

NEW ALIGNMENTS IN NORTH AMERICAN *CRATAEGUS* (ROSACEAE)

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ABSTRACT

New combinations are made for 30 southeastern USA *Crataegus* entities. The following varieties are designated: *C. allegheniensis* Beadle var. *extraria*, *C. allegheniensis* var. *ignava*, *C. allegheniensis* var. *mira*, *C. sororia* Beadle var. *segnis*, *C. sororia* var. *visenda*, *C. intricata* Lange var. *biltmoreana*, *C. intricata* var. *fortunata*, *C. intricata* var. *horseyi*, *C. intricata* var. *padifolia*, *C. alabamensis* Beadle var. *florens*, *C. alabamensis* var. *ravenelii*, *C. alabamensis* var. *teres*, *C. lassa* Beadle var. *colonica*, *C. lassa* var. *integra*, *C. lassa* var. *lanata*, *C. lassa* var. *recurva*, *C. munda* Beadle var. *pexa*, *C. quaesita* Beadle var. *egens*, *C. quaesita* var. *floridana*, *C. mollis* (Torr. & A. Gray) Scheele var. *dumetosa*, *C. mollis* var. *lanuginosa*, *C. mollis* var. *meridionalis*, *C. mollis* var. *texana*, *C. mollis* var. *viburnifolia*, *C. uniflora* Muench. var. *brittonii*, *C. pruinosa* (Wendl.) K. Koch var. *gattingeri*, *C. pulcherrima* W.W. Ashe var. *incilis*, *C. pulcherrima* var. *opima*, *C. sargentii* Beadle var. *gilva*, *C. venusta* Beadle var. *pallens*.

KEY WORDS: *Crataegus*, Rosaceae, new combinations, southeastern USA

In preparation for a forthcoming field guide to *Crataegus* of the southeastern USA, a number of new alignments are necessary to accommodate desired taxonomic concepts. These new alignments are proposed to consolidate minor morphological variation into infraspecific categories of wide-ranging species.

The proliferation of *Crataegus* species names in the early part of the 20th century, especially by Charles S. Sargent, William W. Ashe and Chauncey D. Beadle, occurred at a time when it was conventional to recognize relatively similar morphologies as distinct species. With subsequent study of the hawthorns of North America by later authors, the accuracy and stability of many of the species names became doubtful. The situation was rectified to some extent during intervening years by hawthorn specialists W.W. Eggleston, Jesse M. Palmer and Emil Kruschke, who published synonymy, new combinations, and infraspecific categories of many of the names, mostly of taxa occurring in the midwestern and northeastern USA. Especially in the southeastern USA, the use of infraspecific categories has lagged behind the trend and many of the original specific names of the early authors have been left unchanged due to obscurity, or they have been relegated to a broad synonymy that dismisses significant variation. In recent years, *Crataegus* series revisions by James B. Phipps have been the only detailed attempt by a specialist to investigate and reform the taxonomy of all southeastern *Crataegus*.

This paper is another attempt to bring aspects of southeastern USA *Crataegus* taxonomy to a level that is easily applied by field workers by combining a few examples of poorly known, related yet doubtfully distinct species into infraspecific categories. While genetic investigation of southeastern *Crataegus* is still in its infancy, new combinations based on morphology provide a hierarchy in the array of closely related taxa. Furthermore, several varietal or subspecific names have not been available for taxa whose similarities seem intuitive. This short paper proposes new taxonomic combinations at varietal rank for such taxa, based on observations and opinions of the

author after many years of field and herbarium study, and from considerable experience with hawthorn cultivation. A brief rationale accompanies each new combination.

The infraspecific rank of variety is used here mostly due to tradition, since in application to *Crataegus*, only the varietal category has made an appearance. Designation of varieties in this genus is wrought with similar concerns as with species rank, mainly the questionable extent of genetic uniformity due to a presence of polyploidy and apomixis. It is not precisely known how many of the named entities represent microspecies, morphospecies, nothospecies or compilospecies, but until this is revealed by further research, taxonomy based on morphology remains utilitarian. For the varieties proposed here, most have fairly broad ranges and represent a sufficiently distinct morphology within a species concept so that they are recognizable when sympatric with the typical species or any of its other varieties. The entities *horseyi*, *padifolia*, *pallens*, *lamuginosa*, *meridionalis*, and *viburnifolia* (here at varietal rank) represent regional, fragmented, or localized populations of a conspicuous morphology, yet their variation is minor when considered within a broad concept of the species. In all cases, rare intermediates may be encountered in mixed populations, but this is typical among any plant species with sympatric varieties and is not wholly indicative of a need for an overly expansive synonymy.

1. SERIES *APRICA* J.B. Phipps

Crataegus allegheniensis Beadle group. Several hawthorn species named by C.D. Beadle, spread among his groups *Euflavae*, *Ignavae*, and *Sororiae*, suggest a sufficiently close alliance that they may be regarded as one species complex. All of these are included as members of the new series *Apricae* by Phipps and Dvorsky (2007). The presence of variable stamen numbers but similar foliage morphology in this complex suggests that some or all may be derived from hybrid origins. Taking into account the oldest named member described in 1910, *C. allegheniensis* forms the core species.

Crataegus allegheniensis Beadle var. *extraria* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus extraria* Beadle, Biltmore Bot. Stud. 1: 31. 1901. LECTOTYPE (Phipps & Dvorsky 2007): Georgia. Cobb Co.: Marietta, 11 September 1901, C.D. Beadle 2485 (US).

This is a variant having 12 to 15 stamens per flower and a pilose-pubescent hypanthium, whereas the typical variety bears 10 stamens and a glabrous hypanthium. This variety seems fairly widely dispersed across the known range of *C. allegheniensis*.

Crataegus allegheniensis Beadle var. *ignava* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus ignava* Beadle, Biltmore Bot. Stud. 1: 31. 1901. LECTOTYPE (Phipps & Dvorsky 2007): Alabama. DeKalb Co.: Lookout Mountain, Valley Head, Oct 1900, C.D. Beadle 2289 (US).

This is a 20-stamen variant of the species, apparently of wide distribution based on recent collections.

Crataegus allegheniensis Beadle var. *mira* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus mira* Beadle, Biltmore Bot. Stud. 1: 78. 1902. TYPE (Phipps & Dvorsky 2007): Georgia. Cobb Co.: 9 May 1901, C.D. Beadle 4287 (holotype: US).

This variety differs from the typical variety by its wider leaf shape, more pubescent floral parts and 12–15 stamens. It is most similar to *C. allegheniensis* var. *extraria*, but anthers are frequently yellowish, rarely purplish as in the latter.

Crataegus sororia Beadle var. *segnis* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus segnis* Beadle, Biltmore Bot. Stud. 1: 32. 1901. LECTOTYPE (Phipps & Dvorsky 2007): Alabama. Butler Co.: Greenville, 24 Aug 1901, C.D. Beadle 2155 (A).

The typical variety is known by its tomentose pedicels, yellowish or pink anthers and broadly elliptic leaves having rather coarse serrations. The var. *segnis* bears less indumentum, purplish anthers and leaves of a more rhombic to obovate shape, finely or obscurely toothed. Its known range is south of the typical variety.

Crataegus sororia Beadle var. *visenda* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus visenda* Beadle, Biltmore Bot. Stud. 1: 79. 1902. LECTOTYPE (Phipps & Dvorsky 2007): Florida. Liberty Co.: Bristol, 29 Mar 1901, T.G. Harbison 4031 (A).

This variety is similar to var. *segnis*, but leaves are more often obovate or widest distally and the twigs and branches frequently droop. Its distribution is much wider than the other two varieties of *C. sororia* as treated here, adjoining the typical variety to the north and sympatric with var. *segnis* on the south. It also extends from Alabama and Florida to North Carolina, being the most wide-ranging representative of the species. This variety exhibits morphology approaching that of Series *Lacrimatae* J. B. Phipps, suggesting an alliance.

2. SERIES *INTRICATAE* (Sargent) Rehder

Crataegus intricata Lange group. The concept of *Crataegus intricata* Lange has been variously interpreted by floristicians, often inclusive of a rather extensive synonymy. Palmer (1946, 1950) initiated a more broadly defined concept for the species, followed by Kruschke (1965), who promoted the idea that more reduction in the taxonomy was due. That idea is continued here for a few southeastern representatives of the Series.

Crataegus intricata Lange var. *biltmoreana* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus biltmoreana* Beadle, Botanical Gazette 28: 406. 1899. TYPE: North Carolina. Buncombe Co.: 10 August 1899, *Biltmore s.n.* (holotype US 981071).

The presence of hairs on young twigs and foliage and floral and fruiting parts is the only significant distinguishing trait separating *C. biltmoreana* from the normal range of variation accepted in *C. intricata*. Other related species, *C. boyntonii* Beadle, *C. neobushii* Sargent, and *C. rubella* Beadle, were treated as varieties of *C. intricata* by Kruschke (1965), as was *C. straminea* Beadle by Palmer (1950). All of these entities differ as much, or more, in their leaf morphology from the typical *C. intricata* as does *C. biltmoreana*, except in the realm of vestiture. This variety is sympatric with typical *C. intricata* across much of its range.

Crataegus intricata Lange var. *fortunata* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus fortunata* Sargent, Proc. Acad. Nat. Sci. Philadelphia. 62: 239. 1910. TYPE: Pennsylvania. Washington Co.: Charleroi, 7 October 1905, O.E. Jennings 34 (holotype: A). Flowering specimens from the type locality, 21 May 1906, also are numbered O.E. Jennings 34 (A).

The yellow fruit color of this plant, coupled with more subcoriaceous foliage and robust thorns than seen in typical *C. intricata* suggest that treatment at varietal rank is appropriate. The foliage characters are closest to those of *C. intricata* var. *rubella*, a variety with red fruit of oval or pyriform shape. Kruschke (1965) proposed the combination *C. intricata* var. *neobushii* (Sargent) Kruschke f. *fortunata* (Sargent) Kruschke, but he also noted a possible alternative affiliation of *fortunata* to *C. straminea* Beadle.

Crataegus intricata Lange var. *horseyi* (E.J. Palmer) R.W. Lance, comb. et stat. nov. *Crataegus horseyi* E.J. Palmer, Ohio J. Sci. 56: 211-212. 1956. TYPE: Ohio. Gallia Co.: Gallipolis, 13 May 1925, R.E. Horsey 2247 (holotype: A 2569).

This entity may only be a localized version of *C. intricata*, possibly allied to *C. intricata* var. *rubella* (Beadle) Kruschke but with the distinction of finely serrate calyx margins and small (6-9mm), subglobose fruit. It is accepted here as a variety pending relocation and further study.

Crataegus intricata Lange var. *padifolia* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus padifolia* Sargent, Trees and Shrubs. 2:75. 1908. LECTOTYPE (Phipps et al. 2007): Missouri. Taney Co.: Swan, 24 April 1907, *B.F. Bush 5K* (A 261591).

Generally considered an endemic of the Ozark and Ouachita Mountain regions, this western member of *Intricatae* is distinguished in fruit by its nearly sessile calyx coupled with weakly lobed leaves. Other characters fall closely within the concept of *C. intricata*. The variety *C. padifolia* var. *incarnata* (Sarg.) bears closer resemblance to typical *C. intricata* in leaf shape and may represent an intermediate form, here relegated to synonymy.

3. SERIES *LACRIMATAE* J.B. Phipps

Crataegus alabamensis Beadle var. *florens* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus florens* Beadle, Biltmore Bot. Stud. 1: 94. 1902. LECTOTYPE (Phipps & Dvorsky 2008): Mississippi. Lowndes Co.: Columbus, 25 Apr 1901, *T.G. Harbison 4176* (NY).

This variety exhibits sparse indumentum in its foliage and inflorescence parts, a departure from the typical variety, which has densely pubescent or tomentose pedicels and young leaves. The general morphology otherwise suggests a close affinity.

Crataegus alabamensis Beadle var. *ravenelii* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus ravenelii* Sargent, Bot. Gaz. 33: 122. Feb 1902. LECTOTYPE (Phipps & Dvorsky 2008): Georgia. Augusta, sand hills, 1901, *A. Cuthbert 411* (A).

The widespread *C. ravenelii* is placed as a variety of *C. alabamensis* due to foliage similarities. Phipps and Dvorsky (2008) placed it in synonymy with *C. condigna* Beadle, but in my opinion the type of *C. condigna* illustrates a smaller-leaved and possibly intermediate plant involving other species. The gradation of leaf serrations from small and near crenate to larger and more dentate parallels a range of vestiture between the more heavily pubescent *C. alabamensis* var. *alabamensis* on one hand, to extremes of glabrescence and tothing in *C. teres*, with *C. ravenelii* being intermediate in these features.

Crataegus alabamensis Beadle var. *teres* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus teres* Beadle, Biltmore Bot. Stud. 1: 43. 1901. LECTOTYPE (Phipps & Dvorsky 2008): Alabama. Montgomery Co.: Montgomery, 15 Apr 1900, *C.D. Beadle 2169* (US).

This is the most extreme variety allied to *C. alabamensis*, as it is nearly completely glabrous. It is additionally distinct in its 2–3 styles (3–5 in the other varieties) but not so readily distinguishable through other morphology. It appears most similar to var. *florens*, which has hairs in its inflorescence.

Crataegus lassa Beadle group. The morphology used to distinguish the majority of Beadle's species that he placed in groups *Anisophyllae*, *Colonicae*, *Integrae*, *Michauxianae*, and *Recurvae* is here considered minor variation within one recognizable species complex. At the core of this complex is the earliest named entity having a suitable type, *C. lassa* Beadle of 1901. The most significant aspects of variation within this group are distinguished by recognition of 4 varieties.

Crataegus lassa Beadle var. *colonica* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus colonica* Beadle, Biltmore Bot. Stud. 1: 104. 1902. NEOTYPE (Phipps & Dvorsky 2008): South Carolina. Beaufort Co.: Bluffton, June 1882, *J.H. Mellichamp s.n.* (A).

This variety is most recognizable by its abundant thorns, subentire leaf margins and pyriform fruits, characters considered here insufficient to support specific status.

Crataegus lassa Beadle var. *integra* (Beadle) R.W. Lance, comb. nov. *Crataegus flava* Aiton var. *integra* Nash, Bull. Torrey Bot. Club 22: 150. 1895. LECTOTYPE (Phipps & Dvorsky 2008): A): Florida. Lake Co.: vicinity of Eustis, 1-15 July 1894, *G.V. Nash 1142* (A; isolectotype US).

The leaf shape of this entity is slightly different from that seen in the species, more frequently bearing a pointed apex. Other morphology is barely useful in separation from a widened foliar concept of the species.

Crataegus lassa Beadle var. *lanata* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus lanata* Beadle, Biltmore Bot. Stud. 1: 86. 1902. LECTOTYPE (Phipps & Dvorsky 2008): Georgia. Gwinnett Co.: near banks of Yellow R. below McGuire's Landing, 21 June 1899, *C.D. Beadle 587* (US).

This is a persistently white-pubescent variant of *C. lassa*. It also has more consistently lobed leaves than seen in the typical variety.

Crataegus lassa Beadle var. *recurva* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus recurva* Beadle, Biltmore Bot. Stud. 1: 106. 1902. LECTOTYPE (Phipps & Dvorsky 2008): Florida. Marion Co.: Ocala, 20 August 1901, *C.D. Beadle 4007* (A).

The small (<10 mm diam.) fruits and obovate-spatulate leaves, usually 5–15mm wide and with an attenuate base and denticulate margin, account for the major distinction of var. *recurva*. This variety is easily recognizable in its most extreme forms, but intermediates may be encountered that suggest an unknown breeding complex.

Crataegus munda Beadle var. *pexa* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus pexa* Beadle, Biltmore Bot. Stud. 1: 116. 1902. LECTOTYPE (Phipps & Dvorsky 2008): North Carolina. Rowan Co.: near Salisbury, 28 Apr 1897, *Biltmore Herbarium 300b* (US 981163).

Leaf morphology seems sufficiently similar, as do all other traits except longer thorn length, to fit this entity within *C. munda*. It represents a more northern variety in the range of the species, most common in the North Carolina Coastal Plain and extending into southeastern Virginia.

Crataegus quaesita Beadle var. *egens* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus egens* Beadle, Biltmore Bot. Stud. 1: 85. 1902. LECTOTYPE (Phipps & Dvorsky 2008): GA): Florida. Liberty Co.: Bristol, 1 Apr 1901, *T.G. Harbison 4037* (GH; isolectotypes: A, US).

This variant exhibits smaller leaves than the species, but other traits suggest it has its closest alliance with *C. quaesita* or that it may be of hybrid origin. It is reasonably widely dispersed in the Coastal Plain.

Crataegus quaesita Beadle var. *floridana* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus floridana* Sargent, Bot. Gaz. 33: 124. Feb 1902. LECTOTYPE (Phipps & Dvorsky 2008): Florida. Duval Co.: Jacksonville, 18 Jul [no year], *A.N. Curtiss 8* (A).

This variety exhibits more blunt leaf lobing and nearly crenate serrations in its most extreme forms, but other traits suggest a close alliance with the species.

4. SERIES *MOLLES* (Loudon) Rehder

Numerous species in this Series have been described for the southeastern USA region that are closely related to, or perhaps merely variants of, the core species *Crataegus mollis* (Torr. & A. Gray) Scheele. The morphological variation used to separate these entities is not entirely stable, chiefly foliage shape and indumentum, anther color and the shape and color of fruit. The varieties presented here recognize significant segregates in the range of variation.

Crataegus mollis (Torr. & A. Gray) Scheele var. *dumetosa* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus dumetosa* Sargent, Rep. Missouri Bot. Gard. 19: 109. 1908. LECTOTYPE (Phipps et al. 2007): Missouri. Jasper Co.: Neck City, 31 March 1907, *E.J. Palmer* s.n. (A 16331).

This entity refers to plants with atypically elliptic and weakly lobed leaf shapes, which seem to be centered in the Missouri region.

Crataegus mollis (Torr. & A. Gray) Scheele var. *lanuginosa* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus lanuginosa* Sargent, Trees and Shrubs 1: 113. 1903. SYNTYPES: Missouri. Jasper Co.: Webb City, 2 Oct 1901, *C.S. Sargent* 4 (A); Missouri. Jasper Co.: Carterville, Prosperity Junction, 19 May 1901, *B.F. Bush* 543 (A).

This variety exhibits more copious foliar indumentum than the species, pink to rose anther color and is unknown outside of the small range of type specimens. Other traits used in its recognition are minor or inconsistent, as observed through cultivated examples. Natural populations having extant specimens have not been relocated for study.

Crataegus mollis (Torr. & A. Gray) Scheele var. *meridionalis* (Sargent) R.W. Lance, comb. et stat. nov. *Crataegus meridionalis* Sargent, Jour. Arnold Arb. 1: 252. 1920. SYNTYPES: Alabama. Hale Co.: Gallion, 17 April 1915, *T.G. Harbison* 7 (A 16920); Alabama. Hale Co.: Gallion, 21 Sept 1915, *T.G. Harbison* 7a (A 16939).

This variety exhibits atypically narrow leaf shapes (often elliptic) that are also unlobed on floral shoots. The historic and known range of this taxon also is somewhat significant, being on the easternmost fringes of the coastal plain segment of the range of *C. mollis*. Until a more detailed evaluation can be done, which involves finding additional specimens, varietal status seems preferable to synonymy within *C. mollis* or specific recognition.

Crataegus mollis (Torr. & A. Gray) Scheele var. *texana* (Buckl.) R.W. Lance, comb. et stat. nov. *Crataegus texana* Buckley, Proc. Acad. Nat. Sci. Philadelphia 1861: 454. 1862. TYPE: Texas. Common on Brazos and Colorado Rivers, no date, *S.B. Buckley* 161 [holotype: PH photo!].

There is sufficient variation within representatives of the *Molles* group in the southwestern range limits (particularly in Texas) that numerous species have received recognition based on characters such as anther color, stamen number, fruit color, indumentum, and shape of leaves. For the most part, this variation has been rated here as minor, partially due to an overlap of characters among these plants. A number of these named taxa (including *C. dallasiana* Sargent, *C. brazoria* Sargent) have sufficient morphological intermediacy that they are suspected of having hybrid origins, or perhaps they originated sporadically as forms among local, mixed populations of core *Molles* members. *Crataegus mollis* var. *texana* as considered here is a *Molles* entity having rose or red anthers and red fruit, occurring across the most extensive part of the Texas range of the group, differing from typical *C. mollis*, more limited in the same area, chiefly by anther color. The varietal designation considers that the *texana* plants may be seen as one of two regionally significant variations of a wide-ranging *C. mollis*, both forming perhaps the core taxa of a breeding complex that needs further genetic study.

Crataegus mollis (Torr. & A. Gray) Scheele var. *viburnifolia* (Sargent) R.W. Lance, comb. nov. *Crataegus viburnifolia* Sargent, Trees and Shrubs 2: 145. 1911. TYPE: Texas. Brazoria Co.: Columbia, 23 March 1909, *B.F. Bush* & *C.S. Sargent* 11 (holotype: A). EPITYPE (Phipps 2007): Texas. Brazoria Co.: Columbia, common n woods, fruit canary yellow, 25 Sep 1901, *B.F. Bush* tree 11=*Bush* 912 (A).

This variety differs from the species in its leaf morphology (large, coarse marginal serrations), fruit color (typically yellow or orange-blushed), and a restricted geographical range of portions of eastern Texas. Its anther color is normally white to yellowish, similar to that of the typical

variety. The latter trait distinguishes this variety from sympatric *C. mollis* var. *texana*, which has reddish anthers and also red fruit color. There is, however, some overlap in characters among individuals in mixed populations suggesting a reticulate breeding complex. Further work is needed to determine the origin and significance of closely related *C. brazoria* Sargent and *C. dallasiana* Sargent. An alternative viewpoint is suggested by Phipps (2007), designating *C. brazoria* Sarg. var. *viburnifolia* (Sargent) J.B. Phipps.

5. SERIES *PARVIFLORAE* (Loudon) Rehder

Crataegus uniflora Muench. var. *brittonii* (Eggleston) R.W. Lance, comb. et stat. nov. *Crataegus brittonii* Eggleston, Bull. Torrey Bot. Club. 36: 640. 1909. TYPE: North Carolina. Buncombe Co.: Biltmore, 15-18 Sept 1908, *W.W. Eggleston 4134* (holotype: NY; isotype: NY).

The principal differences used to distinguish var. *brittonii* have been leaf shape (more often semi-lobed and larger in size than the species) and greater height of the plant. Since *C. uniflora* has a wide range of variation relating to foliage and habit across its range (plants to 4m tall in Florida), the distinction of *brittonii* seems unremarkable when extreme leaf forms of *C. uniflora* are compared.

6. SERIES *PRUINOSAE* (Sargent) Rehder

Crataegus pruinosa (H.L. Wendl.) K. Koch var. *gattingeri* (W.W. Ashe) R.W. Lance, comb. et stat. nov. *Crataegus gattingeri* W.W. Ashe, J. Elisha Mitchell Sci. Soc. 17: 12. 1900. LECTOTYPE (Phipps 2007): Tennessee. Davidson Co.: Nashville, Sep 1880, *Dr. Gattinger s.n.* (MO).

The smaller anthers and more pronounced terminal leaf lobe seem to be the only significant difference between this plant and the range of variation normally seen in *C. pruinosa*. Despite this minor distinction, this is one of the few members of the *Pruinosae* that has not been previously assigned varietal status under a broadly interpreted *C. pruinosa* by other authors. Although a fairly well distributed southern member of the *Pruinosae*, there seems little defensible evidence to support its specific recognition.

7. Series *Pulcherrimae* (Beadle ex Palmer) Robertson

Of 22 published species in this series by Beadle, a majority are suggested to be sufficiently similar to the earlier-named *C. pulcherrima* W.W. Ashe that they can be relegated to synonymy within a broadened concept of that species. Two varieties are proposed here.

Crataegus pulcherrima W.W. Ashe var. *incilis* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus incilis* Beadle, Biltmore Bot. Stud. 1: 41. 1901. LECTOTYPE (Phipps et al. 2006): Alabama. Autauga Co.: Evergreen, 12 Apr 1900, *C.D. Beadle 2143* (US 969493).

This variety bears more deeply lobed leaves and has a more slender, shrubby habit than the typical species.

Crataegus pulcherrima W.W. Ashe var. *opima* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus opima* Beadle, Biltmore Bot. Stud. 1: 40. 1901. LECTOTYPE (Phipps et al. 2006): Alabama. Butler Co.: Greenville, 2 Oct 1900, *C.D. Beadle 2159/2* (US 981036; epitype NY).

The proportionally wider leaves with usually blunt lobing are the principal difference from the species. This variety extends farther west in the species range than other varieties, to eastern Texas.

Crataegus sargentii Beadle var. *gilva* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus gilva* Beadle, Biltmore Bot. Stud. 1:60. 1902. LECTOTYPE (Phipps et al. 2006): **Alabama**. Marshall Co.: Albertville, rocky woods, Apr 1901, *T.G. Harbison 4374* (A).

The foliage of this variety exhibits very close similarity to the species, but is typically more shallowly lobed or unlobed.

Crataegus venusta Beadle var. *pallens* (Beadle) R.W. Lance, comb. et stat. nov. *Crataegus pallens* Beadle, Biltmore Bot. Stud. 1: 27. 1901. LECTOTYPE (Phipps et al. 2006): **North Carolina**. Buncombe Co.: Biltmore, upland woods, 14 May 1900, *Biltmore Herb. BC2* (US 969397).

This variety extends farther north, to western North Carolina, than other expressions of the species. Leaf, flower and fruit morphology align it with *C. venusta* rather than indicating that it is a distinct species or a synonym or variant of any other member of the *Pulcherrimae*.

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