

the calyces 8–18 mm. long and often equalling the calyx-lobes; calyx-lobes merely lance-ovate and not cordate. The carpels of *M. marrubioides* are closely invested with erect hairs on the upper surface, while those on the carpels of *M. paniculatum* are appressed and nearly parallel to the surface. In view of these differences between the two plants it seems that specific rank should be accorded the population to which Gray gave only varietal recognition. None of the material from the United States has pedicels as slender as those possessed by *M. paniculatum* and none of the material of *M. marrubioides* from the interior foothills of southern California and from the eastern side of the San Joaquin Valley exhibits the abruptly flaring, cordate calyx-lobes developed in *M. paniculatum* and shown in the accompanying figure.

In the same paragraph in which Gray proposed var. *paniculatum* he relegated *M. foliosum* S. Wats. (Proc. Am. Acad. 20: 356. 1885) to the synonymy of *M. marrubioides* Dur. & Hilg. An examination of the type of *M. foliosum* S. Wats., shows that it has the leaf-pattern of *M. densiflorum* S. Wats., rather than that of *M. marrubioides*. *Malvastrum foliosum* may be a race of *M. densiflorum*, but certainly it is not conspecific with *M. marrubioides*. On the basis of the material examined to date, I prefer to recognize both *M. paniculatum* and *M. foliosum* as distinct species.

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A NEW SPECIES AND SUBGENUS OF ATRIPLEX FROM SOUTHWESTERN COLORADO

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The genus *Atriplex* in the Chenopodiaceae is characterized, in part, by the presence of a pair of bract-like organs which enclose more or less permanently a single carpellate flower. The carpellate flower, moreover, lacks a perianth except in a very few species. These species fall into two groups, (1) the Eurasian section *Hortenses* in which some of the carpellate flowers are ebracteolate and are provided with a regular 3–5-lobed herbaceous calyx, and (2) the North American section *Endolepis* in which the carpellate flowers are provided with a calyx of hyaline scales.

Hall and Clements (The phylogenetic method in taxonomy. The North American species of *Artemisia*, *Chrysothamnus*, and *Atriplex*. Carnegie Inst. of Wash. Publ. No. 326. 1923) divided the North American species of *Atriplex* into the two subgenera *Euatriplex* and *Obione*, and postulated the characters which might be combined in a primitive stock from which the subgenera were derived. This primitive stock, according to Hall, would have an inferior radicle, and would have a perianth present both in staminate and pistillate flowers. The present paper records the dis-

covery of a species of *Atriplex* which embodies these and other primitive characters.

The proposed new species was collected in the spring of 1949 on a botanical survey of the "Four Corners" area of southwestern Colorado which was sponsored by the University of Colorado Council on Research and Creative Work. This area is one that is noteworthy for the extreme localization of the species inhabiting it. The season was an especially good one for the collection of ephemeral desert annuals. One small colony of a few hundred individuals of the new species was found on an extremely barren gray clay mesa slope uninhabited by any other species except *Phacelia demissa* A. Gray. The two species grew in adjacent stands and were superficially very similar in habit, stature, and foliage characters.

In addition to the two characteristics stated above, the proposed species possesses the following attributes which Hall asserted to be primitive or generalized in *Atriplex*; bracts soft, herbaceous, widest below the middle, free to the base or nearly so; plants monoecious, with flowers of each sex mixed together in small axillary clusters; herbaceous habit. The new species also possesses a primitive feature of considerable phylogenetic importance which Hall did not anticipate, namely, the inclusion of several carpellate flowers (i.e., an entire branch of an inflorescence) within a pair of bracts. Occasional pairs of bracts were found to surround from one to two pairs of similar but smaller bracts, each in turn enclosing from two to four carpellate flowers. This evidence supports the viewpoint that the bracteal structure of the carpellate flowers of *Atriplex* represents a greatly modified and reduced inflorescence in which the bract-pairs are homologous to the floral bracts of a complex dichasium. The shape and the absence of fusion of the bracts, the inferior position of the radicle, and the annual habit suggest a close relationship with the section *Hortenses*. The nature of the carpellate perianth suggests some relationship to the section *Endolepis*, the members of which, however, differ from the new species in certain fundamental respects, such as the superior radicle and united bracts. In the author's opinion, the combination of characters exhibited by the new species is unique and necessitates (1) an expansion of the definition of the genus *Atriplex* to include the several-flowered carpellate bract-pairs, and (2) the recognition of a third subgenus for Hall's primitive stock, exemplified by the present species. This subgenus is here proposed.

Subgenus **Proatriplex** W. A. Weber, subgen. nov. Radicula inferior. Perianthium et in floribus staminatis et in carpellatis adest. Bracteae usque ad basin liberae plerosque flores carpellatos includentes.

Radicle inferior. Perianth present in both staminate and carpellate flowers. Bracts free to the base, enclosing several carpellate flowers.



FIG. 1. *Atriplex pleiantha* Weber, type specimen.

Atriplex pleiantha sp. nov. Herba annua monoica erecta glabra vel rare farinosa paene ex basi ramosissima 0.5–1.5 dm. alta caule foliisque subsucculentis; rami ascendentes albi vel plerumque subrufi; folia plura alterna integra succulenta petiolis 0.5–1.0 cm. longis laminis ovatis vel suborbicularibus 5–15 mm. longis apice obtusissimis et per gradus in contraria acutis basi eodem modo cuneatis vel truncatis; flores staminati et carpellati in inflorescentia immixti aut flores staminati in spicas breves terminales moniliformes collecti; stamina florum staminatorum 5, segmentis perianthii opposita affixa; bracteae florum carpellatorum trianguli-ovatae brevi-petiolatae integrae 3–7 mm. latae et longae apice obtusae vel mucronatae ad basin ipsam tantum conjunctae, margine superiore cilia inflexa aliquot ferente, binis bracteis quibusque 2–6 flores carpellatos includentibus demum cupulam fingentibus; perianthium florum carpellatorum manifestum squamis 5 hyalinis lanceolatis vel oblanceolatis rare ciliato-marginatis in cupula permanentibus 1.0–1.2 mm. longis consistens; utriculus suborbicularis compressus ater glaber et fulgens 1.5 mm. longus, maturatus discedens, non in perpetuum in bracteis inclusus; semen verticale; radicula inferior.

Erect annual herb, much branched from near the base, glabrous or sparsely farinose, 0.5–1.5 dm. tall with rather fleshy stem and foliage; branches ascending, white or commonly reddish; leaves numerous, alternate, entire, fleshy, the petioles 0.5–1.0 cm. long, the blades ovate or suborbicular, 5–15 mm. long, very obtuse to acute at the apex, cuneate to truncate at the base; flowers monoecious, the staminate and carpellate mixed in the inflorescence or the staminate grouped into short terminal moniliform

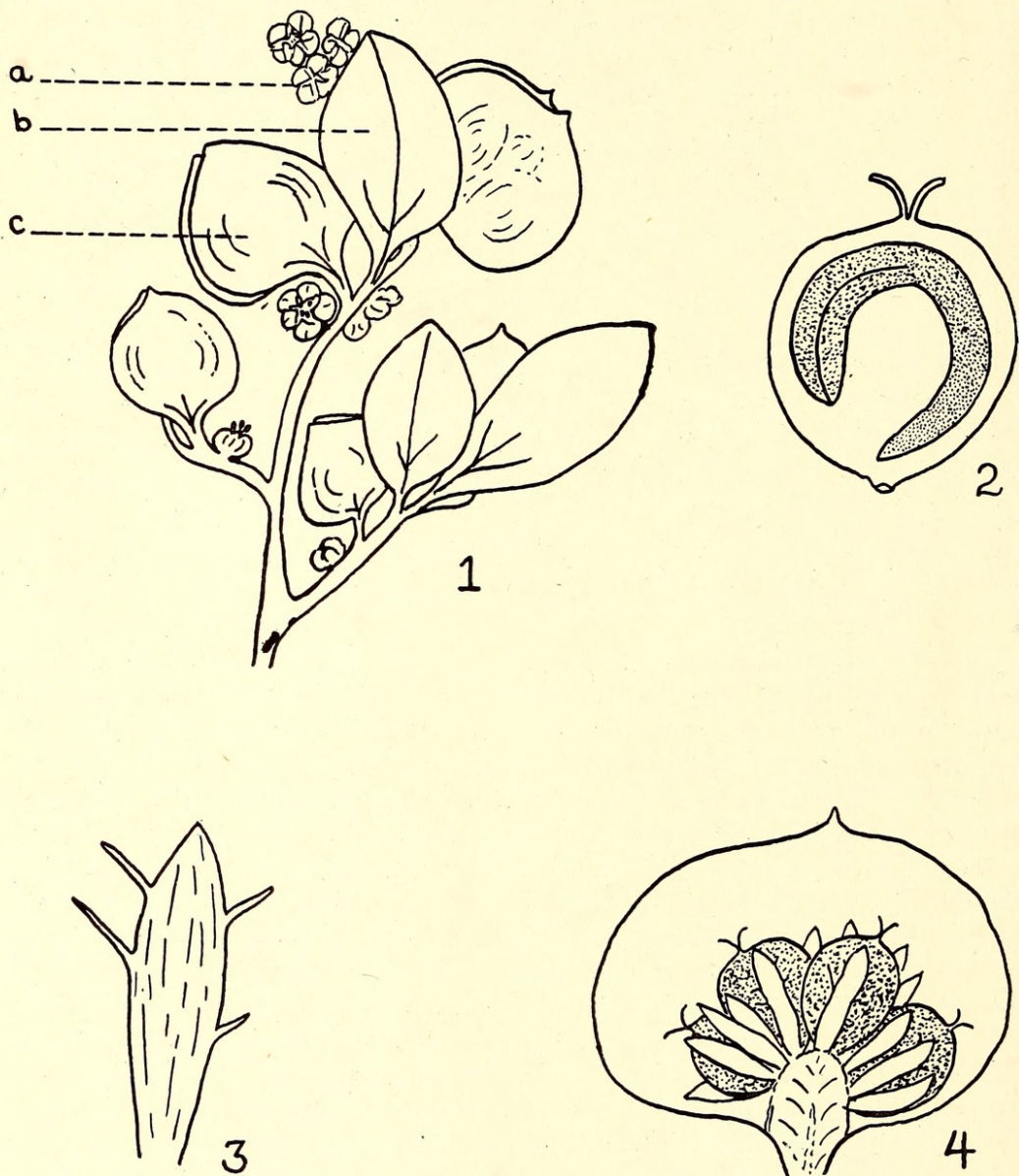


FIG. 2. *Atriplex pleiantha* Weber, 1, portion of plant ($\times 5$), showing a. staminate flower, b. leaf, c. bract of carpellate flower cluster; 2, gynoecium showing position of embryo ($\times 15$); 3, perianth segment of carpellate flower ($\times 30$); 4, diagrammatic representation of ventral view of bract showing enclosed cluster of carpellate flowers ($\times 6$).

spikes; stamens of staminate flowers 5, opposite the perianth segments; bracts of carpellate flowers triangular-ovate, short-petiolate, entire, 3–7 mm. broad and long, obtuse or mucronate at apex, united only at the very base, usually bearing a few inflexed cilia on the upper margin, each pair of bracts enclosing from 2 to 6 carpellate flowers; perianth of carpellate flowers well-developed, consisting of 5 hyaline, lanceolate or oblanceolate, sparsely ciliate-margined scales, 1.0–1.2 mm. long, persistent in the cupule formed by the bracts; utricle suborbicular, compressed, black, smooth and shining, 1.5 mm. long, falling free at maturity, not permanently enclosed within the bracts; seed vertical; radicle inferior.

COLORADO. Montezuma County: barren clay slope of mesa, northeast of trading post on Mancos River a few miles above its junction with the San Juan River, ca. 27 mi. southwest of Towaoc, Ute Indian Reservation (Township 32 N., Range 19 W., Section 17), June 12, 1949, *W. A. Weber 4788* (type, Univ. of Colorado Herb.; isotypes, Gray Herb., Pomona College Herb., U. S. Nat. Herb., Univ. of California Herb.).

The writer wishes to express his appreciation to Dr. John Hough for preparation of the Latin diagnoses.

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REVIEW

Marin Flora, Manual of the Flowering Plants and Ferns of Marin County, California. By JOHN THOMAS HOWELL. University of California Press, Berkeley and Los Angeles, California. vii + 1–323 pp., frontispiece, plates 1–24, maps 2. 1949. \$4.50.

Among the symptoms of approaching maturity of the science of Botany in California are the number of semi-popular and popular local floras that are beginning to appear for various regions of the state. The latest is "Marin Flora" by John Thomas Howell of the California Academy of Sciences. Such works serve a very useful purpose for the professional botanist as well as for the layman and naturalist. They become a detailed historical record of the composition and condition of a flora which through the activities of man is destined to become irrevocably altered with time.

The first twenty-eight pages deal with a discussion of descriptive ecology and plant geography as these appear to relate themselves to the physical features of the area. The lists of plants comprising the various plant associations should prove very useful to ecologists in both the plant and animal fields. It is not to be expected that all ecologists and plant geographers will agree with Mr. Howell's conclusions. It must be borne in mind that in so far as we are able to deal with such problems today, we must rely



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