

NEW COMBINATIONS IN AGERATINA

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In the present treatment of the genus Ageratina it is gratifying to us to be able to supply the evidence that confirms the suspicions of so many other workers, and which brings some order out of the previous chaos in Eupatorium. With varying degrees of insight, Moench, Necker, Spach, Schultz-Bipontinus, Coulter, and E.L.Greene have noted the more distinctive members of Ageratina and have sought to place them in a separate genus. With equal determination, other workers have found that other species obscure the generic limits, and the concept of a monolithic genus Eupatorium has been restored. More recently cytologists have discovered widely differing series of chromosome numbers in Eupatorium but could find no basis for separation of the species involved. All indications have been that a distinct element existed if reliable characters could be found. Now, by use of detailed floral anatomy, we have been able not only to precisely delimit Ageratina, but to recognize a whole complex of genera as Ageratinoid.

The initial efforts to recognize a distinct genus must have relied on mostly superficial aspect of very limited material. Even so, the efforts of Moench and Necker were both doomed to failure. Moench used the name, Batschia, which was third in a series of four homonyms. Necker did not indicate the status of any of his names and his Kyrstenia is not considered validated until the work of E.L.Greene (1903). Spach (1841) dealing with the two common species of eastern North America (under three names) provided the earliest valid name for the genus, Ageratina.

Of all the previous efforts, that of E.L.Greene deserves special attention. Aside from misplaced faith in the Necker name, Kyrstenia, Greene seemed to have a rather good concept of the group. Among other remarks indicating his resolve to dismantle Eupatorium, he offered the following, "These two plants (i.e. E. ageratoides and E. aromaticum), and with them a host of their congeners are so unlike true Eupatorium and at the same time so like Ageratum in foliage, inflorescence, uniserial involucre, and even as to flowers and fruits, that nothing but the fine-bristly rather than paleaceous pappus could have kept them apart from the genus last named, where, as already noted, Linnaeus did actually place the first species. They differ from Eupatorium by a set of characters exactly corresponding to those by which Erigeron is held separate from Aster."

"One must needs assume the Atlantic North American species

just mentioned to be the proper type of Kyrstenia. They are herbaceous perennials with opposite leaves and a corymbose inflorescence; their thin almost uniserial involucreal bracts notably pointed."

Greene goes on to say, "This typical group has many representatives beyond our borders in Mexico, Central and even South America, some herbaceous, others shrubby, of which I cite but few."

It must be made clear that there is not now any evidence of close relationship between Ageratina and Ageratum. The latter has high papillae on the backs of the corolla lobes, strong annulations in the anther collars, and a very different carpodium structure in addition to the pappus character. Also, Greene's concept of Eupatorium was slightly erroneous, since the verticillate group he emphasized is not typical but a rather specialized subgenus. Still, Eupatorium clearly differs from Ageratina by its smooth corolla lobes, hairy stylar base, indistinct carpodium, presence of only glands on the corolla and achene, and blunt-tipped pappus setae.

Among the species cited by Greene there are members of a group that includes Eupatorium pycnocephalum Lessing. This group is the one most frequently confused with Ageratina, and with its basic chromosome number of  $x = 10$  it has been especially frustrating to the efforts of cytologists. These species which are so superficially similar, we would place in the totally separate genus, Fleischmannia, and we do not consider them at all closely related. Fleischmannia while similar in habit, leaf form, and tendency for hairy corollas, is clearly distinct in the papillose backs of the corolla lobes, the strongly annulated thickenings of the anther collars, the complete lack of enlargement of the style base, and the thick-walled calls of the strongly rimmed carpodium. Even the papillae of the inner surface of the corolla lobes are different in basic structure, being only the projecting upper ends of elongate cells and not forming a compact mass. Needless to say the more specialized features of Ageratina such as the narrow stemmed corollas and very deciduous pappus setae do not occur in Fleischmannia.

The genera that are most closely related to Ageratina are not necessarily those that have been confused with it. Often they have possessed distinctive characters and have been maintained separate from Eupatorium. It is to Ageratina rather than to Ageratum that Oxylobus is related in spite of its distinctive squamate pappus. The corollas, stamens, styles, and carpodia of Oxylobus, Macvaughiiella, and Jaliscoa are all basically identical to those of Ageratina. Macvaughiiella is distinguished by the flattened achene with 3 or less pappus setae at its angles, and Jaliscoa has its short crest-like pappus and a paleaceous receptacle. Less close but definitely related are such groups as Spaniopappus of the West Indies, and Eupatorium eximium and its relatives in Costa Rica.

Cytological evidence is strongly in agreement with that from floral anatomy. Reports as obtained from Darlington & Wylie (1956) and various supplements (Cave, 1956-64; Ornduff, 1965-67; Powell & King, 1969) indicate the following: A. adenophora (as E. glandulosum, two separate counts)  $2n = 51$ ; A. altissima (as E. ageratoides and E. rugosum)  $2n = 34, 36$ ; A. anisochroma  $n = ca. 17$ ; A. azangaroensis (as E. sp., Powell & King, 1969)  $n = 17^a$ ; A. glabrata  $n = 17$ ; A. gracilis  $n = 18?$ ; A. herbacea  $n = 17, 2n = 34$ ; A. occidentalis  $2n = 34$ ; A. pazcuarensis  $n = 25$ ; A. petiolaris  $2n = 34$ ; A. prunellaefolia  $n = 50I, 52I$ ; A. purpusii  $2n = 34$ ; A. riparia  $2n = 48$ ; A. rockrothii  $2n = 51, over 80$ ; A. scorodonioides  $n = 17$ ; A. sternbergiana  $2n = 34$ ; A. tinifolia  $n = ca. 40$ ; A. ventillana  $n = 17$ ; A. wrightii  $2n = 34$ . One specimen reported as  $n = 10$ , King 3037, Mexico, cf. E. ligustrinum DC. (Turner, Ellison, & King, 1961), has been checked and proves to be Eupatorium albicaule Schultz-Bip. which is not an Ageratina. There seems little doubt that the base number of Ageratina is  $x = 17$ . Ageratina adenophora with type II pollen in some plants (King & Robinson, 1967) seems to be an apomictically reproducing triploid.

At present, there is only one report of  $n = 17$  outside of Ageratina, in a Costa Rican plant possibly related to Eupatorium eximium B.L.Robinson. The closely related genus, Oxylobus, has been consistently reported as  $n = 16$ .

It is worth noting that this cytological evidence has been compiled by us since having established the limits of Ageratina on the basis of floral anatomy. We here provide others with an opportunity to compare what cytological evidence they may have on other species with the list that follows.

Ageratina Spach, Hist. Veg. Phan. 10: 286. 1841

Batschia Moench, Meth. 567. 1794. not Batschia Gmelin, 1791 (Boraginaceae); Batschia Mutis ex Thunberg, 1792 (Menispermaceae); or Batschia Vahl, 1794 (Leguminosae). T.: B. nivea Moench = Ageratina altissima (L.) R.M.King & H.Robinson.

Ageratiopsis Schultz-Bip. ex Bentham & J.D.Hooker, Gen. Pl. 2: 246. 1873. nom. nud. T.: Eupatorium ageratoides Linnaeus f. = Ageratina altissima (L.) R.M.King & H.Robinson.

Mallinoa Coulter, Bot. Gaz. 20: 47. 1895. T.: M. corymbosa Coulter = Ageratina muelleri (Schultz-Bip. ex Klatt) R.M.King & H.Robinson.

Kyrstenia Necker ex E.L.Greene, Leafl. Bot. Obs. Crit. 1: 8. 1903. L.T.: Eupatorium aromaticum L. = Ageratina aromatica (L.) R.M.King & H.Robinson.

Sparingly to densely branched herbs or shrubs; leaves opposite, rarely only subopposite or alternate, deltoid to elliptical, short to long petiolate, margin toothed or lobed to entire, serrate in most species. Inflorescence laxly to rather densely corymbose; heads 10-40 flowered; involucre of ca. 30 rather narrow usually acute subimbricate mostly subequal phyllaries in 1-2(3) series; receptacle glabrous or with minute scattered hairs. Corolla tubular or often with a long very slender base and abruptly enlarged limb; outer surface and margins of lobes smooth often with some bulging or projecting cells at the tip, with hairs and/or glands or glabrous, without stomates; inner surface of lobes papillose with dense layer of short bulging or long-projecting cells; cells of backs of lobes and of tube mostly narrow with sinuous walls. Anther collar composed of numerous quadrate cells below, elongate cells above, all with little or no ornate thickening on the walls; exothecial cells in part usually lax and somewhat longer than wide; anther appendage large, often truncate at apex; pollen spherical, tricolpate, spinose, type II sometimes present. Style usually with distinctly swollen glabrous basal node which is often marked by special firm-walled cells; surface cells of stylar appendage densely long projecting, in two small groups of species with cells only slightly projecting. Achene prismatic, usually 5-costate, usually bearing setae or glands or both; carpodium distinct but without distinct upper limit, cylindrical or rounded, with rather lax elongate or quadrate cells having thin beaded walls; embryo usually borne high in the achene with lower end partially sclerotized, basal vasculature of achene united to well above level of carpodium; pappus of 5-40 slender scabrous setae often easily deciduous by specialized fragile zone at base, with pointed apical cells. Chromosome numbers  $n = 17$ ,  $n = 18?$ ,  $2n = 34$ ,  $2n = 36$ ,  $n = ca. 40$ ,  $2n = 48$ ,  $2n = 51$ ,  $2n = over 80$ .

Lectotype species: Eupatorium aromaticum L. (King & Robinson, 1969).

Our studies indicate that the genus contains the following 4 subgenera and 196 species.

#### Subgenus Ageratina

Plants herbaceous; corollas usually very narrowly stalked below, usually with hairs on the backs of the lobes, rarely with a few long-stalked glands or glabrous; cells on inner surface of corolla lobes and on stylar appendage densely long-projecting; type II pollen seen in 1 species; achene without glands; carpodium cylindrical with mostly elongate cells; pappus setae very easily deciduous. 80 species.

Ageratina adenophora (Spreng.) R.M.King & H.Robinson, comb. nov.  
Eupatorium adenophorum Spreng., Systema Vegetabilium 3: 420.  
1826. Mexico, California, W.Ind., S. Amer., Portugal, Pac.

Isl., Australia. Widely adventive.

Ageratina altissima (L.) R.M.King & H.Robinson, comb. nov.  
Eupatorium altissimum L., Sp. Pl. 839. 1753. E. United States.

Ageratina amblyolepis (B.L.Robinson) R.M.King & H.Robinson, comb. nov.  
Eupatorium amblyolepis B.L.Robinson, Proc. Amer. Acad. 35: 330. 1900. Mexico.

Ageratina apollinairei (B.L.Robinson) R.M.King & H.Robinson, comb. nov.  
Eupatorium apollinairei B.L.Robinson, Proc. Amer. Acad. 54: 236. 1918. Colombia.

Ageratina aromatica (L.) Spach, Hist. Veg. Phan. 10: 28. 1841.  
Eupatorium aromaticum L., Sp. Pl. 839. 1753. E. United States.

Ageratina arsenei (B.L.Robinson) R.M.King & H.Robinson, comb. nov.  
Eupatorium arsenei B.L.Robinson, Contr. Gray Herb. n.s. 104: 10. 1934. Mexico.

Ageratina articulata (Schultz-Bip. ex Hieron.) R.M.King & H.Robinson, comb. nov.  
Eupatorium articulatum Schultz-Bip. ex Hieron. in Urban, Engl. Bot. Jahrb. 40: 385. 1908. Venezuela.

Ageratina aschenborniana (Schauer) R.M.King & H.Robinson, comb. nov.  
Eupatorium aschenbornianum Schauer, Linnaea 19: 720. 1847. Mexico.

Ageratina atrocordata (B.L.Robinson) R.M.King & H.Robinson, comb. nov.  
Eupatorium atrocordatum B.L.Robinson, Contr. Gray Herb. n.s. 104: 12. 1934. Mexico.

Ageratina azangaroensis (Schultz-Bip. ex Weddell) R.M.King & H.Robinson, comb. nov.  
Eupatorium azangaroense Schultz-Bip. ex Weddell, Chlor. Andina 1: 217. 1857. Ecuador.

Ageratina badia (Klatt) R.M.King & H.Robinson, comb. nov.  
Eupatorium badium Klatt, Bull. Soc. Bot. Belg. 31: 186. 1892 (1893). Costa Rica, Mexico.

Ageratina bellidifolia (Bentham) R.M.King & H.Robinson, comb. nov.  
Eupatorium bellidifolium Bentham, Pl. Hartw. 43. 1840. Mexico.

Ageratina bimatra (Standley & L.O.Williams) R.M.King & H.Robinson, comb. nov.  
Eupatorium bimatum Standley & L.O.Williams, Ceiba 3: 64. 1952. Honduras.

- Ageratina bustamenta (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium bustamenta A.P.Dceandolle, Prodr. 5: 168. 1836. Mexico.
- Ageratina calderillensis (Hieron.) R.M.King & H.Robinson, comb. nov. Eupatorium calderillense Hieron. in Urban, Engl. Bot. Jahrb. 40: 381. 1908. Bolivia.
- Ageratina camachensis (Hieron.) R.M.King & H.Robinson, comb. nov. Eupatorium camachense Hieron. in Urban, Engl. Bot. Jahrb. 40: 386. 1908. Bolivia.
- Ageratina chiapensis (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium chiapense B.L.Robinson, Proc. Amer. Acad. 35: 332. 1900. Mexico.
- Ageratina chiriquensis (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium chiriquense B.L.Robinson, Proc. Amer. Acad. 54: 238. 1918. Panama.
- Ageratina choricephala (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium choricephalum B.L.Robinson, Proc. Amer. Acad. 54: 239. 1918. Mexico.
- Ageratina choricephaloides (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium choricephaloides B.L.Robinson, Proc. Amer. Acad. 55: 8. 1919. Peru.
- Ageratina ciliata (Lessing) R.M.King & H.Robinson, comb. nov. Eupatorium ciliatum Lessing, Linnaea 6: 404. 1831. Mexico.
- Ageratina conspicua (Kunth & Bouché) R.M.King & H.Robinson, comb. nov. Eupatorium conspicuum Kunth & Bouché, Ind. Sem. Hort. Berol. 13. 1847. Mexico.
- Ageratina corylifolia (Griseb.) R.M.King & H.Robinson, comb. nov. Eupatorium corylifolium Griseb., Fl. Brit. W. Ind. 361. 1861. W.Ind.
- Ageratina cuencana (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium cuencanum B.L.Robinson, Proc. Amer. Acad. 54: 241. 1918. Ecuador.
- Ageratina cutervensis (Hieron.) R.M.King & H.Robinson, comb. nov. Eupatorium cutervense Hieron. in Urban, Engl. Bot. Jahrb. 40: 383. 1908. Ecuador, Peru.
- Ageratina dasyneura (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium dasyneurum B.L.Robinson, Proc. Amer. Acad.

55: 10. 1919. Colombia.

Ageratina enixa (B.L.Robinson) R.M.King & H.Robinson, comb. nov.  
Eupatorium enixum B.L.Robinson, Contr. Gray Herb. n.s. 68:  
15. 1923. Mexico.

Ageratina funkii (B.L.Robinson) R.M.King & H.Robinson, comb. nov.  
Eupatorium funkii B.L.Robinson, Contr. Gray Herb. n.s. 68:  
16. 1923. Colombia.

Ageratina gilbertii (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium gilbertii B.L.Robinson, Proc. Amer. Acad.  
55: 16. 1919. Peru.

Ageratina glabrata (H.B.K.) R.M.King & H.Robinson, comb. nov.  
Eupatorium glabratum H.B.K., Nov. Gen. et Sp. 4: 121. ed.  
fol. 1818. Mexico.

Ageratina glandulifera (Hieron.) R.M.King & H.Robinson, comb.  
nov. Eupatorium glanduliferum Hieron. in Sodiro, Engl. Bot.  
Jahrb. 29: 13. 1900. Ecuador.

Ageratina glechonophylla (Lessing) R.M.King & H.Robinson, comb.  
nov. Eupatorium glechonophyllum Lessing, Linnaea 6: 105.  
1831. Chile, Ecuador.

Ageratina gracilentia (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium gracilentum B.L.Robinson, Proc. Amer. Acad.  
55: 18. 1919. Peru.

Ageratina gracilis (H.B.K.) R.M.King & H.Robinson, comb. nov.  
Eupatorium gracile H.B.K., Nov. Gen. et Sp. 4: 124. ed. fol.  
1818. Colombia.

Ageratina grandidentata (A.P.Decandolle) R.M.King & H.Robinson,  
comb. nov. Eupatorium grandidentatum A.P.Decandolle, Prodr.  
5: 167. 1836. Mexico.

Ageratina ibaquensis (Schultz-Bip. ex Hieron.) R.M.King & H.  
Robinson, comb. nov. Eupatorium ibaquense Schultz-Bip. ex  
Hieron. in Urban, Engl. Bot. Jahrb. 40: 384. 1908.  
Venezuela.

Ageratina iodotricha (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium iodotrichum B.L.Robinson, Proc. Amer. Acad.  
55: 19. 1919. Ecuador.

Ageratina lobulifera (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium lobuliferum B.L.Robinson, Contr. Gray  
Herb. n.s. 77: 24. 1926. Peru.

- Ageratina lorentzii (Hieron.) R.M.King & H.Robinson, comb. nov.  
Eupatorium lorentzii Hieron., Engl. Bot. Jahrb. 22: 787.  
1897. Argentina.
- Ageratina luciae-brauniae (Fernald) R.M.King & H.Robinson, comb.  
nov. Eupatorium luciae-brauniae Fernald, Rhodora 44: 463.  
1942. Kentucky.
- Ageratina malacolepis (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium malacolepis B.L.Robinson, Proc. Amer. Acad.  
44: 618. 1909. Mexico.
- Ageratina mariara (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium mariarum B.L.Robinson, Proc. Amer. Acad.  
36: 481. 1901. Mexico.
- Ageratina muelleri (Schultz-Bip. ex Klatt) R.M.King & H.Robinson,  
comb. nov. Eupatorium muelleri Schultz-Bip. ex Klatt,  
Leopoldina 20: 90. 1884. Mexico.
- Ageratina oligocephala (A.P.Decandolle) R.M.King & H.Robinson,  
comb. nov. Eupatorium oligocephalum A.P.Decandolle, Prodr.  
5: 166. 1836. Mexico.
- Ageratina pacifica (B.L.Robinson ex I.M.Johnston) R.M.King &  
H.Robinson, comb. nov. Eupatorium pacificum B.L.Robinson  
ex I.M.Johnston, Proc. Calif. Acad. Sci. 20: 99. 1931.  
Mexico.
- Ageratina pampalcensis (B.L.Robinson) R.M.King & H.Robinson,  
comb. nov. Eupatorium pampalcense B.L.Robinson, Contr.  
Gray Herb. n.s. 104: 24. 1934. Peru.
- Ageratina paupercula (A.Gray) R.M.King & H.Robinson, comb. nov.  
Eupatorium pauperculum A.Gray, Proc. Amer. Acad. 17: 205.  
1881-82. Arizona, Mexico.
- Ageratina pazcuanensis (H.B.K.) R.M.King & H.Robinson, comb. nov.  
Eupatorium pazcuanense H.B.K., Nov. Gen. et Sp. 4: 123.  
ed. fol. 1818. Mexico.
- Ageratina photina (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium photinum B.L.Robinson, Proc. Amer. Acad.  
35: 338. 1900. Mexico.
- Ageratina pichinchensis (H.B.K.) R.M.King & H.Robinson, comb.  
nov. Eupatorium pichinchense H.B.K., Nov. Gen. et Sp. 4:  
122. ed. fol. 1818. Ecuador, Colombia.
- Ageratina prunellaefolia (H.B.K.) R.M.King & H.Robinson, comb.



- nov. Eupatorium prunellaefolium H.B.K., Nov. Gen. et Sp. 4: 123. ed. fol. 1818. Mexico.
- Ageratina psilodora (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium psilodorum B.L.Robinson, Proc. Amer. Acad. 55: 27. 1919. Colombia.
- Ageratina purpusii (Brandege) R.M.King & H.Robinson, comb. nov. Eupatorium purpusii Brandege, Erythea 7: 3. 1899. Baja California.
- Ageratina ramonensis (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium ramonense B.L.Robinson, Proc. Amer. Acad. 44: 619. 1909. Mexico.
- Ageratina repens (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Fleischmannia repens B.L.Robinson, Proc. Amer. Acad. 54: 262. 1918. Mexico.
- Ageratina rhodopappa (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium rhodopappum B.L.Robinson, Contr. Gray Herb. n.s. 77: 31. 1926. Colombia.
- Ageratina rhyodes (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium rhyodes B.L.Robinson, Proc. Amer. Acad. 55: 28. 1919. Ecuador.
- Ageratina rhytidodes (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium rhytidodes B.L.Robinson, Contr. Gray Herb. n.s. 77: 33. 1926. Peru.
- Ageratina riparia (Regel.) R.M.King & H.Robinson, comb. nov. Eupatorium riparium Regel. Gartenfl. 15: 324. 1866. Mexico, W.Ind., Pac. Isl., Australia. Widely adventive.
- Ageratina rivalis (Greenman) R.M.King & H.Robinson, comb. nov. Eupatorium rivale Greenman, Zoe 5: 186. 1904. Mexico.
- Ageratina rothrockii (A.Gray) R.M.King & H.Robinson, comb. nov. Eupatorium rothrockii A.Gray, Syn. Fl. N. Amer. 1(2): 102. 1897. Arizona, Mexico.
- Ageratina roraimensis (N.E.Brown) R.M.King & H.Robinson, comb. nov. Eupatorium roraimense N.E.Brown, Trans. Linn. Soc. ser. 2, 6: 38. 1901. Brit. Guiana, Venezuela.
- Ageratina rufa (E.L.Greene) R.M.King & H.Robinson, comb. nov. Kyrstenia rufa E.L.Greene, Leafl. Bot. Obs. Crit. 1: 10. 1903. Mexico.

- Ageratina schaffneri (Schultz-Bip. ex B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium schaffneri Schultz-Bip. ex B.L.Robinson, Proc. Amer. Acad. 27: 171. 1892. Mexico.
- Ageratina scopulora (Weddell) R.M.King & H.Robinson, comb. nov. Eupatorium scopulorum Weddell, Chlor. Andina 1: 216. 1857. Peru.
- Ageratina skutchii (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium skutchii B.L.Robinson, Contr. Gray Herb. n.s. 104: 27. 1934. Mexico, C.Amer.
- Ageratina sodiroi (Hieron.) R.M.King & H.Robinson, comb. nov. Eupatorium sodiroi Hieron. in Sodiro, Engl. Bot. Jahrb. 29: 12. 1900. Ecuador.
- Ageratina sotarensis (Hieron.) R.M.King & H.Robinson, comb. nov. Eupatorium sotarense Hieron., Engl. Bot. Jahrb. 21: 333. 1895 (as E. soratense). Colombia.
- Ageratina sternbergiana (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium sternbergianum A.P.Decandolle, Prodr. 5: 167. 1836. Peru.
- Ageratina subcordata (Bentham ex Oerst.) R.M.King & H.Robinson, comb. nov. Eupatorium subcordatum Bentham ex Oerst., Kjoeb. Vidensk. Meddel. 77. 1852. Costa Rica.
- Ageratina tambillensis (Hieron.) R.M.King & H.Robinson, comb. nov. Eupatorium tambillense Hieron. in Urban, Engl. Bot. Jahrb. 40: 380. 1908. Peru.
- Ageratina tarmensis (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium tarmense B.L.Robinson, Contr. Gray Herb. n.s. 104: 28. 1934. Peru.
- Ageratina tenuis (R.E.Fries) R.M.King & H.Robinson, comb. nov. Eupatorium tenue R.E.Fries, Arkiv. Bot. 5(13): 9. 1906. Argentina.
- Ageratina tonduzii (Klatt) R.M.King & H.Robinson, comb. nov. Eupatorium tonduzii Klatt, Bot. Beibl. Leopoldina 1895: 4. 1895. Costa Rica.
- Ageratina vallincola (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium vallincola A.P.Decandolle, Prodr. 5: 168. 1836. Peru.
- Ageratina ventillana (Cuatrecasas) R.M.King & H.Robinson, comb. nov. Eupatorium ventillanum Cuatrecasas, Ann. Missouri

Bot. Gard. 52: 305. 1965. Peru.

Ageratina vulcanica (Bentham ex Oerst.) R.M.King & H.Robinson, comb. nov. Eupatorium vulcanicum Bentham ex Oerst., Kjoeb. Vidensk. Meddel. 78. 1852. C.Amer.

Ageratina xanthochlora (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium xanthochlorum B.L.Robinson, Contr. Gray Herb. n.s. 77: 44. 1926. Mexico.

Ageratina zinniifolia (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium zinniifolium B.L.Robinson, Proc. Amer. Acad. 54: 261. 1918. Colombia.

Ageratina zunilana (Standley & Steyermark) R.M.King & H.Robinson, comb. nov. Eupatorium zunilanum Standley & Steyermark, Field Mus. Publ., Bot. 23: 191. 1944. Guatemala.

Subgenus Klattiella R.M.King & H.Robinson, subg. nov.

Plantae suffrutescentes; corolla inferne perangustata, in parte angustata distincte pubescens, lobis quam fauce aequilongis vel longioribus extus glanduliferis intus obsolete late papillatis; appendices styli valde papillatae; achaenia glandulifera et setifera; carpopodium aliquantum breve rotundatum, cellulis quadratis vel oblongis; setae pappi aliquantum persistentes. 2 species. Type: Eupatorium anisochromum.

Ageratina anisochroma (Klatt) R.M.King & H.Robinson, comb. nov. Eupatorium anisochromum Klatt., Bull. Soc. Bot. Belg. 31: 186. 1892 (1893). Costa Rica.

Ageratina paucibracteata (Alain) R.M.King & H.Robinson, comb. nov. Eupatorium paucibracteatum Alain, Contr. Ocas. Mus. Hist. Nat. Coleg. "De La Salle" 18: 8. 1960. Cuba.

Subgenus Neogreenella R.M.King & H.Robinson, subg. nov.

Plantae herbaceae vel frutescentes; corolla inferne plerumque non angustata, lobis quam fauce brevioribus extus glanduliferis vel setiferis vel glabris intus dense vel laxe papillatis; filamenta antherarum in parte inferiore longa; appendices styli plerumque valde papillatae raro leviter papillatae; achaenia glandulifera vel setifera; carpopodium breve rotundatum, cellulis plerumque quadratis; setae pappi aliquantum persistentes. 113 species. Type: Eupatorium wrightii.

Southward the subgenus includes many more shrubby species with more elliptical leaves. Such plants may represent the more

primitive element in the genus. Also, in Peru, a small group of species including A. cuzcoensis, A. pentlandiana, A. simulans, and A. stictophylla is rather distinct in its less papillose style branches and its lack of a distinct styler node.

Ageratina acutidentata (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium acutidentatum B.L.Robinson, Proc. Amer. Acad. 43: 29. 1907. Mexico.

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Ageratina ampla (Bentham) R.M.King & H.Robinson, comb. nov. Eupatorium amplum Bentham, Pl. Hartw. 200. 1845. Colombia.

Ageratina angustifolia (H.B.K.) R.M.King & H.Robinson, comb. nov. Mikania angustifolia H.B.K., Nov. Gen. et Sp. 4: 138. ed. fol. 1818. Colombia.

Ageratina arbutifolia (Bentham) R.M.King & H.Robinson, comb. nov. Eupatorium arbutifolium Bentham, Pl. Hartw. 199. 1845. Colombia.

Ageratina aristei (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium aristei B.L.Robinson, Proc. Amer. Acad. 55: 6. 1919. Colombia.

Ageratina baccharoides (H.B.K.) R.M.King & H.Robinson, comb. nov. Eupatorium baccharoides H.B.K., Nov. Gen. et Sp. 4: 132. ed. fol. 1818. Colombia.

Ageratina betulaeifolia (E.L.Greene) R.M.King & H.Robinson, comb. nov. Kyrstenia betulaeifolia E.L.Greene, Leafl. Bot. Obs. Crit. 1: 10. 1903. Mexico.

Ageratina blepharilepis (Schultz-Bip.) R.M.King & H.Robinson, comb. nov. Eupatorium blepharilepis Schultz-Bip. in Seemann, Bot. Voyag. Herald 300. 1856. Mexico.

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1836. Mexico.

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- Ageratina calaminthaefolia (H.B.K.) R.M.King & H.Robinson, comb. nov. Eupatorium calaminthaefolium H.B.K., Nov. Gen. et Sp. 4: 129. ed. fol. 1818. Mexico.
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- Ageratina cardiophylla (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium cardiophyllum B.L.Robinson, Proc. Amer. Acad. 35: 331. 1900. Mexico.
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- Ageratina chapalensis (Watson) R.M.King & H.Robinson, comb. nov. Eupatorium chapalense Watson, Proc. Amer. Acad. 26: 138. 1891. Mexico.
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Ageratina deltoidea (Jacquin) R.M.King & H.Robinson, comb. nov.  
Eupatorium deltoideum Jacquin, Pl. Hort. Schoenb. Wien 3:  
63. 1798 (1803). Mexico.

Ageratina dendroides (Spreng.) R.M.King & H.Robinson, comb. nov.  
Eupatorium dendroides Spreng., Systema Vegetabilium 3: 415.  
1826. Ecuador.

Ageratina desquamans (B.L.Robinson) R.M.King & H.Robinson, comb.  
nov. Eupatorium desquamans B.L.Robinson, Proc. Amer. Acad.  
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Eupatorium dictyoneurum Urban, Symb. Ant. 3: 402. 1903.  
Haiti.

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Eupatorium elegans H.B.K., Nov. Gen. et Sp. 4: 133. ed.  
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1880. Mexico.

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Eupatorium fastigiatum H.B.K., Nov. Gen. et Sp. 4: 125. ed.  
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54: 244. 1918. Colombia.

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Ageratina gynoxoides (Weddell) R.M.King & H.Robinson, comb. nov. Eupatorium gynoxoides Weddell, Chlor. Andina 1: 216. 1857. Colombia.

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Ageratina hederæfolia (A.Gray) R.M.King & H.Robinson, comb. nov. Eupatorium hederæfolium A.Gray, Mem. Amer. Acad. 4: 65. 1849. Mexico.

Ageratina herbacea (A.Gray) R.M.King & H.Robinson, comb. nov. Eupatorium ageratifolium var. herbaceum A.Gray, Smiths. Contr. Knowl. 5 (6): 74. 1853. New Mexico.

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Ageratina lasia (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium lasium B.L.Robinson, Contr. Gray Herb. n.s. 68: 21. 1923. Mexico.

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Eupatorium lucidum Ortega, Nov. Pl. Hort. Matrit. Dec. 35.  
1797. Mexico.
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Eupatorium macbridei B.L.Robinson, Contr. Gray Herb. n.s. 68: 23. 1923. Peru.
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Eupatorium mairetianum A.P.Decandolle, Prodr. 5: 160. 1836. Mexico.
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Eupatorium mortonianum Alain, Contr. Ocas. Mus. Hist. Nat. Coleg. "De La Salle" 18: 8. 1960. Cuba. This has been considered a hybrid between A. havanensis and Eupatorium villosum Sw. We consider this impossible in view of the totally different anatomical characters of E. villosum, none of which appear in Ageratina mortoniana.
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Acad. 42: 44. 1906. Mexico.

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Crit. 1: 10. 1903. Mexico.

Ageratina tetragona (Schrad.) R.M.King & H.Robinson, comb. nov.  
Eupatorium tetragonum Schrad., Ind. Sem. Hort. Gotting.  
1830 ex Linnaea 6: 72. 1831. Mexico.

Ageratina theaeifolia (Benth) R.M.King & H.Robinson, comb. nov.  
Eupatorium theaeifolium Benth, Pl. Hartw. 199. 1845.  
Colombia, Venezuela.

Ageratina thyrsoiflora (E.L.Greene) R.M.King & H.Robinson, comb.  
nov. Kyrstenia thyrsoiflora E.L.Greene, Leafl. Bot. Obs.  
Crit. 1: 9. 1903. Mexico.

Ageratina tinifolia (H.B.K.) R.M.King & H.Robinson, comb. nov.  
Eupatorium tinifolium H.B.K., Nov. Gen. et Sp. 4: 133. ed.  
fol. 1818. Colombia.

Ageratina tomentella (Schrad.) R.M.King & H.Robinson, comb. nov.  
Eupatorium tomentellum Schrad., Ind. Sem. Hort. Gotting.  
1833: 3. 1833. Mexico.

Ageratina tristis (A.P.Decandolle) R.M.King & H.Robinson, comb.  
nov. Eupatorium triste A.P.Decandolle, Prodr. 5: 166.  
1836. Jamaica.

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1886. Mexico.

Ageratina vernalis (Vatke & Kurtz) R.M.King & H.Robinson, comb.  
nov. Eupatorium vernale Vatke & Kurtz, Ind. Sem. Hort.  
Berol. 1871: Append. 2. 1871. Mexico, Guatemala.

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H.Robinson, comb. nov. Eupatorium vernicosum Schultz-Bip.  
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Ageratina viburnoides (A.P.Decandolle) R.M.King & H.Robinson,  
comb. nov. Eupatorium viburnoides A.P.Decandolle, Prodr.  
5: 171. 1836. Mexico.

Ageratina viscosa (H.B.K.) R.M.King & H.Robinson, comb. nov.  
Eupatorium viscosum H.B.K., Nov. Gen. et Sp. 4: 129. ed.  
 fol. 1818. Colombia.

Ageratina wrightii (A.Gray) R.M.King & H.Robinson, comb. nov.  
Eupatorium wrightii A.Gray, Smiths. Contr. Knowl. 3: 87.  
 1850. W. United States, Mexico.

Subgenus Pachythamnus R.M.King & H.Robinson, subg. nov.

Plantae frutescentes vel subarborescentes; caulis distincte  
 incrassatus; folia facile decidua per anthesin plerumque absentia;  
 corolla inferne vix angustata extus interdum rare setifera,  
 cellulis apicalibus protuberantibus, lobis intus valde et dense  
 papillatis; filamenta antherarum in parte inferiore brevia;  
 appendices styli leniter papillatae; achaenia setifera; carpo-  
 podium breve rotundatum, cellulis quadratis; setae pappi  
 aliquantum persistentes. 1 species. Type: Eupatorium crassirameum.

Ageratina crassiramea (B.L.Robinson) R.M.King & H.Robinson, comb.  
 nov. Eupatorium crassirameum B.L.Robinson, Proc. Amer.  
 Acad. 35: 332. 1900. Mexico, C.Amer.

#### Species synonymized

E. amplifolium A.Gray = A. rubricaulis  
E. durandii Klatt = A. anisochroma  
E. remyanum Philippi = A. glechonophylla

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