Taxon: Hypochaeris radicata **Family:** Asteraceae

Common Name(s): false dandelion
flatweed
gosmore
hairy cat's ear
Hypochoeris radicata
spotted cat's ear

Synonym(s): Hypochoeris radicata L.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 16 Dec 2015

WRA Score: 16.0 **Designation:** H(Hawai'i) **Rating:** High Risk

Keywords: Perennial Herb, Weed, Palatable, Wind-Dispersed, Seed Contaminant

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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)	Intermediate
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)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	y
406	Host for recognized pests and pathogens		

Qsn #	Question	Answer Option	Answer
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
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		
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	y
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
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	y
702	Propagules dispersed intentionally by people		
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	n
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[No evidence of domestication] "H. radicata was originally native to Morocco, where the oldest populations are still found. From there the species expanded its range in the late Quaternary via at least three migratory routes, the earliest of which was apparently to the south-western Iberian Peninsula, with subsequent movement to the central Mediterranean and elsewhere. It is now considered native throughout Europe (Ortiz et al., 2008). Ortiz et al. (2008) proposed that there were possibly two or more independent colonisations of the UK."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**Intermediate**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 15 Dec 2015]	"Native: Africa Macaronesia: Portugal - Madeira Islands; Spain - Canary Islands Northern Africa: Algeria; Libya; Morocco; Tunisia Asia-Temperate Caucasus: Azerbaijan; Georgia; Russian Federation - Dagestan; Russian Federation-Ciscaucasia - Ciscaucasia Western Asia: Turkey Europe East Europe: Belarus; Estonia; Latvia; Lithuania; Moldova; Russian Federation-European part - European part; Ukraine Middle Europe: Austria; Belgium; Czech Republic; Germany; Hungary; Netherlands; Poland; Slovakia; Switzerland Northern Europe: Denmark; Ireland; Norway; Sweden; United Kingdom Southeastern Europe: Albania; Bosnia and Herzegovina; Bulgaria; Croatia; Greece; Italy; Macedonia; Montenegro; Romania; Serbia; Slovenia Southwestern Europe: France; Portugal; Spain"

Qsn #	Question	Answer
202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 15 Dec 2015]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"H. radicata is adapted to a wide range of climatic conditions."
	Plants for a Future. 2015. Hypochoeris radicata. http://www.pfaf.org/user/Plant.aspx?LatinName=Hypochoeris+radicata. [Accessed 15 Dec 2015]	"USDA hardiness zone : 4-8"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Elevation range exceeds 1000 m, demonstrating environmental versatility] "in Hawai'i naturalized and often common, usually in wet but also relatively dry, disturbed sites, 1,100-2,800 m..."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized and often common, usually in wet but also relatively dry, disturbed sites, 1,100- 2,800 m, on all of the main islands except Ni'ihau and O'ahu. The earliest collection we have seen was made on Maui in 1909 (Brigham et al. s.n., BISH); however, Heller (1897) cites a Kaua'i collection (Heller 2835) made in 1896"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Later, H. radicata was almost certainly taken, either accidentally or deliberately, by European migrants to new colonies in North and South America, Asia, Australia and New Zealand. Some seeds may have been taken by migrants for medicinal or food purposes; others may have been inadvertently taken in hay or straw for livestock, in straw palliasses, or in vegetation used for packing household necessities. This spread was probably helped by an important change in ecological tolerance, allowing H. radicata, originally suited to humid Mediterranean woodlands, to invade more open temperate grasslands."

301	Naturalized beyond native range	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"H. radicata is a very successful colonizing species that is now present on all continents except Antarctica (Ortiz et al., 2008). It tends to be distributed in cooler, temperate parts of the world (Turkington and Aarssen, 1983). Its northern limit may be controlled more by winter cold than by lack of summer warmth. Both Turkington and Aarssen (1983) and Ortiz et al. (2008) have questioned whether the species is truly native to the UK and Europe. Ortiz et al. (2008) proposed that the native area of distribution should be North Africa, the Iberian Peninsula and the central (and possibly eastern) Mediterranean. Although widespread in the USA, H. radicata seems to have stabilized there and, according to DiTomaso et al. (2013), is not likely to expand beyond its present habitats."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized and often common, usually in wet but also relatively dry, disturbed sites, 1,100- 2,800 m, on all of the main islands except Ni'ihau and O'ahu. The earliest collection we have seen was made on Maui in 1909 (Brigham et al. s.n., BISH); however, Heller (1897) cites a Kaua'i collection (Heller 2835) made in 1896"

302	Garden/amenity/disturbance weed	y
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Time, energy and expense are spent by gardeners in controlling H. radicata when it invades lawns and golf courses, and by municipal councils in killing it on roadsides and waste places around towns and cities."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	**Notes**
	DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA	"Impacts: The catsears move into overgrazed pastures and rangeland, crowding out palatable forage species."

304	Environmental weed	y
	Source(s)	**Notes**
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	" A native of grassy places and meadows, this plant forms extensive colonies where invasive that shade out native grasses and forbs, and prevent the establishment of shrubs and trees. It tolerates a wide range of soils and strongly competes with native species. Establishment occurs mainly in disturbed sites"

Qsn #	Question	Answer
	Queensland Government. 2011. Weeds of Australia - Flatweed Hypochaeris radicata. http://keyserver.lucidcentral.org/weeds/data/080c0106-040c-4508-8300-0b0a06060e01/media/html/Hypochaeris_radicata.htm. [Accessed 15 Dec 2015]	"Flatweed (Hypochaeris radicata) is regarded as an environmental weed in New South Wales and Victoria. It is a very common weed of parks, gardens, footpaths, lawns, roadsides, disturbed sites, waste areas, cultivation and pastures in south-eastern Australia, but is also common in natural habitats. This species is possibly the most widely distributed weed in south-eastern Australia. It is particularly aggressive in disturbed habitats, although it even invades relatively undisturbed forests. Other habitats invaded include grasslands, remnant grassy woodlands, open woodlands and wetland margins. It can become dominant where there is regular soil disturbance and, because it produces rosettes, individual plants can cover a relatively large area of soil. This allows this species to suppress native grasses and herbs quite effectively. Flatweed (Hypochaeris radicata) has been recorded in numerous conservation areas in Victoria (e.g. Brisbane Ranges National Park, Phillip Island Nature Park and Wilsons Promontory National Park), South Australia (e.g. Marino Conservation Park, Brownhill Creek Recreation Park, Hale Conservation Park, Totness Recreation Park, Cudlee Creek Conservation Park and Eurilla Conservation Park) and New South Wales (e.g. Rawdon Creek Nature Reserve and Kosciuszko National Park). It also appears on local and regional environmental weed lists in Victoria (e.g. Manningham, Knox City and the Goulburn Broken Catchment) and New South Wales (e.g. in the wider Sydney and Blue Mountains region and on the Central Coast). It is reported to grow in the ground layer of several endangered ecological communities in New South Wales and the ACT (e.g. bangalay sand forests, sub-tropical coastal floodplain forests and natural temperate grasslands), and may be a threat to the integrity of some of these communities. In Wilsons Promontory National Park, in southern Victoria, flatweed (Hypochaeris radicata) grows in habitats occupied by the endangered late helmet-orchid (Corysanthes sp. aff diemenicus). It may threaten the survival of this species at this site, which is one of only two locations where this rare native plant is known to exist in the wild."
	Loope, L.L., Nagata, R.J. & Medeiros, A.C. 1992, Alien plants in Haleakala National Park Pp. 551-576 in Stone et al (eds) Alien plant invasions in native ecosystems of Hawaii. Coop. Nat. Park Resources Studies Unit, University of Hawaii, Honolulu, HI	"Gosmore (Hypochoeris radicata), a yellow-flowered composite, is almost ubiquitous in non-forest vegetation from dry sites of Haleakala Crater to bogs of the northeast rift Although its total ground cover at a given site rarely exceeds 10% in sites not recently disturbed and averages 5% or less, it occupies a significant area that might otherwise be available to seedlings of native plants. In recent pig diggings, coyer of this species may sometimes approach 50%. This species is very conspicuous after removal of feral pigs and goats in the Kalapawili grasslands. It appears to be an early successional pioneer forb that decreases with time. However, it may persist especially in areas of frequent disturbance, e.g., trailsides, streambeds, and landslides."
	Anderson, S. J., Stone, C. P., & Higashino, P. K. 1992. Distribution and spread of alien plants in Kipahulu Valley, Haleakala National Park, above 2,300 ft. elevation. Pp. 300 338.in Stone et al. (eds.). Alien Plant Invasions in Native Ecosystems of Hawaii: Management and Research, Cooperative National Park Resources Studies Unit, University of Hawaii, Honolulu, HI	"Hypochoeris radicata (gosmore), a weedy composite of Mediterranean origin, is distributed throughout the study area by wind-borne seeds. Abundantly and widely distributed in the Deschampsia grassland areas at upper elevations, it invades pig-dug and eroded areas. Pigs seek out these plants and uproot them for the starchy tap roots. Gosmore cover intensifies and increases in distribution as pigs dig up the roots and create more niches for this plant and other weedy species."

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	Notes
	Stroh, P.A. 2015. Hypochaeris glabra L. Smooth Cat's-ear. Species Account. Botanical Society of Britain and Ireland	"H. glabra is considered an invasive alien species throughout much of its naturalised range, with most ecological studies posing the question of how best to eradicate the species. Many methods have been trialled including burning, exposure to radiant heat treatment and hand-pulling. All experiments have been unsuccessful in their stated aims."
401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Fibrous-rooted perennial herbs 1.5-6 dm tall; stems usually branched or unbranched in small plants, usually hispid. Leaves oblanceolate, 3-35 cm long, 0.5-7 cm wide, usually densely hispid, toothed or pinnatifid."
402	Allelopathic	
	Source(s)	Notes
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Potentially Yes] "H. radicata may exert allelopathic effects on other grassland species (Aarseen, 1981). Root leachates were found to reduce shoot dry weight of several grassland species (Newman and Rovira. 1975). Leaf extracts caused a significant decline in germination rate and seedling shoot length in Agrostis tenuis (now known as A. capillaris). The same authors found that H. radicata is autotoxic, its own exudates inhibiting its growth by more than that of neighbouring plants, which may explain why it is often found as isolated individuals or in small clusters rather than forming large patches or pure stands (Aarssen, 1981)."
403	Parasitic	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Fibrous-rooted perennial herbs 1.5-6 dm tall;" [Asteraceae. No evidence]
404	Unpalatable to grazing animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"In New Zealand and Australia H. radicata has been considered one of the most palatable species occurring in tussock grassland and, being more productive than other herbs, is therefore useful to livestock (Coop et al., 1953; Healy, 1962). It often invades thin, overgrazed and under-fertilised pastures and thus tends to offset the reduced carrying capacity of these pastures (Sewell, 1950; Lamp and Collett, 1976). Sheep preferentially eat H. radicata before any other herb or grass (Struik, 1967; Hughes, 1975). H. radicata is superior to many grasses in nutritive value and is comparable to white clover, being high in protein, low in fibre, exceptionally high in calcium and quite good for copper content (Coop et al., 1953). It is also rich in sulphur, phosphorus (Begg and Freney, 1960) and chloride (Fagan and Watkins, 1932). Highest nutritive value occurs in spring and winter months (Coop et al., 1953). Stapledon (1948) suggested sowing H. radicata in grazed grasslands along with a non-aggressive grass. The shoots of H. radicata are eaten by sheep (Ovis ovis), pigs (Sus scrofula), snowshoe hares (Lepus americanus) (Radwan and Campbell, 1968), slugs (Healy 1962), snails (Helix aspersa (Weiner, 1993), birds and ants. Pigs uproot the plants and feed on the roots."

405	Toxic to animals	y
	Source(s)	**Notes**
	Gardner, S. Y., Cook, A. G., Jortner, B. S., Troan, B. V., Sharp, N. J. H., Campbell, N. B., & Brownie, C. F. (2005). Stringhalt associated with a pasture infested with Hypochoeris radicata. Equine Veterinary Education, 17(3): 118-122	"'Australian' stringhalt occurs typically in late summer or early autumn after dry weather or drought conditions in horses on poor quality pastures and, in most reports, is associated with a high concentration of Hypochoeris radicata (Pemberton 1979; Huntington et al. 1989). The distribution of Hypochoeris radicata includes Australia, New Zealand, South America, North America, the UK and Ireland, continental Europe and the Mediterranean (Burrows and Tyrl 2001; Gasquez and Lonchamp 2001)."
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Potentially] "The consumption of H. radicata apparently causes stringhalt, a disease of horses, at least in Australia and New Zealand (Cahill et al., 1995). Stringhalt refers to a myoclonic affliction of one or both hindlimbs seen as spasmodic overflexion of the joints (Merck Veterinary Manual, 2013). MacKay et al. (2013) observed dose-dependent cytotoxicity when they exposed cultured cells of neural tissue to extracts of H. radicata."

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"...the rosettes may harbor slugs (Healy 1962)."
	The Royal Horticultural Society. 2015. Hypochaeris radicata - cat's ear. https://www.rhs.org.uk. [Accessed 15 Dec 2015]	"Pests Generally trouble free Diseases Generally trouble free "

407	Causes allergies or is otherwise toxic to humans	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[No evidence] "H. radicata leaves have been used as in salads or cooked as a vegetable (PFAF, 2013). Leaves can be rather bitter, although young leaves are milder. The roots can also be dried and ground and used as a coffee substitute. The plant also has properties useful to herbalists and for natural medicines. Jamuna et al. (2012) described its use in traditional medical practice for its anticancer, anti-inflammatory, anti diuretic and hepatoprotective activity, and also in treating kidney problems. In Nilgiris (Tamil Nadu, India), traditional healers prescribed H. radicata for wound healing and skin diseases caused by pathogens. Jamuna et al. (2012) also investigated the antibiotic properties of roots and leaves and found that 'the antibacterial activity of the methanolic extracts of both parts was comparable to that of the standard drug, ampicillin.'"

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Guthrie-Smith (1953) observed H. radicata to be one of the early colonisers after fire in grassland in New Zealand." [No evidence that it increases risk in fire prone habitats]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"H. radicata is most commonly found in open sites, including forest clearings, although plants have been reported growing under the shade of bracken (Pteridium aquilinum (L) Kuhn) (Radwan and Campbell 1968)."
	The Royal Horticultural Society. 2015. Hypochaeris radicata - cat's ear. https://www.rhs.org.uk. [Accessed 15 Dec 2015]	"Sunlight: Full Sun Partial Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"H. radicata has been found growing on a diverse range of soils, from light sand or gravel (Fogg 1945; Muenscher 1949) to clay (Saxby 1943)."
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"H. radicata tolerates a wide range of soil texture and pH, having been found from light sand and gravel through to clay, and from soils with a pH of 3.9 to those with pH 8.6 (Turkington and Aarssen, 1983)."
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"It tolerates a wide range of soils and strongly competes with native species. Establishment occurs mainly in disturbed sites"

411	Climbing or smothering growth habit	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Fibrous-rooted perennial herbs 1.5-6 dm tall; stems usually branched or unbranched in small plants, usually hispid."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"A native of grassy places and meadows, this plant forms extensive colonies where invasive that shade out native grasses and forbs, and prevent the establishment of shrubs and trees."
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"Newman and Rovira (1975) also determined that H. radicata is autotoxic; i.e., it is inhibited more by exudate from its own species than from other species. This may explain why plants of 11. radicata are normally found as isolated individuals, or a few individuals in a group, but not as patches or pure stands."

501	Aquatic	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Terrestrial herb] "Fibrous-rooted perennial herbs 1.5-6 dm tall;" ... "usually in wet but also relatively dry, disturbed sites"

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 14 Dec 2015]	"Family: Asteraceae (alt.Compositae)"

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Asteraceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Herbaceous perennial growing from hard, thickened, overwintering base (caudex); fibrous-rooted, but often with several enlarged roots, appearing tap-rooted"

601	Evidence of substantial reproductive failure in native habitat	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[No evidence. Widespread distribution] "H. radicata is a herbaceous perennial originally native to Morocco. It is a very successful colonizing species that is now present on all continents except Antarctica (Ortiz et al., 2008)."

602	Produces viable seed	y
	Source(s)	**Notes**
	UC IPM. 2014. Common catsear (Hypochaeris radicata). Agriculture and Natural Resources, UC Davis, CA. http://www.ipm.ucdavis.edu/PMG/WEEDS/common_catsear.html. [Accessed 15 Dec 2015]	"Common catsear reproduces by seed."
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"Reproduce by seed."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"Hypochoeris radicata hybridizes readily in nature with H. glabra (2n = 10). Hegi (1928) lists this hybrid under the name H. balbisii Loislel."
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"Smooth and common catsear hybridize with one another, but most hybrids produce few viable seed."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"Hagerup (1954), however, has suggested that self-pollination (i.e., geitonogarny) and self-fertilization occur. Self-pollination may be achieved in three ways: (l) activity of insects of the genus Thrips in the interior of the flower head; (2) the opening and closing of the flower head; (3) the trapping of rain water inside the open flower head (Hagerup 1954)."
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Able to produce a few seeds through selfing] "H. radicata is cross-pollinated and self-incompatible. Picó et al. (2004) observed that selfing dramatically reduced seed set, but the few selfed seeds produced were larger and had a greater chance of surviving to flowering than outcrossed seeds. This ability to self-fertilise may be important for isolated individuals that are the first to reach new habitats."

605	Requires specialist pollinators	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"Insects that have been observed visiting H. radicata flowers include honey bees (Apis mellifera Linn.) (Percival 1950). solitary bees (e.g. Panurgus spp.) (Knuth 1908; Munster-Swendsen 1968), various flies (e.g., Eristalis spp.) and small beetles (Meligeths spp.) (Hagerup 1954; Parmenter 1958; Proctor and Yeo 1972). Knuth (1908) provided a comprehensive list of insect visitors to flowers of non-Canadian material. Insects are attracted by the color and distinct scent of the flower."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"...when flowering was prevented, plants switched their resources to greater vegetative reproduction and they generated more new rosettes. Struik (1967) found that 20% of his sampled plants (in lawns and grazed pasture) were in clusters of two to six individuals, presumably originating by vegetative reproduction of a single plant."
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"In heavily grazed area or mowed turf, plants can reproduce vegetatively by offsets from the crown , and diffuse clonal patches can develop. However, root fragments do not regenerate when detached from the crown."
	UC IPM. 2014. Common catsear (Hypochaeris radicata). Agriculture and Natural Resources, UC Davis, CA. http://www.ipm.ucdavis.edu/PMG/WEEDS/common_catsear.html. [Accessed 15 Dec 2015]	"In heavily grazed areas or mowed turf it can also reproduce from shoots that grow in the crown area."

607	Minimum generative time (years)	1
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Ho (1964, cited in Aarssen, 1981) found that mature, flowering plants can be produced from seed in as little as 2 months under favourable conditions in British Columbia. According to several sources (Fryxel, 1957; Parker 1975),"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"Seeds disperse with wind, by clinging to animals, through human activities, and as seed contaminants."

702	Propagules dispersed intentionally by people	
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Intentionally dispersed in the past. Unlikely to be intentionally dispersed now] "Seeds may have also been taken by European migrants to North and South America, Asia, Australia and New Zealand deliberately for medicinal or food purposes."

703	Propagules likely to disperse as a produce contaminant	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"Seeds disperse with wind, by clinging to animals, through human activities, and as seed contaminants."
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Seeds may have been inadvertently transported to the Americas, Asia, Australia and New Zealand by European migrants as contaminants of grass seed, straw or hay for livestock, straw palliasses, or vegetation used for packing household necessities."

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"Seeds disperse with wind, by clinging to animals, through human activities, and as seed contaminants."
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Soons et al. (2004) simulated wind dispersal of grassland plant seed (one species being H. radicata) and found that 'autocorrelated turbulent fluctuations in vertical wind velocity are the key mechanism for long-distant dispersal.' Dispersal distances are greatest under high wind velocity, when mechanically produced turbulent air movements are large. Under very low wind velocity conditions seeds are dispersed further when there is more surface heating, but never as far as when winds are strong." ... "The large numbers of wind-dispersed achenes (seeds) ensure their wide dispersal from the parent plants."

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"The feathery pappus of the achene (Fig. 2d) renders it particularly adapted for wind dispersal." ... "The achene may become attached to the substrate by the short processes on its surface (Fig. 2d) (Ridley 1930). Birds are known to disperse the fruit by attachment to their feet and plumage, and ants have been observed carrying achenes of H. radicata (Ridley 1930). Achenes may also be dispersed as contaminants of commercial grass seeds (Wellington 1960; Johnston 1962)."

706	Propagules bird dispersed	
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Potentially externally dispersed by birds] "Ridley (1930, cited in Aarssen, 1981) reported that birds are known to disperse the fruit by attachment to their feet and plumage, and ants have been observed carrying seeds of H. radicata."

Qsn #	Question	Answer
707	**Propagules dispersed by other animals (externally)**	**y**
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Ridley (1930, cited in Aarssen, 1981) reported that birds are known to disperse the fruit by attachment to their feet and plumage, and ants have been observed carrying seeds of H. radicata."

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Bakker, J. P., Bravo, L. G., & Mouissie, A. M. (2008). Dispersal by cattle of salt-marsh and dune species into salt-marsh and dune communities. Plant Ecology, 197(1): 43-54	"Appendix 1: Species and seed trait data for seeds found in cattle dung" [No Hypochaeris radicata found in seeds, although present in vegetation]
	Cosyns, E. (2004). Ungulate seed dispersal: aspects of endozoochory in a semi-natural landscape. PhD Dissertation. Ghent University.	"Appendix 7.1 Alphabetically ordered list of plant species of which germinable seeds were recorded from fresh dung of different Ungulate and Lagomorph species. The on average proportion seeds [%] to the total amount of germinable seeds [= 100] recorded from the indicated amount of dung is shown for each of the mentioned animal species." [Hypochaeris radicata seeds in donkey dung at a low proportion (0.05%)]

801	Prolific seed production (>1000/m2)	y
	Source(s)	**Notes**
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"H. radicata produces large numbers of wind-dispersed achenes (Salisbury 1964; Struik 1967). Ho (1964) estimated an average production of 2329 achenes per plant over a 21 -day period in British Columbia."
	Kroon, H. de , Plaisier, A., & van Groenendael, J. (1987). Density dependent simulation of the population dynamics of a perennial grassland species, Hypochaeris radicata. Oikos, 50(1): 3-12	"Up to 20 flowering stalks, each containing one or more flowering heads, can be found on a single rosette. Each flowering head contains between 15 and 300 seeds and this results in 300-6000 seeds per rosette (Turkington and Aarssen 1983; H. de Kroon, pers. obs.)."

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**n**
	Source(s)	**Notes**
	DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA	"Both catsears produce plumed seeds which are distributed by wind or by clinging to the fur, feathers, and feet of animals. Seeds generally do not persist in the soil seedbank."
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"H. radicata is a relatively short-lived species which lives for up to two seasons (de Kroon et al., 1987; Fone, 1989). Plants can overwinter as green leafy rosettes or, in colder climates, above ground parts die back, leaving perennating buds at ground level (Aarssen, 1981). The seeds do not seem to persist for long in the soil seed bank."
	Aarssen. L. W. 1981. The biology of Canadian Weeds Hypochoeris radicata L. Canadian Journal of Plant Science 61(2): 365-381	"In the laboratory, Ho (1964) found 68% germination immediately following harvest, 587o germination after 1 mo of dry storage at room temperature and 4Vo after 2 mo of storage for achenes collected in British Columbia."

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Chemical control: In Canada, Turkington and Aarssen (1983) mentioned that H. radicata was 'resistant' to atrazine and dalapon and moderately 'resistant' to paraquat, asulam, picloram and other herbicides. However, they suggested that adequate selective control can be achieved in grassland or turfgrasses with MCPA, 2,4-D, or mecoprop. DiTomaso et al. (2013) presented a long list of herbicides that can be used to control H. radicata in different circumstances. Some of these are selective and will not affect grasses; others will kill any green plant they contact. The list includes 2,4-D, aminocyclopyrachlor, aminopyralid, chlorsulfuron, clopyralid, dicamba, fluroxypyr, glyphosate, hexazinone, imazapyr, metsulfuron, picloram, sulfometuron and triclopyr."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"It regenerates rapidly from the crown of the taproot after fire."
	DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA	"Mowing and light to moderate grazing usually facilitate survival." ... "Cultivation can control both species."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	CABI, 2015. Hypochaeris radicata. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Unknown for Hawaiian Islands, although widespread distribution suggests no] "The stalks of H. radicata often show gall swellings caused by the hymenopteran insect Aulax hypochaeridis. Guthrie-Smith (1953) observed broomrape (Orobanche minor) attached to the roots of H. radicata in New Zealand. Both Aarssen (1981) and Turkington and Aarssen (1983) listed invertebrate species that parasitise or feed on H. radicata, and Turkington and Aarssen (1983) also listed fungi and viruses found on H. radicata (see Natural Enemies table)."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Broad climate suitability
• Naturalized in regions with tropical climates
• Widely naturalized in the Hawaiian Islands & elsewhere
• Weed of lawns, golf courses & waste places
• Agricultural & environmental weed
• Hypochaeris glabra is an invasive weed
• Potentially allelopathic
• Causes stringhalt disease in horses
• Tolerates many soil types
• Reproduces by seeds & vegetatively by offsets from the crown
• Hybridizes with H. glabra
• Possibly self-compatible in certain situations (with low seed set)
• Reaches maturity in <1 year
• Seeds dispersed by wind, as a contaminant, & through external attachment to birds, other animals & possibly equipment
• Prolific seed production
• Able to resprout after fires, but controlled through cultivation

Low Risk Traits
• Unarmed (no spines, thorns or burrs)
• Palatable to browsing & grazing animals
• Mostly self-incompatible
• Does not form a persistent seed bank
• Certain herbicides provide effective control
• Cultivation provides effective control