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NAMES AND TYPES IN PERENNIAL ATRIPLEX LINNAEUS (CHENOPODIACEAE) IN NORTH AMERICA SELECTIVELY EXCLUSIVE OF MEXICO

Stanley L. Welsh¹ and Clifford Crompton²

ABSTRACT.—Cited are names and combinations within the woody species of Atriplex as they occur in North America. Types and their repositories are included for all taxa except those for which that information could not be located. New nomenclatural proposals include Atriplex gardneri var. optera (A. Nelson) Welsh & Crompton, comb. nov.; A. garrettii var. navajoensis (C. A. Hanson) Welsh & Crompton, comb. nov.; Atriplex acanthocarpa var. coahuilensis (Henrickson) Welsh & Crompton, comb. nov. A lectotype is designated for A. breviflora S. Watson.

Key words: Chenopodiaceae, Atriplex types, North America.

This list of names and synonyms of perennial and woody Atriplex taxa is preliminary to the preparation of a taxonomic treatment for the woody species of Atriplex as they occur in North America, both indigenous and introduced species. All names, whether treated as taxa recognized by me or as mere synonyms, are included. The taxonomic treatment that will appear subsequently in the publication of the Flora North America Project will distinguish between the names of taxa per se and their included synonyms. The relatively large number of names and synonyms for this small group of plants is indicative of the changes in generic concepts, the ever-changing interpretation of the status of a taxon, and the general phenotypic plasticity of this amazing group of shrubs, subshrubs, and perennial herbs, which hybridize freely among themselves and sometimes with other taxa not apparently closely allied. They grow on a surprising array of substrates in the American West, from the cold temperate of northern Alberta to the much warmer climates of Mexico. Often they are among the most important shrub species on saline, fine-textured substrates, and sometimes they are the only shrubby inhabitants. Their ability to survive and even thrive in saline sites has placed them in a position of importance for browsing animals where other browse is scarce or lacking. They cover huge areas where geomorphological processes have exposed raw, saline strata in vast expanses.

Niobrara Shale, Mancos Shale, Morrison Formation, and numerous other geological formations support these plants. Saline pans and other poorly drained lowlands are occupied by these species. Despite the affinity for saline areas, where they have little competition (except from other halophytes), some of the species thrive where total soluble salts are low. The four-wing saltbush, Atriplex canescens (Pursh) Nuttall, is such a plant. It grows from the edge of saline areas up gradient into far less saline substrates, often in grasslands or in shrublands dominated by sagebrush and other shrubby species.

Hybridization is an important factor contributing to the diversity of woody Atriplex species. There are at least two main taxa around which many of the remainder are placed, and with which most form at least occasional hybrids, i.e., A. canescens (Pursh) Nuttall and A. confertifolia (Torrey & Fremont) S. Watson. Some of the hybrids have received names and formal taxonomic recognition. Most of them are of occasional occurrence, and some of the taxa treated in contemporaneous taxonomic works are apparently of hybrid derivation—now more or less stabilized as populations, mainly on very peculiar substrates.

The following list is thought to be exhaustive for woody and perennial Atriplex names in North America, especially for those north of Mexico. A few taxa represented in Mexico are included where they round out the names for

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species complexes largely confined north of that country. Pertinent types have been received on loan by the gracious kindness of curators of the herbaria cited with the specimens. Abbreviations for the herbaria are those standard ones cited in Index Herbariorum, except that the origin of the collection is indicated by use of such designations as NY Torrey for historic specimens. This is thought to be important because it authenticates the antiquity of the specimen and might prove important in certain cases in judging whether a particular author had access to a given specimen.

The type information is presented below in dual format for some taxa, with the type locality or collector information (herein arbitrarily designated "Type locality") as recorded with the protologue cited first and with the label data of the type specimen (herein designated "Type") cited second where there is a substantial difference in the two accounts.


Basionym: Obione acanthocarpa Torrey
This is a shrub or subshrub, generally less than 1 m tall, characterized by spongy fruiting bracteoles 8–15 mm long, borne on slender to stout pedicels 4–20 mm long. Leaves are variable, but often sinuate-dentate to undulate-crisped and with hastately lobed base. The species occurs from west Texas and southern New Mexico south to southeastern Arizona, and var. coahuilensis in southern Texas.


= A. acanthocarpa var. coahuilensis (Henrickson) Welsh & Crompton (cited below).
Type: Mexico, Coahuila, ca 2 km W of Nadadores in saline pastured flats near El Porvenir along Hwy. 30, with Suaeda, Sperobolus, Distichlis, 27°03'N lat, 101°37'W long, 540 m, 6 Dec 1975, J. Henrickson 14784; holotype TEX; isotypes MEXU, NY!, RSA.

This taxon is distinguished by its fruiting bracteoles bearing radiating processes, and stems with at least the medial leaf blades hastate-lanceolate, and with mature fruiting inflorescences very long. Its range is from southern Texas to southeast Coahuila and coastal Tamaulipas.

Atriplex acanthocarpa var. coahuilensis (Henrickson) Welsh & Crompton, comb. nov.


= A. gardneri var. cuneata (A. Nelson) Welsh

Atriplex acanthocarpa var. pringlei (Standley) Henrickson, Southwest. Nat. 33: 461. 1998

Basionym: A. pringlei Standley
The taxon is endemic to Mexico, from northern Zacatecas and southern Nuevo Leon south to San Luis Potosi.


Basionym: A. stewartii I. M. Johnston
The taxon is endemic to Coahuila, Mexico, and is distinguished by its 4-winged fruiting bracteoles, although specimens are transitional to A. acanthocarpa var. acanthocarpa.


Type: "Yalgoo, W. A." [western Australia], 10 Oct. 1945, C. A. Gardner 7751a; holotype PERTH!


= A. canescens (Parsh) Nuttall
Type: New Mexico, Dona Ana Co., Mesilla Park, Cockerell in 1900; holotype US!

The US specimen bears the following label data: "Atriplex angustior, n. sp. Distinguished from A. canescens by the very narrow (3 mm broad) leaves. Apparently = A. canescens angustifolia but that name is preoccupied. Sand Hills Park, No. 1 M. 1900, T. D. A. Cockerill."

Hall and Clements (1923) cited this as a new name for A. canescens var. angustifolia, but it seems obvious that while Cockerill recognized the equivalency of the taxa, he was proposing a new taxa, not merely a new name.


= A. gardneri var. aptera (A. Nelson) Welsh & Crompton


Hanson (1962) suggested that his taxon was of hybrid derivation involving A. canescens and A. buxifolia as parental taxa. Distribution of specimens assignable to the concept is sporadic, possibly indicating multiple origins, and it cannot be considered a taxon in the usual sense. The type specimen of A. aptera has definite wings aligned in four rows similar to some A. canescens but agrees in aspect, size, and general features with A. gardneri.

Atriplex berglandieri Moquin-Tandon, Chenop. Enum. 65. 1840.

= A. canescens (Parsh) Nuttall
Type: "In regno Mexicano. Berglandier 1828"; holotype. Moquin-Tandon enlarges on the type information in his treatment in Prodromus (13[2]: 114. 1849), "In regno Mexicanu inter Laverdo et Ejjar (Berglandi n. 1450)."


= A. gardneri var. bonnevillensis (C. A. Hanson) Welsh
Type: Utah, Millard Co., "dry lake bed L5 miles northeast of headquarters, Desert Range Experiment Station (dominant plant)," 12 July 1961, C. A. Hanson 354; holotype BYU; isotypes CHI, MO!, NY!, UTC!

The sheets at GH and NY have the date printed as 13 July 1961, probably representing typographical errors.

Type locality: “Frémont; 459 Torrey; 75 Brewer” (l.c.).


The type of A. brevirei has been designated by Watson on the basis of at least three collections, and as there are duplicates of the type material, it is proper to designate the material at GH as lectotype. The sheet at US bears a sketch and notes by John Torrey: “75. Ohiome—near the Sea, at Sta Monica. Probably O. lentiformis (large fruited) in an abnormal state. The bracts appear to have been changed by galls.”

Recognition of A. brevirei at taxonomic level as either a variety or subspecies of A. lentiformis is not without merit. Indeed, the plants have typically larger leaves and fruiting bracteoles that average larger. However, there is a series of intermediates that connect the robust coastal material with the less robust plants in the interior. Plants designated as belonging to A. brevirei are considered by me as taxonomically negligible.


= A. gardneri var. aperta (A. Nelson) Welsh

Type locality: Wyoming, Sheridan Co., Dayton, 1920 m altitude, September 1899; Tweedy 2456; holotype NY!


= A. gardneri var. aperta (A. Nelson) Welsh

Type locality: Wyoming, Sheridan Co., Dayton, 1200 m altitude, September 1899; Tweedy 2456; holotype NY!


= A. gardneri var. aperta (A. Nelson) Welsh

Type locality: Wyoming, Sheridan Co., Dayton, 1200 m altitude, September 1899; Tweedy 2456; holotype NY!


Basionym: A. garrettii Rydberg

**Atriplex canescens** var. gigantea Welsh & Stutz, Great Basin Nat. 44: 189. 1984.

Type: Utah, Juab Co., Lundy's valley, T35S, R4W, 8 Sept. 1895, S. L. Welsh & G. Moore 5120; holotype BR!; isotype NY!

The variety is based on its very broad bracts, stems that produce roots by layering, thus accommodating burial in dunes, and diploid chromosome number.

**Atriplex canescens** var. laciniata Parish, in Jepson, Fl. Calif. 442. 1914.

= A. canescens x A. polycarpa as to possible origin.

Type locality: California, Imperial Co., “Caleb, Colorado Desert, Parish 8256” (Jepson l.c.).


This variety has been suggested as based on specimens intermediate between A. canescens and A. linearis (C. A. Hanson l.c.), although Stutz (personal communication 1984) posed quite another possibility, i.e., that a chromosomal race of A. polycarpa forming hybrids with A. canescens has resulted in at least partially stabilized populations of var. laciniata within the Salton Basin. The type is characterized by deeply laciniate, 4-lobed bracteoles within the size range of A. canescens. It has slender branchlets and narrow leaves approaching those of both A. linearis and A. canescens var. macilenta, which had a similar origin from a separate chromosomal race of A. polycarpa forming hybrids with A. canescens.


Basionym: A. linearis S. Watson

= A. linearis S. Watson


Basionym: A. linearis S. Watson

= A. linearis S. Watson


Basionym: A. macropoda Rose & Standley

This taxon is known from Baja California.

**Atriplex canescens** var. macilenta Jepson, Fl. Calif. 442. 1914.

Type locality: California, Imperial Co., “Holtville, Colorado Desert, Parish 8258” (l.c.).
Type: California, Imperial Co., "Plants of Southern California. Salton Basin. Bluffs of Alamo River, Halibartio. About 15 feet below Sea Level, S. B. Parish 8258, Oct. 18, 1912"; holotype UC JEPS; isotypes DS ("Calexico"), GHI, POM!

The type has leaves to 4 mm wide, narrowly oblanceolate and obtuse apically. Bracts are small, as in A. linearis, and toothed along the margin of the wings. The toothed margin of the wings hints at the laciniate nature of bracts on plants from the nearby Salton Basin and named var. laciniata Parish. Plants called var. maclenta approach but do not exactly match the more characteristic specimens of A. linearis from southern Arizona and northern Mexico. According to Stutz (personal communication 1994), the var. maclenta is a high polyploid, while A. linearis is a diploid. The relatively broader, thicker leaves of var. maclenta are apparently diagnostic.

The specimen at DS, Parish 8258, Oct. 1912, is labeled as having been taken on "Bluffs of the Alamo, Calexico." It is one of three localities cited under Parish's number 8253, and the specimens other than the one taken at Holtville are probably best considered as paratypes.

Parish made a series of collections from the Salton Basin in October 1912. His numbers 8255 and 8256 were collected on October 11; 8255 is a small-bracteolated, narrow-leaved plant assignable to var. maclenta, the type of which (8258) was taken on 18 October. Parish’s number 8256, the type of var. laciniata, is evidently closely placed geographically within the Salton Basin, which also supports A. polycarpa, which is potentially chromosome races of A. polycarpa through hybridization with different chromosome races of A. polycarpa through hybridization with A. canescens. Number 8255 approaches A. linearis in size of bracts and width of leaves, and possibly that species is also involved in the derivation of both var. laciniata and maclenta.


Basionym: Pierocochton occidentale Torrey & Fremont = A. canescens (Parsh) Nuttall var. canescens

This name was erected on false supposition that the type of A. canescens sensu stricto differed from the tall phases of the plant so widely distributed in the American West. It is an unfortunate later synonym.


= A. confertifolia (Torrey & Fremont) S. Watson

Type: Arizona, Apache Co., "dry hills near the north end of the Carrizo Mountains," E. C. Standley 7481, 31 July 1911; holotype US!


Basionym: Obtium confertifolia Torrey & Fremont, in Fremont


Type locality: "Nearly allied to A. nuttallii. Discovered by Miss Alice Eastwood at Grand Junction, Colorado, in well formed fruit on 20th May, 1891. Miss Eastwood notes it as the earliest of fruit of several perennial species of the genus growing in the same locality" [sic].

Type: Atriplex corrugata Watson, n. sp. Grand Junction, Colorado. Miss Alice Eastwood—May 20/1891"; holotype GHI; isotypes UC (fragments taken from holotype by H. M. Hall), K, MO, US!

The type consists of two fertile branches, one pistillate and the other staminate. Both have the small, narrow leaves characteristic of the taxon throughout its rather small range. The species is almost exclusively restricted to saline substrates of such fine-textured strata as the members of the Cretaceous Mancos Shale and Jurassic Morrison Formation, inter alia, where it often occurs as a monotypic. It forms occasional hybrids with A. confertifolia and A. gardneri var. canesca, with whom its ecology is sporadic. The taxon is probably most closely allied to the latter, with which it shares large land areas, but from which its autecology is restricted. It is regarded herein at species rank because of the maintenance of morphological integrity despite occasional contact with the other taxa over much of its area. Additionally, there are hints in its morphology of close ties in still another direction, i.e., with A. bovata.


= A. gardneri var. canesca (A. Nelson) Welsh

Type locality: "M. E. Jones 5443, Emery, Utah, 1894," S. Watson (1902).

Type: M. E. Jones 5443, Emery, 7000 ft., Emery Co., Utah, 16 June 1894; holotype RM!; isotypes MO!, NY! (3 sheets), US!


= A. gardneri var. canesca var. tridentata

Type: Utah, Carbon Co., "Wellington, ca. 0.1 mi S of Price River, in clay hills along road leading to city dump," 9 July 1961, Hanson 946; holotype BRY!; isotypes GHI, POM!

The specimens on which this taxon are based demonstrate intermediacy between the canesca and tridentata phases of A. gardneri. Their recognition at any taxonomic level is problematical.


= A. polycarpa (Torrey) Watson

Type: Baja California, Comondu, four feet high, rounded April 24, 1889, Brandegee 325; holotype UC!


= A. watsonii A. Nelson

Type locality: California, "Near San Diego; Dr. E. Palmer, 1875 (n. 334)" [Watson 1877].


The type consists of a small and a large branch, both staminate. The large branch is evidently from a sprawling herbaceous perennials. Leaves are mostly opposite, becoming subopposite above, elliptic to ovate-lanceolate, obtuse to rounded apically; the glomerules are 3–5 mm thick and are arranged in terminal spikes 1–4 cm long.


Basionym: A. fruticulosa Osterhout.

= A. gardneri (Moquin-Tandon) Dietrich var. gardneri
Atriplex fruticosa Nuttall ex Moquin-Tandon, in de Candolle, Prod. 13(2): 112. 1849. pro syn.

= A. gardneri var. fruticosa

Type: "Atriplex fruticosa. A. Halimium affinis. R. Mts." Nuttall; holotype BM!

The type of A. fruticosa is mounted with collections with the notation "British North America. Dr. Richardson 1819-28," and designated as A. canescens. In Index Kewensis the name fruticosa is noted as a synonym of A. canescens, a supposition possibly based on the identity of the Richardson material, but more probably on the publication of the name as a synonym of A. canescens by Moquin-Tandon. The epithets fruticosus and heterophyllus, both herbarium names of Nuttall, were published as synonyms and are not to be regarded in considerations of priority.

Atriplex fruticulosa Jepson, Pittonia 2: 306. 1892.

Type: California, "Little Oak, Solano Co., Aug. 16, 1892. Willis L. Jepson"; holotype UC; isotype MO!

This plant functions mostly as an annual but is apparently capable of a longer life span, extending to become a short-lived perennial. The name has priority over the later homonymy, A. fruticulosa Osterhout (1898).


Basionym for: A. cuneata Osterhout

= A. gardneri (Moquin-Tandon) Dietrich var. gardneri

Type locality: Wyoming, Albany Co., Steamboat Lake, "The type was collected near a small alkaline lake in Southern Wyoming." Osterhout s.n. 2 July 1896; holotype (no. 1324) RM!; isotype NY!, RM! (this second sheet, presumably an isotype, lacks the collector’s number). A collector's number was not cited with the protologue, but the holotype sheet at RM bears the number 1324. Material on which this entity was based differs in no particular way from A. gardneri var. gardneri.

Atriplex gardneri (Moquin-Tandon) Dietrich, Syn. Pl. 5: 537. 1892.

Basionym: Obione gardneri Moquin-Tandon

There is a sheet, possibly identifiable as belonging to this species and not bearing on the nomenclature of the species, in the Lewis and Clark herbarium at PH: "A half shrub from the high plains of Missouri. July 20th 1806." It is cited here to demonstrate that the species was known from the earliest collections into the western plains.

Atriplex gardneri var. aptera (A. Nelson) Welsh & Crompton, comb. nov.


This entity was treated by Hanson (1962) as a probable derivative of hybridization between A. canescens and A. bussofolia (A. gardneri sens. lat.). It is a low shrub most similar to the latter, but with bracteoles winged as in A. canescens or with tubercles aligned in four rows, and with yellow staminate flowers. It is likely that the condition of 4-winged fruits has arisen independently on many occasions and that the resulting populations are not associated genetically as in a typical taxon. Regardless of origin, however, the resultant plants are readily recognizable and are widely distributed from southern Canada south along the prairies to Nebraska and Wyoming. A. canescens also forms hybrids with other phases of the gardneri complex (see below).


Basionym: A. homoeoellus C. A. Hanson

This variety is more or less intermediate between A. gardneri var. falcata and A. canescens, but it most nearly resembles the former in habit. The bracteoles are 5-8 mm long and 3-9 mm wide, ovoid, with four lateral wings or rows of flattened tubercules to 3 mm wide, or the wings rarely absent. The plants are confined to playas and saline pans in the valleys of western Utah and across Nevada.


Basionym: A. canescens A. Nelson


Basionym: A. nutallii var. falcata M. E. Jones


= A. gardneri var. utahensis (M. E. Jones) Dorn

Basionym: A. tridentata Kuntze


Basionym: A. welschii C. A. Hanson


Basionym: A. nutallii var. utahensis M. E. Jones


Despite earlier treatments in which this taxon was regarded at infraspecific status within A. canescens, the nearest allies appear to be in the gardneri complex. Apparent hybrids are known between A. garrettii and A. confertifolia (C. A. Hanson 1962), but not with A. canescens.

Atriplex garrettii var. navajoensis (C. A. Hanson) Welsh & Crompton, comb. nov.


This variety differs from the type material in plant size, length of staminate inflorescences, color of staminate flowers, and other intangibles. Generally the plants are very similar. The few known localities, from the vicinity of Lee’s Ferry to Navajo Bridge in Coconino County, AZ, are only disjunct by about 100 km from the nearest populations of var. garrettii.

Atriplex gardoni Hooker, J. Bot. 5: 261. 1853. nom. nov. pro A. gardneri Moquin-Tandon

= A. gardneri (Moquin-Tandon) Dietrich var. gardneri

Basionym: A. brevicaulis S. Watson = A. lentiformis sens lat?

Basionym: A. brevicaulis S. Watson = A. lentiformis sens lat?

Basionym: A. griffithsii Standley = A. lentiformis sens lat?

*Atriplex lentiformis* var. *griffithsii* (Standley) Benson, Amer. J. Bot. 30: 236. 1943.
Basionym: A. griffithsii Standley = A. lentiformis sens lat?

Basionym: Obione torreyi S. Watson

Type locality: Mexico, Sonora, alkaline soil about Guaymas, Palmer 120, 121, 235; syntypes GIL


Paratypes 120 and 121 are immature, the latter staminate. The lectotype sheet #235 has at least four branches with more or less mature fruiting bracteoles. The bracteoles are 4-winged, rather deeply laciniate lobed to merely toothed along the wings, and are 3-6 mm wide.

Hanson (1962) regarded *A. linearis* as the most substantial variant within the *canescens* complex but recognized that it forms hybrids with *A. canescens*. The plants are certainly morphologically distinct from most phases of that entity. The slender, short to elongate leaves (seldom more than 4 mm wide and to 3.8 cm long), fruiting bracteoles seldom over 6 or 7 mm wide, and very slender branchlets are apparently diagnostic in most instances.


=A. linearis* S. Watson (sens lat?), but the fruiting bracteoles are long pedicellate, unlike *A. canescens*

Type locality: "Type collected on Pinchillinique Island, Lower California, March 27, 1911, J. N. Rose 16518 (U.S. Nat. Herb. no. 638637)."

Type: Lower California, Pinchillinique Island, Gulf of California, J. N. Rose 16518, March 27, 1911; holotype US!

Nomenclature for all Hanson, nuttallii including its basionym. Few names were available, specifically Atriplex 2200 Ft. M. E. Jones sn; and by implication the var. gardneri type gardneri (Moquin-Tandon) Dietrich var. corrugata canescens, vaxfalcata use oppositifolia anomaia 116. was neomexicana IdallO, July, 1899, Jones P. Pursh, basionym of Atriplex canescens, Pursh, sensu stricto. a Alt. Bot (c. gardneri Hall Stud. Syst. Bot. Bridge gardneri of canescens, canescens, Calligonum canescens (S. Watson) A. Nelson, in initiation of Watson's use of the epithet that is in symptomology not of that era alone. Smeltie; Bot 5: Jones, val'. corrugata (Moquin-Tandon) Dietrich S. Watson [1891r var. vardenensis Bot. 64. 1848. Type: Australia, "Cultivated in Italy, seed from South Australia"; holotype not seen.


= A. canescens (Pursh) Nuttall sens. str.

It is unfortunate that one must at this late date attempt to analyze Watson's use of the name nuttallii for a portion of the woody atriplexes in the American West. From its publication in 1874 the name has been the source of much confusion, serving to clutter Atriplex nomenclature for all subsequent time. It seems certain from a study of Watson's proposal, justification for which can only be inferred, that he was merely presenting a new name for material that he thought to be misinterpreted by contemporary botanists. The evolution of botanical thought with regard to the perennial atriplex species parallels that for other newly discovered taxa in the American West and was initiated when the first of the woody specimens arrived from western botanical explorers. Few names were available, specimens were few and often fragmentary, literature was difficult to obtain, and it was easy to misapply concepts and mix names, a symptomology not of that era alone.

Supposed senex names cited by Watson (1874) within the synonymy of A. nuttallii include Atriplex canescens as used by Nuttall and an assortment of other historical authors, Obione canescens of Moquin-Tandon and other authors, and still another synonym, i.e., "A. gordonii Hook," with the citation "Pl. Geyer in Lond. Jour. Bot. 5: 2619," and by implication the type of A. gordonii (i.e., A. gardneri).

Watson first cited the name A. canescens as published by Nuttall (1818), the implication being that Calligonum canescens Pursh, basionym of A. canescens, could not apply. Nuttall is indeed author of the combination Atriplex canescens, and the place of citation is his 1819 publication, wherein he cites C. canescens as the basionym of his combination; furthermore, Nuttall's description is clearly C. canescens Pursh, sensu stricto. It is Watson's understanding of Nuttall's use of the epithet that is in error. Thus, A. canescens of Nuttall is certainly not a mere sensu name, however one might wish to interpret the application of the epithet. Both the name and the concept as supplied by Nuttall are A. canescens, including its basionym. A. nuttallii of Watson thus includes the type of Calligonum canescens, and the epithet nuttallii is illegitimate under stipulations of the International Code. Hence, from a nomenclatural viewpoint there is no problem. Nuttall based his Atriplex canescens squarely on Calligonum canescens Pursh, and Watson quoted A. canescens Nuttall as the name-bringing synonym of A. nuttallii, which was stillborn. The lectotype of Calligonum canescens Pursh is at FIG and is therefore the lectotype of both Obione canescens and A. nuttallii, which cannot be transferred to a different species or brought to life by sophisticated arguments. Hence, the proposal for lectotypification by McNeill et al. (1983) is illegitimate.

Atriplex nuttallii var. anamonia M. E. Jones, Contr. W. Bot. 11: 19. 1903.

= A. gardneri var. falcata (M. E. Jones) Welsh

Type locality: "The type is my specimens from Dolly Varden Smelter, E. Nevada, July 1894 [1891]."

Type: Nevada, Elko Co., "Marcus E. Jones Herbarium. Atriplex nuttallii var. anamonia (sic) Jones n. var. Dolly Varden at the Smelter, VII-24-91. N.W. of IbaIpah, Utah." M. E. Jones sn; holotype POM; isotype UC!; specimen UC! [frag.]

Jones was clearly in error in citing the date of the collection as 1894. His itinerary cited in Leaflets of Western Botany (10: 189-236) places him at the Dolly Varden Smelter on 24 July 1891, not 1894.


Basionym: A. buxifolia Rydberg

= A. gardneri (Moquin-Tandon) Dietrich var. gardneri


= A. corrugata S. Watson


Basionym: A. canecens A. Nelson

= A. gardneri var. canecens (A. Nelson) Welsh


Basionym: A. nuttallii var. falcata M. E. Jones

= A. gardneri var. falcata (M. E. Jones) Welsh

Atriplex nuttallii var. falcata M. E. Jones, Contr. W. Bot. 11: 19. 1903.

= A. gardneri var. falcata (M. E. Jones) Welsh


= A. gardneri (Moquin-Tandon) Dietrich var. gardneri

Basionym: Obione gardneri Moquin-Tandon


= A. gardneri var. utahensis (M. E. Jones) Dorn

Basionym: A. tridentata Kuntze

Atriplex nuttallii var. tridentata (Kuntze) R. J. Davis, Fl. Idaho 261. 1952.

= A. gardneri var. utahensis (M. E. Jones) Dorn
Basionym: A. tridentata Kuntze


= A. gardneri var. utahensis (M. E. Jones) Dorn
Type locality: "This is No. 1760 Jones from Salt Lake City, and is the more common form in Utah."
Type: Utah, Salt Lake City, Salt Lake Co., M. E. Jones 1760, 16 June 1894; holotype POM; isotype UC (frag.).


= A. gardneri var. cuneata (A. Nelson) Welsh
Type locality: Colorado, Delta Co., Delta, Cowen 4071 (Rydberg 1904).


Atriplex obovata Moquin-Tandon, Chenop. Enum. 61. 1840.

Type locality: "In Peruvia (v.s. in herb. Mus. Paris)" (l.c.).

The islectotype sheet at GH consists of three leafy branches, now lacking fruiting bracteoles or staminate flowers. The material is certainly a match for what has traditionally passed under the name obovata; hence, there is no problem with its interpretation.


= A. obovata Moquin-Tandon
Type locality: Texas, El Paso Co., Fornillo Creek, Harbord 103.

Type: No. 103 (see specimen of male), 1–2 [feet] high – foliage & specially fruit different from that of A. acanthacarpa. Fornillo Creek, W Texas. Aug. [18]63. V. Havard, U.S.A.; holotype GH!; isotype US!

The sheet at GH has two branches, one staminate and one with fruiting bracteoles. The bracteoles are rather strongly tuberculate, a feature not unusual within the species as a whole.

Basionym: Pierocochton occidentale Torrey & Frémont

= A. canescens (Pursh) Nuttall


= A. canescens × A. gardneri var. gardneri

This is a coarse specimen, very woody and obviously intermediate between A. canescens and A. gardneri var. gardneri

Atriplex oppositifolia S. Watson, Proc. Amer. Acad. Arts 9: 118. 1874, non DC.

= A. matamorensis A. Nelson; Obione oppositifolia (S. Watson) Ulbrich, in Engler & Prantl

Type locality: "In the Rio Grande Valley on the Mexican side, collected only by Berlandier (No. 3201, Matamoros to San Fernando)" (Watson l.c.).

Type: "de Matamuras a San Fernando circa Cuijano, Oct. 1830," and "Herbarium Berlandierianum Texano-Mexicanum. No. 3201. A. oppositifolia n. sp. S.W! [initials are Sereno Watson's on sheet at GH]," Berlandier; holotype GHI; isotype NY!

The specimen at GH is doubly mounted with Palmer 1160, 1879. It is a portion of a herbaceous perennial with minute leaves ca 2–3 mm long and 1 mm wide. Bracteoles are conspicuously veined on the faces and prominently toothed lateral to the apical tooth.


= A. lentiformis (Torrey) S. Watson (the A. brevifolia S. Watson phase)

Type locality: "At Santa Monica, California, on the sea­shore at the base of the bluffs; S. B. & W. F. Parish. October, 1881" (Watson 1882).


The fruiting bracts are ca 3 mm high and 4 mm wide.

Leaves are elliptical and obtuse, tapering basally to a short petiole.


= A. gardneri var. utahensis (M. E. Jones) Dorn


Type: "A. Nelson 4429, Bitter Cr., Point of Rocks, 6500 ft, Sweetwater Co., Wyoming, 30 August 1897"; lectotype at RM! (Hall & Clements, Publ. Carnegie Inst. Wash. 326: 324. 1923); islectotypes GHI! (two sheets, male and female), NY!, US!


Basionym: A. eremicola Osterhout

= A. gardneri (Moquin-Tandon) Dietrich var. gardneri


Type locality: "Near Colton [actually at Lancaster according to Parish in Zee 5: 113, 1901], California; Dr. C. C. Parry 1881"; holotype (Perry 221) GHI; isotypes NY!, UC (frag.).

The type consists of a branched stem, with lateral spinescent stems to 4 cm long. The leaves are ovate-orbicular. The plant is obviously allied to A. confertifolia, but distinct.


Basionym: Obione polycarpa Torrey
= A. acanthocarpa ssp. pringlei (Standley) Heinrichson
Type locality: "Type collected on alkaline plains, Hacienda de Angostura, San Luis Potosi, Mexico, July 15, 1891, C. G. Pringle 3775 (U.S. Nat. Herb. no. 48258)."
Type: "Mexico, San Luis Potosi, alkaline plain, Hacienda de Angostura, 15 Jul 1891," C. G. Pringle 3775; holotype US!; isotype G!

= A. obtusa Moquin-Tandon
Basionym of: A. jonesii Standley
= A. obtusa Moquin-Tandon
Type locality: Arizona, Navajo Co., "No. 4109 Jones, Winslow, Ariz., Sept., 1884, distributed as A. Greggii" (Jones 1903).
Type: "Flora of Arizona. 4109. Atriplex Greggii, Watson; Winslow, M. E. Jones, September 1, 1884"; holotype US!; isotypes GII, NY!, POM!
The isotype at GII consists of three branches, two staminate and one pistillate.

Type locality: California, Kern Co., Maricopa Hills, May 15, 1913, Eastwood 3269 (Macbride 1918).
The holotype at GII consists of a branched stem bearing lateral spineless branches to 4.2 cm long; that at US consists of spiny branchlets and two packets of fruiting bracteoles.

Atriplex spinosa (Moquin-Tandon) D. Dietrich, Syn. Pl. 5: 536. 1852.
Basionym: Ohione spinosa Moquin-Tandon, in de Candolle
= A. canescens (Pursh) Nuttall

= A. acanthocarpa ssp. stewartii (I. M. Johnston) Heinrichson
Type locality: Mexico.
The plant is obviously allied to A. acanthocarpa, the variably 4-winged fruiting bracteoles having been derived independently or possibly through introgression from A. canescens. Heinrichson (1988) does not suggest the latter possibility but does note that the 4-winged condition is not consistent, that there is a transition from that condition to those where the wings are replaced by radiating processes.

Atriplex subconfera Rydberg, Fl. Rocky Mts. 248. 1917 [1918].
= A. confertifolia (Torrey & Frémont) S. Watson
Type locality: Idaho, between Twin and Shoshone Falls, Nelson & Macbride 1379; holotype NY!; isotypes POM, UC.

This appears to be a small-leaved phase of A. confertifolia of little or no taxonomic significance.

Basionym: Ohione tetraperta Bentham
= A. canescens (Pursh) Nuttall

Basionym: Ohione torreyi S. Watson

Basionym: A. griffithsii Standley
= A. lentiformis (Torrey) S. Watson

= A. gardneri var. utahensis (M. E. Jones) Dorn
Type locality: Utah, Box Elder Co., Corrine, Kunze 3084, 1874.
Type: O. Kunze 3084, "Be Corinne am Salsee, 7000 (much too high) ft, [Box Elder Co.], Utah, September 1874"; holotype NY!, isotype? K!
The specimen at K, labeled "Atriplex tridentata OKz n. sp. U. S. N. Am. xxv. Cheyenne & Corinne. 7000'." Sept. 74. 3084. Herbarium Otto Kunze, is perhaps best regarded as a parasite.

Basionym: A. decumbens S. Watson

= A. gardneri var. weidii (C. A. Hanson) Webh
Type: "Utah: Grand Co., 4 mi south of Cisco along state highway 128, July 5, 1961"; C. A. Hanson 322; holotype BRY!; isotypes GHI, ISC!

= A. canescens (Pursh) Nuttall

Type locality: Lyman or Buffalo counties, South Dakota, M. Lewis in 1804.
The original description of Calligonum canescens Pursh is "C. dioicum, pulverulento-fruticosum; folis lanceolatis, floribus axillaris glomeratis in apice ramulorum subspicatis, fructibus alatis, alis venosis crassulo-denatis. In the plains of the Missouri, near the Big bend. II. July, Aug. v.s. in Herb. Lewis. Flowers exceeding small. Goats delight to feed upon this shrub."
The sheet at PH contains three branches, the left one with immature fruit, the middle one sterile, and the one at right with mature fruiting bracteoles. This latter specimen was designated specifically as the lectotype by McNell et al. (1983); it clearly fits the concept of the species as interpreted by contemporary authors, except for Stutz and Sanderson (1979), who claim that the type belongs to what was subsequently named A. aptera A. Nelson, based on the
assumption that the Lyman County, South Dakota, type locality is not within the current range of *A. canescens* as presently accepted but is within the range of *A. ateria*. Examination of a great many specimens from throughout the western plains has failed to yield a plant of *A. ateria* with fruiting bracteoles identical to the lectotype, which is matched many times among the specimens traditionally passing as *A. canescens*.

The type sheet bears the designation "Sept. 21, 1804," and the site of the Lewis and Clark camp on that date is adjacent to present Lower Brule, Lyman or Buffalo counties, a short distance above the confluence of the White River. That portion of the Missouri River has been inundated by waters behind the Fort Randall Dam, far downstream. Nutall had traversed the river corridor in 1811, going upriver as far as Fort Mandan. The description and discussion by Nutall (1818) of the species is pertinent to the interpretation of the Lewis type material. He describes the plant as about 3 or 4 feet high, with the "calix (i.e., fruiting bracteoles) 2-parted, becoming indurated, acute, with 4 unequal crisscrossed or dentate angles"; the habitat was designated: "On the denuded saline hills of the Missouri [possibly a reference to the lower-growing, variable, gardneri-like *A. ateria*] commencing about 15 miles below the confluence of the White River, and continuing to the mountains [i.e., to the Mandan, as near as he went toward the mountains]." Much of the habitat where plants typical of *A. canescens*, as traditionally interpreted, could have grown is beneath the waters of Fort Randall Dam, and a valid assumption that typical *A. canescens* did not occur there cannot be made. Some plants from areas of South Dakota adjacent to Lower Brule clearly approach typical *A. canescens*. There is no justification for interpretation of the name differently from that used in the historic past.


= *A. acanthocarpa* (Torrey) S. Watson

Type locality: "Plans between the Burro mountains; September, Bigelow, (in fruit.) On the Rio Grande, below Presidio del Norte; Parry. Near the Filoncella, Sonora, September"; Thurber. (No. 1738; Wright. His No. 1737 seems to be a slender form of the same.)

Type: "Rio Grande below Presidio del Norte (El Paso), Aug." Parry s.n.; lectotype NY! (Henrickson Southwest. Nat. 33: 454. 1988); isotype NY!


Basionym: *A. berlandieri* Moquin-Tandon

= *A. canescens* (Pursh) Nutall


Basionym: *Calligonum canescens* Pursh

= *A. canescens* (Pursh) Nutall


= *Atriplex confertifolia* (Torrey & Frémont) S. Watson

Type locality: "On the borders of the Great Salt Lake" (l.c.)

Type: "Obione confertifolia, Tor. & Frém. in Frém. 2nd Rept. (1845). Borders of the Great Salt Lake near mouth of Weber River, Weber Co., Utah. 761, 1843"; Frémont s.n. probably 10 September 1843; holotype NY!

This species is noted by Frémont (1845) in his journal entry for 10 September 1843, on his return trip from Disappointment [Frémont] Island. The plant was probably collected on the trip from the water's edge to the camp on the lower Weber River, in Weber Co., Utah. The holotype consists of a single branch in young fruit. The sheet bears the notation in Torrey's handwriting, "Obione rigid*va* var. confertifolia n.s.p. (crossed out) T. & F." Below the notation is a drawing of a fruiting bract, with one side folded back, and an ovary. This is clearly the specimen on which the species was based. There is a second sheet at NY: "Frémont's 2nd Exped.," with the notation "Grayia or near it." The specimen has male inflorescence fragments and clearly is not a portion of the type collection.

*Obione coriacea* (Forsk.). Moquin-Tandon, in de Candolle, Enum. 71. 1840.

This Egyptian species was compared by Torrey and Frémont (Frémont 1845) with *Obione confertifolia* (see above). It does not occur in North America.


= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Type locality: SE Wyoming or W Nebraska, "Ad La Platte, Gardn. n. 250" (Moquin-Tandon in de Candolle l.c.).


The fragments at GH consist of a leaf and two immature fruiting bracteoles, probably taken from the type at K (Hooker herbarium), which we have not seen. Writing on the fragment envelope is in ink, but partly illegible. The name of the collector is subject to interpretation, but is presumed to be "Gordon." Moquin-Tandon interpreted it as "Gardner," and named the species after the person assumed by him to be the collector. The epithet was spelled gardneri on purpose and is not an orthographic variant. It is legitimate under stipulations of the International Code.


= *Atriplex hymenelytra* (Torrey) S. Watson

Type locality: "Hills and gravelly places on the William's River [Bigelow]. This species was found by Dr. Parry and by Colonel Frémont on the Gila" (l.c.)

Type: "Frémont's Expedition to California, 1849. Obione hymenelytra, n. sp. (lectotype NY!, Brown, Amer. Midl. Nat. 55: 203. 1956.). "Frémont's Expedition to California, Gila" [1849] (presumed isotypes NY Crooke!, CH!). A third sheet, "Frémont's 2nd Expedition," is at NY! Except for the sheet designated as lectotype, the Frémont materials from 1849 are scanty, consisting mainly of fruiting bracts (presumed isotypes NY!), CH!) and a branchlet of equivocal source (CH!). The lectotype at NY bears all of the accoutrements of a Torrey type specimen, except for lack of illustrations, but includes a descriptive label in Torrey's handwriting and the name Obione hymenelytra, n. sp., on the label.


= *Atriplex leutiformis* (Torrey) S. Watson

Type locality: California, along the Colorado River, S. W. Woodhouse s.n., 6 November 1851 (Sitgreaves Expedition, November 1851) (l.c.)

Type: Arizona, NY? I have been unable to locate material at NY with this designation nor make a determination as to its disposition taxonomically.


= Atriplex leucophylla (Moquin-Tandon) D. Dietrich
Type locality: “In California (Chamisso), San Francisco (Barclay)” (l.c.).
Type: “San Francisco, Barclay”; holotype K!


= A. obtusa Moquin-Tandon


Basionym: Pierocanthus occidentalis Torrey & Frémont = A. canescens (Pursh) Nuttall


= A. canescens (Pursh) Nuttall
Type locality: Texas, Valley of the Rio Grande, Wright in 1852.

All three sheets at GH bear the number 1742 on the label. One of them also has the number 394, which was evidently the field collection number. The number 1742 was subsequently applied. The specimens all have very narrow leaves to ca 4 mm wide and immature fruiting bracteoles. The sheet at GH with the number 394 is doubly mounted with a second Wright collection (1741 = No. 24), which has 4-winged fruiting bracteoles to 7 mm wide. Notes appear above both labels on the sheet. That above reads: "24, Chenop. hills near Frontera, 3-4 ft tall, branching widely, July 19, 1851. El Paso Co., Texas"; above 324 is, "324. Obione, sandy ridges on Rio Grande, 3-5 feet tall, much branching, June 17, 1852, Rio Grande below El Paso, Texas." The latter is an isotype. All of the specimens appear to be A. canescens, sens. lat.

Specimens with narrow leaves occur here and there throughout the range of the species. Those from western Texas that fit within the concept of var. angustifolia seem not to represent a taxon worthy of consideration.


Basionym: Atriplex oppositifolia S. Watson


= A. polycarpa (Torrey) S. Watson
Type: Arizona, Graham Co., "With the preceding," i.e., "Hills and gravelly places, on William’s River valley of the Gila River near base of Mt. Graham, ca 13 mi SW of Stafford," October 28, 1846, Emory s.n.; holotype NY!


= Atriplex confortifolia (Torrey & Frémont) S. Watson
Authentic specimen: "Obione rigida T. & F. On an island [Frémont Island] in Great Salt Lake, [Weber Co., Utah], Frémont 767, 1843"; Frémont s.n., 9 September 1843 (NY!, Torrey!).

The name was published without a description and is a nomen nudum. The specimen was taken on 9 September 1843 when Frémont and his boating party were on Disappointment Island in the Great Salt Lake. It seems clear from the notation that Torrey intended, at least initially, to name the species O. rigida, with the specimen taken later on “borders of the Great Salt Lake” as var. confortifolia of that species. Reasons for change of mind are not apparent, but Torrey abandoned the epithet rigida in favor of confortifolia. The application of the same number, in this case 767, to two sheets of the same taxon is in keeping with the practice of Frémont, at least occasionally, of using the number to indicate a species and not a collection. The sheet bears drawings of bracts, fruit, seed, and embryo, roughly sketched by Dr. Torrey.


= A. canescens (Pursh) Nuttall
Type locality: “In Columbia (Nutt.). Phyllocarpa spinosa Nutt.” in herb. Hook.” (l.c.).
Type: “Lophocarya * Pierocarya (crossed out) * spinosa, R. Mts. of the Columbia. Pr. canescens. Atriplex canescens?”, Nuttall s.n.; holotype BM!
This name has consistently been treated as a synonym of A. confortifolia, but the Nuttall specimen at BM is A. canescens.


= A. canescens (Pursh) Nuttall
Type locality: California, San Diego.
The isotypes at GH and K each consist of a large branch with few leaves and fruiting bracteoles still attached. The leaves are up to 4 mm wide and the bracts somewhat laciniate. Specimens approach the "laciniate" phase of A. canescens and possibly represent interspeciation of A. linnearis with A. canescens. The specimen at K bears the label information, "Obione tetraptera. California. Barkley, Hooker 1844."


= A. torreyi (S. Watson) S. Watson
Type locality: Nevada, Humboldt Co., dry valleys bordering the Truoe and Carson rivers, Torrey 463 (Watson 1871).
The holotype at GH is doubly mounted with Pary 280, 1838. It is staminate, with glomerules ca 2 mm thick arranged on short lateral spikes (to ca 1.5 cm long) on lateral branches of a much larger paniculate cluster to 28 cm long. Branches are longitudinally striate and ridged with low, acute ridges.

**Phyllocarpa spinosa** Nuttall ex Moquin-Tandon, in de Candolle, Prodr. 13(2): 108. 1849. pro syn. = A. canescens (Pursh) Nuttall


Basionym: _Calligonum canescens_ Pursh

= A. canescens (Pursh) Nuttall


A. occidentalis (Torrey & Frémont) Dietrich; A. canescens var. occidentalis (Torrey & Frémont) Welsh & Stutz = _Atriplex canescens_ (Pursh) Nuttall var. _canescens_

Type locality: "The precise locality of this plant we cannot indicate, as the label was illegible; but it was probably from the borders of the Great Salt lake" (l.c.).

Type: *Petrochiton occidentale* Torr. & Frém. Frémont, probably 10 September 1843 [locality data are missing from the type specimen] (holotype NY, microfiche BRY!).

The herbarium sheet bears a folded sheet of paper with the usual careful and detailed drawings of bracts, embov, and seed, and the designation "Petrochiton." In the lower right corner of the sheet is written "Frémont, N. Gen. Pterocalyx," and at the bottom center the words "Petrochiton occidentale, Torr. & Frém." The sheet contains three branches, with the bracts mainly fallen away. This sheet was designated as lectotype by G. D. Brown, Amer. Midl. Nat. 55: 209, 1956, but no other specimens are cited with the protologue and the designation should be holotype.

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**1852.** Appendix D. _Botany_. _In: H. Stansbury_. Exploration and survey of the valley of the Great


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