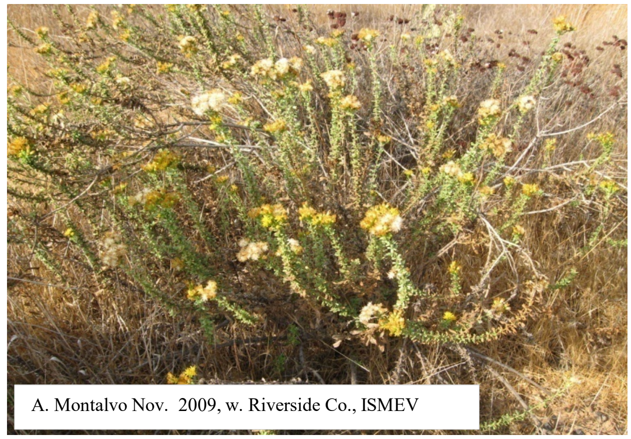
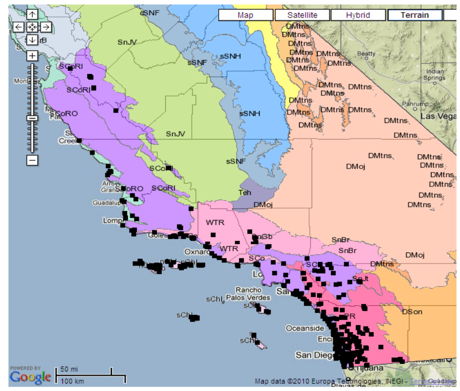
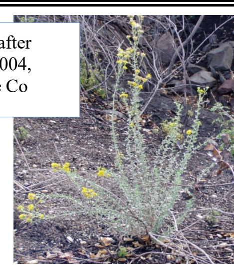
SPECIES	*Isocoma menziesii* (Hooker & Arnott) G. L. Nesom
NRCS CODE: **ISME5** **(general for species)** 	Family: **Asteraceae** Order: **Asterales** Subclass: **Asteridae** Class: **Magnoliopsida**   A. Montalvo Nov. 2009, w. Riverside Co., ISMEV
Subspecific taxa **NRCS CODES:** **1. ISMEM** **2. ISMED** **3. ISMED2** **4. ISMES** **5. ISMEV**	FNA (2010), USDA PLANTS, and the Jepson Flora Project (JepsonOnline 2nd Edition 2010) recognize five varieties; all occur in CA; Hickman (1993) did not recognize varieties *decumbens* or *diabolica.* 1. *I. m.* var. *menziesii* 2. *I. m.* var. *decumbens* (Greene) G. L. Nesom 3. *I. m.* var. *diabolica* G. L. Nesom 4. *I. m.* var. *sedoides* (Greene) G. L. Nesom 5. *I. m.* var. *vernonioides* (Nuttall) G. L. Nesom
Synonyms (numbers correspond to order of subspecific taxa above)	General, for ISME5: *Haplopappus venetus* (Kunth) S. F. Blake ; *Isocoma veneta* (Kunth) Greene; *Pyrrocoma menziesii* Hooker & Arnott. Synonyms by varietal name: 1. *Haplopappus venetus* subsp. *oxyphyllus* (Greene) H. M. Hall; *Isocoma oxyphylla* Greene; *I. veneta* (Kunth) Greene var. *oxyphylla* (Greene) R. M. Beauchamp 2. *Isocoma decumbens* Greene; *Haplopappus venetus* subsp. *furfuraceus* (Greene) H. M. Hall; *Isocoma veneta* var. *furfuracea* (Greene) R. M. Beauchamp 3. None listed 4. *Bigelowia veneta* (Kunth) A. Gray var. *sedoides* Greene; *Haplopappus venetus* var. *sedoides* (Greene) Munz; *Isocoma veneta* var. *sedoides* (Greene) Jepson 5. *Isocoma vernonioides* Nuttall; *Haplopappus venetus* subsp. *vernonioides* (Nuttall) H. M. Hall; *Isocoma veneta* (Kunth) Greene var. *vernonioides* (Nuttall) Jepson
Common name **(numbers correspond to order of subspecific taxa above)**	General for species: Menzies' goldenbush, Menzies's coast goldenbush; Menzies's jimmyweed; coast goldenbush; coastal isocoma; Pacific jimmyweed (Painter 2009). For varieties: 1. Menzies's goldenbush, spreading goldenbush 2. decumbent goldenbush (Painter 2009) 3. Satan's goldenbush (Painter 2009) 4. prostrate goldenbush (Roberts 2008) 5. coastal goldenbush (Roberts 2008)
Taxonomic relationships	*Isocoma* has about 10 species in southwestern North America and Mexico (Hickman 1993). *Isocoma* is related to *Hazardia, Machaeranthera,* and *Ericamer ia* (Lane & Hartman1996).
Related taxa in region	Of the three species of *Isocoma* in California, only *I. acradenia* (E. Greene) E. Greene, the alkali goldenbush, occurs in southern California. It can be distinguished by its often swollen, glandular, oblong phyllaries which have blunt tips, more inland and eastward distribution (primarily in Central Valley and desert sites), affinity to alkaline or gypsum flats and slopes, and finer soil texture including clay.
Taxonomic issues	The three southern CA varieties intergraded (e.g., Nesom 1991), and varietal names are difficult to place on many specimens. For example, it can be difficult to distinguish between var. *menziesii* (plants glabrous to glabrate; leaves mostly entire to shallowly serrate at apex, acute; if obtuse then small) and var. *vernonioides* (plants prominantly villous; leaves mostly dentate, lobed, incised, and obtuse to acute ending in an acute lobe; e.g., Munz 1974, FNA 2010). In Riverside and San Diego counties, the variety *vernonioides* can produce small, often nearly glabrous leaves that might reflect genes from var. *menziesii* (FNA 2010), which occurs primarily in Riverside Co. Also, the low growing, coastal, fleshy-leaved variety *sedoides* appears to have intergraded with variety *v ernonioides* near the coast (FNA 2010).

Other	*I. menziesii* var. *diabolica* from the San Francisco Bay Area is on the CNPS list 4.2. The plant is endemic and considered fairly endangered in California (on State list S3.2 and CNPS list 4.2; CNPS 2009).
GENERAL	
Map	**ISME5** All varieties included on map. Data provided by the participants of the Consortium of California Herbaria represent 466 records with coordinate data out of 1224 reterieved records; data accessed 9/1/10. See Berkeley Mapper: https://ucjeps.berkeley.edu/consortium/ 
Geographic range	*I. menziesii* has a patchy distribution from central CA south into Baja CA along coast and inland valleys, as well as the Channel Islands. 1. var. *menziesii* : uncommon, primarily Riverside and San Diego counties, CA, into Baja CA. 2. var. *decumbens* : uncommon, San Diego County southward into Baja CA (FNA 2010). 3. var. *diabolica* : endemic to San Benito and Santa Clara counties, CA (of inland montane habitats). 4. var. *sedoides* : CA coast; uncommon in Orange Co. (Roberts 2008). 5. var. *vernonioides* : widespread and locally common, CA coast, inland valleys, south into Baja CA.
Distribution in California; Ecological section and subsection	Primarily in Central West and South West portions of California Floristic Province (Ecological Sections: 261A; 261Ba-j; M262A; most of M262B below 1200 m). 1. South Coast, southern Channel Islands, Peninsular Ranges. 2. see Geographic range section 3. see Geographic range section 4. Primarily from Santa Barbara Co. south to Baja CA; coastal portion of South Coast and northern Channel Is. 5. From San Francisco Bay Area, south along coast to Baja CA; Inner and Outer South Coast Ranges and Sacramento Valley, Channel Islands, South Coast, inland into western Riverside Co.
Life history, life form	shrub/subshrub, evergreen, retains leaves during drought
Distinguishing traits	Late season flowering subshrubs with green to grey-green leafy stems that branch mostly from base, ending in loose to tight clusters of heads with tubular yellow disk flowers. The heads are subtended by 3 to 6 rows of phyllaries, each of which has very small resin glands at the tip (JepsonOnline 2010, Jepson 2nd Edition 2010). The alternate leaves can be entire to dentate and are often clustered in leaf axils. Plants are prostrate to erect; the low growing forms tend to be on the coast. In the fall, leaves can turn bluish-grey-green, especially after a cold snap.
Root system, rhizomes, stolons, etc.	Taproot (Clarke et al. 2007). The main root of the related *Happlopappus venetus* is highly branched (Sigüenza et al. 1996).
Rooting depth	Root area exceeds shoot area 40:1 (Kummerow et al. 1977). For *Ericameria pinifolia* , a species in a related genus (noted as *Hazardia pinifolius* in the paper), there is a conical vertical tap root, horizontally arranged, spreading lateral roots, to 80 cm depth; fine roots in upper 30 cm; most roots in upper 20 cm (shallowly rooted) (D'Antonio & Mahall 1991).
HABITAT	
Plant association groups	May be dominant or co-dominant in shrubland alliances (Sawyer et al. 2009) but often occurs scattered within disturbed grasslands or coastal sage scrub. Often a component of coastal sage scrub on dry, sandy slopes and flats (Hickman 1993). 1. ISMEM: coastal sage scrub, open forb/grasslands, on slopes of arroyos, and along boarders of alkaline saltgrass meadows in western Riverside Co. (A. Montalvo, pers. obs.).

Habitat affinity and breadth of habitat	Generally for ISME5: Coastal salt-marsh, wetlands and non-wetlands, sandy soils (Newton & Claassen 2003); especially occurs in disturbed places, e.g., coastal bluffs, alluvial fans, stream terraces, arroyo bottoms, overgrazed pastures (Louda 1983, Sawyer et al. 2009). 1. var. *menziesii* : landward side of dunes; on slopes and along arroyos inland (Hickman 1993). Soil sandstone to granite, dunes, hillsides, arroyos. 4. var. *sedoides* : uncommon along coastal bluffs in Orange Co. (Roberts 2008); exposed coastal bluffs, headlands, beaches (Hickman 1993). 5. var. *vernonioides* : common in disturbed habitats, such as alluvial fans, riparian edges, microsites in coastal sage scrub and grasslands, especially near wet places (Roberts 2008). Protected dune microsites, shores of lagoons.
Elevation range	Below 1200 m (Hickman 1993)
Soil texture, chemicals, depth	Semi-dry, rocky and sandy (Hickman 1993) 1. var. *menziesii* : sandy soils derived from sandstone or granite; sand dunes. 4. var. *sedoides* : sandy soils, marine terrace bluffs. 5. var. *vernonioides* : sandy soils; also(too many spaces) tolerant of somewhat salty soils of lagoon shores and marshes. In western Riverside, populations of plants that appear to be *I. m.* var. *menziesii* grade into *I. m.* var. *vernonioides* and occur in a variety of soils, including sandy and fine sandy loams derived from granite, fine sandy loams derived from weathered gabbro and latite-porphyry, and fine textured alkaline alluvial soils at the edges of flood plains of major watercourses. Plants may be generally tolerant of alkaline/saline soils. It is not known if there is variation in tolerance to alkaline/salty soils (A. Montalvo pers. obs.).
Drought tolerance	Dry to moist tolerant (Hickman 1993)
Precipitation	In Meditterranean cimate regions of California with dry warm to hot summers and cool, wet winters. From inland to coastal locations, rainfall varies from about 10 to 25 inches.
Flooding or high water tolerance	Plants from along watercourses and floodplains in western Riverside Co. tolerate limited flooding and summer water (A. Montalvo pers. obs).
Wetland indicator status for California	*I.* var. *vernonioides* : Facultative wetland (USDA PLANTS)
Shade tolerance	Generally a plant of full sun and open habitats but withstands partial shade in gardens and at the edge of riparian areas.
GROWTH AND REPRODUCTION	
Seedling emergence relevant to general ecology	Seedlings emerge in the cool winter season after the autumn seed dispersal and ample rain (A. Montalvo, pers. obs.).
Growth pattern (phenology)	Vegetative growth is in winter and spring and plants bloom April-Dec. (but primarily in late summer); mature seeds are released October to December (Louda 1983, A. Montalvo, pers. obs.). Plants usually take more than two rainy seasons to reach maturity but can reach maturity the first summer in a good rainfall year or if irrigated (Montalvo, pers. obs.).
Vegetative propagation	None.
Regeneration after fire or other disturbance	*I. m.* var. *menziesii* has a low occurrence of resprouting after fire (Sawyer et al. 2009), but plants resprout readily after mowing (A. Montalvo pers. obs.). A related species, *H. squarrosa,* resprouted up to 0.5 m from main shoots (Keeley & Keeley 1984) and flowered and set seed in first year after fire. In a sample of 90 post fire sites in chaparral and coastal sage scrub in s. California, *H. squarrosa* resprouted after fire and produced seedlings in the second spring at 35 of 90 sites (Keeley et al. 2006). *Isocoma* was not listed in this study, indicating that it either did not often resprout after fire or populations were not in the study areas.  ISMEV after fire, 10/2004, Riverside Co
Pollination	Butterflies and native bees visit flowers; also wasps (chrysidid), flies, and non-native honey bees (*Apis mellifera*) (Louda 1983).
Primary seed dispersal	Wind. The plumose achenes are easily scattered by wind.
Breeding system, mating system	Plants reproduce sexually and are capable of outcrossing.
Hybridization potential	Yes. Hybrids between *Isocoma veneta* and *Xanthocephalum humile* (Kunth) Benth were found in Mexico, but hybrids had reduced fertility (Hartman & Lane 1991). The authors proposed that hybridization is possible between members of the subfamily Asteraceae that have a base number of n=6 chromosomes.

Inbreeding and outbreeding effects	
BIOLOGICAL INTERACTIONS	
Competitiveness	Roots displaced by non-native iceplant *Carpobrotus edulis* (D'Antonio & Mahall 1991).
Herbivory, seed predation, disease	Louda (1983) examined herbivory in natural populations from the coast and inland sites in southern CA. There were many more adults at coastal compared to inland sites, but more viable seeds were released inland; vertebrate herbivore pressure was greater inland with corresponding higher seedling mortality (Louda 1983). In the presence of spiders on inflorescences, seed set was lower, but seed maturation increased with a net increase of 17.7% seed production/branch (Louda 1982c).
Palatability, attractiveness to animals, response to grazing	
Mycorrhizal?	For a study in coastal Baja California, Sigüenza et al. (1996) found roots colonized by arbuscular mycorrhizae. Colonization was low in February and March and highest in June. Spore density was highest late in the growing season. Vogelsang et al. (2004) found that native plants such as *I. menziesii* grew better in soils containing mycorrhizal fungi.
ECOLOGICAL GENETICS	
Ploidy	There is variation in chromosome count reports. JepsonOnline (2010) reports 2n=12, and FNA (2010) lists 2n=24. Anderson et al. (1974) reported n=6 for *I. menziesii* (noted as *Haplopappus venetus*). Base (gametic) chromosome number of *I. m.* var. *vernonioides* was listed as n=6 for two populations (Point Dume and Whittier, Los Angeles Co.) and 10 pairs plus a ring of 4 chromosomes for one population (Otay, San Diego Co.), published as *Haplopappus venetes* var. *vernonioides* (Raven et al. 1960). Nesom (1991) lists chromosome counts as n=12 pairs (i.e., 2n=24) for var. *menziesii* and var. *vernonioides* .
Plasticity	
Geographic variation (morphological and physiological traits)	Louda (1983) found that the pattern of decreasing abundance of plants of *I. m.* var. *vernoniodies* from coastal to inland locations in San Diego county was less likely due to variation in seed predation patterns than to patterns in seedling establishment. Both seed set and seed predation were higher toward the coast, and more seeds survived to dispersal stage further away from the coast. However, seedling survival was greater toward the coast. No studies were found that addressed if there are genetic differences between plants from the different climatic zones with respect to susceptibility to insects or seedling survival.
Genetic variation and population structure	Not measured. Gene dispersal is likely to be high in this species due to pollination by insects and dispersal of the buoyant, plumose seeds by wind. High levels of dispersal often result in low population structure and high levels of genetic variation.
Phenotypic or genotypic variation in interactions with other organisms	
Local adaptation	
Translocation risks	
SEEDS	For RSABG seed images: http://www.hazmac.biz/seedphotoslistgenus.html
General	No data found for standard minimum viability and germination. The body of the achene is often tan-colored, about six times longer than wide, wider on the plumose end, and usually with lengthwise striations. The top of the achene has a ring of long whitish bristles (parachute), about as long as the body to longer.
Seed longevity	Relatively short-lived. Seeds stored under ambient warehouse conditions in coastal Carpinteria, CA showed a significant drop in seed viability by the second year (Jody Miller, S&S Seeds, pers. com.). Data from seven seed lots tested over two years had an average of 34% germination in the first year and 9.6% germination the second year. One seed lot was assessed in year 3, and it dropped to 0% germination (42%, 14%, and 0% for years 1, 2, and 3, respectively).
Seed dormancy	None known.
Seed maturation	Seed mature in the fall; most dispersal is in November to December (Louda 1983). The pappus becomes fluffy and achenes detach easily from receptacle when mature.

Seed collecting	In southern CA, ripe seeds are often ready to harvest mid October to mid December (A. Montalvo, pers. obs.). Ripe heads can be shaken over open containers to collect dispersing achenes, or ripe heads can be removed from plants and placed immediately into open containers or porous bags. Avoid harvesting on windy days.
Seed processing	For another species, *Isocoma acradenia* , Wall & Macdonald (2009) recommend rubbing flowers over a large screen and using an Oregon Seed Unit blower at speed 1.0 to sort achenes, before sieving over a medium screen to separate seeds from bracts. The plumose seeds are retained in a number 18 sieve (1 mm mesh) (A. Montalvo pers. obs.).
Seed storage	Store under cool, dry conditions to increase longevity. Seeds are likely to survive longer after drying and freezing, similar to *Chrysothamnus,* a closely-related genus.
Seed germination	No pre-treatment required (De Hart 1994). Seedlings emerge in early winter with adequate rainfall.
Seeds/lb	835,000 (S&S Seeds 2010). [800,000 seeds/ pure live seed lb (http://www.ssseeds.com/media/218482/ssseeds_guide.pdf)
Planting	In the nursery, seeds are planted on the surface of soil and sprinkled with an incomplete layer of course sand to improve soil/seed contact (A. Montalvo pers. obs.). Shallow seeding methods are expected to provide higher germination than methods that bury seeds deeper than 1/8 inch; seeds can be successfully hydroseeded, hand sown and raked/harrowed, or planted with a seed imprinter (A. Montalvo pers. obs.)
Seed increase activities or potential? ISMEV seedling, Jutta Burger 	This is an easy species to grow, and plants can withstand warm weather irrigation. The Irvine Ranch Conservancy planted a field with 2-inch liners of ISMEV at 24 in and 36 in spacing in Orange County in fall, 2009. After occasional applications of supplemental water, plants produced 100% cover by mid-summer of year 1 and began flowering in mid September 2010 (J. Burger, pers. com.). ISMEV seed increase field in Orange Co., CA, Jutta Burger 
USES	
Revegetation and erosion control	Good for stabilizing soil of open banks of arroyos, bioswales, and water quality basins (A. Montalvo pers. obs). Fast growing from seed; does well on gentle slopes or flats. In western Riverside Co., resprouts after mowing in fuel modification areas (A. Montalvo, pers. obs.).
Habitat restoration	Plants establish well from seeds or containers (A. Montalvo, pers. obs.). Sterile fill slopes and seed beds can be inoculated with beneficial microorganisms by planting small plants that have had their soil inoculated with healthy native soil in the nursery.
Horticulture or agriculture	*I. m.* var. *sedoides* is a low growing shrub good for coastal rock gardens and for stabilizing sandy soils (Keator 1994). Varieties *menziesii* and *vernonioides* are available from southern California native plant nurseries for use in gardens for late summer and early fall color (A. Montalvo, pers. obs.). In the nursery, sow untreated seeds on the surface of well-drained soil; a very thin layer of course sand or soil over the seeds helps to keep them from blowing away and to keep seeds moist. Seedlings emerged within 5 days of planting from seeds collected within a month of planting (A. Montalvo, pers. obs.). Plants respond well to trimming or mowing in late winter or spring. Flats or pots can be inoculated with healthy whole soil from natural populations before planting seeds to encourage the young plants to become mycorrhizal.
Wildlife value	Late season nectar source for butterflies, bees. Provides cover.
Plant material releases by NRCS and cooperators	None.
Ethnobotanical	No information was found for *I. menziesii.* However, a related species, *I. acradenia* (listed as *Haplopappus acradenius* in the publication), was used by the Cahuilla people for a variety of medicinal purposes (Bean & Saubel 1972). An infusion of the roots was boiled and drunk for colds, the steam from an infusion of the leaves was inhaled for sore throats, and a poultice of boiled leaves was used on sores. They also warn that some related species (then recognized as Haplopappus) are poisonous. In fact, Kingsbury (1964) lists *Haplopappus venetus* as having toxic concentrations of nitrates.

ACKNOWLEDGMENTS	Partial funding for production of this plant profile was provided by the U.S. Department of Agriculture, Forest Service, Pacific Southwest Region Native Plant Materials Program. Jutta Burger of the Irvine Ranch Conservancy provided comments and seed increase information for this profile.
CITATION	Montalvo, A. M., and J. L. Beyers. 2010. Plant Profile for *Isocoma menziesii*. Native Plant Recommendations for Southern California Ecoregions. Riverside-Corona Resource Conservation District and U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Riverside, CA. Online: https://www.rcrcd.org/plant-profiles.
LINKS: REVIEWED DATABASES & PLANT PROFILES	
Fire Effects and Information System (FEIS)	No matches: https://feis-crs.org/feis/
Jepson Flora, Herbarium (JepsonOnline)	https://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?Isocoma%20menziesii
Jepson Flora, 2nd Edition (JepsonOnline 2nd Ed)	https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=3640
USDA PLANTS	https://plants.usda.gov/java/nameSearch?keywordquery=isocoma+menziesii&mode=sciname&submit.x=0&submit.y=0
Native Seed Network	https://nativeseednetwork.org/
GRIN	https://npgsweb.ars-grin.gov/gringlobal/search.aspx
Flora of North America (online version)	http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250067013
Native American Ethnobotany Database (NAE)	http://naeb.brit.org/
Calflora	https://www.calflora.org//
Rancho Santa Ana Botanic Garden Seed Program, seed photos	http://www.hazmac.biz/rsabghome.html

Bibliography for *Isocoma menziesii*

Anderson, L. C., D. W. Kyhos, T. Mosquin, A. M. Powell, and P. H. Raven. 1974. Chromosome numbers in Compositae. IX. *Haplopappus* and other Astereae. American Journal of Botany **61**:665-671.

Bean, J. L., and K. S. Saubel. 1972. Temalpakh: Cahuilla Indian Knowledge and Usage of Plants. Malki Museum Press, Morongo Indian Reservation, CA.

Bowler, P. A. 2000. Ecological restoration of coastal sage scrub and its potential role in habitat conservation plans. Environmental Management **26**:S85-S96.

Clarke, O. F., D. Svehla, G. Ballmer, and A. Montalvo. 2007. Flora of the Santa Ana River and Environs with References to World Botany. Heyday Books, Berkeley, CA.

CNPS. 2009. Inventory of Rare and Endangered Plants (online edition, v7-09a). California Native Plant Society, Sacramento, CA. https://www.cnps.org/rare-plants/cnps-inventory-of-rare-plants.

D'Antonio, C. M., and B. E. Mahall. 1991. Root profiles and competition between the invasive, exotic perennial, *Carpobrotus edulis*, and two native shrub species in California coastal scrub. American Journal of Botany **78**:885-894.

De Hart, J. 1994. Propagation Secrets for California Native Plants. Jeanine De Hart, Encinitas, California.

Evens, J., and S. San. 2005. Vegetation Alliances of the San Dieguito River Park Region, San Diego County, California. California Natural Heritage Program of the California Department of Fish and Game and the California Native Plant Society, Sacramento, CA.

Ferren, W., Jr., and D. M. Hubbard. 1998. Review of ten years of vernal pool restoration and creation in Santa Barbara, California. Pages 206-216 *in* C. W. Witham, E. T. Bauder, B. Belk, W. Ferren, Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, CA.

FNA Editorial Committee. 1993+. Flora of North America north of Mexico. 10+ volumes. New York and Oxford. Available online: http://beta.floranorthamerica.org/Main_Page. Last accessed August 2010.

Hartman, R. L., and M. A. Lane. 1991. A natural intergeneric hybrid in the x = 6 group of the Astereae (Asteraceae). SIDA Contributions to Botany **14**:321-329.

Hickman, J. C. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, CA.

JepsonOnline. 2010. The Jepson Manual Higher Plants of California; Online Version with 2nd edition notes. https://ucjeps.berkeley.edu/jepman.html. (Updated to Jepson eFlora: https://ucjeps.berkeley.edu/eflora/)

JepsonOnline 2nd Edition. 2010. D. Keil, in press. *Isocoma*. In B. G. Baldwin et al. (editors.), The Jepson Manual: Vascular Plants of California. Univ. of California Press, Berkeley. Retrieved from ucjeps.berkeley.edu/jepsonmanual/review/ on October 17, 2010. (Updated to: https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=3640)

Keator, G. 1994. Complete Garden Guide to the Native Shrubs of California. Chronicle Books, San Francisco, CA.

Keeley, J. E., C. J. Fotheringham, and M. Baer-Keeley. 2006. Demographic patterns of postfire regeneration in Mediterranean-climate shrublands of California. Ecological Monographs **76**:235-255.

Keeley, J. E., and S. C. Keeley. 1984. Postfire recovery of California coastal sage scrub. The American Midland Naturalist **111**:105-117.

Kern, M. D., M. K. Sogge, R. B. Kern, and C. Van Riper, III. 1993. Nests and nest sites of the San Miguel Island song sparrow. Journal of Field Ornithology **64**:367-381.

Kingsbury, J. M. 1964. Poisonous Plants of the United States and Canada. Prentice-Hall, Inc., Englewood Cliffs, NJ.

Knight, C. A., and D. D. Ackerly. 2002. An ecological and evolutionary analysis of photosynthetic thermotolerance using the temperature-dependent increase in fluorescence. Oecologia **130**:505-514.

Knight, C. A., and D. D. Ackerly. 2003. Evolution and plasticity of photosynthetic thermal tolerance, specific leaf area and leaf size: Congeneric species from desert and coastal environments. New Phytologist **160**:337-347.

Kummerow, J., D. Krause, and W. Jow. 1977. Root systems of chaparral shrubs. Oecologia **29**:163-177.

Lane, M. A., and R. L. Hartman. 1996. Reclassification of North American *Haplopappus* (Compositae: Astereae) completed: *Rayjacksonia* gen. nov. American Journal of Botany **83**:356-370.

Louda, S. M. 1982a. Distribution ecology: Variation in plant recruitment over a gradient in relation to insect seed predation. Ecological Monographs **52**:25-41.

Louda, S. M. 1982b. Limitation of the recruitment of the shrub *Haplopappus squarrosus* (Asteraceae) by flower- and seed-feeding insects. Journal of Ecology **70**:43-53.

Louda, S. M. 1982c. Inflorescence spiders: A cost/benefit analysis for the host plant, *Haplopappus venetus* Blake (Asteraceae). Oecologia **55**:185-191.

Louda, S. M. 1983. Seed predation and seedling mortality in the recruitment of a shrub, *Haplopappus venetus* (Asteraceae), along a climatic gradient. Ecology **64**:511-521.

Maron, J. L., and E. Crone. 2006. Herbivory: Effects on plant abundance, distribution and population growth. Proceedings of the Royal Society of London Series B, Biological Sciences **273**:2575-2584.

Munz, P. A. 1974. A Flora of Southern California. University of California Press, Berkeley, CA.

Nesom, G. L. 1991. Taxonomy of *Isocoma* (Compositae: Astereae). Phytologia **70**:69-114.

Newton, G. A., and V. Claassen. 2003. Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making. California Department of Conservation, California Geological Survey.

Oneal, A. S., and J. T. Rotenberry. 2008. Riparian plant composition in an urbanizing landscape in southern California, U.S.A. Landscape Ecology **23**:553-567.

Painter, E. 2009. Common (vernacular) names applied to California vascular plants. University of California Herbarium. (see Jepson Interchange for updated links by variety: e.g., https://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?7751.)

Peinado, M., J. L. Aguirre, J. Delgadillo, and M. Macias. 2008. A phytosociological and phytogeographical survey of the coastal vegetation of western North America. Part I: Plant communities of Baja California, Mexico. Plant Ecology **196**:27-60.

Raven, P. H., O. T. Solbrig, D. W. Kyhos, and R. Snow. 1960. Chromosome numbers in Compositae. I. Astereae. American Journal of Botany **47**:124-132.

Roberts, F. M., Jr. 2008. The Vascular Plants of Orange County, California: An Annotated Checklist. F. M. Roberts Publications, San Luis Rey, CA.

S&S Seeds. 2010. S & S Seeds Seed Selection Guide. http://www.ssseeds.com/media/218482/ssseeds_guide.pdf.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A Manual of California Vegetation, 2nd edition. California Native Plant Society Press, Sacramento, CA.

Sigüenza, C., I. Espejel, and E. B. Allen. 1996. Seasonality of mycorrhizae in coastal sand dunes of Baja California. Mycorrhiza **6**:151-157.

USDA PLANTS. 2010. The PLANTS Database (https://plants.usda.gov/java/). National Data Center, Baton Rouge, LA 70874-4490 USA.

Vogelsang, K. M., J. D. Bever, M. Griswold, and P. A. Schultz. 2004. The Use of Mycorrhizal Fungi in Erosion Control Applications. Final Report for Caltrans Contract No. 65A0070.

Wall, M., and J. Macdonald. 2009. Processing Seeds of California Native Plants for Conservation, Storage, and Restoration. Rancho Santa Ana Botanic Garden Seed Program, Claremont, CA; available online: http://www.hazmac.biz/seedhome.html.