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THE BINOMIALS OF HELENIUM IN WALTER'S FLORA CAROLINIANA

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IN the course of a recent revision (unpublished) of the decurrent-leaved species of the genus *Helenium* L., it became necessary to critically evaluate the binomials used by Thomas Walter in the genus for his *Flora Caroliniana* (1788). The general importance of the *Flora Caroliniana* in North American taxonomy and particularly in that of the southeastern United States has been noted by Blake (1915), Maxon (1936) and more recently by Totten (1956). The significance of Walter's treatment of the genus *Helenium* lies in the fact that he created three new binomials within the genus. The identity of these binomials has long been intriguing, the more so in that they ostensibly did not apply to the even then highly segregated species, *Helenium autumnale* L.

In evaluating these binomials there are two direct sources of evidence and data. The first of these, the descriptions provided in the *Flora Caroliniana*, is unfortunately rather meagre, the descriptions being quite short. Therefore, for clarity of exposition and ease of reference, the text of Walter's treatment is reproduced below. The second of these sources is Walter's herbarium, which is preserved at the British Museum of Natural History. Inasmuch as John Fraser carried Walter's personal herbarium to England at the same time as he did the manuscript of *Flora Caroliniana*, it can be presumed that one was to serve as a supplement to the other. Nevertheless, it seems that the specimens of Walter's herbarium have either been

ignored or else overlooked in previous evaluations of the binomials. To these two sources can be added the modern knowledge of the Southeastern flora and these provide the basis for the interpretation and disposition presented herein.

327. HELENIUM. *Receptaculum* disci nudum, radii paleaceum. *Pappus* margo 8-partitus. *Calyx* simplex multipartitus. *Corollulae* radii 3 4 vefidae *discus* semiglobosus.
- vernale* 1. foliis oblongis alternis integris, floribus solitariis terminalibus luteis, petalis radii (24) trifidis.
- aestivale* 2. foliis oblongis integris, flosculis radii sex luteis quadrifidis, disco purpureo, pappo subsetaceo.
- serotinum* 3. foliis serratis sessilibus caule laevi, floribus luteis, corollulis radii duodecim.
- autumnale* 4. foliis serratis decurrentibus, caule ramoso alato, flosculis radii 12 luteis, disco purpureo aliquando geminato.

The description of *Helenium vernale* sensu Walt. can be applied to two of the vernal species of *Helenium* found in the Southeastern Coastal Plain, *Helenium Nuttallii* A. Gray and *Helenium pinnatifidum* (Nutt.) Rydb. The description fits either one equally well, with the exception of the adjective "integris." The entire-margined condition of the leaves is more characteristic of *H. Nuttallii* than it is of *H. pinnatifidum*. Nevertheless, *H. pinnatifidum* very often occurs with entire-margined basal leaves, particularly so in the Florida-Georgia area of its distribution. Over the course of the years, however, *H. vernale* Walt. has been interpreted as applying to the same taxon as *H. pinnatifidum* (Nutt.) Rydb.

Morphologically, *Helenium pinnatifidum* is characterized by having pubescent achenes, peduncles and involucre bases that are pubescent, mid-cauline leaves that are only shortly decurrent (4 mm. or less) along the stem and by radical leaves that are usually pinnatifid in outline and not with petioloid bases. The distribution of *H. pinnatifidum* is in the outer portions of the Coastal Plain, more so than *H. Nuttallii*, and extending farther southeastward into peninsular Florida and northeastward into southeastern North Carolina. However, a simple check of the specimen (Fig. A) in the Walter Herbarium that most closely fits his description¹ reveals that the achenes are glabrous and

¹ Morphological data provided by Mr. W. T. Stearn of the British Museum of Natural History.

that the peduncle is glabrous as well. These characters are diagnostic of *H. Nuttallii* and the author is convinced that if the midcauline leaves were present on the specimen they would be conspicuously decurrent and that the radical leaves would be more entire rather than pinnatifid and would have petioloid bases. In addition, *H. Nuttallii* has a distribution that is more toward the inner portion of the Coastal Plain than *H. pinnatifidum* and is the only species of the two in question that occurs with regularity in Berkeley County, South Carolina. Moreover, the pappus scales of the Walter specimen correspond more closely to the stereotype of the pappus scales of *H. Nuttallii* than they do to that of *H. pinnatifidum*. Regrettably, the variable nature of the pappus scales in both taxa is such that there is a degree of overlapping and intergradation in the size and shape of the scales to the extent that the pappus scale characteristics are not as differential criteria as those presented above.

In the course of time, then, the binomial *Helenium vernale* has come to be misapplied to the taxon which was rightfully named *H. pinnatifidum* (Nutt.) Rydb., while the name *H. Nuttallii* A. Gray, which now becomes a synonym, has usurped the rightful position of *H. vernale* sensu Walt. The importance of the specimen in the Walter Herbarium and its preservation cannot be overstressed in relation to the binomial, for were it not for the specimen, the binomial would have to be declared a *nomen dubium* inasmuch as neither the epithet nor the brief description are sufficient to resolve the problem of its correct application.

It is the author's considered opinion that the binomials *Helenium aestivale* Walt. and *Helenium serotinum* Walt., long held as *nomina dubia*, do not have application to any of the species of *Helenium*, and most particularly not to any of those species encountered in the flora of the Southeastern United States. It is my belief that these two binomials apply instead to the genus *Gaillardia*, and that Walter made no distinction between the genus *Helenium* L. and the genus *Gaillardia* Fougx. (1787).² This is not so surprising, for Walter classified his

² Walter was probably not aware of Fougereux's paper, due in part to the time lapse in communication between Europe and North America and in part to the obscurity of the original publication in relation to botany.

H. vernale along with the other species of *Helenium* in the *Flora* under the class *Syngenesia Polygamia Superflua*, even though by virtue of the neutral and sterile ray florets it patently belongs to the class *Syngenesia Frustraria*. Indeed, according to the interpretation presented herein, all the binomials of Walter in the genus *Helenium*, whether they be truly members of *Helenium* or *Gaillardia*, would be classified as pertaining to the *Syngenesia Frustraria* for both the vernal species of *Helenium* and the species of *Gaillardia* are characterized by neutral and sterile ray florets.

The three remaining specimens in the Walter Herbarium labeled *Helenium* are in fact specimens of *Gaillardia* Fougx. These specimens belong to the Section *HOLLANDIA* Biddulph (1944) of the genus *Gaillardia*. This section of the genus is based on the characters listed below:

1. Receptacle with small dentiform setae;
2. Style branches long and hispidulous;
3. Lobes of the disk corollas caudate-acuminate.

It is to be noted that the setiferous character of the receptacle usually associated with *Gaillardia* as a diagnostic generic character becomes less than distinctive within this section, especially in relation to the character of the receptacle in *Helenium*. In fact and in practice, no real distinction can be made between the genus *Helenium* and the section *HOLLANDIA* (*Gaillardia*) solely on the basis of the receptacular surface and its projections. Of these three *Gaillardia* specimens, two belong to the species *Gaillardia lanceolata* Michx. while the remaining one would be referred to *G. lutea* Greene according to present usage. Whether these specimens were collected in Berkeley County, South Carolina or not, is a moot question. Most likely they were collected to the southeast or southwest of Walter's area and probably by John Fraser who traveled in both South Carolina and Georgia (fide Maxon). Biddulph records *G. lanceolata* from Aiken County, South Carolina³ as well as from Georgia, Florida and thence westward into Texas. East of the Mississippi River, she records *G. lutea* from Baldwin County, Alabama and Brevard County, Florida.

³ Specimens of *G. lanceolata* are on deposit in the Duke University Herbarium from Sumpter Co., S. C. and Columbus Co., N. C.

The description of *Helenium aestivale* Walt. can certainly be applied to *Gaillardia lanceolata* Michx. The characters of oblong, entire leaves; few yellow rays; purple disk; and sub-setaceous (long-awned) pappus have no real meaning in relation to any species of *Helenium* that occurs in the Southeastern United States but do apply to *G. lanceolata*. In the same manner, if *Helenium serotinum* Walt. is equated with *G. lutea* Greene, then the description provided by Walter agrees with the particulars that Biddulph gives for that taxon.

The author is aware of the dangers and fallacies that can arise in interpreting descriptions in terms of specimens and *vice versa* but if the binomial *Helenium vernale* Walt. is to be maintained then *H. aestivale* Walt. and *H. serotinum* Walt. should also be maintained, for certainly the latter two binomials are no more dubious than the former. In view of the priority of the epithets of Walter over those of later authors and according to Article 65 of the *International Rules of Botanical Nomenclature* (7th ed.), which states that prior epithets must be reinstated, there being no obstacle to their reinstatement, the following new combinations are proposed:

Gaillardia aestivale (Walt.) H. Rock, comb. nov.⁴

Helenium aestivale Walt. Fl. Carol. 210. 1788.

Gaillardia lanceolata Michx. Fl. Bor.-Am. 2: 142. 1803.

Gaillardia serotinum (Walt.) H. Rock, comb. nov.⁵

Helenium serotinum Walt. Fl. Carol. 210. 1788.

Gaillardia lutea Greene Pittonia 5: 57. 1902.

The remaining binomial used by Walter in the *Flora* is *Helenium autumnale* sensu Walt. (non Linnaeus). This binomial is not represented by a specimen in the Walter Herbarium. However, from the description and from the epithet, it is evident that what Walter considered to be *Helenium autumnale* L. is *Helenium flexuosum* Raf. (*H. nudiflorum* Nutt.) The decisive factor in this interpretation is the phrase "disco purpureo", one of the most obvious characters that serves to distinguish *H. flexuosum* from *H. autumnale*. However, in the light of the widely variable and descriptive polynomial synonymy

⁴ Lectotype: *Helenium aestivale* Walt., specimen No. 235, Walter Herbarium (BM), (Fig. C).

⁵ Lectotype: *Helenium serotinum* Walt., specimen No. 243, Walter Herbarium (BM), (Fig. D).

listed under *H. autumnale* by Linnaeus (1753), Walter's inclusion of the later defined *H. flexuosum* with *H. autumnale* is indeed warranted. Even though *H. flexuosum* is classified on technical characters along with the vernal-flowering species of *Helenium* (*Leptopoda* Nutt.), its actual flowering period in Walter's area ranges from mid-June through late October. It is the author's personal experience that *H. flexuosum* is one of the conspicuous and most abundant composites in the immediate vicinity of Walter's grave and former garden and of that area of South Carolina in general.

An alternate possibility is that *Helenium autumnale* sensu Walt. is the same as *H. brevifolium* (Nutt.) Wood. However, *H. brevifolium* is distinctly vernal in its flowering habit and while rather endemic in the nature of its distribution northward of the Gulf Coastal Plain, it is unreported from South Carolina. Moreover, the small number of ray florets cited by Walter would rule against *H. brevifolium* as a possibility, for in that taxon the number of ray florets is usually well in excess of twenty rays.

Even though Walter's descriptions are short and concise, the pattern of the phrasing and the order of arrangement of the species appears to have a significance that exceeds that of just mere description. If one allows some liberality in translation and a slight amount of change in the sequence of the phrases, but maintaining the order of the species, the following key can be constructed solely on the basis of the descriptive material provided by Walter.

1. Leaves entire and oblong
 2. Ray florets 24 in number, trifid; heads solitary, terminal and yellow; leaves alternate.....*Helenium vernale*.
 2. Ray florets 6 in number, 4-fid; disk purple; pappus sub-setaceous (long-awned).....*Helenium aestivale*.
1. Leaves serrate
 3. Leaves sessile (not decurrent); stem smooth (not winged); heads yellow; ray florets 12 in number.....*Helenium serotinum*.
 3. Leaves decurrent; stem winged and branched; disk purple; ray florets yellow and 12 in number...*Helenium autumnale*.

It is just such an analytical device that perhaps contains the answer to the contention raised by Dr. Baldwin in a letter⁶ to Stephan Elliott:

⁶ An undated letter from Dr. Baldwin of Georgia to Stephan Elliott of Charleston, South Carolina. The letter is now mounted with the lectotype of *Leptopoda puberula*

That the first mentioned species of *Galardia* is the *Helenium vernale* of Walter I contend—Walter would scarcely have omitted the fol. [iis] decurrent. [ibus] It is probable that he was ignorant of the species with decurrent leaves. . . .

From the schema above it can be seen that the decurrent-leaved condition has no bearing on the relation of *Helenium vernale* to the other three species of Walter's *Flora*. Rather, the question of whether the leaves are decurrent or not is raised only in effecting a decision between *Helenium serotinum* and *Helenium autumnale*. The fact that Walter did not state that *Helenium vernale* has decurrent leaves cannot be taken to infer that the leaves are non-decurrent, for by the same token, neither did he state that the leaves are sessile as he explicitly does for *Helenium serotinum*. Therefore, in view of the pattern and the phraseology of Walter's descriptions, it seems reasonable to assume that Walter intended the descriptive material to be diagnostic as well, even though he did not adopt a key-like format, an innovation which apparently originated in the same year (1788), with the publication of Lamarck's *Flore Française*.—
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MacBride in Ell. contained in the Elliott Herbarium of the Charleston Museum. In the above quotation, the *Galardia* referred to is *Galardia fimbriata* Michx., a *nomen rejiciendum*, which is synonymous in part with *Helenium pinnatifidum* (Nutt.) Rydb.



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