vernonia subsessilis* is also apparently shrubbier than *Acilepis*. Although sometimes small and appearing unbranched from the

roots, it possesses a basically branching perennial structure. The most important differences between the genera, however, become apparent when *V. subsessilis* is subjected to microscopic examination. Differences are seen in the anthers, in the setulae of the achenes, and especially in the pollen (Fig. 1A–D).

The anthers of *Vernonia subsessilis* consistently show a large broad basal appendage on the lower end of the spurred theca. Such appendages are totally lacking in *Acilepis*. The setulae of the achene in *V. subsessilis* have their two cells fused to their tips, in contrast to *Acilepis* in which the cells of the setulae are deeply separat-

ed, often to the base. The pollen of *V. subsessilis* differs from that of *Acilepis* in four ways (Fig. 1A–D). First, it is tricolporate rather than triporate (Fig. 1B, C). Second, the spinules are distinctly longer and more pointed (ca. 3–4 μm long versus ca. 1 μm long in *Acilepis*). Third, the tectum along the crests of the muri has distinct perforations (Fig. 1D). Fourth, the muri are firmly attached to the foot layer by columellae with no intervening rhizomate base that is easily stripped from the foot layer, in contrast to *Acilepis* (Robinson & Skvarla 2009).

The resemblance of *Vernonia subsessilis* to *Acilepis* is evidently superficial. The pollen, in particular, shows that this species is most likely related to primarily African genera such as *Baccharoides*. For the present, well-developed tricolporate lophate pollen is not known in the subtribe Erlangeinae H. Rob. to which *Acilepis* belongs. Among paleotropical Vernoniae with tricolporate lophate pollen, *Baccharoides* of the subtribe Linziinae Keeley & H. Rob. possesses almost exactly the same kind of tricolporate, echinolophate, microperforate, pollen with a lacuna at each pole, features otherwise uncommon among African Vernoniae. However, the Asian species does not key to *Baccharoides* in Robinson (2007) because its pappus bristles lack flattened outer surfaces. The involucre bracts of *V. subsessilis* also lack the highly differentiated, often showy, membranous tips that are characteristic of *Baccharoides*.

Etymology.—The new genus established here for *Vernonia subsessilis* is named after Khasia, the region of Assam, India from which most of the material has been seen.

Khasianthus H. Rob. & Skvarla, gen. nov.

Type species.—*Vernonia subsessilis* DC., Prodr. 5:62 (1836).

A *Baccharioides* similis sed in bracteis involucri distaliter non elaboratis et in setis pappi abaxialiter non planis.

Subshrubs up to 1 m tall; stems erect from basal cluster of roots, sparingly branched, densely pubescent with strongly antrorse, whitish hairs, hairs mostly of a long, I-shaped, rather straight terminal cell. Leaves alternate, subsessile, chartaceous, oblanceolate to obovate, with cuneate bases, margins remotely serrulate or crenulate to subentire, apices acuminate to rounded, with many spreading lower secondary veins, surfaces with prominulous veins and veinlets, with sparse, small glandular dots, with appressed hairs on midvein and sometimes sparsely over abaxial surface. Inflorescence corymbiform or nearly racemiform, with linear bracts at lower nodes; peduncles elongate, with dense whitish hairs. Heads with involucre broadly campanulate; involucre bracts gradate, persistent, sericeous on outer surface, ca. 80 in 5–6 series, 3–7 mm long, lanceolate or acicular to linear-lanceolate, apices slender and herbaceous in all but inner series, recurved in anthesis in lower series, inner bracts erect, with raised midvein, with short-acute tips; receptacle alveolate, with fine hairs. Florets 40–50; corollas purple, becoming whitish, basal tube slender with small stipitate glands, lobes as long as throat, lobes erect, with glandular dots mostly near tip; anther base spurred, with distinct broad tail; endothelial cells with vertical annulations; apical appendages oblong-ovate, with narrowly rounded tips, glabrous, cells thin-walled; style shaft thick, rounded at base to narrow insertion, without basal node; style branches with sharply acute sweeping hairs. Achenes to 3.5 mm long, 10-ribbed, with many slender setulae that have pairs of cells fused to the tip, glands dense between ribs, raphids elongate, mostly in ribs; pappus reddish, of many capillary bristles, not or scarcely broadened at tips, not flattened on outer surface, outer series of short bristles. Pollen grains ca. 60 μm in diameter in fluid, tricolporate, echinolophate with sharp spinules, muri firmly

attached to foot layer by columellae, tectum restricted to crests of muri, with distinct perforations; one lacuna at each pole, intercolpar lacunae arranged in groups of six, one near each pole and two rows of two equatorially (1:2:2:1) (Fig. 1A–D).

The genus appears to contain only a single species with two varieties.

***Khasianthus subsessilis* (DC.) H. Rob. & Skvarla, comb. nov.**

Conyza divergens Wall. Numer. List [Wallich] n. 3000 comp. 110, nom. nud. *Vernonia subsessilis* DC., Prodr. 5:62 (1836).

Conyza bracteolata Wall. Numer. List [Wallich] n. 3036 comp. 146, nom. nud. *Vernonia bracteolata* DC., Prodr. 5:62 (1836).

Vernonia subsessilis var. *bracteolata* Hook.f., Fl. Brit. India 3:230 (1881).

The variation in width of leaves in the species has been noted since the time of J. D. Hooker (1881). Some variation is included within the typical variety, which includes both of the species described by Candolle (1836). All the material of the typical variety has acuminate leaf tips, sometimes very short.

***Khasianthus subsessilis* var. *macrophylla* (Hook.f.) H. Rob. & Skvarla, comb. nov.**

Vernonia subsessilis var. *macrophylla* Hook.f., Fl. Brit. India 3:230 (1881).

The variety recognized here, as seen in a specimen collected by Rock (7839) from between Tengyueh in Yunnan China and Bhamo in northern Myanmar, has leaf tips almost rounded and inflorescences nearly racemiform rather than broadly corymbiform. The leaves are also somewhat more pubescent on the undersurface.

In Rock's field notes, on file in the US, the collection is cited as one day from Tengyueh, evidently fully inside of China.

Acknowledgments

Marjorie Knowles, technician in the Department of Botany, National Museum of Natural History, Smithsonian Institution, is thanked for help in preparation and correction of the manuscript. Jun Wen, of the Department of Botany, is thanked for suggestions regarding the Rock collection from China.

Literature Cited

- Candolle, A. P. de. 1836. Trib. 1. *Vernoniaceae*. Less.—Prodromus systematis naturalis regni vegetabilis 5:9–103.
- Erdtman, G. 1960. The acetolysis method. A revised description.—Svensk Botanisk Tidskrift 54: 561–564.
- Hooker, J. D. 1881. *Lasianthus* (Rubiaceae) - *Agapes* (Vacciniaceae).—Flora of British India 3:193–448.
- Robinson, H. 1999a. Generic and subtribal classification of American Vernoniaceae.—Smithsonian Contributions to Botany 89:i–iv, 1–116.
- . 1999b. Revisions in paleotropical Vernoniaceae (Asteraceae).—Proceedings of the Biological Society of Washington 112:220–247.
- . 2007. Vernoniaceae. Pp. 149–174 in J. Kadereit and C. Jeffrey, eds., The Families and Genera of Vascular Plants. Vol. 8. Flowering Plants - Eudicots—Asterales. Springer-Verlag, Berlin, Heidelberg, New York.
- , & J. J. Skvarla. 2006. Studies on the Gymnantheminae (Vernoniaceae: Asteraceae): restoration of the genus *Monosis*.—Proceedings of the Biological Society of Washington 119:600–607.
- , & ———. 2007. Studies on the Gymnantheminae (Vernoniaceae: Asteraceae) II: A new genus, *Decaneuropsis*, from China, India, and southeast Asia.—Proceedings of the Biological Society of Washington 120:359–366.
- , & ———. 2009. Studies on paleotropical Vernoniaceae (Asteraceae), additions to the genus *Acilepis* from southern Asia.—Proceedings of the Biological Society of Washington 122:131–145.
- , S. C. Keeley, J. J. Skvarla, & R. Chan. 2008. Studies on the Gymnantheminae: Asteraceae) III: Restoration of the genus *Strobocalyx* and the new genus *Tarlmounia*.—Proceedings of the Biological Society of Washington 121:19–33.

Associate Editor: Carol Hotton.