

Family: *Papaveraceae*

Taxon: *Eschscholzia californica*

Synonym: *Eschscholzia douglasii* Benth. [\neq *Eschscholzia* *Common Name:* Californian poppy
Eschscholzia mexicana Greene [\equiv *Eschscholzia* Mexican gold-poppy

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation: H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score 14
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)		y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates		y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs		y=1, n=0	n
402	Allelopathic		y=1, n=0	n
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	y
405	Toxic to animals		y=1, n=0	y
406	Host for recognized pests and pathogens		y=1, n=0	
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	
408	Creates a fire hazard in natural ecosystems		y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0	y
411	Climbing or smothering growth habit		y=1, n=0	n

412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	n
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	y
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 14

Supporting Data:

101	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257–264.	[Is the species highly domesticated?? No] "There are three common variants of <i>E. californica</i> that are relevant to this study: first, plants from coastal environments that are perennial and usually short in stature with prostrate growth and yellow flowers; second, perennial plants from non desert, inland areas that generally grow taller and have orange flowers, sometimes called <i>E. californica</i> var. <i>crocea</i> (Benth.); and third, an annual form that occurs in desert regions, sometimes called <i>E. californica</i> var. <i>peninsularis</i> (Greene) (Munz 1963). These varietal differences persist when plants are grown in common environments (Boucher 1985)."
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Species suited to tropical or subtropical climate(s)? 2-high] "Native to Central and South America and the West Indies; in Hawaii naturalized in disturbed sites, especially along roadsides, 550-920 m, in dry forest on Maui and mesic forest on Hawaii."
202	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Quality of climate match data? 2-high] "Native to Central and South America and the West Indies; in Hawaii naturalized in disturbed sites, especially along roadsides, 550-920 m, in dry forest on Maui and mesic forest on Hawaii."
203	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Broad climate suitability (environmental versatility)? Yes] " <i>Eschscholzia californica</i> is an annual or perennial herb of the family <i>Papaveraceae</i> . It is native in western North America from the Columbia River to Baja California and from the Pacific Coast eastward into the Great Basin. Within this area it grows at altitudes from sea level to 6,500 feet on open, well-drained soils of dunes, alluvial fans, river terraces, and hillsides."
203	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257–264.	[Broad climate suitability (environmental versatility)? Yes] " <i>Eschscholzia californica</i> grows across a wide range of environmental conditions in its native range, often occupying open, naturally disturbed environments (Cook 1962)."
204	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Native to Central and South America and the West Indies; in Hawaii naturalized in disturbed sites, especially along roadsides, 550-920 m, in dry forest on Maui and mesic forest on Hawaii."
205	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Does the species have a history of repeated introductions outside its natural range? Yes] "It is both widespread and abundant within its native region; man has extended its range by introducing it to Chile, New Zealand, Tasmania, and Australia, where it has become naturalized."
301	1988. Webb, C. J./Sykes, W.R./Garnock-Jones, P.J.. Flora of New Zealand, Volume IV: Naturalised pteridophytes, gymnosperms, dicotyledons. Botany Division, DSIR, Christchurch, New Zealand http://FloraSeries.LandcareResearch.co.nz	[Naturalized beyond native range? Yes] "Dry stony sites, especially on roadsides and dry riverbeds" [New Zealand]
301	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Naturalized beyond native range? Yes] "...in Hawaii naturalized in disturbed sites, especially along roadsides, 550-920 m, in dry forest on Maui and mesic forest on Hawaii."
301	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257–264.	[Naturalized beyond native range? Yes] "Our study focuses on the comparison of native California poppies, <i>Eschscholzia californica</i> Cham. (<i>Papaveraceae</i>), with populations that are invasive in Chile. Endemic to western North America, <i>E. californica</i> is an invasive species in other areas of the world, chiefly those with Mediterranean climates (Stebbins 1965)."
302	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia Californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Garden/amenity/disturbance weed? Yes] "The poppy has behaved as a benign weed under conditions created by man. Small populations arise atop gravel piles, in gravelly ballast of railroads, or on road cuts and other areas where the established vegetation has been destroyed by excavation. Occasionally poppies may be seen in grain fields, where their growth is apparently favoured by mowing the overtopping grain. Although the plants themselves are cut back, new shoots emerge from ground level and flower from mid-summer to autumn." [but a benign weed]

302	2002. Bowen, B./Johnson, K./Franklin, S./Call, G./Webber, M.. Invasive Exotic Pest Plants in Tennessee. <i>Journal of the Tennessee Academy of Science</i> . 77(2): 45-48.	[Garden/amenity/disturbance weed? Yes] "Lesser Threat. Exotic plant species that spread in or near disturbed areas, and are not presently considered a threat to native plant communities." [List includes <i>Eschscholzia californica</i>]
302	2007. Leger, E.A./Rice, K.J.. Assessing the speed and predictability of local adaptation in invasive California poppies (<i>Eschscholzia californica</i>). <i>Journal of Evolutionary Biology</i> . 20(3): 1090-1103.	[Garden/amenity/disturbance weed? Yes] "Eschscholzia californica has adjusted rapidly to its role as a non-native plant in Chile. Not only has it become more adept at colonizing disturbed environments (Leger & Rice, 2003), but it has also evolved what appear to be locally adapted genotypes over the course of 150 years. The evidence for local adaptation is robust, as similar clinal patterns are seen when plants are grown in different common gardens. The adaptations of the invasive poppies are broadly convergent with those seen in the native range, but invasive <i>E. californica</i> demonstrates that evolution can be flexible, with plants evolving minor differences in traits while retaining the same general syndromes along similar gradients."
302	2009. Parks, J.. The War on Pests: Dealing to key pest plants and animals that threaten native species. Banks Peninsula Conservation Trust & Environment Canterbury, Canterbury, NZ	[Garden/amenity/disturbance weed? Yes] "Weeds: Certain weeds specialise in invading rocky habitats. For example, in the lower altitude rocky outcrops on the Port Hills, boneseed (<i>Chrysanthemoides monilifera</i>), boxthorn (<i>Lycium ferocissimum</i>), wallflower (<i>Cheiranthus cheiri</i>), spur valerian (<i>Centranthus ruber</i>), Cotoneaster spp., pig's ear (<i>Cotyledon orbiculata</i>), fennel (<i>Foeniculum vulgare</i>), miner's lettuce (<i>Claytonia perfoliata</i>), Californian poppy (<i>Eschscholzia californica</i>), and the ferns (<i>Polypodium vulgare</i>) and male fern (<i>Dryopteris filix-mas</i>) are of increasing concern and have the potential to spread to the rest of the Peninsula unless checked."
302	2011. Lady Bird Johnson Wildflower Center. Native Plant Database - <i>Eschscholzia californica</i> . http://www.wildflower.org/plants/result.php?id_plant=ESCA2	[Garden/amenity/disturbance weed? Yes] "California poppy is often used in wildflower mixes. It is easy to grow, drought tolerant, and reseeds so readily that it can become weedy."
303	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Agricultural/forestry/horticultural weed? No] "The poppy has behaved as a benign weed under conditions created by man. Small populations arise atop gravel piles, in gravelly ballast of railroads, or on road cuts and other areas where the established vegetation has been destroyed by excavation. Occasionally poppies may be seen in grain fields, where their growth is apparently favoured by mowing the overtopping grain. Although the plants themselves are cut back, new shoots emerge from ground level and flower from mid-summer to autumn." [no evidence of negative impacts]
304	2002. Bowen, B./Johnson, K./Franklin, S./Call, G./Webber, M.. Invasive Exotic Pest Plants in Tennessee. <i>Journal of the Tennessee Academy of Science</i> . 77(2): 45-48.	[Environmental weed? No] "Lesser Threat. Exotic plant species that spread in or near disturbed areas, and are not presently considered a threat to native plant communities." [List includes <i>Eschscholzia californica</i>]
304	2011. Weedbusters. <i>Eschscholzia californica</i> . http://weedbusters.co.nz/weed_info/detail.asp?WeedID=147	[Environmental weed? Possibly] "Outcompetes small native grasses and herbs on poor soils."
305	2007. Randall, R.P.. Global Compendium of Weeds - <i>Eschscholzia caespitosa</i> [Online Database]. http://www.hear.org/gcw/species/eschscholzia_caespitosa/	[Congeneric weed? No] " <i>Eschscholzia caespitosa</i> ...casual alien" [no evidence that this species is negatively affecting agriculture or natural systems]
305	2007. Randall, R.P.. Global Compendium of Weeds - <i>Eschscholzia ciliata</i> [Online Database]. http://www.hear.org/gcw/species/eschscholzia_ciliata/	" <i>Eschscholzia ciliata</i> ...naturalised" [no evidence that this species is negatively affecting agriculture or natural systems]
401	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Produces spines, thorns or burrs? No] "Glaucous, subglabrous annual or perennial herbs; stems erect or ascending, sprawling with age, 2-6 dm long, branched. Leaves ca. 3-12 cm long, the lobes linear-elliptic, 1-3 mm wide."
402	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Allelopathic? No] " <i>Avena</i> was chosen as competitor in the slope experiment because it frequently grows with or near <i>Eschscholzia</i> ... <i>Avena</i> was chosen as competitor in the slope experiment because it frequently grows with or near <i>Eschscholzia</i> . Examination of Table 4 shows that competition with the poppy (under the density of the 1959 experiment) only slightly reduced the total number of culms of <i>Avena</i> . This reduction was most marked at the top of the slope. The total number of spikelets is also slightly reduced; for those samples which can be paired, the total produced in absence of competition was 7979 and in presence of competition, 7152." [No evidence of allelopathy]

403	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Parasitic? No] "Glaucous, subglabrous annual or perennial herbs; stems erect or ascending, sprawling with age, 2-6 dm long, branched." [Papaveraceae]
404	1986. Fuller, T.C./McClintock, E.M.. Poisonous plants of California: Issue 53 of California natural history guides. University of California Press, Berkeley and Los Angeles, CA	[Unpalatable to grazing animals? Yes] "Thirteen different alkaloids have been found in plants of this species. There is no morphine present; earlier reports have not proved justified. In western Australia the plant was suspected of poisoning livestock, although it is not usually eaten by animals."
404	2004. Theodore Payne Foundation for Wildflowers and Native Plants. Plants Less Tasty to Deer. http://www.theodorepayne.org/plants/plants4deer.htm	[Unpalatable to grazing animals? Yes] "Plants Less Tasty to Deer...Eschscholzia californica, California Poppy O – poisonous"
404	2007. Skelly, J./Smith, E.. Choosing the Right Plants for Northern Nevada's High Fire Hazard Areas. University of Nevada Cooperative Extension, Reno, NV	[Unpalatable to grazing animals? Yes] "This plant is not bothered by rabbits, squirrels or deer."
404	2010. Oregon Department of Fish and Wildlife. Wildlife Division - Living with Deer and Elk- Deer Resistant Plants. http://www.dfw.state.or.us/wildlife/living_with/deer_resistant_plants.asp	[Unpalatable to grazing animals? Yes] "Deer Resistant Plants" [List includes Eschscholzia californica]
405	1986. Fuller, T.C./McClintock, E.M.. Poisonous plants of California: Issue 53 of California natural history guides. University of California Press, Berkeley and Los Angeles, CA	[Toxic to animals? Yes] "Thirteen different alkaloids have been found in plants of this species. There is no morphine present; earlier reports have not proved justified. In western Australia the plant was suspected of poisoning livestock, although it is not usually eaten by animals."
406	2006. Glawe, D. A.. First report of powdery mildew of Eschscholzia californica (California poppy) caused by Erysiphe cruciferarum in North America. Plant Health Progress. December: 1-2.	[Host for recognized pests and pathogens? Unknown] "During an ongoing study of Erysiphales in the Pacific Northwest, a powdery mildew fungus was collected repeatedly on California poppy (Eschscholzia californica) in Seattle, King County, Washington, USA, since 2001. The fungus was determined to be Erysiphe cruciferarum, a species not reported previously on this host in North America. The disease typically was observed during August to October. Signs included amphigenous white to greyish, superficial mycelia occurring on leaves as well as stems and capsules. Severe symptoms or detrimental effects on infected plants were not noted."
406	2011. EasyBloom. California Poppy - Aurantiaca Orange (Eschscholzia californica). http://www.easybloom.com/plantlibrary/plant/california-poppy	[Host for recognized pests and pathogens? Unknown] "Pests: Prone to foliar fungal problems."
407	2008. Meuninck, J.. Medicinal Plants of North America: A Field Guide. Morris Book Publishing LLC, Guilford, CT	[Causes allergies or is otherwise toxic to humans? Possibly] "Caution: Not to be used during pregnancy or by nursing mothers."
407	2009. Turner, N.J./von Aderkas, P.. The North American guide to common poisonous plants and mushrooms. Timber Press, Portland, OR	[Causes allergies or is otherwise toxic to humans? Possibly] [This book mentions Eschscholzia californica as a member of the poppy family, but does not suggest that it is toxic or allergenic]
407	2011. eFloras. Flora of North America - Eschscholzia californica. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=220004967	[Causes allergies or is otherwise toxic to humans? Yes, but only if consumed] "Eschscholzia californica is the state flower of California. Although it is toxic to humans, its roots are relished by gophers."
407	2011. Lady Bird Johnson Wildflower Center. Native Plant Database - Eschscholzia californica. http://www.wildflower.org/plants/result.php?id_plant=ESCA2	[Causes allergies or is otherwise toxic to humans? Possibly, if ingested] "Use Food: The Nisengan of California boiled and consumed young spring leaves... Warning: Can be poisonous if ingested. Sensitivity to a toxin varies with a person's age, weight, physical condition, and individual susceptibility. Children are most vulnerable because of their curiosity and small size. Toxicity can vary in a plant according to season, the plant's different parts, and its stage of growth; and plants can absorb toxic substances, such as herbicides, pesticides, and pollutants from the water, air, and soil." [Possibly toxic if ingested, but also consumed as a food by some people]
408	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Creates a fire hazard in natural ecosystems? No] No evidence

408	2007. Salmon, T.P./Bell, C.E./Mellano, V.J. et al.. Wildfire Preparedness & Recovery in San Diego County. A Review & Analysis White Paper of Data & Research Studies Relevant to Wildfire. Farm & Home Advisor's Office, UC Coop. Extension, San Diego, CA	[Creates a fire hazard in natural ecosystems? No] "California poppy (<i>Eschscholzia californica</i>) also shows sensitivity to high heat from fire and germination may be reduced. But the smoke greatly improves seed germination for wild populations of California poppy."
408	2007. Skelly, J./Smith, E.. Choosing the Right Plants for Northern Nevada's High Fire Hazard Areas. University of Nevada Cooperative Extension, Reno, NV	[Creates a fire hazard in natural ecosystems? No] {Recommended for planting in fire prone areas}
408	2009. Welch, D.T.. Effects of prescribed burning on composition of serpentine grassland vegetation. MSc Thesis. San Jose State University, Department of Biological Sciences, San Jose, CA	[Creates a fire hazard in natural ecosystems? No] "According to Vogl, some green annual plants, such as <i>Eschscholzia californica</i> (California poppy) can withstand "top removal" due to burning and produce seeds the following year." [Somewhat tolerant of fire, but no evidence of increased fire risk]
409	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia Californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Is a shade tolerant plant at some stage of its life cycle? No] " <i>Eschscholzia californica</i> Cham., the California poppy, occurs naturally in western North America from the Columbia River south to Baja California and from the coast of California eastward into the Great Basin. Within this extensive region it grows in open sites, frequently associated with grasses. Both the poppy and the grasses require ample light for optimal development and begin growth contemporaneously after the advent of winter rains. In dry years, when grass develops poorly, poppies apparently do well; in wet years the reverse is true."
409	2008. Miller, G.O.. Landscaping with Native Plants of Southern California. Voyageur Press, Minneapolis, MN	[Is a shade tolerant plant at some stage of its life cycle? No] "Exposure: full sun"
409	2011. Lady Bird Johnson Wildflower Center. Native Plant Database - <i>Eschscholzia californica</i> . http://www.wildflower.org/plants/result.php?id_plant=ESCA2	[Is a shade tolerant plant at some stage of its life cycle? No] "Light Requirement: Sun"
409	2011. Weedbusters. <i>Eschscholzia californica</i> . http://weedbusters.co.nz/weed_info/detail.asp?WeedID=147	[Is a shade tolerant plant at some stage of its life cycle? No] "Where appropriate plant local native plants to shade out seedlings"
410	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia Californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Tolerates a wide range of soil conditions? Yes] " <i>Eschscholzia</i> populations can tolerate a wide range of soils, including serpentine, although there is apparently a certain degree of genetic specialization to soil type amongst the populations."
410	2008. Miller, G.O.. Landscaping with Native Plants of Southern California. Voyageur Press, Minneapolis, MN	[Tolerates a wide range of soil conditions? Yes] "Soil: adaptable, well draining."
411	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Climbing or smothering growth habit? No] "Glaucous, subglabrous annual or perennial herbs; stems erect or ascending, sprawling with age, 2-6 dm long, branched. Leaves ca. 3-12 cm long, the lobes linear-elliptic, 1-3 mm wide."
412	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Forms dense thickets? No] "...in Hawaii naturalized in disturbed sites, especially along roadsides, 550-920 m, in dry forest on Maui and mesic forest on Hawaii." [No evidence]
412	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257-264.	[Forms dense thickets? No] No evidence
501	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Aquatic? No] "Glaucous, subglabrous annual or perennial herbs..."
502	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Grass? No] Papaveraceae
503	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Nitrogen fixing woody plant? No] Papaveraceae

504	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia Californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "During early stages of development a long taproot and a low rosette of leaves are produced. This taproot permits the plant to survive subsequent drought at the soil surface and to grow in soils of low water holding capacity. These observations help to explain how the species can grow in what appear to be inhospitable sites. They do not answer the question of why it does not occur in greater abundance on deeper, moister, chemically more favourable soils." [not a true geophyte]
504	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Glaucous, subglabrous annual or perennial herbs; stems erect or ascending, sprawling with age, 2-6 dm long, branched. Leaves ca. 3-12 cm long, the lobes linear-elliptic, 1-3 mm wide."
601	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
601	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia Californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
601	2008. Miller, G.O.. Landscaping with Native Plants of Southern California. Voyageur Press, Minneapolis, MN	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Produces viable seed? Yes] "Capsules cylindrical, tapering to apex, 3-8 (10) cm long. Seeds grayish brown, 1.2-1.5 mm long, reticulate"
603	1978. Clark, C.. Systematic Studies of <i>Eschscholzia</i> (Papaveraceae). I. The Origin and Affinities of <i>E. mexicana</i> . <i>Systematic Botany</i> . 3(4): 374-385.	[Hybridizes naturally? No] "Hybridization is generally uncommon in <i>Eschscholzia</i> . Field hybrids are virtually unknown...fertility. A total of over forty attempts to hybridize <i>E. californica</i> with either <i>E. parishii</i> , <i>E. glyptosperma</i> , <i>E. caespitosa</i> , <i>E. lemmonii</i> , <i>E. hypocoides</i> , and <i>E. lobbii</i> were unsuccessful (Clark, unpublished data)."
603	1978. Clark, C./Jernstedt, J.A.. Systematic Studies of <i>Eschscholzia</i> (Papaveraceae). II. Seed Coat Microsculpturing. <i>Systematic Botany</i> . 3 (4): 386-402.	[Hybridizes naturally? No] " <i>Eschscholzia caespitosa</i> and <i>E. californica</i> are morphologically somewhat similar, but are not known to hybridize in the field or experimentally, and are ecologically separated."
604	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Self-compatible or apomictic? Yes] "Another point evident from the data is that although a plant may be self-compatible, it may not constantly self-fertilize. This is shown in the next to last column by the relatively low per cent of flowers which actually set seeds on plants which are self-compatible...we have seen that annual <i>Eschscholzia californica</i> is only slightly and perhaps not significantly more self-compatible than the perennial..." [Although not universal in members of a population, a percentage of <i>Eschscholzia californica</i> are self-compatible to some degree]
605	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Requires specialist pollinators? No] "Pollination.-Pollination by wind has been shown to exist, but its importance under natural conditions is quite unknown. It is facilitated, perhaps, by the powdery nature of the pollen, its production in large quantities, and the size of individual pollen grains...Pollination is preponderantly by insects. The large showy flowers, though they produce no nectar, provide an abundance of pollen, which is gathered by a wide variety of insects throughout the blooming period from March to October. In early spring large numbers of beetles congregate in the flowers to feed and mate. Grant (1950) included <i>Eschscholzia</i> among beetle pollinated plants; however, beetles do not appear to be as significant to pollination as honeybees (<i>Apis</i>), bumblebees (<i>Bombus</i>), and representatives of the hymenopteran families Halictidae and Melittidae. A most striking association of the plant with insects has been discovered by Timberlake (1956). He has found four and perhaps five species of solitary panurgine bees of the genus <i>Perdita</i> which gather pollen only from <i>Eschscholzia californica</i> or from it and <i>Calockortus splendens</i> Dougl. Thrips (Thripidae) (Cook, 1961) and hover flies (Syrphidae) (Knuth, 1908) have also been observed to visit the flowers. Though knowledge of pollinators is imperfect, it is apparent that a great variety of insects visit the plant's flowers and that efficiency of pollination may have been improved by the origin of oligolectic habits in some insects within the natural range of the species."
605	2002. Thorp, R.W./Schroeder, P.C./Ferguson, C.S.. Bumble bees: boisterous pollinators of native California flowers. <i>Fremontia</i> . 30(3-4): 26-31.	[Requires specialist pollinators? No] "Some flowers offer no nectar and rely solely on pollen to attract potential pollinators. Examples of plants with nectarless flowers attractive to bumble bees include lupine (<i>Lupinus</i>), California poppy (<i>Eschscholzia</i>), and wild rose (<i>Rosa</i>)..." [bee pollinated]

606	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Reproduction by vegetative fragmentation? No] "Seed dispersal.-Since vegetative reproduction is absent from the species, seeds are the only effective dispersal units besides pollen."
606	2008. Miller, G.O.. Landscaping with Native Plants of Southern California. Voyageur Press, Minneapolis, MN	[Reproduction by vegetative fragmentation? No] "Propagation: fall- or winter-sown seeds." [No evidence that this plant spreads or propagates by vegetative means]
607	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Minimum generative time (years)? 1-2] "Glaucous, subglabrous annual or perennial herbs" [Annual capable of flowering in one year]
701	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257-264.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Possibly] "It also grows quite well in human disturbed environments and is commonly planted along roadsides in California."
701	2011. Weedbusters. <i>Eschscholzia californica</i> . http://weedbusters.co.nz/weed_info/detail.asp?WeedID=147	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Possibly] "Which habitats is it likely to invade?: Bare, sandy or gravelly, dry or well-drained soils with high light levels, such as degraded or disturbed tussock grassland, braided rivers, dunes, coastal cliffs, degraded pasture, roadsides, scree slopes, and subalpine herbfields."
702	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257-264.	[Propagules dispersed intentionally by people? Yes] "It also grows quite well in human disturbed environments and is commonly planted along roadsides in California."
703	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257-264.	[Propagules likely to disperse as a produce contaminant? Yes] "It is also likely that there were accidental introductions through the import of alfalfa seed, as <i>E. californica</i> was a common seed contaminant in alfalfa grown in California, and trade in agricultural products between the two areas expanded rapidly during the 1850s (Gillis 1885; Hillman & Henry 1928). All plants in Chile appear to be perennial varieties and grow primarily in human disturbed environments (Frias et al. 1975)."
704	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Propagules adapted to wind dispersal? Yes] "Seeds range in size from 1.0- 1.9 mm and are spherical. The coat is dull brown with slight ridges which form a reticulate pattern. The only obvious mechanism for their dispersal is the capsule, which opens explosively as it falls from the clasping receptacle. Seeds may be scattered in a radius of five feet by this action. It is possible that they are blown along the ground or carried in moving water, for they are not easily wetted and may float for days in standing water." [but only for short distances]
705	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Propagules water dispersed? Yes] "Seeds range in size from 1.0- 1.9 mm and are spherical. The coat is dull brown with slight ridges which form a reticulate pattern. The only obvious mechanism for their dispersal is the capsule, which opens explosively as it falls from the clasping receptacle. Seeds may be scattered in a radius of five feet by this action. It is possible that they are blown along the ground or carried in moving water, for they are not easily wetted and may float for days in standing water."
706	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules bird dispersed? No] "Capsules cylindrical, tapering to apex, 3-8 (-10) cm long. Seeds grayish brown, 1.2-1.5 mm long, reticulate" [Not fleshy-fruited, or otherwise adapted for animal consumption]
707	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules dispersed by other animals (externally)? No] "Capsules cylindrical, tapering to apex, 3-8 (-10) cm long. Seeds grayish brown, 1.2-1.5 mm long, reticulate" [No evidence, and unlikely as seeds and capsules lack any means of external attachment]
708	1962. Cook, S.A.. Genetic System, Variation, and Adaptation in <i>Eschscholzia californica</i> . <i>Evolution</i> . 16(3): 278-299.	[Propagules survive passage through the gut? Unknown] "Seeds range in size from 1.0- 1.9 mm and are spherical. The coat is dull brown with slight ridges which form a reticulate pattern. The only obvious mechanism for their dispersal is the capsule, which opens explosively as it falls from the clasping receptacle. Seeds may be scattered in a radius of five feet by this action. It is possible that they are blown along the ground or carried in moving water, for they are not easily wetted and may float for days in standing water." [Unknown, but seeds unlikely to be ingested or dispersed internally]
801	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Prolific seed production (>1000/m ²)? Probably not] "Glaucous, subglabrous annual or perennial herbs; stems erect or ascending, sprawling with age, 2-6 dm long, branched" [Unlikely, as plants are relatively small and do not appear to grow in high densities]

802	2002. Dremann, C.C./Shaw, M.. Releasing the Native Seedbank: An Innovative Approach to Restoring a Coastal California Ecosystem. <i>Ecological Restoration</i> . 20(2): 103-107.	[Evidence that a persistent propagule bank is formed (>1 yr) Yes] "Today, there are many species that have appeared from long. dormant seeds growing on the site, including those previously mentioned as well as California poppy (<i>Eschscholzia californica</i>),..."
802	2003. Leger, E.A./Rice, K.J.. Invasive California poppies (<i>Eschscholzia californica</i> Cham.) grow larger than native individuals under reduced competition. <i>Ecology Letters</i> . 6: 257-264.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "As seeds of <i>E. californica</i> can be dormant, all seeds were soaked in a 5 mg per 100 mL)1 solution of giberellic acid overnight before planting. This treatment is known to increase time to emergence slightly, but does not significantly affect growth rate or leaf size of poppy plants."
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/	[Evidence that a persistent propagule bank is formed (>1 yr) Yes] "Storage Behaviour: Orthodox Storage Conditions: 22% germination following 10 years open storage (Harrington, 1972); seeds maintained for 2-3 years in commercial storage conditions (Priestley, 1986); long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 17 years; average germination change 92.5 to 100%, mean storage period 12 years, 2 collections." [laboratory storage confirms field observations]
803	2011. Weedbusters. <i>Eschscholzia californica</i> . http://weedbusters.co.nz/weed_info/detail.asp?WeedID=147	[Well controlled by herbicides? Unknown] "What can I do to get rid of it? : Pull out small patches (spring summer)." [No information given on herbicide efficacy]
804	1965. Cook, S.A.. Population Regulation of <i>Eschscholzia Californica</i> by Competition and Edaphic Conditions. <i>Journal of Ecology</i> . 53(3): 759-769.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Occasionally poppies may be seen in grain fields, where their growth is apparently favoured by mowing the overtopping grain. Although the plants themselves are cut back, new shoots emerge from ground level and flower from mid-summer to autumn."
804	2009. Welch, D.T.. Effects of prescribed burning on composition of serpentine grassland vegetation. MSc Thesis. San Jose State University, Department of Biological Sciences, San Jose, CA	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "According to Vogl, some green annual plants, such as <i>Eschscholzia californica</i> (California poppy) can withstand "top removal" due to burning and produce seeds the following year."
805	2005. Leger, E.A./Forister, M.L.. Increased resistance to generalist herbivores in invasive populations of the California poppy (<i>Eschscholzia californica</i>). <i>Diversity and Distributions</i> . 11: 311-317.	[Effective natural enemies present locally? Unknown] "There have been no comprehensive studies of the natural enemies of the California poppy in California, although there are a number of cases where generalist Lepidoptera have been reported to use <i>E. californica</i> as a host plant."