

**ADDITIONS TO THE GENUS *ORBIVESTUS* H. Rob.
(ASTERACEAE:VERNONIEAE) AND NEOTYPIFICATION OF
VERNONIA TEITENSIS O. HOFFM.**

Harold Robinson

Department of Botany, MRC 166, National Museum of Natural
History, P.O. Box 37012, Smithsonian Institution, Washington DC.,
20013-7012

ABSTRACT

Orbivestus H. Rob. is redefined as having divaricately seriate-cymose branching in the inflorescence. Eleven species are included, and five species, *O. catumbensis* (Hiern) H. Rob., *O. leopoldii* Vatke, *O. teitensis* (Hoffm.) H. Rob., *O. turbinata* (Oliv. & Hiern) H. Rob., and *O. unionis* (Sch.Bip. ex Walp.) H. Rob. are added to the genus while *V. undulata* Oliv. & Hiern is provisionally rejected. Neotypes are selected for *Vernonia teitensis* Hoffm., *V. johannis* O. Hoffm. and *V. pilgeriana* Muschl., whose types were destroyed in Berlin. *Phytologia* 91(3): 483-493 (December, 2009).

KEY WORDS: *Orbivestus*, *Vernonia teitensis*, neotypes, Africa, Vernonieae, Asteraceae.

Previous attempts by the author to resolve the relationships of African Vernonieae have resulted in some over simplifications (Robinson 1999) and left many of the species unresolved. The most recent efforts, presented here, have relied on a character previously noted mostly in Western Hemisphere members of the tribe but rare in the Eastern Hemisphere. A related group of species is here recognized based on divaricately seriate-cymose branching of the inflorescence.

The divaricate seriate-cymose branching of the ultimate branches of the inflorescence is almost unique in the tribe to New World members of the Vernonieae. As illustrated by Cabrera (1944), the seemingly sessile lower heads are not sessile, they are actually immediately subtended by lateral branches bearing successive heads. This particular form of inflorescence, referred to as subdichasioid by

Adams (1956), is unknown in all but the present group among Old World members of the Vernoniaeae. For purposes of comparison, the superficially similar Neotropical *Vernonanthura* H. Rob. (1902) is the best choice. The African species studied here with divergent seriatly cymose inflorescence branches differ from *Vernonanthura* by the mostly membranous rather than centrally coriaceous involucre bracts, having a narrow median ridge instead of a broad shield, and having irregularly denticulate rather than entire margins. Internally, the corolla lobes of the African material totally lack the marked longitudinal resinous cells that are evident in *Vernonanthura* and its closest relatives. The achenes are 5-costate rather than 8-10 costate. The raphids of the achene wall are narrowly rhomboid rather than subquadrate or shortly oblong. A final character of seemingly primary importance is in the sweeping hairs of the style. These hairs in the African species are almost totally restricted to the style branches. This is similar to other Old World Vernoniaeae and unlike the New World Vernoniaeae that have sweeping hairs clearly present on the upper style shaft below the branches. In this respect, the African group is like most other Old World Vernoniaeae that have sweeping hairs nearly or completely restricted to the style branches. Thus, in spite of the superficial similarity, the African and American entities are not here considered close relatives.

Regarding the generic placement of the African group studied here, a more recently described African genus, *Orbivestus* H. Rob. (1999), as typified by *Vernonia karaguensis* Oliv. & Hiern, shows the divergently cymose structure of the branches of the inflorescence that is characteristic of the present group. This characteristic was not appreciated at the time of the description of that African genus.

The relationship *Orbivestus* to other African Vernoniaeae is not certain. Recent efforts have shown that many of the Tropical African Vernoniaeae are individually distinctive, and their generic dispositions remain to be established. One of the species included here, *Vernonia leopoldii* Vatke, was placed in the genus *Hilliardiella* H. Rob. by Robinson (1999). That is now seen as a mistake. *Hilliardiella* is from farther south in Africa, while *V. leopoldii* and its relatives are mostly central African, especially Ethiopian and Eritrean. *Hilliardiella* also lacks the branching in the inflorescence from immediately below the older heads. It has only 3-4 series of involucre bracts rather than 5-7, its corollas have numerous T-shaped hairs distally, the anthers lack tails

at the bases of the thecae, while *Orbivestus* has well-developed tails, and the pappus bristles of *Hilliardiella* are not flattened on the outer surface as they are in *Orbivestus*.

Even more highly developed seriate cymes are known in one other African member of the Vernoniae that is not recently introduced, *Manyonia* H. Rob., also of Central Africa. In the latter case, the genus seems to have close relatives in tropical America, especially *Dipterocypsela* S.F. Blake (Robinson 1999) of Colombia.

Evidently, an African lineage of the Vernoniae has separately evolved seriate cymose heads that are immediately subtended by lateral branches bearing further heads. These are not directly related to the New World members of the tribe with similar inflorescences. Such inflorescences have also evolved in more remote members of the Asteraceae such as some species of *Clibadium* L. in the Heliantheae.

There is more uniformity in the form, texture and coloration of the involucre bracts in *Orbivestus* than in many of the other genera of the Vernoniae. The tips are more acute in many specimens of *O. karaguensis* under the name *Vernonia cistifolia* O. Hoffm. in Engl., and at least one specimen of *O. unionis* (Sch.Bip. ex Walp.) H. Rob. Other unifying characteristics are the area of the sweeping hairs extending downward slightly onto the area where the style branches join, the T-shaped hairs, and the erect, rather than recoiled, lobes of the corolla.

Orbivestus H. Rob., Proc. Biol. Soc. Wash. 112(1): 230. 1999. Type:

Vernonia karaguensis Oliv. & Hiern

Vernonia subg. *Orbisvestus* S.B. Jones, Rhodora 83: 60. 1981. Type:

Vernonia karaguensis Oliv. & Hiern

Subshrubs to small shrubs with erect stems from a woody base, not or sparsely branched between base and inflorescence; hairs T-shaped. Leaves alternate, usually decrescent upwardly, sessile or short petiolate, blades elliptical or ovate to oblanceolate, mostly 4-9 cm long, 2-5 cm wide, base short-obtuse to acuminate, margins scarcely repand-dentate, apex short-acute, upper surface with small spinules and few small hairs, lower surface paler, grayish with slender hairs and partially

sunken glandular dots, venation pinnate with up to 6 or 8 lateral veins each side, spreading at 45-60° angles. Inflorescences with leaves of main axis only somewhat to greatly reduced, with only minute bracteoles on branches. Inflorescence shape broadly corymbiform or cylindrical with rounded to flattened top, with lower heads appearing sessile as result of proliferation by immediately subtending branches, branches of inflorescence tomentose with T-shaped hairs. Heads broadly campanulate, 4-14 mm high and wide; involucre bracts mostly persistent, innermost somewhat deciduous, ca. 50-100 in 5-7 series, strongly gradate, 1-8 mm long, 1.0-1.5 mm wide, ovate to oblong, subacute and mucronate to apiculate at tip, innermost acute, tips appressed, margins membranous and irregularly denticulate distally, often reddish, with dark median keel extending to apex, scarcely thickened and greenish near keel, with numerous small T-shaped hairs except at margins. Receptacle epaleate, tuberculate. Florets 15- ca. 50 in a head; corollas purplish, narrowly funnel form, 4-8 mm long, with sparsely scattered glandular dots, tube slender, 2-3 mm long, throat 1.5-2.5 mm long, lobes 1.0-2.5 mm long, linear-lanceolate, erect, not recurving, sparsely glanduliferous to distinctly or minutely scabridulous outside, without longitudinal internal ducts filling lobe; anther thecae 1-2 mm long, without glandular dots, calcarate and with long tails at base, endothelial cells short, usually with 2-3 nodes on transverse walls; apical appendage 0.5-1.0 mm long, narrowly lanceolate, often sharply acute; style base with distinct expanded node; sweeping hairs on style branches and scarcely extending on to upper style shaft, slender and narrowly acute. Achenes 1.5-2.0 mm long when mature, 5-costate, with few to many setulae when young, often glabrous at maturity, often with numerous glandular dots on sides between costae, surface with numerous idioblasts that are not joined in series, with narrowly rhomboid raphids internally; carpodium stopper-shaped to slightly turbinate, with many series of small thick-walled cells; inner pappus of 25-30 slender capillary bristles, rather flattened outside and barbellate on sides, tips only slightly narrowed, outer pappus of narrow scales 0.5-1.5 mm long. Pollen grains ca. 50 µm in diam in fluid, type A, sublophate, tricolporate, echinate, with perforated tectum continuous between colpi.

As presently known, the genus contains the following eleven species. *Vernonia homilantha* S. Moore and *V. undulata* Oliv. & Hiern,

placed in the genus by Robinson (1999) do not have the seriate-cymose condition now seen as characteristic of *Orbivestus*. In the case of *Orbivestus homantha* (S. Moore) H. Rob., the species does have the T-shaped hairs and the acute tips of the sweeping hairs and some of the overall aspect of *Orbivestus*, and the species is not at this time rejected from the genus. In the case of *Vernonia undulata*, the inflorescence is of a completely different, laxly branching form, and the species is excluded here. It should be noted that many specimens under the name *V. undulata* seem to belong to the still unplaced *V. biafrae* Oliv. & Hiern.

Recently added to the genus, but not seen in this study, are *Orbivestus albocinerascens* (C. Jeffrey) Isawumi, *O. bamendae* (C.D. Adams) Isawumi, and *O. blumeoides* (Hook. f.) Isawumi (Isawumi 2008). Also not seen in this study, and not included in the genus, is *Vernonia brachtrichoides* C. Jeffrey of Tanzania, which Jeffrey (1988) placed close to *V. karaguensis*, but which he distinguished by its larger heads with involucre bracts to 10 mm long, corollas 10.5 mm long and pappus bristles 7.5-8.0 mm long.

Key to the species of *Orbivestus* as constructed from limited material, previous keys, and descriptions.

- 1. Heads with involucre 4-5 mm high and wide.....2
- 1. Heads with involucre 7-1.5 mm high and wide.....5
- 2. Erect herbs.....*O. karaguensis*
- 2. Weakly to distinctly shrubby, scrambling plants, or small trees.....3
- 3. Leaf blades remotely dentate on margins; all heads appearing shortly pedunculate; involucre bracts rounded at tips....*O. homilanthus*
- 3. Leaf blades subtire to undulate or minutely denticulate on margins; many heads appearing sessile with subtending lateral innovations; involucre bracts with pointed to mucronate tips.4
- 4. Corollas white.....*O. albocinerascens*
- 4. Corollas purple, mauve, or blue.....*O. cinerascens*

5. Leaf blades densely tomentose on abaxial surface.....*O. leopodii*
 5. Leaf blades with pubescence not totally covering green abaxial surface.....6
 6. Leaf margins with distinct serrations.....7
 6. Leaf margins subentire, undulate, minutely denticulate, or with small callus-mucronations.....8
 7. Leaf blades oblanceolate.....*O. catumbensis*
 7. Leaf blades ovate.....*O. unionis*
 8. Leaf blades auriculate near base.....*O. bamendae*
 8. Leaf blades not auriculate near base.....9
 9. Leaf blades acuminate into petiolate base.....*O. turbinata*
 9. Leaf blades sessile.....10
 10. Heads ca. 1.3 cm long.....*O. blumeoides*
 10. Heads ca. 7-8 mm long.....*O. teitensis*

The species of *Orbivestus*

- Orbivestus albocinerascens*** (C. Jeffrey) Isawumi, Comp. Newsl. 46: 36. 2009. *Vernonia albocinerascens* C. Jeffrey, Kew Bull. 43(2): 222. 1988.
- Orbivestus bamendae*** (C.D. Adams) Isawumi, Comp. Newsl. 46: 36. 2008. *Vernonia bamendae* C.D. Adams, W. African Science Assoc. 3: 116. 1957.
- Orbivestus blumeoides*** (Hook.f.) Isawumi, Comp. Newsl. 46: 35. 2008. *Vernonia blumeoides* Hook.f., J. Linn. Soc. Lond., Bot. 7: 198. 1864.
- Orbivestus catumbensis*** (Hieron.) H. Rob., **comb. nov.** basionym: *Vernonia catumbensis* Hiern, Cat. Welw. Afr. Pl. 1: 524. 1898.

Orbivestus cinerascens (Sch.Bip. in Schweinf.) H. Rob., Proc. Biol. Soc. Wash. 112(1): 211. 1999. *Vernonia cinerascens* Sch.Bip. in Schweinf., Beitr. Fl. Aeth. 162. 1897.

Vernonia tephrodoides Chiov., Fl. Somal. 2: 255. 1932.

Orbivestus homilanthus (S. Moore) H. Rob., Proc. Biol. Soc. Wash. 112(1): 230. 1999. *Vernonia homilantha* S. Moore, J. Bot. 41: 138. 1903.

Vernonia sennii Chiov., Fl. Somal. 2: 256. 1932.

Orbivestus karaguensis (Oliv. & Hiern) H. Rob., Proc. Biol. Soc. Wash. 112(1): 231. 1999. *Vernonia karaguensis* Oliv. & Hiern, Trans. Linn. Soc. Lond. 29: 91. 1873.

Vernonia johannis O. Hoffm. in Engl., Pflanzw. Ost-Afr. C 405. 1895.
Type: Tanzania, Ugueno, *Volkens 467* (B, destroyed).
Neotype: Ruanda Région du Mutara, envirens de Mimuli, réserve IRSAC, colline Bibale, 27/3/1959, *Troupin II.636* (US).

Vernonia cistifolia O. Hoffm. in Engl., Pflanzw. Ost-Afr. C 404. 1895.

Vernonia elliotii S. Moore, J. Linn. Soc. Bot. 35: 315. 1902.

Vernonia bothrioclinoides C.H. Wright, Bull. Misc. Inf. 1906: 106. 1906.

Vernonia porphyroplepis S. Moore, J. Bot. 54: 251. 1980.

Vernonia multiflora De Wild., Feddes Repert. 13: 208. 1914 (non Less.).

Vernonia pilgeriana Muschl., Bot. Jahrb. Syst. 46: 78. 1911. Type: Tanzania, Ngare Olmotony, *Uhling 208* (B, destroyed).
Neotype: Ruanda Région du Mutara, envirens de Mimuli, réserve IRSAC, colline Bibale, 27/3/1959, *Troupin II.636* (US).

Vernonia campanea S. Moore, J. Bot. 54: 251. 1916.

Vernonia melanacrophylla Cufod., Nouv. Giorn. Bot. Ital., n.s. 50: 102. 1943.

Vernonia multiflora is added to the synonymy, and two synonyms whose types were destroyed in Berlin are neotypified to

firmly fix their identity as members of this species. The synonymy follows the provisional synonymy given by Jeffrey (1988) plus evidence from the limited descriptions. Some specimens under the name *V. cistifolia* seem unlike other members of *Orbivestus* in the fewer rows and long tips on the involucre bracts.

The species may be interpreted too broadly. Material in the herbarium under the name *Vernonia cistifolia* from Malawi seems distinctive, with denser inflorescences and often dense tomentum on the abaxial surfaces of the leaves. One of the existing names in the synonymy, such as *Vernonia bothrioclinoides* C.H. Wright from Malawi, may represent this entity.

Orbivestus leopoldii (Sch.Bip. ex Walp.) H. Rob., **comb. nov.**

Basionym: *Cyanopsis leopoldii*(i) Sch.Bip. ex Walp., Repert. Bot. Syst. 2: 949. 1843. *Vernonia leopoldii* (Sch.Bip. ex Walp.) Vatke, Linnaea 39: 478. 1875. *Hilliardiella leopoldii* (Sch.Bip. ex Walp.) H. Rob., Proc. Biol. Soc. Wash. 112(1): 230. 1999.

Cyanopsis hypoleuca Sch.Bip. ex Walp., Repert. Bot. Syst. (Walpers) 6: 98. 1846, not *Vernonia hypoleuca* DC.

Vernonia bipontinii Vatke, Linnaea 39: 478. 1875.

The species shows the weakest development of seriate cymes of any of those here added to the genus, but such branching is present, and other characters and geography all fit with *Orbivestus*.

Orbivestus teitensis (O. Hoffm. in Engl.) H. Rob., **comb. nov.**

Basionym: *Vernonia teitensis* O. Hoffm. in Engl., Pflanzenw. Ost-Afr. C: 404 (1895). Type: Kenya, Teita, *Hildebrandt 2466a* (B, destroyed); Neotype: Kenya: Muthaiga, near Nairobi, alt. 1700 m, June 28- July 4 1927, *Piemeisel & Kephart 11* (US).

The species is presently known from Congo, Kenya, and Uganda in Central Africa as indicated by the three specimens cited below. Among the herbaria possibly having duplicates of *Piemeisel & Kephart* material are A, BM, MO, and NY.

Repeated attempts to key three specimens labeled as *Vernonia* from Kenya, Congo and Uganda in the treatment of *Vernonia* in East Tropical Africa (Jeffrey 1988) have failed. However, that same

publication provided a probable answer to the problem in a list of taxa insufficiently known. The description of *Vernonia teitensis* Hoffmann (Engler 1895) from Kenya, as far as it went, matched the unidentified material perfectly. The description as given by Hoffmann (Engler 1895) was, "*V. teitensis* O. Hoffm. n. sp.; suffruticosa; ramis junioribus villosis; foliis ellipticis breviter petiolatis vel subsessilibus repando-dentatis plerumque obtusis, basi angustatis, supra scabris, subtus puberulis et glanduloso-punctatis; capitulis parvulis 20 floris corymbosis; involucri late campanulati bracteis appressis acutis; achaeniis 5 costatis subglabris." The Hoffmann name apparently has not been associated with any more recent collections until now. The original type was cited as from Kenya: Teita, *Hildebrandt 2466a* (deposited at Berlin). The type material in Berlin was evidently destroyed during WWII, but the name has a potential priority dating from 1895. Thus, in order to avoid any future confusion, the identity of the species is fixed here by neotypification using one of the specimens in the U.S. National Herbarium.

The three available specimens are as follows: KENYA: Muthaiga, near Nairobi, alt. 1700 m, June 28-July 4, 1927, *R.L. Piemeisel & I.W. Kephart 11* (US); BELGIAN CONGO: Foothills of mountains west of Katana, Lake Kivu, 6300 ft. disturbed vegetation at roadside, on top of bank; 6/7/59. *1959 Cambridge Congo Expedition 29* (US), woody stem, purple flowers very conspicuous, visited by bees; UGANDA PROTECTORATE: Ilipayo, grass bank, flower purplish, March 1914, *R. Dümmer 207* (US). The specimen chosen here as Neotype is the one from Kenya where the original type was collected, *Piemeisel & Kephart 11*. *Piemeisel & Kephart 11* (neotype US). It remains possible that an older name exists for this reasonably widespread central African species, but it seems unlikely since the present concept dates from 1895. In any case, the conclusions in this study are based on the preceding neotypification.

Orbivestus turbinata (Oliv. & Hiern) H. Rob., **comb. nov.** Basionym: *Vernonia turbinata* Oliver & Hiern ex Oliver, Trans. Linn. Soc. 29: 90, t. 56. F. B. 1873.

Orbivestus unionis (Sch.Bip. ex Walp.) H. Rob., **comb. nov.** Basionym: *Vernonia unionis* Sch.Bip. ex Walp., Repert. 2: 345. 1843.

ACKNOWLEDGEMENTS

I wish to thank Ingrid Pol-yin Lin of the Department of Botany for the scan of the Neotype of *Vernonia teitensis* O. Hoffm. I also thank Vicky Funk and Guy Nesom for reviewing the manuscript.

LITERATURE CITED

- Adams, C. D. 1957. New records of Flowering Plants in West Africa. J. West African. Science Assoc. 3: 111-122.
- Cabrera, A. L. 1944. Vernoneias Argentinae (Compositae). Darwiniana 6(3): 265-379.
- Engler, A. 1895. Die pflanzenwelt Ost-Afrikas und der Nachbargebiete. 3 vol., 28 pl., Berlin, D. Reimer
- Isawumi, M.A. 2008. The status of generic revision in the African Vernonieae (Asteraceae). Compositae Newsletter 46(2): 27-48.
- Jeffrey, C. 1988. The Vernonieae in East Tropical Africa. Kew Bull. 43(2): 195-277.
- Robinson, H. 1992. A new genus *Vernonanthura* (Vernonieae, Asteraceae). Phytologia 73(2): 65-76.
- Robinson, H. 1999. Revisions in Paletropical Vernonieae (Asteraceae). Proc. Biol. Soc. Washington 112(1): 220-347.

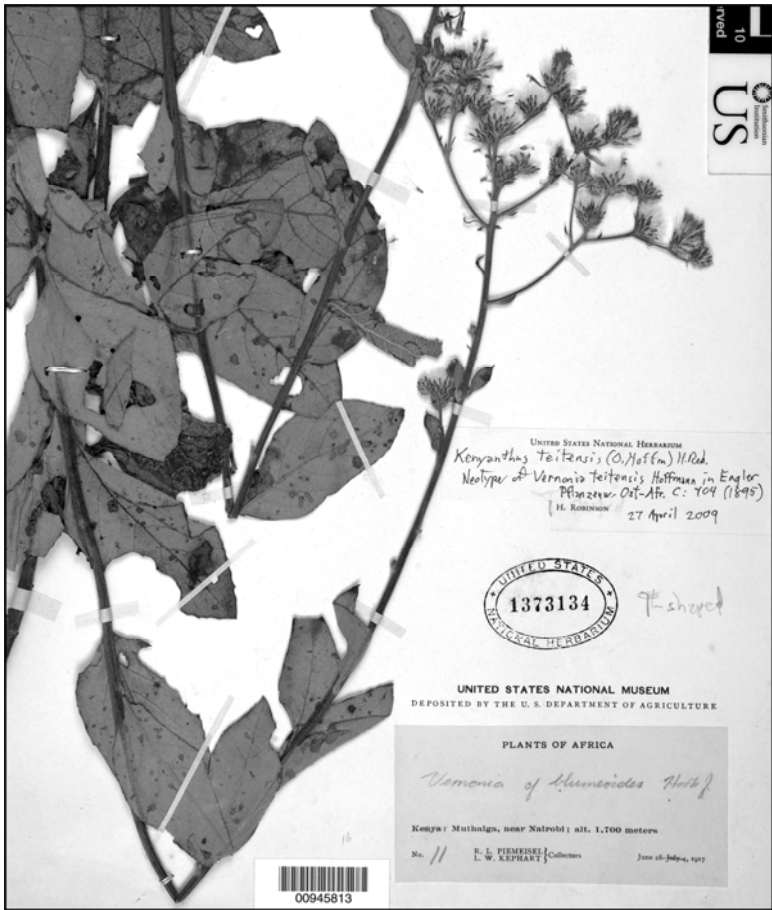


Figure 1. *Orbivestus teitensis* (O. Hoffm.) H. Rob. Neotype of *Vernonia teitensis* Hoffm. in Engl., Piemeisel & Kephart 11 (US)