

1958

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Recommended Citation

Rossbach, George B. (1958) "New Taxa and New Combinations in the Genus *Erysimum* in North America," *Aliso: A Journal of Systematic and Floristic Botany*. Vol. 4: Iss. 1, Article 7.
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NEW TAXA AND NEW COMBINATIONS IN THE GENUS *ERYSIMUM* IN NORTH AMERICA

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This partial treatment of *Erysimum* is derived from an unpublished monograph of the genus and its approximately twenty-five species and eight varieties in North America, concerning which the writer has made extensive taxonomic study in various American herbaria and afield through most of the range of taxa in the United States. Citations of characteristic collections and extensive discussions of taxonomy, synonymy, ecology and geology are omitted for lack of space. The writer's complete and named collections including types are in the Dudley Herbarium at Stanford University and duplicates are deposited variously elsewhere.

Erysimum inconspicuum (S. Wats.) MacMill. var. *coarctatum* (Fern.)
G. B. Rossbach, comb. nov.

Erysimum coarctatum Fern. *Rhodora* 29: 141. 1927.

Type.—sur les cailloutis calcaires, Ile a la Proie, Quebec, *Victorin & Rolland* 21464, July 20, 1925 (GH).

Distribution.—Often on rocky calcareous sites, locally on Mingan Islands and Anticosti Island of eastern Quebec, and in western Newfoundland.

Discussion.—Several botanists have erroneously included these plants within *Erysimum asperum* (Nutt.) DC., of the Great Plains, and to which Fernald improperly related them, namely Robinson, Britton & Brown and Deam, but they are obviously eastern segregates of *E. inconspicuum*, which occurs widely westward and northwestward and very locally along the Great Lakes. The variety differs from the species in the leaves being not at all or scarcely cinereous, usually crowded, stems often more than one and coarctate, petals larger and a richer yellow. The species most closely approaches the variety in moist or shady situations in Mackenzie, Yukon, British Columbia and Alaska.

Erysimum desertorum (Woot. & Standl.) G. B. Rossbach, comb. nov.

Cheirinia desertorum Woot. & Standl. *Contr. U. S. Nat. Herb.* 16: 125. 1913.

Type.—near Hachita, [southern Grant County, southwestern] New Mexico, *E. O. Wootton*, June 16, 1906 (US sheet No. 563775).

Distribution.—Definitely known from type locality, but very similar plants occur in southern New Mexico, southwestern Texas and Sonora.

Discussion.—Plants have been little collected, are seemingly local, and probably approach xerophytic members of *Erysimum capitatum* (Dougl.) Greene and *E. argillosum* (Greene) Rydb., the widespread and variable western montane complex. It may be that future research will reduce taxonomic rank.

Erysimum capitatum (Dougl.) Greene var. **angustatum** (Greene)

G. B. Rossbach, comb. nov.

Cheiranthus angustatus Greene, Pitt. 3: 132. 1896; not Abrams, Fl. Los Ang. 179. 1904; not Davidson & Moxley, Fl. S. Cal. 155. 1923.*Erysimum insulare* Greene var. *angustatum* (Greene) Jepson, Fl. Cal. 2: 75. 1936, in part, i.e. Antioch, but not Arroyo Seco Canyon, San Gabriel Mountains.Not *Erysimum angustatum* Rydb. Bull. N. Y. Bot. Gard. 2: 171. 1901, near Dawson, Yukon, a valid species.

Type.—"Sandy banks of the San Joaquin River in the interior of California, where specimens in flower and fruit were collected by the writer, 14 April, 1887", from E. L. Greene in Pittonia 3: 132. 1896 (ND two sheets).

Distribution.—Area of the type, being restricted to more or less consolidated dunes of fine sand and some clay dust, with sparse herbs and shrubs, or less often with pasture grasses, herbs and scattered *Quercus agrifolia*, alt. ca. 80 ft., dunes along tidal estuary of San Joaquin River just east of Antioch, Contra Costa County, California.

Discussion.—These homogeneous local plants are characterized by the following combination of conditions: elongate caudex, tall coarse stem usually near 5 mm. in diameter near base, leaves elongate linear-lanceolate, gradually tapering, acute, and siliques slender, commonly under 2 mm. broad. On nearby Mt. Diablo grow plants characteristic of the species.

Erysimum capitatum var. **bealianum** (Jepson) G. B. Rossbach, comb. nov.*Erysimum asperum* (Nutt.) DC. var. *bealianum* Jepson, Fl. Cal. 2: 74. 1936.

Type.—Barstow, 2200 ft., Mojave Desert, San Bernardino County, California, Jepson 5181, October 20, 1912 (JEPS). Identifiable material composed of matured stems and racemes with siliques and seeds. Many characteristic collections by others adequately represent the variety.

Distribution.—Porous soil on desert plains, with small bushes, usually within the zone of *Yucca brevifolia*, between 2000 and 4000 ft., western Mojave Desert, known from just east of longitude 117° west and westward, in western San Bernardino County and in nearby portions of Kern and Los Angeles counties, California. Related forms within the species extend locally along arid foothills especially northward and northwestward, and to the southwest in the Little San Bernardino Mountains of Riverside County. But plants seemingly characteristic of this variety also occur, isolated, on the edge of the Carrizo Plain, e.g. foothills at its northeastern and southeastern ends, in San Luis Obispo County, California.

Discussion.—These plants are identifiable on the basis of the following combination of characters: stems of non-impoveryished plants over 5 mm. in diameter near base, leaves oblanceolate, rather blunt, entire or very sparingly and minutely denticulate, cinereous, siliques broad, commonly 2-2.5 mm., less often to 3.

Erysimum capitatum var. **washoense** G. B. Rossbach, var. nov.

Planta biennis; caulibus 1-7 in base saepe ramosis rigidis humilibus 0.5-12 cm. vulgo 3-8 ad basem racemi: foliis elongatis lineare-oblanceolatis subacutis, foliis rosulatis 2.5-7 cm. longis circa 1 vel circa 3 mm. latis vulgo dentatis, foliis caulinis 1.2-5 cm. vulgo circa 3 longis 2-3.5 mm. latis integris vel sparsim dentatis, omnibus foliis pubescentibus multis, pilis 2-3-divisis vulgo 2-divisis praevalentibus angustis vulgo 3-divisis praevalentibus latioribus: racemis comparate longis vulgo 3-10 cm. interdum 1-21: pediculis 2.5-11 mm. vulgo 3-6 longis interdum inferioribus multum longioribus circa 0.7-1 mm. diametro: petalis luteis parvis circa 7-16 mm. longis 3-5

mm. latis ad unguam gradatim fastigatis: siliquis confertis ascendentibus rigidis compressis sed rotundo-rhomboides transectione inaequaliter carinatis ad stylum gradatim fastigatis 3-7.5 cm. longis 1.5-2 mm. latis, pilis sparsis brevis tenuis 2-3-divisis; stylo longo 2-3 mm. circa 0.5-0.8 mm. diametro; stigmatibus vadosis bilobatis parvis 0.7-1.7 mm. lato: seminibus saepissime remotis ovalibus vel oblongatis aliquantum compressis 1.5-2.5 mm. vulgo 2 longis 0.7-1.2 mm. latis luteo-castaneis alatis; appendice terminale.

Biennial; stems 1 to about 7, often branched at any point on a major stem or individually simple, rigid, low, 0.5-12 cm., commonly 3-8, to base of raceme: leaves elongate, linear-oblongate, subacute, radical 2.5-7 cm. long, slightly over 1 to slightly over 3 mm. broad, nearly always dentate, cauline 1.2-5 cm., commonly about 3, long, 2-3.5 mm. broad, entire to sparingly dentate, all leaves pubescent with numerous 2-3-parted hairs, usually 2-parted dominant on the narrow, usually 3-parted dominant on the broader: racemes comparatively long, commonly 3-10 cm., occasionally 1-21: pedicels 2.5-11 mm., commonly 3-6, long, sometimes lower ones much longer, about 0.7-1 mm. thick: petals yellow, small, about 7-16 mm. long, 3-5 mm. broad, tapering gradually to claw: siliques crowded, ascending, straight or slightly upcurved, rigid, compressed, but rounded-rhombic in cross-section, unequally keeled, tapering gradually to style, 3-7.5 cm. long, 1.5-2 mm. broad, pubescent with sparse, short, fine, 2-3-parted hairs; style long, 2-3 mm., about 0.5-0.8 mm. thick; stigma not conspicuously bilobed, small, 0.7-1.7 mm. wide: seeds most often remote, oval to oblong, somewhat compressed, usually bearing minute scarious appendage at distal end, somewhat compressed, usually bearing minute scarious appendage at distal end, 1.6-2.5 mm., commonly 2, long, 0.7-1.2 mm. broad, yellow-castaneous.—April-July.

Type.—Steamboat Spring, 5000 ft., [Washoe County], Nevada, *M. E. Jones*, June 7, 1897 (POM).

Distribution.—Rough deposit of more or less active hot springs, open ground, Steamboat Springs, and springs about ten miles south-southeast of Reno, 4600 ft., Upper Sonoran zone, Washoe County, Nevada.

Discussion.—These local, ecologically restricted, xerophytic dwarf plants are now well represented in herbaria. As seen afield and in collections, they prove to be comparatively homogeneous and fairly distinct on a combination of characters: very low, often with several stems, the major ones divaricately and rigidly long-branched, leaves cinereous and callose-tipped, petals small, siliques rigid, somewhat compressed and unequally keeled, with long styles. In certain respects they therefore resemble *E. argillosum* (Greene) Rydb. of the Rocky Mountains and locally west through the Great Basin, and also *E. perenne* (S. Wats.) Abrams, which is primarily in the higher Sierra Nevada.

Past treatment of these plants is confused. They are not *E. pumilum* Nutt. in Torr. & Gray, Fl. N. Am. 1: 95. 1838, as Sereno Watson may have believed when he made the combination *E. asperum* var. *pumilum* in Bot. King Exped. 24. 1871. More divergent are they from *E. occidentale* (S. Wats.) Robinson, with which Watson likely confused them (*Cheiranthus occidentalis* S. Wats. Proc. Am. Acad. 23: 261. 1888), perhaps followed by Robinson, Peck, Abrams and Davis under *Erysimum*. Nevada plants referred to by the above authors under *E. occidentale* are certainly not at all concerned with the distinct and more coastal type of species properly of that name which these authors also and correctly locate in its restricted range on the sandy areas along the Columbia River and its lower tributaries east of the Gorge.

Erysimum pallasii (Pursh) Fern. var. **bracteosum** G. B. Rossbach, var. nov.

Herba, caulibus altis circa 8.5-18 cm. plurimum 15-16 ad basim racemi: foliis anguste lineare-oblongatis profunde multidentatis circa 3-5 cm. longis 1-2 mm. latis, pilis paucissimis: inflorescentibus diverse elongatis; sepalis elongatis, 6-7 mm. longis circa 1 mm. latis: pediculis bracteatis prope basi, bracteis inferioribus foliosis superioribus minoribus vel absentibus: siliquis immaturis tenuis; stylo circa 1 mm. longo tenuo circa 0.5 mm. diametro.

Stems tall, about 8.5-18 cm., most 15-16, to base of raceme: leaves narrowly linear-oblongate, numerous and deeply dentate, about 3-5 cm. long, 1-2 mm. broad, pubescence very sparse: inflorescence not quite corymbose, to varying degrees rather elongate; sepals elongate, 6-7 mm. long, about 1 mm. broad: pedicels, except for upper, bearing bracts at or near base; bracts foliose below, smaller to absent above: siliques immature, slender; style about 1 mm. long, slender, about 0.5 mm. thick. Described as differing from species.

Type.—Teller, west coast of Alaska, *Ella Gebrmann*, June 25, 1916 (CAS).

Topotype.—*Ella Gebrmann*, June 21, 1916 (US).

Known distribution.—Type locality, Teller, Alaska.

Discussion.—Plants of this variety grow in a region of less rigorous climate than those areas to the north and east occupied by plants of usual *E. pallasii*, and their elongate habit is in keeping with the comparatively mild climate. Varietal distinction lies in much greater height and elongation of all parts, more numerous and deeply dentate leaves, and presence of leaves, and above them, bracts, extending farther up the raceme. To date, the writer has not seen intermediate plants. The variety may be related to *E. nivale* (Greene) Rydb., especially the form of this which has rose-colored rather than yellow petals and has been called *E. amoenum* (Greene) Rydb. *E. nivale* and its rose form occurs locally at high altitudes in the Rocky Mountains of Colorado and locally in nearby states, replaced by *E. perenne* in the Sierra Nevada and sparingly northward. Plants of this montane group are not presently known north of Idaho and Washington, and forms of *E. pallasii* are not known to approach them southward beyond Great Bear Lake and a mountain in southwestern Mackenzie (Raup, Bot. S. W. Mackenzie) and Seward Peninsula, Alaska, except for a seeming form of this species on a mountain near Banff. Geographical and taxonomic intermediates are to be sought.

Erysimum franciscanum G. B. Rossbach, sp. nov. var. **franciscanum**

Planta biennis vel perennis, caudice breve vel producto simplice vel ramoso saepe aliquibus ramis solum foliis rosulatis; caulibus 1-pluribus simplicibus vel ramosis 5-43 cm. raro magis vulgo 9-25 cm. ab caudice ad basim racemi: foliis non carnosus, foliis caulinis inferioribus et rosulatis elongatis lineare-oblongatis acutis acriter saepe profunde numerosaque sinuato-dentatis, foliis fastigatis gradatissime ad petiolum 2.5-17 cm. vulgo 4-9 longis 1-14 mm. vulgo 2-8 mm. latis, pilis paululum sparsim 2-3-divisis, interdum paucis multo-divisis sed vulgo praevalenter 3-divisis: racemis 2-34 cm. vulgo 4-23 longis, racemis centralibus vulgissime 10-20 cm.: pediculis plus quam minus ascendentibus 3-24 mm. vulgo 5-14 longis circa 1 mm. diametro: inflorescentibus vulgo confertis; petalis luteis vel flavidis grandibus 14-29 mm. vulgo 18-25 longis 5-15 mm. vulgo 7-10 latis vulgo ad ungulam abrupte fastigatis: siliquis vulgo ascendentibus interdum late divergentibus gradatim raro abrupte ad stylum fastigatis vulgo valde compressis non carnosus inaequaliter sed manifeste carinatis 4-13.5 cm. vulgo 6.5-10 longis circa 2-3.5 mm. latis vulgo purpura tingatis, pilis non

copiosis brevibus 2-3-divisis interdum paucis multo-divisis; stylo vulgo 1-2 mm. longo circa 0.5-1 mm. diametro; stigmatate circa 0.7-2 mm. lato: seminibus oblongatis vel ovatis valde compressis plus quam minus prominentiter carinatis 2-3.5 mm. vulgo circa 2.5 longis 1.5-2 mm. latis castanaceis vel testaceis alatis; partibus terminalibus et margine uno seminorum fere vel in totum alatis.

Biennial or short-lived perennial, caudex short to elongate, simple or branched, often with some divisions bearing rosettes only; stems 1-several, occasionally many, simple or branched, 5-43 cm., rarely more, commonly 9-25 from caudex to base of raceme: leaves not fleshy, lower cauline and radical elongate, linear-oblancoolate, acute, sharply, often quite deeply, and numerous sinuate-dentate, tapering very gradually to petiole, 2.5-17 cm., commonly 4-9, long, 1-14 mm., commonly 2-8, broad, pubescence rather sparse, hairs 2-3-parted, sometimes with a few many-parted, but usually dominantly 3-parted: racemes 2-34 cm., commonly 4-23, long, those of central axes most commonly 10-20 cm.: pedicels more or less ascending, less so than siliques, 3-24 mm., commonly 5-14, long, about 1 mm. thick: inflorescence usually crowded; petals yellow to cream-colored or occasionally rich egg-yellow, large, 14-29 mm., commonly 18-25, long, 5-15 mm., commonly 7-10, broad, usually abruptly contracted to claw: siliques usually ascending, most often strongly so, occasionally widely spreading if long and heavy, tapering gradually, rarely abruptly, to style, usually strongly compressed, not fleshy, unequally, yet conspicuously, keeled, 4-13.5 cm., commonly 6.5-10, long, about 2-3.5 mm. broad, commonly tinged with purple, pubescence not abundant, of short, 2-3-, sometimes with a few many-parted hairs; style commonly 1-2 mm. long, about 0.1-1 mm. thick; stigma about 0.7-2 mm. wide: seeds oblong to oval, strongly compressed, more or less prominently keeled, extensively bordered about distal end and mostly or wholly along one side by a rather narrow, scarious wing, measuring, inclusive of wing, 2-3.5 mm., commonly about 2.5, long, 1.5-2 mm. broad, castaneous to a paler yellowish brown.—Early February-June.

Type.—Soil containing much disintegrated serpentine rock, open bank on east side of Crystal Springs Lake, 350 ft., San Mateo County, California, *G. B. Rossbach* 837, May 18, 1938 (DS).

Distribution.—Usually open, sometimes openly wooded or brushy, rocky, gravelly or sandy soil, often either of disintegrated serpentine or nearly pure sand, but only very locally on dunes near coast, but seemingly not found on the hard, metamorphosed, red-brown shale common to hills in San Francisco, etc. Local in California on the San Francisco peninsula from Golden Gate (Presidio), south to region of Crystal Springs Lake, very local in region of Mt. Tamalpais, Marin County, formerly but not recently found at Bodega Bay (not Bodega Head), Sonoma County; very local in Curry County, Oregon, on serpentine slope by Rogue River near Gold Beach. Most common on Sunset Heights, San Bruno Hills, slopes about the lakes called Crystal Springs, San Andreas, Pilarcitos, and in parts of nearby Montara Mountains. Except on Sunset Heights, plants within San Francisco city limits, including Merced Lake and several hills, have been recently largely extirpated due to urban expansion.

Discussion.—*Erysimum franciscanum* is closest to *E. concinnum* Eastw. and *E. amophilum* Heller of the coastal complex, and is also close to true *E. capitatum* (Dougl.) Greene of the inland montane complex. It seems likely that these coastal groups resembling *E. capitatum* are of hybrid origin. An extreme coastal type like *E. menziesii* (Hook.) Wettst. at Point Pinos near Monterey and non-maritime *E. capitatum* conceivably crossed under some geographically differing conditions to produce *E. concinnum*, then more recently the last could have crossed with *E. capitatum* to

produce *E. franciscanum*. These putative hybrids sometimes occur near possible parents or rare colonies very close to such, but the stated hypothetical hybrids could exist irrespective of the present proximity or purity of either suspected parental type due to destruction or introgression.

Erysimum franciscanum differs from *E. concinnum* least and to somewhat varying degrees in having more linear and more gradually tapering leaves, usually more gradually tapering siliques, usually longer style, and general lack of succulence. It differs from *E. ammophilum* in having usually much broader, more dentate lower leaves, usually ascending instead of divaricate siliques, and these more gradually tapering to a longer style, and in some areas the plants have cream-white petals as may some of *E. concinnum*, but never *E. ammophilum*. Siliques, seeds, and above all, leaves are notably broader than on plants of related *E. teretifolium* Eastw., local to the Santa Margarita sand deposit in Santa Cruz County. Finally, *E. franciscanum* differs from *E. capitatum* in having flatter, more extensively winged seeds, broader, much more compressed siliques, often several stems, which are generally lower, more consistently deeply dentate leaves, and never deep orange, brick-red, maroon or purple petals.

Members of this proposed taxon have long been known, but they have been ascribed to differing species and thus erroneously named as follows: *Cheiranthus asper* Nutt. sensu Cham. & Schlecht. Linnaea 1:14. 1826, at least in part, not Nutt. Gen. 2: 69. 1818, of the Great Plains. This error was continued by Torrey and by Brewer & Watson.

The following erroneous synonym became generally and continuously used, and concerns seven taxa of the coastal complex, especially these of northerly California. *Cheiranthus capitatus* Dougl. sensu Torr. & Gray, Fl. N. Am. 1: 71. 1838, in part, not Dougl. in Hook. Fl. Bor.-Am. 1: 38. 1829, which is the widespread western species largely of inland hills, as proven by study of a photograph of the type at Kew, obligingly sent to the writer by C. A. Weatherby. This error was continued and spread by E. L. Greene, under *Erysimum*, Fl. Fran. 269. 1891, followed by Jepson in both his floras, and retained under the original genus by Howell, Fl. N. W. Am. 1: 39. 1897. The other coastal plants most especially confused here are *E. concinnum* and *E. menziesii*. The latter was earlier given the already used, invalid name, *E. grandiflorum* by Nuttall in Torr. & Gray, Fl. N. Am. 1: 96. 1838. This name was also indiscriminately applied to the above coastal plants by Robinson in Gray, Syn. Fl. 11: 144. 1895. As will be noted below, also the southern coastal complex is to a degree confused with the above plants.

***Erysimum franciscanum* var. *crassifolium* G. B. Rossbach, var. nov.**

Varietas a specie cauli suffrutescente, basi plerumque patente, caudice elongato plerumque ramoso plus ramos steriles in rosulas terminales gerens, caulibus pluribus crassis patento-ascendentibus, foliis confertis carnosis ad basem versus marcescentibus, petalis vere aureis, siliquis carnosis tumidis in stylum abrupte transeuntibus, stylo brevi crasso plerumque longitudine non plusque 1 mm. diametro plus minusve 1 mm., discedit.

Short-lived perennial or biennial, suffrutescens, caudex elongate, usually branched, often with some divisions bearing rosettes only; racemose stems usually several, simple or branched, stout, sprawling-ascending (or if low, more or less erect), with some to many crowded marcescent leaves below, 10-35 cm., sometimes 6-54, to base of raceme: leaves usually fleshy, yellowish green, usually recurved, broadly to linear-oblancoolate, more or less acute, numerous sinuate-dentate, the lower 3.5-11 cm., commonly 5-9, long, 4-18 mm., commonly 5-12, broad, sparsely pubescent with 2-3-

parted, sometimes with a few many-parted, but dominantly 3-parted hairs: racemes 2-20 cm. long; pedicels ascending to more or less divergent, 6-13 mm. long, 1-1.7 mm. thick: inflorescence crowded, more or less capitate; petals rich egg-yellow, large, 18-28 mm., commonly 20-24, long, 7-15 mm., commonly 8-11, broad, abruptly contracted to claw; sepals usually fleshy, 7-12 mm., commonly 9-10, long, 2-4 mm., commonly about 3, broad: siliques ascending, occasionally divergent, more or less upcurved, tapering abruptly to style, more or less fleshy, plump, usually strongly compressed when dry, yellowish and often purplish green, 5-10 cm., commonly over 6, long, 2-3 mm. broad, pubescence not abundant, of small, short, 2-3-, or some many-parted, but dominantly 3-parted hairs; style short, thick, almost lacking to 1.8 mm., commonly 1 or less, long, 0.5 to about 2 mm., commonly about 1, thick; stigma 1-2.5 mm., commonly between 1 and 2, wide: seeds usually crowded, often irregular in shape, nearly circular to oval to oblong, strongly compressed, extensively bordered about distal end and more or less along one side by a narrow, scarious, pale brown wing, measuring, inclusive of wing, 2-2.3 mm., commonly 2, long, about 1.8 mm. broad, castaneous to yellowish brown.—Latter February to early June.

Type.—With loose, low, coastal chaparral of *Eriophyllum*, *Artemisia californica*, *Rhus*, etc., high seaward slope, about 2 miles south of San Francisco boundary and about 3 miles north of Sharp Park (Salada), San Mateo County, California, *G. B. Rossbach* 572, March 26, 1955, matured siliques and seeds added July 27, 1955 (DS).

Distribution.—Usually in open coastal chaparral, sometimes more exposed, on coastal slopes, bluffs, headlands. Several colonies known in San Mateo County, California: 2 miles south of San Francisco boundary, and on seaward end of Montara Mountains on and near Pedro Point and on and near Devil's Slide. At least one other colony was found in 1922 and 1939 in northern Santa Cruz County, California, among sparse bushes and herbage on seaward slopes of sandhills near coast, Scott Creek and Route 1.

Discussion.—Plants of var. *crassifolium* differ from usual conditions of the species as follows: suffrutescens, usually basally spreading, caudex elongate, usually branched, usually bearing more vegetative branches, the usually several racemose stems stout, spreading-ascending; leaves fleshy, often large, crowded below, where narrower and becoming marcescent; petals consistently rich yellow; siliques fleshy, plump (but compressed when dry) tapering abruptly to style, which is short, commonly not over 1 mm., and thick, about 1 mm.

Erysimum suffrutescens* (Abrams) G. B. Rossbach, comb. nov. var. *suffrutescens

Cheiranthus suffrutescens Abrams, Bull. So. Cal. Acad. Sci. 2: 41. 1903.

Erysimum concinnum Eastw. subsp. *suffrutescens* Abrams, Ill. Fl. Pac. States, 2: 319. 1944.

Type.—Sand dunes, Playa del Rey, [Los Angeles County], California, *Abrams* 2511, June 10, 1902 (DS).

Distribution.—Coastal sandy ground, mainly dunes, southern Santa Monica Bay, Los Angeles County, and dunes along southwestern San Luis Obispo County from Santa Maria River north to southern Morro Bay, California.

Discussion.—These plants have by some been confused with the northern coastal complex and the inland montane complex. Robinson placed them in part under *E. grandiflorum* Nutt., a synonym of *E. menziesii* (Hook.) Wettst. of Point Pinos and locally to the north. Abrams, in finally relating them to *E. concinnum*, confused them with a quite different group of northern California and southern Oregon. Jepson and Munz referred them in part to *E. capitatum*, assuming that taxon to be coastal, not interior.

Plants are characteristically suffrutescent, with divided, subligneous caudex, bearing some vegetative branches as well as the spreading-erect fertile stems. Siliques are equally quadrangular or to varying degrees compressed parallel to septum.

The related species, *E. insulare* Greene, of Santa Rosa and San Miguel islands, California, and as an atypical form on Outer Islet, Guadalupe Island, Baja California, differs in having leaves which are narrower, more linear and attenuate, more recurved, entire, and more densely pubescent, more crowded, on more sprawling stems, and in siliques being shorter, and not only subequally quadrangular, but often compressed even at right angles to septum, more commonly strict, on usually longer pedicels, and replete with smaller, non-compressed, wingless seeds. Regarding siliques and seeds, the following variety is near *E. insulare*.

***Erysimum suffrutescens* var. *grandifolium* G. B. Rossbach, var. nov.**

Planta suffruticosa diffusa; ramis inferioribus vel solum vegetatis vel racemosis, ramis vegetatis foliis rosulatis apicibus ferentibus, ramis racemosis longis vulgo 20-40 cm. interdum 15-60 ad basim racemi: foliis carnosius confertis apud basim ramorum racemosorum marcescentibus aliisque caducis linearibus oblanceolatis grandibus saepe latisque saepe recurvatis vulgo integris sed interdum sparsim denticulatis 4-16 cm. vulgo 5-12 longis 3-20 mm. vulgo 3-12 latis, pubescentibus pilis dispargis 2-4-divisis saepe praevalentibus 3-divisis: racemis 2-34 cm. vulgo 5-25 longis: pediculis diversis vulgo 6-10 longis 1-2 mm. diametro: inflorescentibus confertis; petalis flavis vel aurantiaco-flavis vulgo 17-20 mm. longis vulgo 7-10 mm. latis: siliquis divergentibus vel ascendentibus curvatis sursum saepe valde contra septem compressis vel paene quadratis subaequaliter carinatis apice et basi abrupte contractis multi-seminiferis carnosius crassis vulgo 3-6 cm. longis circa 2-4 mm. latis, pubescentibus pilis 2-4-divisis plerumque 3-divisis brevibus numerosisque; stylo plerumque brevi 0.2-1.8 mm. longo 0.6-2 mm. diametro; stigmato vulgo circa 1.5 mm. lato: seminibus in ordinibus duobus in quisque valva plerumque cofertis formatis irregulariter non valde compressatis prominente carinatis saepe non alatis vulgo 1.5-2 mm. longis 1-1.6 mm. vulgo circa 1 latis castaneis vel luteo-bruneis.

Short-lived perennial and possibly biennial, suffrutescent, becoming thicker and more ligneous basally, usually much branched and sprawling to ascending below, caudex elongate; lower branches either solely vegetative or racemose, the vegetative bearing dense rosettes of leaves at apices, the racemose long, commonly 20-40 cm., occasionally 15-60, to base of raceme: leaves fleshy, yellowish green, often purplish, crowded near bases of racemose branches, where marcescent or some dropping, linear-oblanceolate, large and often broad, recurved at apex except for the broader, usually entire, but often sparingly denticulate near raceme, 4-16 cm., commonly 5-12, long, 3-20 mm., commonly 3-12, broad, sizes in both dimensions tending to fall into two overlapping groups, pubescent with sparse, 2-4-parted, often dominantly 3-parted hairs: racemes 2-34 cm., commonly 5-25 long: pedicels divergent, 5-16 mm., commonly 6-10, long, 1-2 mm. thick: inflorescence often compact; petals rich yellow to slightly orange-yellow, 14-22 mm., commonly 17-20, long, 6-13 mm., commonly 7-10, broad, tapering rather abruptly to claw: siliques divergent to ascending, more or less upcurved, often much compressed at right angles to septum, or nearly square, subequally and prominently keeled, abruptly contracted to either extremity, replete with many seeds, fleshy, 2-7 cm., commonly 3-4.5 or 6, long, tending toward two extremes according to plant, thick, 2-4 mm. broad, usually broader when short, pubescent with numerous, short, 2-4-parted, usually dominantly 3-parted hairs; style usually short, 0.2-1.8 mm. long, 0.6-2 mm. thick; stigma shallowly bilobed, 0.7-2.3

mm., commonly about 1.5, wide: seeds in two rows in either valve, usually crowded, irregular, not much compressed, thickly keeled, often wingless, 1-2.5 mm., commonly 1.5-2, long, 1-1.6 mm., commonly slightly over 1, wide, castaneous or yellowish brown.—February-June, especially April.

Type.—Sand, coastal dunes at Surf, Santa Barbara County, California, G. B. & R. P. Rossbach 831, May 7, 1938 (DS).

Distribution.—Coastal dunes at Surf and for some miles southward, Santa Barbara County, and steep rocky slopes on Morro Rock near Morro Bay, San Luis Obispo County, California.

Discussion.—Members of this proposed variety have been included within related *E. insulare* by Munz, Man. So. Cal. 206. 1933, and treated as a variety of the taxonomically and geographically more remote *E. concinnum* by Abrams, Ill. Fl. Pac. States 2: 319. 1944. Field study of the variety at Surf and of the species at Oso Flaco Lake and on Santa Monica Bay reveals relationship.

Plants of the variety differ from those of the species in being more sprawling and massive, more succulent, and in bearing more vegetative branches. Leaves tend to be much broader, tending more toward two sizes and shapes according to location, whether in sterile rosettes or on fertile stems. Pubescence is sparser and includes more 3-parted hairs as opposed to 2-parted. Siliques tend to resemble those of offshore *E. insulare*, in being often compressed at right angles to septum, or nearly square, subequally and prominently keeled, fleshy, short and broad, abruptly contracted, filled with many angular, barely compressed, thickly keeled, often wingless, small seeds.

Although the southern and northern coastal complexes differ much for members of such a genus as *Erysimum*, there seem to be some inter-relationships. Forms of *E. amophilum* seem to occur in both regions, and *E. suffrutescens* var. *grandifolium* resembles the northern *E. franciscanum* var. *crassifolium*.

***Erysimum suffrutescens* var. *lompocense* G. B. Rossbach, var. nov.**

Varietas *E. capitato* similis a specie *suffrutescente* minus *suffrutescens*, caudice plus minusve erecto simplice vel aliquantulum diviso folia pauca marcescentia ad basem versus atque ramulos brevos paucos gerente vel eis deficientibus caulibus gracilibus plerumque longioribus racemosisque parte infra racemum 30-61 cm. plerumque 30-50 longa simplicibus vel interdum ramosis folias acutas remote denticulatas interdum integras elongatas haud carnosas, siliquis 6-13 cm. longas 1.3-1.8 mm. latas gerentibus, petalis aurantiacis vel luteo-aurantiacis, seminis longis angustis ad apicem versus alatis, discedit.

Short-lived perennial or biennial, becoming subliguous and slightly suffrutescent at base; caudex simple or few times divided, slightly elongate; all or most stems racemose, but sometimes one or more short, basal, purely vegetative branches present, racemose stems usually slender, 30-61 cm., commonly 30-50, to base of raceme, simple or sometimes branched, but usually bearing very small abortive axillary branches: leaves thin, not fleshy, commonly more or less marcescent and slender along base of stem, tending to drop just above this zone, narrowly linear-lanceolate to slightly oblanceolate, acute, attenuate below and usually distally remotely denticulate, sometimes entire, 4-18 cm., commonly 6-9, long, 1-9 mm., commonly 2-5, broad, narrowest on rosettes of first year or low on stem, pubescent with fine, 2-3-, dominantly 2-parted, rather widely spaced hairs: racemes long, 10-41 cm.: pedicels ascending, slightly upcurved, 5-12 mm., commonly 7-10, long, slender, about 0.6-0.9 mm. thick: inflorescence capitate; petals orange to orange-yellow, 13-20 mm., commonly 15-18 long, 4-8 mm., commonly 5-7, broad, rather abruptly contracted to claw: sili-

ques ascending, at least when young, compressed parallel to septum, unequally and slenderly keeled, long, slender, not fleshy, often purplish green, 6-13 cm., commonly 8-10, long, about 1.3-1.8 mm. broad, pubescent with short, fine, 2-3-, dominantly 2-parted hairs; style 0.5-3 mm., commonly 1-1.5, long, about 0.5-0.8 mm. thick; stigma small, 0.7-1.4 mm., commonly 1-1.2, wide: seeds long, narrow, distally winged, but none seen in quite mature condition.—Latter February or early March-May, mainly April.

Type.—Locally common on fine-sandy ground, with open shrubbery and herbs, low mesa west of Mission Purisima Concepcion, about 300 ft., Santa Barbara County, California, *G. B. Rossbach* 590, May 1, 1955 (DS).

Distribution.—Loose, fine, sandy or diatomaceous ground, with open brush or small trees and sparse herbs, on more sterile areas of low mesas and their eroding edges and slopes, between 200 and 400 ft. (few atypical relations up to 800 ft.), near but not on the coast, California, in western Santa Barbara County, especially east and north of Lompoc, and into southern San Luis Obispo County on Nipomo Mesa near Nipomo and west to region of Guadalupe at southern boundary of county and north to Black Lake Canyon, where plants approach the species, but not occurring on the nearby broad coastal dunes as at Oso Flaco Lake, where the species is common.

Discussion.—Comparative morphology, ecology and distribution support the writer's hypothesis that members of coastal *E. suffrutescens* are hybrid between a more extreme coastal type and plants of inland *E. capitatum*, and that the group here named is the result of further introgression of *E. suffrutescens* with *E. capitatum*. To whichever species they are relegated, plants of this variety approach the coastal species regarding the somewhat subligneous base with some marcescent leaves and more or less elongate, sometimes branching caudex. They approach or equal plants of some forms of *E. capitatum* in height, form of leaf, length and slenderness of silique and color of petals. Putative parents are geographically near in oppositely extreme environments. *E. suffrutescens* grows on nearby coastal dunes in vicinity of Oso Flaco Lake, and var. *grandifolium* occurs on dunes from Surf southward. *E. capitatum* is known from a wooded coastal hillside at Avila, northwest of Nipomo, and some plants nearest to *E. capitatum* and too coarse, tall, and deeply orange-flowered for the variety in question, grow among small oaks and bushes on sandy slopes near Santa Rita in Santa Barbara County.