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New Mexico *Solidagos*: A Preliminary Look at a Difficult Problem, with a Tentative Key

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Introduction

Solidago in the Southern Rockies is beset with influences from the Great Plains, Mexico, and the Northern Rockies. However, within New Mexico, special and isolated environments may separate some of its variants from these other areas. Because most of its taxonomy comes from these other states and regions, published keys and articles may not take into account the unique variations within our state. These can best be understood as a nearly continuous variation of species radiating from central hubs or complexes. The distinctions are often very fine, which has led to many misidentifications. In studying all the *Solidago* in the herbaria at UNM, COLO, and Randall Davey Audubon Society, I have become convinced that careful attention to phyllary shape and orientation can be of great assistance in identifying the species. Below I will define three species complexes and make a preliminary attempt to describe characteristics which separate the species contained therein. Finally I will present a key to *Solidago* that incorporates these observations. This genus in New Mexico may have some distinct varieties not present elsewhere. I hope this treatment will provide a basis for a more general study of these interesting taxonomic problems.

Complexes

In New Mexico, variation in *Solidago* centers around three hubs or complexes which I denote by the species that seem to be central to each. It is gratifying that, after I had separated *Solidago* into these three complexes, I found that Guy Nesom (1993) had recognized nearly the same groups, and so I will note his terms for them as well as mine. (For brevity, only species epithets will be used when it is clear the discussion is about *Solidago*.)

1. *Simplex* Complex

Species included: *simplex, speciosa, multiradiata,* and *missouriensis*; included in section *Solidago* subsection *Solidago* by Nesom (1993), except for *missouriensis*, which he placed in section *Unilaterales* subsection *Junceae*.

Here the gradation runs from *speciosa* var. *pallida* to *simplex* var. *simplex*, then forks in two directions to *simplex* var. *nana* and to *multiradiata*. I include *missouriensis* in this complex, as it is difficult to separate from *multiradiata* if its inflorescence is not secund, although *multiradiata*'s relatively larger phyllaries and ray flowers might suffice.

2. *Velutina* Complex

Species included: *mollis*, *nana*, *nemoralis*, and *velutina* (including *sparsiflora*); included in section *Solidago* subsection *Nemorales* by Nesom (1993).

Here the gradation is less a continuous line and more a variation among individuals. All four were lumped together in *velutina* by Nesom (1989a), with an interesting discussion worth reading, but later treated as distinct (Nesom 1993). Certainly, they are difficult to separate, but I believe the attempt is at least instructive, and may serve to delineate some variations unique to New Mexico. In several ways this is the most interesting and challenging complex in New Mexico.

Geography plays a role in identification in this complex. As one goes east towards the Great Plains, the variation tends toward *mollis* and *nemoralis*. As one moves north to lower elevations (below 7,000 ft.) the connection is to *nana*. Phyllary shape is also important. If we require that *velutina*'s phyllaries be acute/acuminate, as most manuals do, New Mexico material of *velutina* seems to have two additional expressions (see III. *Velutina* Phyllary Types, below). One may correspond to Wooton and Standley's (1915) more northerly *howelii*, and the other may represent an undescribed taxon. Also, I note that the Jemez Mountains seem to have a Great Plains signature with representation of both *speciosa* and *nemoralis*. Separation of the species in the *velutina* complex (especially *mollis*) is difficult and a special treatment appears below in addition to the key.

3. *Canadensis* Complex

Species included: *altissima*, *canadensis*, and *gigantea*; included in section *Unilaterales* subsection *Triplinerviae* by Nesom (1993).

The *Canadensis* Complex shows great variability and intergrading features (see Nesom 1989c), making species recognition difficult. For example, small specimens of *canadensis* (often with very narrow cauline leaves) and large specimens of *velutina* (in the *velutina* complex) are more often confused than heretofore recognized (Taylor & Taylor 1984), and occasionally mixed characters appear on the same specimen (collections I made around the town of Mogollon are particularly perplexing, exhibiting well defined characteristics of both species).

Phyllaries, a great aid in Solidago identification

Features traditionally used to distinguish the species in *Solidago* are panicle type (open panicle with secund branches versus thyrse), stem and leaf pubescence, and leaf venation (1 or 3 prominent veins). Lamentably, all of these characters seem to have their exceptions. I strongly suggest the use of phyllaries as reliable indicators or at least tie breakers.

Shape, surface nature, and degree of imbrication of the phyllaries are potentially robust indicators for distinguishing the various species and varieties. For example, phyllaries of *canadensis* differ so much from those of the *velutina* complex that, except in very rare cases, it is dead simple to separate the two even when other indicators are ambiguous. In nearly all cases there are additional features that correlate with phyllary characteristics so as to corroborate the identification. My point is that closer attention to phyllary characteristics is a powerful aid in taxonomy of New Mexico *Solidago* and perhaps elsewhere.

Within the *Velutina* Complex the phyllary characteristics are even more significant and nearly always definitive. For example, the rounded, pale, and half-cylindrical shape of phyllaries of *nemoralis* sets it off from the rest of the complex (excepting *nana* which is nearly identical to *nemoralis* but for its compact thyrse-like inflorescence). When this characteristic is combined with other characteristics (basal leaves present at flowering and one-nerved leaves) it helps establish a strong argument that *nemoralis* is one of the dominant *Solidago* in the Jemez Mountains around Los Alamos, where these specimens had heretofore

been lumped with velutina. In addition, phyllaries segregate *velutina* itself into two (and perhaps three) varieties. Finally separation of *velutina* from *mollis* and *nana* is aided by examination of the phyllaries.

Within the *Canadensis* Complex phyllaries allow separation from hirsute specimens of *gigantea*, which in turn can be separated from *missouriensis* when sizes overlap. And the glutinous covering on phyllaries of *simplex* (when present) easily separates it from all species but it taller cousin, *speciosa*.

The following table summarizes phyllary characteristics.

Summary of Phyllary Characteristics (grouped by complex)				
Complex	Species	Shape	Imbrication	Surface
simplex complex	*simplex*	rounded, inner acute	3-4 ranks	usually glutinous
	speciosa	rounded, inner bluntly acute	3-4 ranks	sometimes glutinous
	multiradiata	long acuminate to acute	2-3 ranks	papery, ciliate margins
	missouriensis	rounded	3 ranks	similar to velutina #3, but thicker
canadensis complex	*canadensis*	narrowly acuminate	4-5 ranks	glandular
	altissima	usually acute	4-5 ranks	glandular
	gigantea	acute to long attenuate	1-2 ranks	glandular
velutina complex	*velutina* #1	rounded, innermost bluntly acute	3-4 ranks	some glandular tips
	velutina #2	acute & broadly attenuate	4-5 ranks	some glandular tips
	velutina #3	parallel with bluntly acute tips	3-4 ranks	hardly glandular tips
	mollis	similar to velutina #3, middle one broad	2-3 ranks	similar to velutina #3
	nemoralis	rounded	3-4 ranks	glabrous, lower half pale, middle often revolute
	nana	rounded to bluntly acute	4 ranks	usually like nemoralis

Velutina **Phyllary Types**

This species seems to have three distinct phyllary types, which I have named types 1, 2, and 3.

Type 1

Phyllaries rounded excepting at times innermost bluntly acute. These are not common but deserve study. Could these be *howelii*?

Type 2

Phyllaries all broadly attenuate-acute. This is perhaps the standard *velutina*. Most manuals indicate that *sparsiflora* (now included in *velutina*) has this type of phyllary.

Type 3

Phyllaries parallel and ending in a blunt point. Among the specimens at UNM this is the most common type--twice as common as type 2. UNM specimens of *mollis* exhibit this type. (COLO specimens of *mollis* do not, instead being thin and acute, more like type #2.)

It would be well to find out if these types occur out of state, but in New Mexico we may indeed have a distinct variety in type 3. Complicating this, is the additional problem that a few plants are mixed type 2/3 or 1/3, but these are exceptions to a rather well-defined set.

Additional characteristics. Specimens with type 2 phyllaries have leaves that are normally slightly narrower (4-6 times longer than wide) than those with type 3 (3-5 times longer than wide). Separation on the basis of leaf pubescence is less reliable since this varies from nearly glabrous to villous (when villous, it is well to be sure specimen is not *mollis* or *nemoralis*, which are generally much more hirsute). Note also that nearly all *velutina* cauline leaves are at least sparsely glandular, which further complicates separation from *canadensis*.

Identification within the *Velutina* Complex

The following is an attempt at a separation of the species based on my observations and the literature. Despite variations, out of all this comes a distillate that seems workable, with the proviso that there will always be the exceptional deviant.

The four species can be completely divided by presence of creeping rhizomes and by infloresence type.

	Open panicle with secund, recurved branches	Thyrse, with few, if any, secund branches
Creeping rhizomes	*velutina*	*mollis*
Caudex or short rhizome	*nemoralis*	*nana*

In addition, leaf features may help distinguish the species:

Basal leaves early deciduous, 3-nerved: *velutina* and *mollis.*

Basal leaves present at flowering time, 1-nerved: *nemoralis* and *nana.*

Specimens of *nemoralis* and *nana* from Colorado (at COLO) are nearly identical, differing only in inflorescence type, but being essentially identical in all other features. In New Mexico this may also be true (it seems to be so for the few specimens in my collection), but further study needs to be done. Interestingly, C. Taylor (pers. commun.) says she has seen few, if any, *nemoralis* in Colorado or New Mexico.

The biggest problem in New Mexico *Solidago* is identifying *mollis*. In fact, New Mexico specimens referrable to *mollis* may represent a distinct variation, differing from those occuring in Colorado in having type #3 phyllaries (rather than type #2) and smaller, narrower cauline leaves.

Generic Changes

Several species formerly in *Solidago* have been moved to more appropriate genera (see References):

Solidago graminea (Woot. & Standl.) Blake = Petradoria pumila (Nutt.) Greene subsp. graminea (Woot. & Standl.) L.C. Anderson

Solidago occidentalis (Nutt.) Torr. & Gray = Euthamia occidentalis Nutt.

Solidago parryi (Gray) Greene = Oreochrysum parryi (Gray) Rydb.

Solidago petradoria Blake = Petradoria pumila (Nutt.) Greene subsp. pumila

Solidago rigida L. = Oligoneuron rigidum (L.) T.C. Porter

Tentative Key to *Solidago* in New Mexico

This key is designed as a guide to identification of *Solidago* in New Mexico. Thus, it omits several species from surrounding states and concentrates on some interesting variations that seem to occur only in New Mexico. Most *Solidago* keys begin by separating species by differences in shapes of the infloresence. While this is an important distinction in the evolutionary history of *Solidago*, I find it both confusing and often ambiguous (differing in young vs. mature plants), and so I have chosen to begin the key based on pubescence features. This characteristic is much easier for the observer to determine (although there are always odd cases), and follows the separation into complexes described above. This key is definitely "work in progress," and I would appreciate any comments on its accuracy, inadequacies, incisive modifications, etc.

1 Stems glabrous or nearly so

2 Flower heads secund or usually so

3 Plants short (<40 cm); basal lvs present at flowering time; cauline leaves few, narrowly oblanceolate, usually entire ... ***S. missouriensis*** (with three weak varieties; needs further study)

3 Plants tall (to >1 m); basal lvs absent at flowering time; cauline lvs abundant and large, lanceolate, usually dentate ... ***S. gigantea***

2 Flower heads not secund

4 Achenes glabrous ... ***S. speciosa*** var. ***pallida***

4 Achenes hirsute

5 Creeping rhizomes present ... ***S. missouriensis***

5 Creeping rhizomes absent

6 Basal leaf petioles with ciliate margins; heads and ray flowers 13 in number ... ***S. multiradiata***

6 Basal leaf petioles without ciliate margins; ray flowers 8 in number ... ***S. simplex***

7 Plants tall (15-60 cm), occuring below 12,000 ft ... var. ***simplex***

7 Plants short (about 15 cm), occurring above 11,000 ft ... var. ***nana***

1 Stems hirsute

8 Inflorescence thyrse-like, flower heads not secund (some specimens of *mollis* slightly secund)

9 Leaves 1-nerved; middle to upper cauline leaves elliptical to ovate ... ***S. wrightii***

10 Foliage and stems scabrous pubescent with stipitate glands ... var. ***adenophora***

10 Foliage and stems lacking stipitate glands ... var. ***wrightii***

9 Leaves 3-nerved (*mollis* weakly so); middle to upper cauline leaves oblanceolate to linear

11 Basal leaves absent at flowering time; cauline leaves broad, some dentate; creeping rhizomes present; middle phyllaries broadly acute, in about 3 ranks; inflorescence a compact thyrse with occasional lower branches recurved with secund flowers ... ***S. mollis***

11 Basal leaves present at flowering time; cauline leaves not much reduced, similar to basal leaves; caudex or short rhizome developed, creeping rhizome absent; phyllaries rounded, in 4 ranks, inflorescence a loose thyrse, flowers not secund ... ***S. nana***

8 Inflorescence a panicle, the flower heads secund

12 Leaves 1-nerved; basal leaves on long petioles and present at flowering time; phyllaries rounded, usually pale ... ***S. nemoralis***

12 Leaves 3-nerved; basal leaves absent at flowering time; phyllaries various, but not pale

13 Cauline leaves obviously reduced upwards, not noticeably crowded, entire to minutely dentate, oblanceolate becoming linear ... ***S. velutina*** (*S. mollis* with slightly secund branches may occur here)

13 Cauline leaves uniform in size, crowded, often obviously dentate, lanceolate

14 Stems below inflorescence glabrous; phyllaries acute, in 1-2 ranks ... ***S. gigantea***

14 Stems below inflorescence hirsute; phyllaries very long and attenuate, in 4-5 ranks

15 Heads 3-5 mm high ... ***S. altissima***

15 Heads 2-3 mm high ... ***S. canadensis*** (with two weak varieties; needs further study)

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Solidago altissima L.

Solidago arizonica (Gray) Woot. & Standl.

Solidago canadensis L. var. *arizonica* Gray

Solidago canadensis L. var. ***canadensis***

Solidago canadensis L. var. ***gilvocanescens*** Rydb.

Solidago gilvocanescens (Rydb.) Smith

Solidago gigantea Ait.

Solidago gigantea Ait. var. *leiophylla* Fern.

Solidago pitcheri Nutt.

Solidago missouriensis Nutt. var. ***fasciculata*** Holz.

Solidago glaberrima Martens

Solidago missouriensis Nutt. var. ***missouriensis***

Solidago marshallii Rothr.

Solidago missouriensis Nutt. var. ***tenuissima*** (Woot. & Standl.) C. & J. Taylor

Solidago tenuissima Woot. & Standl.

Solidago mollis Bartl.

Solidago multiradiata Ait.

Solidago ciliosa Greene

Solidago scopulorum (Gray) A. Nels.

Solidago nana Nutt.

Solidago nemoralis Ait. var. ***decemflora*** (DC.) Fern.

Solidago decemflora DC.

Solidago simplex Kunth var. ***nana*** (Gray) Ringius

Solidago spathulata DC. var. *nana* (Gray) Cronq.

Solidago decumbens Greene

Solidago simplex Kunth var. ***simplex***

Solidago aureola Greene

Solidago decumbens Greene var. *oreophila* (Rydb.) Fern.

Solidago glutinosa Nutt.

Solidago neomexicana Gray

Solidago oreophila Rydb

Solidago spathulata DC. subsp. *glutinosa* (Nutt.) Keck.

Solidago spathulata DC. var. *neomexicana* (Gray) Cronq.

Solidago speciosa Nutt. var. ***pallida*** Porter

Solidago velutina DC.

Solidago howellii Woot. & Standl.

Solidago sparsiflora Gray

Solidago trinervata Greene

Solidago wrightii Gray var. ***adenophora*** Blake

Solidago wrightii Gray var. ***wrightii***

Solidago bigelovii Gray

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Penstemon pulchellus Lindl. [= P. campanulatus (Cav.) Willd.]: A Specious Member of New Mexico's Flora

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***P**enstemon campanulatus* (Cav.) Willd. (Scrophulariaceae) is a Mexican species that ranges from the mountains bordering the northern plateau southeastward to the Trans-Volcanic region (Straw 1963). The only record attributed to the U.S. is based on two collections made by Edgar A. Mearns, while he was with the U.S.-Mexico boundary survey of 1892-1894 (Mearns 1907). These specimens (nos. 2112 and 2222) were collected on 5 and 11 September 1893 in the San Luis Mountains (Warren L. Wagner pers. comm.), a primarily Sonoran and Chihuahuan range with a minor extension into New Mexico. These supposed U.S. occurrences were first reported by Wooton and Standley (1915), who referred them to *P. pulchellus* Lindl.--which Straw (op. cit.) considers a synonym of the nominate subspecies of *P. campanulatus*. Although Nisbet and Jackson (1960) followed Wooton and Standley in attributing these specimens to New Mexico, they went on to state that the existence [of this taxon in the state] is very doubtful. They also questioned the validity of *P. pulchellus* as a species, pointing out its close resemblance to *P. campanulatus* of central Mexico. Straw (op.cit.) went further, first in assigning Mearns 2222 to *P. campanulatus* ssp. *chihuahuensis* Straw, and then in attributing it to Chihuahua rather than New Mexico. However, he provided no explanation for the latter, nor did he make any mention of Mearns's other 1893 collection (no. 2112). Presumably as a consequence, several recent works have continued to list *P. campanulatus* (or "*pulchellus"*) as a member of the floras of New Mexico (e.g., Martin and Hutchins 1981, Roalson and Allred 1995) and the U.S. (e.g., Kartesz 1998). Nonetheless, the available evidence supports the positions of Nisbet and Jackson (op. cit.) and Straw (op. cit.), notably in showing that both Mearns's *P. campanulatus* specimens almost certainly came from Mexico. Given this and the absence of any other known U.S. collection(s) of this taxon, I recommend that it be removed forthwith as a member of the floras of New Mexico and the U.S.

Thanks to W.L. Wagner (pers. comm.) of the U.S. National Herbarium (US), I was able to obtain the following details about these two Mearns's specimens of *P. campanulatus* ssp. *chihuahuensis*: no. 2112 (US 232994), base of San Luis Mts. up to 6000 ft., Sept. 5, 1893; no. 2222 (US 233447), cañon [on the] east side San Luis Mts., Sept. 11, 1893. Note that neither specimen has a state or country of origin, although Dr. Wagner informs me that 2112 was filed in the collection in a U.S./Canada folder and 2222 in a Mexican one. Unfortunately, this lack of geographic specificity typifies many plants and animals collected by Mearns et al. in the San Luis Mountains and vicinity, in contrast with material obtained elsewhere during the 1892-1894 boundary survey. For example, state and country are lacking for most bird specimens I have examined from that range, as well the majority of mammals cited in the only biological report published from the survey (Mearns 1907). I have no idea why material from this particular area so consistently lacks state/country of origin. However, it could simply result from an oversight that Mearns did not notice and obviously never corrected. For certain, I cannot believe that country of origin was omitted because of confusion about the boundary=s location, given the presence of surveyors and markers along the survey route. The same would have been true in locating New Mexico=s borders, although admittedly some confusion may have existed (and persisted) concerning the boundary between Chihuahua and Sonora.

In attempting to determine the country/state of origin of these two Penstemon campanulatus specimens, two potential sources of information come to mind. One is Mearns's field notes for his botanical collections, which Dr. Wagner (pers. comm.) has consulted for me and finds inferior in detail to the following. The second is the afore-mentioned report published by Mearns (1907), which besides a treatise on mammals contains detailed information on itineraries, descriptions of sites, and the biological activities of that boundary survey. Although neither of Mearns's specimens is mentioned, this report does detail collecting activities for the dates on which this material was taken. Starting with specimen no. 2222, Mearns (op.cit.:15, 88-90, and 143-144) indicated that his party began the day it was collected (September 11, 1893) at White Water (Station 16). This was a camp located on an arroyo (probably El Desaije) about one mile south of Monument 61 in Chihuahua. On that morning, the party rode to San Francisco Canyon (Station 18) on the east side of the San Luis Mountains, about 10 miles south of the boundary. In fact, the latter is doubtlessly the diagonal (and horseback) distance to this canyon, for Mearns also said the site was five miles southwest of Monument 63. There is indeed a San Francisco Canyon on the east side of the San Luis Mountains of Chihuahua, with its western branches lying five to seven miles due south of the boundary. However, this is a rather minor drainage, and it does not penetrate deeply or reach the higher elevations of these mountains. Given this, I suspect that Mearns and his party were actually in a drainage about a mile to the north, namely Cañón del Oso. Not only is this longer and deeper than San Francisco Canyon, but it clearly heads in the type of forested habitat (e.g., stands of Arizona cypress, *Cupressus arizonica* Green) mentioned by Mearns--and would more likely have contained the stream of water described. Whatever the case, Mearns indicated that "valuable collections were made here, as many of the species obtained belong to the Mexican fauna and flora, only crossing the United States line at a few points." After working its way up the canyon to "the high peaks" of the range (to ca. 7500 feet), the party apparently returned to camp lower down the drainage (or they might have returned to White Water). Either way, Mearns and the others remained in Chihuahua all day on September 11, 1893, meaning that specimen no. 2222 was indeed taken in that state--doubtlessly in the San Luis Mountains (as surmised by Straw 1963)--and quite likely in Cañón del Oso rather than San Francisco Canyon.

As for specimen no. 2112, it was collected on September 5, 1893--which was within a period (the first through ninth of that month) in which Mearns (op.cit.: 15, 89-93, and 144) and his party were camped at Lang's Ranch (or San Luis Spring), elevation 5174 feet, in the Animas Valley (Station no. 20). This site is located in extreme southern Hidalgo County, New Mexico, just north of the Mexican border and yards north of the present settlement of El Valle, Chihuahua. From this camp, Mearns and others explored nearby areas, including what he termed the "west [= northern, apparently mainly west and north of the Continental Divide] slope from the base to the summit" of the San Luis Mountains. Concerning the latter area, Mearns (op.cit.:90) went on to write that "a camp at the spring in Turkey Canyon, at a corresponding altitude [to upper "San Francisco" Canyon (= Cañón el Oso?) in the cypress zone] on the west side, [was a center] of collecting activity for several weeks [in 1892-1893]. A few lines later he indicated that he "made collections in the [San Luis] Mountains on...August 31 and September 1, 4, 5, 6, and 7, 1893, west side from base to summit, in the vicinity of Turkey Canyon." Based on these comments, it is clear that Mearns collected specimens in Turkey Canyon when his no. 2112 of *P. campanulatus* was taken (September 5, 1893). Furthermore, his plant list shows the site supported the type of habitats that would have favored this species, including the Arizona cypress and bigtooth maple (*Acer grandidentatum* Nutt.). Under the circumstances, I believe this specimen was indeed collected in that canyon, which almost certainly is what is now known as Cañón del Diablo. If this assessment is correct, then specimen no. 2112 was taken in Chihuahua at a point some three to five miles due south of the U.S. boundary.

Based on these reconstructions, both Mearns's specimens (nos. 2112 and 2222) of *Penstemon campanulatus* ssp. *chihuahuensis* were taken in Chihuahua, and therefore this taxon should be removed from the floras of the U.S. and New Mexico. If this recommendation is accepted, it will correct an error dating from the time of Wooton and Standley (1915). If not, then presumably proponents of a New Mexico origin of the material will marshal evidence contradicting the reconstruction presented here. In my opinion, not to be construed as such "evidence" would be Wooton and Standley's decision considering these as U.S. specimens in the first place. This is because that decision was seemingly arbitrary and subjective, rather than based on close study of factors such as specimen data, Mearns's itinerary, and the habitat requirements of the plant. In fact, the same flawed approach probably attended their review of other Mearns's specimens

from the San Luis Mountains, with another likely error being attribution of *Eriogonum atrorubens* Engelm. to the U.S. flora (W. Hess pers. comm.). Furthermore, the misrepresentation of Mearns's records from there did not end with Wooton and Standley or plants, as is evident with some of the birds reported in Bailey (1928). Among the latter are three specimens of the blue-throated hummingbird, *Lampornis clemenciae* (Lesson), said to be from the Lang Ranch, July 11-12, 1892 (op.cit.:371). However, the labels state these came from the west side of the San Luis Mountains, where Mearns (1907:90) indicated a collecting camp was maintained in Turkey Canyon by his assistant Francis X. Holzner on July 11-23, 1892--exactly where this montane species would be expected. To return to *P. campanulatus*, just because Mearns did not collect it in New Mexico does not mean that it will not be found there some day. This would most likely occur during wet years, in which high seed production to the south and improved growing conditions everywhere might favor the species's northward expansion. Perhaps the New Mexico area with the highest potential for this would be the upper parts of Lang, Whitewater, or other canyons in the northernmost spur of the San Luis Mountains. In fact, a specimen has been collected in the Chihuahuan portion of this spur, about a mile south of the international boundary. This is NMC 53383, taken by Richard Spellenberg and Rob Soreng on October 10, 1982, just south of Highway 2 in an east-draining canyon [= Cañón de San Luis]. However, that site is still undeniably in Mexico, and so this taxon's occurrence in New Mexico (and the U.S.) will remain unproved until an unquestionable authentic record is obtained from north of the boundary!

From a biological standpoint, whether Mearns collected *Penstemon campanulatus* in the San Luis Mountains of the U.S. or Mexico is of minor significance. After all, geopolitical boundaries have little to do with the natural world, as most are arbitrary and not expected to conform with or reflect patterns of biotic distribution. In fact many taxa in this particular region are shared between the two countries, including Mexican montane forms that extend into the border ranges in New Mexico and/or Arizona. On the other hand, regional biotas are typically defined in geopolitical terms, such as the flora of the U.S. or New Mexico. As a consequence, it is important to have the most accurate information possible on the ranges of component taxa. In addition, geopolitical boundaries can be a factor in the way taxa are managed, which may result in biological consequences. For example, a number of vertebrates common in Mexico are rare and local in the southwestern U.S., to the point of being listed as endangered or threatened taxa in states such as New Mexico. This listing in turn leads to improved management of wildlife habitat, which can benefit both listed and other organisms. Finally, some taxa do reach distributional limits in the U.S.-Mexican border region, as exemplified by the population of Penstemon campanulatus in the San Luis Mountains of Chihuahua (and doubtlessly adjacent Sonora). As such, these populations can provide insights into the parameters that control the distribution of given organisms, such as climate, resource availability, biological factors, and paleontological/historical events.

I wish to acknowledge first and foremost Warren L. Wagner, who did much to elucidate the flora of New Mexico's Animas Mountains (Master's Thesis at the University of New Mexico), where *Penstemon campanulatus* has been long sought but apparently never found. Dr. Wagner provided me with crucial information on E. A. Mearns's two specimens (nos. 2112 and 2222) of this species, which are housed in the U.S. National Herbarium. In addition, I also thank William Hess, Richard Spellenberg, and Rob Soreng for information they provided on plants in the San Luis Mountains and vicinity. Finally, I salute the excellent work of Dr. Mearns and his associates during the 1892-1894 boundary survey, without which we would not have these and many other biological specimens to study and learn from. I am certain they would be glad that the material is still being utilized, although not to the degree that it should be (or have been). In this regard, I would like to point out that Mearns prepared an extensive report that detailed the biological and related findings from that survey (Hume 1942). Unfortunately, the U.S. Congress failed to appropriate funds to publish the full report, and so only the first volume was ever printed (Mearns 1907). Perhaps the Smithsonian Institution or others should consider exhuming, updating, and publishing the remaining portion of the report, which would provide a unparalleled picture of the biota of the boundary at the close of the 19th century. Moreover, such a publication could also address other "specious" records like that of *P. campanulatus*, which persist even though over a century has passed since they were first obtained!

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New Plant Distribution Records

New records for New Mexico are documented by the county of occurrence and the disposition (herbarium) of a specimen.

— David Bleakly (3813 Monroe, NE, Albuquerque, NM 87110)

Symphyotrichum ciliatum (Asteraceae): San Juan Co. (UNM).

Atriplex heterosperma Bunge (Chenopodiaceae): Rio Arriba Co. (UNM).

— Kelly Allred (Box 3-I, New Mexico State University, Las Cruces, NM 88003)

Daucosma laciniata Engelm. & Gray (Umbelliferae): Hidalgo Co. (ARIZ).

Cotula australis (Sieb. ex Spreng.) Hook. f. (Compositae): Lincoln Co. (NMCR).

— Laird McIntosh (BLM, 1800 Marquess, Las Cruces, NM 88005)

Hedypnois cretica (L.) Dum.-Cours. (Compositae): Dona Ana Co. (NMC)