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THE GENUS SPHENOPHOLIS.

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The grasses which for nearly seventy years have been referred to the *Eatonia* of Rafinesque, constitute a small genus, but the characters which serve to distinguish it, the history of its development and relations with other genera, the remarkable inter-relation of its species and their geographical distribution are all points of more than usual interest. The species have been classified by botanists under seven genera and the seven species we here recognize have been cited under more than forty names. Michaux in 1803 placed his one species in *Aira*, and Sprengel, Muhlenburg, Elliott and some other authors of that period followed him. Desvaux (1808) referred the species to *Airopsis*, while De Candolle in 1813, and Torrey in 1824, referred them to *Koeleria*. Trinius placed them in *Trisetum* in the section *Colobanthus*, which Spach took up later (1846) as a genus, but too late for its adoption, the name having already been used by Bartling (1800). In the same year (1830) Kunth, recognizing the generic value of the characters present in the species, established upon Michaux's *Aira obtusata* the genus *Reboulea*, renaming Michaux's plant *Reboulea gracilis*. Gray took up *Reboulea* in the first edition of his Manual (1848), but in the meantime Endlicher (1837), who doubtless was aware that the name *Reboulea* had been applied to a genus of hepatics ten years prior to its adoption by Kunth, was induced for some reason, to refer the species to *Eatonia* of Rafinesque. This name was adopted by Gray in the second edition of his Manual (1856) and by all subsequent authors. After a careful reading of Rafinesque's diagnosis of

his genus *Eatonia* and the description of the species which he names as the type — *Eatonia purpurascens* — no one can believe that Rafinesque's *Eatonia* is identical with that of Endlicher. Rafinesque says of his genus that it is "intermediate between *Holcus*, *Aira* and *Panicum*.[1] He describes the spikelets as being polygamous, with one hermaphrodite and one male flower, the latter enclosed by the third glume, the first glume being "*plus petite*," characters which suggest *Panicum*. His type species is described as being 2 to 4 feet high with ciliate sheaths, divaricate, flexuose panicles, purple spikelets and its habitat the salt marshes of New York. There is no *Eatonia* as we have come to understand that genus, with divaricate purple panicles and none, so far as I am aware, which occur upon saline marshes about New York or elsewhere. We must regard the *Eatonia* of Endlicher, which he clearly describes, as an error in determination and as quite distinct from the *Eatonia* of Rafinesque published eighteen years earlier. This name as well as *Reboulea* and *Colobanthus* being thus unavailable our little genus whose species have been shut out from *Aira*, *Trisetum* and *Koeleria*, is without a name and is apparently homeless, for authors differ as to its position in the grass family, earlier botanists having associated it with the *Aveneae*, while those of more recent times have assigned it to the *Festuceae*, following the classification proposed by Kunth who allied his *Reboulea* with *Phippsia* and *Catabrosa*.

The following is a brief summary of the history or development of the genus: —

Michaux, in 1803, described one species under the name of *Aira obtusata*, giving as the habitat "in aridis Carolina ad Floridam." His description is very brief and admits of being either *Eatonia nitida*,

[1] **Eatonia** Rafin. Original description: "EATONIA. (Graminées.) Fleurs polygames mâles paniculées. Glume biflore, trivalve; valves inégales, mutique, sur un rang, l'extérieure embrassante, plus petite; l'intérieure plus grande. 2 fleurs entre l' intérieure et la médiane, une hermaphrodite et une mâle. Fleur hermaphrodite enveloppée par la grande valve; glumelle à 2 valves égales, plus courte que la glume. 3 étamines. 2 styles fimbriés. Fleur mâle embrassée par la glume médiane, glumelle a une seule valve embrassante. Beau genre intermédiare entre les genres *Holcus*, *Aira* et *Panicum*.

Type, *E. purpurascens*. Glabre, gaînes ciliées, ligules barbues, feuilles étroites, panicule divariquée, flexueuse; glumes ovées sans nervure, acuminées, l'exterieure carinée. Glumelles hermaphrodites, ellipitiques obtuses, lisses; glumelle mâle, ovale, aigue, bianguleuse. Belle plante de 2 à 4 pied de haut, dans les marais maritimes de New-York, etc. Fleurs pourprées. C'est l'*Holcus striatus* de quelques botanistes americains, mais nullement celui de Willdenow, etc. Est-ce aussi le *Koelera pensylvanica* Dec.? et l' *Airopsis obtusa* de Romer? Mais c'est certainement un genre distinct.

(Rafinesque in Journ. d. Phys. **89**: 104, 1819.)

filiformis or, as now understood, either the glabrous or pubescent form of *obtusata*. The latter (pubescent) form is by far the more common in the region specified.

Sprengel in 1807 published *Aira pallens* and *Aira nitida*. In 1810 he named the latter species *Aira pennsylvanica*. In 1813, Muhlenburg published *Aira truncata* based upon *Aira obtusata* of Michaux and in 1817 he published *Aira pallens*, apparently based upon the grass which has been more recently known as *Eatonia pennsylvanica* in which the second floret is awned and doubtless the same as *Aira pallens* Sprengel. Muhlenberg notes that awnless forms occur and evidently referred to these in his catalogue (1813) under the name of *Aira pallens mutica*. *Avena palustris* of Michaux, Muhlenburg treats as a distinct species.

Torrey (1824) describes two species and one variety under *Koeleria*:

1. *Koeleria pennsylvanica*, based upon De Candolle's *Koeleria pennsylvanica* with *Aira mollis* Muhl. and *Aira pennsylvanica* Spr. as synonyms. The grass described is *Eatonia nitida*.

2. *Koeleria truncata*, based upon *Aira truncata* Muhl. which is the *Aira obtusata* of Michaux. The grass described is the *Eatonia pennsylvanica* of A. Gray. The subspecies *major*, of Torrey, is certainly valid and includes *Eatonia intermedia* of Rydberg.

Elliott in his Sketch of the Flora of South Carolina and Georgia, 1816, describes two species, *Aira obtusata* Mx. and *Aira mollis* Muhl. Under the latter, he describes as a variety, *Eatonia filiformis* Vasey, but does not name it.

Trinius, in 1830, describes two species under *Trisetum* (Sect. *Colobanthus*), namely: *T. pennsylvanicum*, based upon *Aira pennsylvanica* Sprengel and *Trisetum lobatum*, which is *Eatonia obtusata* (Mx.).

Endlicher in 1837 takes up *Eatonia* of Rafinesque for *Reboulea* of Kunth (1830) and cites *Aira obtusata* Michx. as representing the genus.

Desvaux, Journ. Bot. 1808, refers *Aira obtusata* of Michaux to *Airopsis*.

Kunth in 1830 establishes *Reboulea* as a new genus to include *Aira obtusata* Mx. giving the latter a new name, *Reboulea gracilis*.

Gray in the first edition of his Manual (1848) takes up *Reboulea* of Kunth and describes two species with one variety; 1. *Reboulea pennsylvanica*, describing the grass now generally recognized as *Eatonia pennsylvanica*, but citing *Koeleria pennsylvanica* DC., which

is based upon *Aira pennsylvanica* of Sprengel, as a synonym, with the variety, *major* (*Koeleria truncata major* of Torrey). 2. *Reboulea obtusata*, based upon *Aira obtusata* Mx. In the second edition of the Manual, Gray refers these species to *Eatonia* following Endlicher who erroneously took up Rafinesque's name.

Chapman in 1860 describes two species with one variety — *Eatonia obtusata* (Mx.) and *Eatonia pennsylvanica*, citing *Aira mollis* Muhl. as a synonym which is the plant he describes, with the variety *filiformis*.

In 1886 Vasey raised Chapman's *E. pennsylvanica filiformis* to the rank of a species and published as new *Eatonia Dudleyi*, which is identical with *E. pennsylvanica* of Chapman and *Aira nitida* and *Aira pennsylvanica* of Sprengel, *Aira mollis* of Muhlenberg being the same.

Fournier in 1881 published one Mexican species which he named *Eatonia densiflora*. This is probably *Eatonia obtusata* with closely pubescent sheathes.

Beal, in 1896, describes six species as being North American raising *Eatonia pennsylvanica longiflora* Vasey to specific rank and making one new species, *Eatonia hybrida*, based upon what he supposed was Vasey's so-called hybrid between *Eatonia pennsylvanica* and *Trisetum palustre*, the *Eatonia pallens* of Scribner and Merrill. The grass he really described is an awned state of *Eatonia filiformis* (*E. aristata* Scribn. & Merrill.)

Scribner and Merrill (1900) published *Eatonia pallens* based upon *Aira pallens* of Sprengel and two species regarded as new, viz: *E. pubescens* and *E. aristata*, the first a pubescent subspecies of *Eatonia obtusata*, the second an awned state of *E. filiformis*.

Britton in his Manual of the Flora of N. Am. (1901) describes five species: *Eatonia obtusata* (Mx.) A. Gray, *E. pubescens* Scribn. & Merrill, *E. pennsylvanica* (DC.) A. Gray, *E. nitida* (Sprengel) Nash and *E. glabra* Nash.

Small, in his Flora of the Southern United States (1901) has seven species, those described by Britton and *E. filiformis* (Chapm.) Vasey, and *E. longiflora* (Vasey) Beal.

Recently (1905) Rydberg published *Eatonia robusta* (Vasey), based upon *E. obtusata robusta* Vasey, and *Eatonia intermedia* which is apparently the same as *Eatonia pennsylvanica major* (Torr.) Gray. *Eatonia robusta* has no valid characters to separate it from *Eatonia obtusata*.

Bentham in 1883 (Gen. Pl. **3**: 1184) recognized two species with possibly a third, while Hackel in Engl. & Prantl, Nat. Pflanzenfam. (1887) gives the number of species as two.

As already pointed out the genus has no available name and I venture to propose the name *Sphenopholis*, or *wedge-scale*, referring to the wedge-shaped second glume of some of the species when viewed from the side. I have reduced the thirteen species published under *Eatonia* to four with five subspecies.

Eatonia obtusata (Mx.) Gray " pubescens, S. & M. " robusta, Rydb. " densiflora Fourn.	= Sphenopholis *obtusata* (Mx.) subspecies *lobata* (Trin.), *pubescens* (Scribn. & Merr.)
" pennsylvanica A. Gray " pallens, S. & M. " longiflora Vasey. " intermedia Rydh.	= Sphenopholis *pallens* (Spreng.) subspecies *major* (Torr.), *longiflora* (Vasey.)
" nitida Nash. " glabra Nash. " Dudleyi,	= Sphenopholis *nitida* (Spr.) subspecies *glabra* (Nash.)
" filiformis Vasey, " hybrida Beal, " aristata S. & M.	= Sphenopholis *filiformis* (Chapm.)

Three species of *Trisetum* are transferred to the genus *Sphenopholis*, viz. *T. interruptum* Buckl. with subspecies *californica* (Vasey), *Trisetum Hallii* Scribn. and *Trisetum palustre* Trin. with new subspecies *flexuosa*, making in all seven species with seven subspecies.

I have referred to the close relationship of the genus *Eatonia* with *Trisetum* in more than one publication and a recent careful examination of the ample material in the National and Gray Herbaria has only served to convince me that Trinius was correct in referring the species to the *Aveneae*. With one exception none of the species is entirely awnless and the only constant character which serves to separate them from *Trisetum* is the articulation of the rachilla below the spikelet. This character is especially pronounced in *S. interruptum* and *S. Hallii*. I regard this character of good generic value; in this case at least it brings together a very natural group of species. All the species vary from wholly glabrous to more or less densely pubescent; there is a general resemblance throughout in the characters of the inflorescence especially in the details; in the dissimilarity of the outer glumes

and in the lemmas and paleas, the latter being always hyaline and strongly narrowed towards the base, and especially is there a common resemblance in the characters of the caryopsis. While the glumes and first floret are persistent, the second floret readily falls off at early maturity and so pronounced is this character that species have been described from herbarium material as having one-flowered spikelets. Kunth describes thus *Reboulea gracilis*.

The characters of the genus *Sphenopholis* as here constituted are the same as those assigned to *Eatonia* by Endlicher, Bentham and others excepting those of the lemmas or flowering glumes which are either awnless or awned below the entire or two-toothed apex, awn straight or divergent rarely twisted and geniculate. As here presented the genus stands, as follows:

Sphenopholis, new name.

Reboulea Kunth. Rev. Gram. **1**:341, Pl. 84, 1830, not *Reboulea* Raddi 1820.

Colobanthus Trin (as a Sect. Trisetum.) 1830. Spach as a genus, Suites, Buff, **13**:163, 1846, not Bartl. 1830.

Eatonia Rafin.; Endl. Gen. Pl. 99, 1837, not Rafinesque, 1819.

Gen. Char.: Spikelets small, 2–3-flowered, paniculate; rhachilla continued above the upper floret into a slender naked or pilose stipe, articulated between the florets and below the spikelets; flowers hermaphrodite. Glumes 2, dissimilar, persistent, membranaceous, the second becoming chartaceous or subcoriaceous in fruit, the first narrow 1- or rarely 3-nerved, the second much broader, usually broadly obovate, 3- or rarely 5-nerved; lemmas rather rigid, chartaceous, 3- rarely 5-nerved, nerves obscure, rounded on the back below compressed near the apex, obtuse, acuminate, entire or 2-toothed, awnless or awned just below the apex; awn straight or divergent, rarely twisted and geniculate; palea hyaline, shorter than the lemmas, narrowed towards the base, 2-nerved, usually somewhat 2-lobed and 2-toothed at the apex. Stamens 3. Styles very short; stigmas plumose. Caryopsis linear or oblong, more or less compressed, abruptly narrowed above into a short beak, glabrous, exsulcate, loosely enclosed within the rigid fruiting glume, free.

Slender grasses with usually flat leaves and narrow, often densely flowered panicles.

Allied to *Trisetum*.

Species 7. All North American. Type, *Sphenopholis obtusata* (*Aira obtusata* Michx.).

Key to the Species.

1 Spikelets awnless, rarely with the second floret short-awned, glumes very dissimilar 2
1 Spikelets always awned, glumes not very unlike 5
2 Leaves very narrow or involute-filiform, basal ones often equaling the culm, second glume broadly truncate . . *S. filiformis.*
2 Leaves flat, much shorter than the culm 3
3 Panicle lanceolate or oblong, spikelets crowded, second glume as broad as long, somewhat cuculate in fruit . . *S. obtusata.*
3 Panicle lax, branches more or less spreading, at least when in flower 4
4 Glumes nearly equal in length, the second very broadly obovate obtuse, florets obtuse, the second one very scabrous all over, *S. nitida.*
4 Glumes unequal, first shorter than second, florets mostly acute, glabrous . . . . . *S. pallens.*
5 Panicle lax, spikelets not crowded, first floret usually awnless *S. palustris.*
5 Panicle narrow spiciform more or less interrupted below . 6
6 Glumes broadly oblanceolate, first floret with a short straight terminal awn . . . . . *S. Hallii.*
6 Glumes narrowly oblanceolate, awns all alike . *S. interrupta.*

Subspecies.

S. obtusata lobata (*Trisetum lobatum* Trin.). Sheathes and leaves scabrous; panicle cylindrical, spikelets crowded on the short oppressed branches.

S. obtusata pubescens (*Eatonia pubescens* Scribn. & Merr.). Sheaths and leaves softly pubescent.

S. nitida glabra (*Eatonia glabra* Nash.). Sheathes and leaves glabrous or merely scabrous.

S. pallens major (*Koeleria truncata major* Torr.). Panicles narrowly lanceolate or oblong, rather densely flowered, first glume linear nearly equalling the second.

S. palustris flexuosa n. subsp. Panicle lax the flexuose branches spreading, both lemmas awned.

S. interrupta californica (*Trisetum californicum* Vasey). Plants pubescent throughout even to the glumes.

LIST OF THE SPECIES WITH THEIR SYNONYMS.

1. **Sphenopholis obtusata** (Mx.) Scribn. n. comb.
   Aira obtusata Michx. 1803.
   Airopsis obtusata Desv. 1808.
   Aira truncata Muhl. 1817.
   Koeleria truncata Torr. 1824 (Excl. descr.).
   Koeleria paniculata Nutt. 1818.
   Reboulea gracilis Kunth. 1840.
   Reboulea obtusata Gray, 1848.
   Eatonia obtusata Gray, 1856 (Excl. char.).
   Southern New England to Florida and westward to Illinois and Texas.

1a. **Sphenopholis obtusata pubescens** (S. & M.) Scribn. n. comb.
   Eatonia pubescens Scribn. & Merrill, 1900.
   Distribution with the species.

1b. **Sphenopholis obtusata lobata** (Trin.) Scribn. n. comb.
   Trisetum lobatum Trin. 1830.
   Eatonia densiflora Fourn. 1881.
   Eatonia obtusata Gray (excl. syn.).
   Eatonia robusta (Vasey) Rydb.
   Maine to Florida and westward to Washington, California. Mexico and Canada.

2. **Sphenopholis filiformis** (Chapm.) Scribn. n. comb.
   Eatonia pennsylvanica filiformis Chapm. 1860.
   Eatonia filiformis Vasey, 1886.
   Eatonia hybrida Beal, 1896.
   Eatonia aristata Scribn. & Merrill, 1900.
   South Carolina to Florida and westward to Mississippi and Texas.

3. **Sphenopholis nitida** (Spr.) Scribn. n. comb.
   Aira nitida Spr. 1807.
   Aira pennsylvanica Spr. 1810.
   Aira mollis Muhl. 1817.
   Koeleria pennsylvanica DC. 1813.
   Trisetum pennsylvanica Trin. 1830.
   Eatonia pennsylvanica Gray, 1856. (Excl. descr.)
   Eatonia pennsylvanica Chapman, 1860.
   Eatonia Dudleyi Vasey, 1886.
   Eatonia nitida Nash. 1895.

Southern New England, New York to North Dakota and southward to South Carolina, Florida, Mississippi and Texas. Canada.

3a. **Sphenopholis nitida glabra** (Nash.) Scribn. n. comb.

Eatonia glabra Nash. 1901.

Southern New York, Illinois, to South Carolina and Tennessee.

4. **Sphenopholis pallens** (Spr.) Scribn. n. comb.

Aira pallens Spr. 1807.
Aira pallescens Kitaib. ? 1817.
Koeleria truncata Torr. 1824. (excl. syn.)
Reboulea pennsylvanica A. Gray, 1848. (Excl. syn.)
Eatonia pennsylvanica A. Gray, 1856. (Excl. syn.)
Eatonia pallens Scribn. & Merrill, 1900.

Maine to North Carolina and westward to Wisconsin, Kansas and Texas.

4a. **Sphenopholis pallens longiflora** (Vasey) Scribn. n. comb.

Eatonia pennsylvanica longiflora. Vasey, 1894.
Eatonia longiflora, Vasey in Beal. 1896.

Texas and ? Louisiana.

4b. **Sphenopholis pallens major** (Torr.) Scribn. n. comb.

Koeleria truncata major Torr. 1824.
Reboulea pennsylvanica major Gray. 1848.
Reboulea gracilis Kunth. 1830. (?)
Eatonia intermedia Rydb. 1905.

Maine to Washington south to Pennsylvania, Illinois, Colorado, New Mexico and Arizona.

5. **Sphenopholis palustris** (Michx.) Scribn. n. comb.

Avena palustris Michx. 1803.
Aira pallens aristata Ell. 1816.
Trisetum palustre Trin. 1830.
Trisetum ludovicianum Vasey, 1885.

Massachusetts southward to Tennessee, Louisiana and Georgia. Canada to latitude 59°.

5a. **Sphenopholis palustris flexuosa** Scribn. n. subsp.

No. 274 A. Commons, from Delaware, 1874, and
No. 4800 A. A. Heller, from Penna. both in the National Herbarium.

6. **Sphenopholis interrupta** (Buckl.) Scribn. n. comb.

Trisetum interruptum Buckl. 1863.
Trisetum elongatum Beal, 1896, not Kunth. 1829. (Err. determ.)

Southwestern Colorado, Texas, Arizona and northern Lower California.

6a. **Sphenopholis interrupta californica** (Vasey) Scribn. n. comb.
Trisetum californicum Vasey, 1893.
Texas.

7. **Sphenopholis Hallii** Scribn. n. comb.
Trisetum Hallii Scribn. 1884.
Texas.

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SOME MAINE RUBI. THE BLACKBERRIES OF THE KENNEBUNKS AND WELLS.—I.

W. H. BLANCHARD.

IN this and in papers to follow are given the results of a careful and persistent study of the blackberries of Kunnebunk, Kennebunkport and Wells, three adjoining sea-coast towns in Southwestern Maine, well-known summer resorts. The time given to this study was two weeks in August, 1904, and all the time from June 24 till Sept. 10, 1905, except one week in August spent in Connecticut. Kennebunk village was headquarters, and the steam and electric railroads made it comparatively easy to reach all parts of the section.

Much of the soil is sandy with outcropping rocks. Woods predominate made impenetrable by hospitable mosquitoes, while the highways are made dangerous by inhospitable automobilists. Many White Mountain and high northern plants such as *Aster radula*, Ait., are common, while no such plants as the Black Raspberry, Desmodiums or Lespedezas appear. A few miles north the normal flora of this latitude begins to be seen.

But five of the blackberries of Vermont and Connecticut were found: *Rubus Allegheniensis*, Porter (*R. nigrobaccus*, Bailey and *R. villosus*, of Gray's Manual) the common high blackberry of the north-east which is often very poor here; *R. recurvans*, Blanchard here perfectly at home; *R. procumbens*, Muhl. (*R. canadensis* of Gray's Manual); and innumerable forms of *R. hispidus*, L. and *R. setosus*, Bigelow (*R. nigricans*, Ryd.). The edible forms of blackberries except in