

Taxon: Cichorium intybus L.	Family: Asteraceae
Common Name(s): Belgium endive chicory coffee chicory French endive succory witloof	Synonym(s): Cichorium intybus var. foliosum Hegi Cichorium intybus var. sativum Cichorium intybus L. var. sativum

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 18 Jan 2019
WRA Score: 17.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Biennial, Crop Weed, Fodder, Self-Compatible Forms, Resprouts

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	y
102	Has the species become naturalized where grown?	y=1, n=-1	y
103	Does the species have weedy races?	y=1, n=-1	y
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		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		
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		
406	Host for recognized pests and pathogens		

Qsn #	Question	Answer Option	Answer
407	Causes allergies or is otherwise toxic to humans		
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		
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	y=1, n=-1	y
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	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	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	y
803	Well controlled by herbicides	y=-1, n=1	y
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)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	y
	Source(s)	Notes
	Dempewolf, H., Rieseberg, L. H., & Cronk, Q. C. (2008). Crop domestication in the Compositae: a family-wide trait assessment. <i>Genetic Resources and Crop Evolution</i> , 55(8), 1141-1157	"Our analysis of food crops in the Compositae classified five species as strongly domesticated: safflower (<i>Carthamus tinctorius</i>), endive (<i>Cichorium endivia</i>), chicory (<i>Cichorium intybus</i>), sunflower (<i>Helianthus annuus</i>), and lettuce (<i>Lactuca sativa</i>)."
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	[Assessment of wild type. Some cultivars may possess traits that reduce weediness] "Chicory, cultivated since ancient times for its leaves, is used for salads." ... "Outstanding cvs grown for compact, crisp, white heads, used mainly for salad leaves are: 'Witloof' or 'Brussels Witloof' (broad, shallow lobed or toothed leaves and wide midribs), 'Sugar Loaf', 'Rossa di Verone' (Leaves with reddish-brown markings, becoming brighter red upon blanching); cvs grown for roots used as coffee substitutes are: 'Brunswick' (deeply cut leaves), 'Long-rooted Magdeburn' and 'Westland' strain, and 'Zealand', 'Brandenburg' (Belgium). Reported from the Euro Siberian Center of Diversity, chicory or cvs thereof is reported to tolerate frost, fungi, high pH, low pH, poor soil, sand, slope, virus, and weeds. (2n = 18) (Duke, 1978)."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley and Sons, Inc., New York, NY	[Assessment of wild, weedy types] "The literature on the culture, morphology, and physiology of the forms of chicory produced for leaves and other culinary uses is very large, but the types that are weedy, and those with roots ground to be processed for coffee flavoring, seem more closely related in habit."

102	Has the species become naturalized where grown?	y
	Source(s)	Notes
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	"Presently cultivated in most temperate regions, where it has escaped and become naturalized as a serious weed in many areas."

103	Does the species have weedy races?	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley and Sons, Inc., New York, NY	"The weedy biotypes are tall biennial or perennial herbs with a deep tap root and crown from which the shoots arise. It is a troublesome weed in more than 40 countries and sites on agricultural lands and is serious in many of them."

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

Qsn #	Question	Answer
	<p>Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley and Sons, Inc., New York, NY</p>	<p>"C. intybus is a member of the largest plant family, Asteraceae, is most frequently found in the temperate zones and is not well adapted to the tropical rain forests where the competition is so intense."</p>
	<p>USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 16 Jan 2019]</p>	<p>"Native Africa NORTHERN AFRICA: Tunisia Asia-Temperate WESTERN ASIA: Afghanistan, Cyprus, Iran, Iraq, Jordan, Lebanon, Syria, Turkey CAUCASUS: Armenia, Azerbaijan, Georgia, Russian Federation-Ciscaucasia [Ciscaucasia] SIBERIA: Russian Federation-Eastern Siberia, [Eastern Siberia] Russian Federation-Western Siberia [Western Siberia] MIDDLE ASIA: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan Asia-Tropical INDIAN SUBCONTINENT: India, [Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Punjab] Pakistan Europe NORTHERN EUROPE: Denmark, Sweden, United Kingdom MIDDLE EUROPE: Austria, Belgium, Czech Republic, Germany, Hungary, Netherlands, Poland, Slovakia, Switzerland EASTERN EUROPE: Estonia, Latvia, Lithuania, Ukraine (incl. Krym) SOUTHEASTERN EUROPE: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece (incl. Crete), Italy (incl. Sicily), Macedonia, Montenegro, Romania, Serbia, Slovenia SOUTHWESTERN EUROPE: France (incl. Corsica), Spain (incl. Balears)"</p>

202	Quality of climate match data	High
	Source(s)	Notes
	<p>USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 16 Jan 2019]</p>	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	<p>Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley and Sons, Inc., New York, NY</p>	<p>"C. intybus is a member of the largest plant family, Asteraceae, is most frequently found in the temperate zones and is not well adapted to the tropical rain forests where the competition is so intense." ... "The general choice of climate, soil, and environment resem-bles that for sugar beet culture, yet its tolerances are sufficiently broad that it is found in the extreme north of the former Soviet Union (Dorogostayskaya 1972), as well as in hot, arid and semi-arid regions of Arabia, North Africa and around the Mediterranean."</p>

Qsn #	Question	Answer
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	"Ranging from Boreal Moist through Tropical very dry to Wet Forest Life Zones, chicory is reported to tolerate pH of 4.5 to 8.3, an annual rainfall of 30 to 400 cm, an annual mean biotemperature of 6° to 27°C (Duke, 1978, 1979)."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	"Ranging from Boreal Moist through Tropical very dry to Wet Forest Life Zones, chicory is reported to tolerate pH of 4.5 to 8.3, an annual rainfall of 30 to 400 cm, an annual mean biotemperature of 6° to 27°C (Duke, 1978, 1979)."
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online	Native Africa NORTHERN AFRICA: Tunisia Asia-Temperate WESTERN ASIA: Afghanistan, Cyprus, Iran, Iraq, Jordan, Lebanon, Syria, Turkey CAUCASUS: Armenia, Azerbaijan, Georgia, Russian Federation-Ciscaucasia [Ciscaucasia] SIBERIA: Russian Federation-Eastern Siberia, [Eastern Siberia] Russian Federation-Western Siberia [Western Siberia] MIDDLE ASIA: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan Asia-Tropical INDIAN SUBCONTINENT: India, [Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Punjab] Pakistan Europe NORTHERN EUROPE: Denmark, Sweden, United Kingdom MIDDLE EUROPE: Austria, Belgium, Czech Republic, Germany, Hungary, Netherlands, Poland, Slovakia, Switzerland EASTERN EUROPE: Estonia, Latvia, Lithuania, Ukraine (incl. Krym) SOUTHEASTERN EUROPE: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece (incl. Crete), Italy (incl. Sicily), Macedonia, Montenegro, Romania, Serbia, Slovenia SOUTHWESTERN EUROPE: France (incl. Corsica), Spain (incl. Balears) Cultivated Africa NORTHEAST TROPICAL AFRICA: Sudan Asia-Tropical INDIAN SUBCONTINENT: India INDO-CHINA: Myanmar Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: Denmark, United Kingdom MIDDLE EUROPE: Austria, Belgium, Czech Republic, Germany, Netherlands, Poland, Slovakia EASTERN EUROPE: Russian Federation-European part [European part] SOUTHEASTERN EUROPE: Italy, Romania

Database]. <http://www.ars-grin.gov/npgs/index.html>.
[Accessed 17 Jan 2019]

SOUTHWESTERN EUROPE: France, Spain
 Northern America
 Canada, United States
 Adventive
 Europe
 NORTHERN EUROPE: Finland
 Naturalized
 Africa
 MACARONESIA: Portugal [Azores]
 NORTHERN AFRICA: Algeria, Morocco
 NORTHEAST TROPICAL AFRICA: Eritrea, Ethiopia
 WEST-CENTRAL TROPICAL AFRICA: Zaire
 SOUTHERN AFRICA: Lesotho, South Africa
 Asia-Temperate
 ARABIAN PENINSULA: Oman
 CHINA: China
 EASTERN ASIA: Taiwan
 Australasia
 AUSTRALIA: Australia
 NEW ZEALAND: New Zealand
 Europe
 NORTHERN EUROPE: Ireland, Norway
 EASTERN EUROPE: Moldova
 SOUTHWESTERN EUROPE: Portugal
 Northern America
 EASTERN CANADA: Canada, [New Brunswick, Newfoundland, Nova Scotia, Ontario, Quebec] St. Pierre and Miquelon
 WESTERN CANADA: Canada [Alberta, British Columbia, Manitoba, Saskatchewan]
 NORTHEASTERN U.S.A.: United States [Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont]
 NORTH-CENTRAL U.S.A.: United States [Illinois, Iowa, Kansas, Missouri]
 SOUTHEASTERN U.S.A.: United States [Arkansas, North Carolina]
 SOUTH-CENTRAL U.S.A.: United States [Texas]
 SOUTHWESTERN U.S.A.: United States [California, Nevada, Utah]
 Southern America
 NORTHERN SOUTH AMERICA: Venezuela [Tachira]
 SOUTHERN SOUTH AMERICA: Argentina, Chile, Uruguay

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes

Qsn #	Question	Answer
	<p>USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 17 Jan 2019]</p>	<p>"Cultivated Africa NORTHEAST TROPICAL AFRICA: Sudan Asia-Tropical INDIAN SUBCONTINENT: India INDO-CHINA: Myanmar Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: Denmark, United Kingdom MIDDLE EUROPE: Austria, Belgium, Czech Republic, Germany, Netherlands, Poland, Slovakia EASTERN EUROPE: Russian Federation-European part [European part] SOUTHEASTERN EUROPE: Italy, Romania SOUTHWESTERN EUROPE: France, Spain Northern America Canada, United States"</p>
	<p>Duke, J. A. (1983). <i>Cichorium intybus</i>. Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html. [Accessed 17 Jan 2019]</p>	<p>"Native to Europe, central Russia and western Asia, and cultivated widely through Europe in early times. Presently cultivated in most temperate regions, where it has escaped and become naturalized as a serious weed in many areas. "</p>

301	Naturalized beyond native range	y
	Source(s)	Notes
	<p>Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis</p>	<p>"Escaped as a ruderal weed in many parts of the world, this species was formerly cultivated as a medicinal plant but more recently is grown as an ornamental and coffee substitute."</p>

Qsn #	Question	Answer
	<p>USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 16 Jan 2019]</p>	<p>"Naturalized Africa MACARONESIA: Portugal [Azores] NORTHERN AFRICA: Algeria, Morocco NORTHEAST TROPICAL AFRICA: Eritrea, Ethiopia WEST-CENTRAL TROPICAL AFRICA: Zaire SOUTHERN AFRICA: Lesotho, South Africa Asia-Temperate ARABIAN PENINSULA: Oman CHINA: China EASTERN ASIA: Taiwan Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: Ireland, Norway EASTERN EUROPE: Moldova SOUTHWESTERN EUROPE: Portugal Northern America EASTERN CANADA: Canada, [New Brunswick, Newfoundland, Nova Scotia, Ontario, Quebec] St. Pierre and Miquelon WESTERN CANADA: Canada [Alberta, British Columbia, Manitoba, Saskatchewan] NORTHEASTERN U.S.A.: United States [Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont] NORTH-CENTRAL U.S.A.: United States [Illinois, Iowa, Kansas, Missouri] SOUTHEASTERN U.S.A.: United States [Arkansas, North Carolina] SOUTH-CENTRAL U.S.A.: United States [Texas] SOUTHWESTERN U.S.A.: United States [California, Nevada, Utah] Southern America NORTHERN SOUTH AMERICA: Venezuela [Tachira] SOUTHERN SOUTH AMERICA: Argentina, Chile, Uruguay"</p>
	<p>Duke, J. A. (1983). <i>Cichorium intybus</i>. Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html. [Accessed 17 Jan 2019]</p>	<p>"Presently cultivated in most temperate regions, where it has escaped and become naturalized as a serious weed in many areas."</p>
	<p>Queensland Government. (2019). Weeds of Australia. <i>Cichorium intybus</i>. http://keyserver.lucidcentral.org. [Accessed 16 Jan 2019]</p>	<p>"This species is widely naturalised in Australia, particularly in the southern and eastern parts of the country. It is widely naturalised in Queensland, New South Wales, ACT, Victoria and Tasmania. It is also widespread in the southern regions of Western Australia and in the south-eastern and eastern parts of South Australia (including Kangaroo Island)."</p>
	<p>Wagner, W.L., Herbst, D.R.& Lorence, D.H. (2019). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed]</p>	<p>No evidence from Hawaiian Islands to date</p>

302	Garden/amenity/disturbance weed	
	Source(s)	Notes

Qsn #	Question	Answer
	USDA Agricultural Research Service. (1971). Common Weeds of the United States. Dover Publications, Mineola, NY	"Along roadsides, grasslands, fence rows, and waste ground, preferring neutral or limestone {where most troublesome} soils; in lawns, fields of small grain and pastures; does not survive in cultivated land." [In lawns and disturbed areas. Impacts agriculture]
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"By rivers, wastelands along seashores, slopes, by ditches; low elevations." ... "Escaped as a ruderal weed in many parts of the world" [Weed of wastelands that impacts agriculture]
	Závada, T., Malik, R. J., & Kesseli, R. V. (2017). Population structure in chicory (<i>Cichorium intybus</i>): A successful US weed since the American revolutionary war. Ecology and Evolution, 7(12), 4209-4219	"Chicory also became a weedy/invasive species in North America and Australia and is labeled a noxious weed in the state of Colorado. Weedy chicory can be found across North America in 48 continental states of the United States and most provinces of Canada (USDA Plants Database). Chicory was also collected in 1956 on O'ahu Island (www.hear.org/vouchers/pier/bish0000011844.htm), but is not currently reported in Hawaii."
	Tehama County Resource Conservation District. (2013). Integrated Weed Management Plan For the Battle Creek Watershed Manton, California 2012-2016. Tehama County Resource Conservation District, Red Bluff, CA	"Chicory is a common roadside weed and has been found along roads within the western half of the Lassen Volcanic National Park. Sightings have also been noted at the Park's Headquarters in Mineral. The plant blooms after living through one winter and prefers being near hot rocks or other debris in the soils, which is one reason it thrives best along roadsides."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"It is a troublesome weed in more than 40 countries and sites on agricultural lands and is serious in many of them. It is found in 30 different crops." ... "C. intybus is a serious weed of cereals and horticulture crops in Italy; lucerne in Argentina, Hungary, and Pakistan; pastures in Hungary and Pakistan; sugarcane in the Punjab area of India; vineyards in the former Soviet Union; and wheat in the Madhya Pradesh area of central India. It is especially troublesome in winter crops in Pakistan, where it is also said that "no field of dover is without it." There is legislation proclaiming it a noxious weed in that country. It is a principal weed in cotton in Iraq, legumes in Egypt, lucerne in India, and pastures in the United States. It is a common weed of arable fields, especially of wheat in the former Yugoslavia; barley in Canada; beans in Greece; cereals in Canada; maize and mustards in northern India; orchards in Spain and Uruguay; peas in Greece; pastures in Bulgaria; tobacco in India; vineyards of several western Mediterranean countries; and wheat in Canada and the United States. It is reported as a weed of unspecified importance in the irrigation systems of Australia, Canada, Greece, and India; barley in Greece and Iran; beans in Chile; cassava in Indonesia; cereals in Chile. Jordan, Poland, and Turkey; clover in India and Iran; maize in Indonesia and the United States; forage crops in the United States; legumes in Egypt, Greece, and India; lucerne in the United States; oats in Greece; orchards in the former Soviet Union; pastures in Australia, Canada, New Zealand, and South Africa; peas in India; rape in Chile and India; sugar beets in Iran and Spain; sunflowers in Spain; tobacco in the former Soviet Union; upland rice in Indonesia; and wheat in Chile, Greece, Iran, Italy, Portugal, and the former Yugoslavia."

Qsn #	Question	Answer
	Queensland Government. (2019). Weeds of Australia. <i>Cichorium intybus</i> . http://keyserver.lucidcentral.org . [Accessed 16 Jan 2019]	"Though this species is primarily seen as a weed of agricultural areas (i.e. crops and pastures), roadsides and disturbed sites, it can spread from these habitats into disturbed native grasslands, rangelands and open woodlands. It is therefore occasionally regarded as an environmental weed in Victoria, South Australia, New South Wales, Tasmania and Western Australia. During a recent survey, chicory (<i>Cichorium intybus</i>) was listed as a priority environmental weed in at least one of Australia's Natural Resource Management regions."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Cereals, Grapevines, Nursery Production, Orchards & Plantations, Pastures, Sunflowers, Vegetables"

304	Environmental weed	
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"It is a troublesome weed in more than 40 countries and sites on agricultural lands and is serious in many of them. It is found in 30 different crops." [Primarily regarded as a weed of agriculture]
	Queensland Government. (2019). Weeds of Australia. <i>Cichorium intybus</i> . http://keyserver.lucidcentral.org . [Accessed]	"Though this species is primarily seen as a weed of agricultural areas (i.e. crops and pastures), roadsides and disturbed sites, it can spread from these habitats into disturbed native grasslands, rangelands and open woodlands. It is therefore occasionally regarded as an environmental weed in Victoria, South Australia, New South Wales, Tasmania and Western Australia. During a recent survey, chicory (<i>Cichorium intybus</i>) was listed as a priority environmental weed in at least one of Australia's Natural Resource Management regions."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Cereals, Grapevines, Nursery Production, Orchards & Plantations, Pastures, Sunflowers, Vegetables"
	Master Gardener Program. (2012). Chicory, <i>Cichorium intybus</i> . University of Wisconsin-Madison. https://wimastgardener.org . [Accessed 18 Jan 2019]	[Rarely invades natural habitats] "It is common along roadsides, railroads, and in disturbed sites or waste ground, and may be seen in poorly maintained lawns, pastures, and abandoned fields. It does not typically invade undisturbed natural habitats."

305	Congeneric weed	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Cichorium endivia</i> ... Livestock, Sheep, Escapee Weed of: Cereals, Cucurbits/Melons, Orchards & Plantations, Vegetables" ... " <i>Cichorium pumilum</i> ... Weed of: Cereals, Cotton, Orchards & Plantations, Sunflowers"

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	[No evidence] "Herbs 40–110 cm tall, perennial, with a strong taproot. Stem usually solitary, erect; branches spreading-ascending, subglabrous. Basal leaves rosulate, obovate to oblanceolate, 15–34 × 2–4 cm, attenuate into a petiole-like basal portion, undivided to usually runcinately pinnatifid, sparsely covered with long multicellular hairs, base attenuate, margin dentate; lateral lobes 3–6 pairs, triangular; terminal lobe distinctly larger than lateral ones, apex rounded to acute. Stem leaves similar to basal leaves but smaller and less divided, gradually reduced toward stem apex, base clasping, apex acute."

402	Allelopathic	
	Source(s)	Notes
	Huangfu, C., Chen, D., Wang, N., & Yang, D. (2010). The mutual allelopathic effect between invasive plant <i>Flaveria bidentis</i> and four forage species. <i>Acta Prataculturae Sinica</i> , 19(4), 22-32	[Possibly Yes. Allelopathy demonstrated in laboratory conditions] "Abstract : Laboratory studies were conducted to determine the mutual allelopathy between the invasive plant <i>Flaveria bidentis</i> and 4 forage species, i.e. <i>Cichorium intybus</i> , <i>Trifolium pratense</i> , <i>Medicago sativa</i> and <i>Lolium multiflorum</i> . The results showed that allelopathic activity depended on both the concentration levels of the extracts and plant tissues from which the extract was derived. The synthetic effect of both types of aqueous extracts across the concentration range from <i>F. bidentis</i> on <i>M. sativa</i> was less than zero, thus the growth of this forage species was actually stimulated, while other 3 forage species were inhibited at most concentrations, even to different degrees. At the same time, this forage species showed higher phytotoxic activity on the germination and seedling growth of seeds of <i>F. bidentis</i> , respectively, with the synthetic effect of 65 and 93% with leaf and stem and root extracts, respectively. Based on these results, <i>M. sativa</i> was a promising native species for restoration of sites infested with <i>F. bidentis</i> ."

403	Parasitic	n
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. 1993+. <i>Flora of North America North of Mexico</i> . 19+ vols. New York and Oxford	"Herbs 40–110 cm tall, perennial, with a strong taproot." [Asteraceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley and Sons, Inc., New York, NY	" <i>C. intybus</i> has been used as fodder for cattle and sheep. In Poland and Germany it was formerly grown with clover and timothy hay as forage for animals. In the former Yugoslavia it is considered excellent for pig fodder. The roots of this plant are sometimes dug and stored for cattle food."

Qsn #	Question	Answer
	<p>Barry, T. N. (1998). The feeding value of chicory (<i>Cichorium intybus</i>) for ruminant livestock. <i>The Journal of Agricultural Science</i>, 131(3), 251-257</p>	<p>"Chicory (<i>Cichorium intybus</i>) is perhaps best known for the extract of its roots used as an ingredient in 'coffee substitute' beverages. It is less well known as a grazed forage for ruminants. Thomas et al. (1952) reported the high content of some major and minor trace minerals in chicory grown in the UK, and commented on its use in pasture mixtures as a source of these minerals. Chicory was first mentioned in New Zealand (NZ) literature as an animal forage by Cockayne (1915), but a long period then elapsed before Lancashire (1978) reported its excellent value for forage production under rotational grazing in dry summer conditions. Plant selection then followed and the cultivar 'Grasslands Puna' was approved for commercial release as a grazed forage plant in 1985 (Rumball 1986). The use of Puna chicory has now spread throughout NZ and the variety is also being used commercially in Australia, North America and South America and is being evaluated in parts of Europe and Asia (W. Green, personal communication). Chicory is a herb, whereas other temperate forages used for ruminant production are either grasses or legumes. This paper reviews work on the chemical composition, nutritive value and feeding value of chicory relative to perennial ryegrass (<i>Lolium perenne</i>) and to red clover (<i>Trifolium pratense</i>), a legume that, like chicory, is used as a forage for dry summer conditions. Throughout this paper, feeding value is defined as the animal production response to grazing a forage under unrestricted conditions (Ulyatt 1973), with its components being voluntary feed intake (VFI), the digestive process and the efficiency of utilization of digested nutrients; the latter two comprise nutritive value/dry matter (DM) eaten."</p>

405	Toxic to animals	
	Source(s)	Notes
	<p>Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley and Sons, Inc., New York, NY</p>	<p>[Possibly toxic to pigs] "It is known, however, that large amounts of this weed ingested by dairy cattle can easily cause off-flavors in milk. Also, Wachnik (1962) in Poland found symptoms of poisoning in pigs 1 wk after feeding them leaves of the plant Pathological symptoms were loss of appetite, diarrhea, and convulsions. Postmortem examination showed haemorrhagic inflammation of mucous membranes of the alimentary tract and liver degeneration."</p>

406	Host for recognized pests and pathogens	
	Source(s)	Notes

Qsn #	Question	Answer
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>Cichorium intybus</i> ... Major host of: <i>Alternaria cichorii</i> (leaf spot of endive); <i>Autographa gamma</i> (silver-Y moth); Chicory yellow mottle virus; <i>Dickeya dianthicola</i> (slow wilt of <i>Dianthus</i> and potato); <i>Golovinomyces cichoracearum</i> (powdery mildew); <i>Helicobasidium brebissonii</i> (violet root rot); Lettuce mosaic virus (lettuce mosaic); <i>Meloidogyne hapla</i> (root knot nematode); <i>Myzus persicae</i> (green peach aphid); <i>Napomyza cichorii</i> ; <i>Phytophthora cryptogea</i> (tomato foot rot); <i>Phytophthora tentaculata</i> ; <i>Polygonum aviculare</i> (prostrate knotweed); <i>Pseudomonas cichorii</i> (bacterial blight of endive); <i>Pseudomonas marginalis</i> (kansas lettuce disease); <i>Sclerotinia minor</i> (<i>sclerotinia</i> disease of lettuce); <i>Senecio vulgaris</i> ; <i>Verticillium albo-atrum</i> (<i>verticillium</i> wilt of lucerne)"
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	"Serious market diseases of chicory are bacterial soft rot and watery soft rot, caused by <i>Erwinia carotovora</i> and <i>Pseudomonas cichorii</i> . Brown heat cancer is caused by boron deficiency. <i>Fuligo septica</i> causes a slime mold. Fungi known to attack chicory are: <i>Alternaria cichorii</i> , <i>A. tenuis</i> , <i>Ascochyta cichorii</i> , <i>Aspergillus ostianus</i> , <i>Botrytis cinerea</i> , <i>Bremia lactucae</i> (Downy mildew), <i>Centrospora acerina</i> , <i>Cercospora cichorii</i> , <i>Didymosphaeria exigua</i> , <i>Erysiphe cichoracearum</i> , <i>Fuligo septica</i> (slime mold), <i>Leptosphaeria ogilviensis</i> , <i>Macrosporium commune</i> , <i>Marssonian panattoniana</i> , <i>Mycosphaerella compositarum</i> , <i>M. tassiana</i> , <i>Phoma cichoracearum</i> , <i>Phymatotrichum omnivorum</i> , <i>Pleospora herbarum</i> , <i>Puccinis cichorii</i> , <i>P. hieracii</i> , <i>P. junci</i> , <i>P. littoralis</i> , <i>Ramularia cichorii</i> , <i>R. lampsanae</i> , <i>Sclerotinia sclerotiorum</i> , <i>Sclerotium rolfsii</i> , <i>Septoria endiviae</i> , <i>S. intybi</i> , <i>Sphaerotheca fuligines</i> , <i>S. humuli</i> , <i>Stagonospora vexata</i> , <i>Thielaviopsis basicola</i> , <i>Verticillium dahliae</i> , <i>Pythium debaryanum</i> , <i>Corticium vagum</i> . Viruses which are known to attack chicory are: Argentine subflower, Cucumber mosaic, Spotted wilt, and Yellows virus. The parasitic plants, <i>Cuscuta epithymum</i> and <i>C. pentagona</i> , also attack chicory. The following nematodes have been isolated from chicory plants: <i>Ditylenchus dipsaci</i> , <i>H. scliachtii</i> , <i>Meloidogyne arenaria</i> , <i>M. hapla</i> , <i>M. javanica</i> , <i>M. sp.</i> , <i>Pratylenchus penetrans</i> , <i>P. pratensis</i> , <i>Paratylenchus macrodorus</i> , and <i>Tylenchus sp.</i> (Golden, p.c., 1984). "

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"As a very old companion of man, it has supplied food for humans and livestock, been used for medical purposes, and is perhaps most widely known as a coffee additive that imparts an interesting bitter flavor admired by some."
	Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford	"Leaves of <i>Cichorium intybus</i> are sometimes used as salad greens; the roasted roots are sometimes ground and used as an addition to (or adulterant of) coffee."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Used in Ayurveda. Leaves given in fever, vomiting, diarrhea, asthma, as a tonic for nerves; roots infusion as a sedative; roots decoction a wash and poultice applied to sores. Seeds in painful micturition." [Used medicinally. No evidence of acute or chronic toxicity reported]

Qsn #	Question	Answer
	Paulsen, E. (2017). Systemic allergic dermatitis caused by sesquiterpene lactones. <i>Contact Dermatitis</i> , 76(1), 1-10	[Susceptible individuals may experience contact dermatitis] "Immediate systemic allergic reactions after the ingestion of different species of chicory are well documented (22–25). A few cases of occupational contact sensitization to <i>Cichorium intybus</i> var. <i>foliosum</i> , <i>C. intybus</i> and <i>Cichorium endivia</i> have been reported, but only 1 patient developed stomatitis on ingestion, and this may have represented contact stomatitis (26, 27). In 2 cases of immediate-type allergy to chicory, the patients also presented with contact dermatitis caused by chicory ascribed to protein contact dermatitis, which seemingly represents a combination of immediate and delayed allergy (24, 25). Neither of these patients developed systemic contact dermatitis on ingestion of chicory or inhalation of vapour from cooked chicory, but, rather, immediate reactions, such as generalized pruritus, facial erythema or angioedema, and dyspnoea (24, 25)."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley and Sons, Inc., New York, NY	[No evidence. Fire risk not listed among impacts. Generally does not occur in or invade fire prone habitats] " <i>C. intybus</i> behaves as a weed in agriculture with greatest frequency in the two temperate zones"

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Cover Crops Canada. (2019). Chicory (<i>Cichorium intybus</i>). http://covercrops.ca/chicory/ . [Accessed 18 Jan 2019]	"Chicory has decent shade tolerance, and fair winter hardiness."
	Practical Plants. (2019). <i>Cichorium intybus</i> - Chicory. https://practicalplants.org/wiki/Cichorium_intybus . [Accessed 18 Jan 2019]	"Has shade tolerance - Partial shade"
	Plants for a Future. (2019). <i>Cichorium intybus</i> . https://pfaf.org/user/plant.aspx?LatinName=Cichorium+intybus . [Accessed 18 Jan 2019]	"It cannot grow in the shade."
	Dave's Garden. (2019). Chicory, Italian Dandelion, Radicchio, Succory, Witloof 'Palla Rossa' - <i>Cichorium intybus</i> . https://davesgarden.com/guides/pf/go/114431/ . [Accessed 18 Jan 2019]	"Sun Exposure: Full Sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes

Qsn #	Question	Answer
	<p>Duke, J. A. (1983). <i>Cichorium intybus</i>. Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html. [Accessed 17 Jan 2019]</p>	<p>"Chicory grows on any type of soil, but, when cultivated grows best on mellow, deeply tilled, fertile soil or sandy loam. A cool weather crop, it tolerates only moderate summer temperatures, and requires well-distributed rainfall, with good drainage, or some irrigation in drier areas. Chicory roots deeply in relatively short time; soil too wet for beans and small grains is not suitable. To insure proper root-growth, apply lime or marl to acid soil to neutralize acidity. Ranging from Boreal Moist through Tropical very dry to Wet Forest Life Zones chicory is reported to tolerate pH of 4.5 to 8.3, an annual rainfall of 30 to 400 cm, an annual mean biotemperature of 6° to 27°C (Duke, 1978, 1979)."</p>
	<p>Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley and Sons, Inc., New York, NY</p>	<p>"The general choice of climate, soil, and environment resembles that for sugar beet culture, yet its tolerances are sufficiently broad that it is found in the extreme north of the former Soviet Union (Dorogostayskaya 1972), as well as in hot, arid and semi-arid regions of Arabia, North Africa and around the Mediterranean. In Great Britain, Canada, and the United States the weed favors high lime soils, but it is found on very many soil types across the world."</p>

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	<p>Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. <i>Flora of China Volume 20-21 (Asteraceae)</i>. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis</p>	<p>"Herbs 40–110 cm tall, perennial, with a strong taproot. Stem usually solitary, erect; branches spreading-ascending, subglabrous."</p>

Qsn #	Question	Answer
412	Forms dense thickets	
	Source(s)	Notes
	Volesky, J. D. (1996). Forage production and grazing management of chicory. <i>Journal of Production Agriculture</i> , 9(3), 403-406	[Dense stands naturally formed after cultivation and release from grazing pressure] "'Grasslands Puna' chicory (<i>Cichorium intybus L.</i>) is a perennial cool-season herb developed as a forage in New Zealand. The objective of this study was to evaluate forage production potential and rotational grazing strategies for chicory grown in central Oklahoma. Pastures were established on two soil types and grazed for 2 yr with 3 rotational strategies described as fast (13 d rest periods), moderate (27 d rest periods), and slow (38 d rest periods). Chicory plant density during the seeding year was higher on a silt loam (4.5 plants/sq ft) than on a silty clay loam soil (2.2 plants/sq ft; $P < 0.05$). By the second year, however, natural reseeding resulted in equally dense stands on both soil types (4.3 plants/sq ft). Moderate and slow rotational grazing resulted in significantly greater ($P < 0.05$) amounts of harvested forage (7050 lb/acre) compared with the fast rotational treatment (5890 lb/acre). Fewer chicory plants bolted under the fast rotation; however, it is likely that this treatment did not allow adequate time for substantial leaf area accumulation and regrowth. Crude protein (CP) content of chicory averaged 18.3% and in vitro dry matter digestibility (IVDMD) averaged 70.9%. Chicory appears to have potential as a productive and high quality cool-season forage crop in Oklahoma."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley and Sons, Inc., New York, NY	No evidence in this publication

501	Aquatic	n
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. 1993+. <i>Flora of North America North of Mexico</i> . 19+ vols. New York and Oxford	[Terrestrial herb] "Herbs 40–110 cm tall, perennial, with a strong taproot. Stem usually solitary, erect; branches spreading-ascending, subglabrous." ... "By rivers, wastelands along seashores, slopes, by ditches; low elevations."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Jan 2019]	Family: Asteraceae (alt.Compositae) Subfamily: Cichorioideae Tribe: Cichorieae Subtribe: Cichoriinae

Qsn #	Question	Answer
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Jan 2019]	Family: Asteraceae (alt.Compositae) Subfamily: Cichorioideae Tribe: Cichorieae Subtribe: Cichoriinae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford	"Herbs 40-110 cm tall, perennial, with a strong taproot." [With a taproot, but not a geophyte]

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"By rivers, wastelands along seashores, slopes, by ditches; low elevations. ?Gansu, Hebei, Heilongjiang, Henan, ?Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Taiwan, Xinjiang [N Africa, C and SW Asia, Europe]."
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	"Native to Europe, central Russia and western Asia, and cultivated widely through Europe in early times. Presently cultivated in most temperate regions, where it has escaped and become naturalized as a serious weed in many areas." [No evidence. Widespread native and introduced range]

602	Produces viable seed	y
	Source(s)	Notes
	Cichan, M. (1983). Self Fertility in Wild Populations of <i>Cichorium intybus</i> L. Bulletin of the Torrey Botanical Club, 110(3), 316-323	"1983.-Two wild populations of <i>Cichorium intybus</i> (Compositae) were examined to determine if self-compatible plants occur in nature and, if present, to measure the extent to which self compatibility (SC) is expressed. Approximately 70% of the individuals tested were found to produce at least some seeds in response to self pollination."
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"Achene brown, subcylindric to obovoid, 2–3 mm, stout, rugulose, apex truncate. Pappus (0.1–)0.2–0.3 mm."
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 17 Jan 2019]	"Perennial herb, reproducing by seeds and from roots; taproot fleshy, deep, branched, up to 75 cm long, with a milky sap"

603	Hybridizes naturally	y
	Source(s)	Notes

Qsn #	Question	Answer
	Sørensen, B. S., Kiær, L. P., Jørgensen, R. B., & Hauser, T. P. (2007). The temporal development in a hybridizing population of wild and cultivated chicory (<i>Cichorium intybus</i> L.). <i>Molecular Ecology</i> , 16(16), 3292-3298	" <i>Cichorium intybus</i> hybridizes naturally with <i>Cichorium endivia</i> (Rick 1953), and according to Kiær et al . (in press) wild chicory hybridizes spontaneously with cultivated chicory."
	Cichan, M. (1983). Self Fertility in Wild Populations of <i>Cichorium intybus</i> L. <i>Bulletin of the Torrey Botanical Club</i> , 110(3), 316-323	"The irregular production of fruits in response to self pollination has been regarded as evidence of pseudo-self compatibility in wild x cultivated hybrids (Stout 1916, 1917, 1918) and in cultivated strains of <i>Cichorium intybus</i> (Pecaut 1962)." [No reports of interspecific hybrids]

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Cichan, M. (1983). Self Fertility in Wild Populations of <i>Cichorium intybus</i> L. <i>Bulletin of the Torrey Botanical Club</i> , 110(3), 316-323	"Two wild populations of <i>Cichorium intybus</i> (Compositae) were examined to determine if self compatible plants occur in nature and, if present, to measure the extent to which self compatibility (SC) is expressed. Approximately 70% of the individuals tested were found to produce at least some seeds in response to self pollination. The expression of the trait, which varies markedly from day to day, does not appear to be influenced by ambient temperature, relative humidity, or light intensity measured at the time of pollination. Likewise, plant age appears to have no effect on the fluctuations in SC. A histological analysis of pollen tube growth, embryogeny, and endosperm development indicates that seeds produced in self pollinated capitula are amphimictic (i.e., derived by normal sexual reproduction) and not agamospermic as other studies have suggested. Corroborating evidence for the occurrence of amphimixis is the outcome of an investigation of seed production in unpollinated capitula; no seeds were formed in heads that were not pollinated. The overall similarity in the expression of SC in wild plants and cultivated strains suggests that facultative inbreeding is part of the normal reproductive system of <i>Cichorium intybus</i> and not merely a transient abnormality."
	Schoofs, J., & De Langhe, E. (1988). Chicory (<i>Cichorium intybus</i> L.). In <i>Biotechnology in Agriculture and Forestry</i> 6. Crops II (pp. 294-321). Springer, Berlin, Heidelberg	[Partial self-compatibility] "According to Stout (1916), self-sterility is the rule in chicory." ... "The self-incompatibility is thus not absolute, which was confirmed by Sneeep (1953), Pecaut (1958) and Plumier (1960). Indeed, about 10 to 200/0 of the plants belonging to commercial varieties are self-compatible. A clear theory of the genetic determination of this characteristic has not yet been found."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Master Gardener Program. (2012). Chicory, <i>Cichorium intybus</i> . University of Wisconsin-Madison. https://wimastgardener.org . [Accessed 18 Jan 2019]	"Bees, flies and butterflies may visit the flowers."

Qsn #	Question	Answer
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"Synflorescence of main axis and larger branches spiciform-paniculiform. Capitula axillary and terminal, solitary or in clusters of a few, sessile or on a several cm long, thick, and apically slightly inflated peduncle, with usually 15–20 florets. Involucre cylindric, 0.9–1.4 cm. Phyllaries abaxially sparsely with glandular or simple hairs, apex ± acute; outer phyllaries lanceolate, longest > 1/2 as long as to approaching inner ones in length, spreading-erect, margin ciliate; inner phyllaries linear-lanceolate. Florets blue or exceptionally pink or bluish white."
	Rumball, W. (1986). Grasslands Puna'chicory (<i>Cichorium intybus L.</i>). New Zealand Journal of Experimental Agriculture, 14(1), 105-107	"The flowers are readily pollinated by honey bees. Seeds ripen within c. 3 weeks and are easily dislodged by wind and feeding birds."
	Plants for a Future. (2019). <i>Cichorium intybus</i> . https://pfaf.org/user/plant.aspx?LatinName=Cichorium+intybus . [Accessed 17 Jan 2019]	"The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"The primary means of reproduction of this species is by seed, but fragments of roots may contribute new shoots."

607	Minimum generative time (years)	1
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford	"Perennials (sometimes flowering first year)."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"The normal behavior of the plant is the formation of a basal rosette of leaves from a crown in the first year, with a flowering stalk, early or late, in the next season. In a typical season in North America, for example, the plant flowers from July to fros1. with first seeds ripe in early August."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Randall, R. P. (2016). Weed Pathways within Western Australia. Department of Agriculture and Food, Western Australia	"Appendix Two: 111 Species in WA with the largest number of dispersal pathways" [<i>Cichorium intybus</i> reported to be dispersed by livestock, sheep, humans, vehicles, animals, flying animals, water and wind]
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"By rivers, wastelands along seashores, slopes, by ditches; low elevations."

Qsn #	Question	Answer
	Tehama County Resource Conservation District. (2013). Integrated Weed Management Plan For the Battle Creek Watershed Manton, California 2012-2016. Tehama County Resource Conservation District, Red Bluff, CA	"Chicory is a common roadside weed and has been found along roads within the western half of the Lassen Volcanic National Park. Sightings have also been noted at the Park's Headquarters in Mineral. The plant blooms after living through one winter and prefers being near hot rocks or other debris in the soils, which is one reason it thrives best along roadsides."
	USDA Agricultural Research Service. (1971). Common Weeds of the United States. Dover Publications, Mineola, NY	[Occurs in heavily trafficked areas] "Along roadsides, grasslands, fence rows, and waste ground, preferring neutral or limestone {where most troublesome} soils; in lawns, fields of small grain and pastures; does not survive in cultivated land."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Duke, J. A. (1983). <i>Cichorium intybus</i> . Handbook of Energy Crops. https://hort.purdue.edu/newcrop/duke_energy/Cichorium_intybus.html . [Accessed 18 Jan 2019]	"Native to Europe, central Russia and western Asia, and cultivated widely through Europe in early times. Presently cultivated in most temperate regions, where it has escaped and become naturalized as a serious weed in many areas."

703	Propagules likely to disperse as a produce contaminant	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley and Sons, Inc., New York, NY	"Clark and Fletcher (1909} reported in Canada in an earlier time that the seeds of this weed often moved about with commercial supplies of clover and grass seed. Johnson and Hensman (1910), in a summary of 10 years of inspection of the purity of agricultural seed supplies, found that chicory was being introduced into Ireland with timothy seed. Anderson (1956) estimated that the average yearly loss of oats in Canada during the period 1936 to 1939 because of this weed was 40% of the crop. In northern India it was also found that <i>C. intybus</i> was introduced into new lucerne fields by contaminants in the seed supply."

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"Achene brown, subcylindric to obovoid, 2–3 mm, stout, rugulose, apex truncate. Pappus (0.1–)0.2–0.3 mm."
	Randall, R. P. (2016). Weed Pathways within Western Australia. Department of Agriculture and Food, Western Australia	"Appendix Two: 111 Species in WA with the largest number of dispersal pathways" [Cichorium intybus reported to be dispersed by livestock, sheep, humans, vehicles, animals, flying animals, water and wind]
	Rumball, W. (1986). Grasslands Puna'chicory (<i>Cichorium intybus</i> L.). New Zealand Journal of Experimental Agriculture, 14(1), 105-107	"Seeds ripen within c. 3 weeks and are easily dislodged by wind and feeding birds."
	Master Gardener Program. (2012). Chicory, <i>Cichorium intybus</i> . University of Wisconsin-Madison. https://wimastergardener.org . [Accessed 18 Jan 2019]	[Short distance wind dispersal] "This species propagates readily from seed or pieces of roots. But the seeds are much heavier than those of a dandelion and lack the feathery pappus that helps those seeds disperse on the wind, so this weed tends to occur where animals, machines, or other human activities move the seeds, rather than the random and ubiquitous distribution seen for dandelions."

705	Propagules water dispersed	y
	Source(s)	Notes
	Randall, R. P. (2016). Weed Pathways within Western Australia. Department of Agriculture and Food, Western Australia	"Appendix Two: 111 Species in WA with the largest number of dispersal pathways" [Cichorium intybus reported to be dispersed by livestock, sheep, humans, vehicles, animals, flying animals, water and wind]
	Wu, Z. Y., Raven, P. H. & Hong, D. Y., (eds.). 2011. Flora of China Volume 20-21 (Asteraceae). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis	"By rivers, wastelands along seashores, slopes, by ditches; low elevations." [Proximity to rivers and ditches would facilitate secondary dispersal by water]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Rumball, W. (1986). Grasslands Puna'chicory (<i>Cichorium intybus</i> L.). New Zealand Journal of Experimental Agriculture, 14(1), 105-107	"The flowers are readily pollinated by honey bees. Seeds ripen within c. 3 weeks and are easily dislodged by wind and feeding birds." [Seeds dislodged by birds, but presumably not internally dispersed]

Qsn #	Question	Answer
707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	USDA Agricultural Research Service. (1971). Common Weeds of the United States. Dover Publications, Mineola, NY	"Achene 2-3 mm. long, obovate, light-brown and darker mottled, finely granular, obscurely 4- to 5-angled, the tip blunt, beakless; Pappus a minute fringed crown of tiny bristlelike scales."
	Randall, R. P. (2016). Weed Pathways within Western Australia. Department of Agriculture and Food, Western Australia	"Appendix Two: 111 Species in WA with the largest number of dispersal pathways" [Cichorium intybus reported to be dispersed by livestock, sheep, humans, vehicles, animals, flying animals, water and wind]
	WRA Specialist. (2019). Personal Communication	Randall (2016) reports dispersal by animals. Pappus would facilitate attachment to wool or fur

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"C. intybus has been used as fodder for cattle and sheep. In Poland and Germany it was formerly grown with clover and timothy hay as forage for animals. In the former Yugoslavia it is considered excellent for pig fodder. The roots of this plant are sometimes dug and stored for cattle food." [Unknown if seeds can survive gut passage if accidentally or intentionally consumed by browsing animals]

801	Prolific seed production (>1000/m2)	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"Pawlowski et al. (1967-68) in Poland found the average seed production per plant was 6800, with a maximum of 68,000. Korsmo (1930) in Norway found an average of 6500 seeds/plant."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	"Ewart (1908) in Australia was able to germinate seeds known to be 8 yr old. Bruns (1965) tested the longevity of weed seeds in fresh water storage in the western United States and found that many chicory seeds deteriorated within 3 mo but that a few were firm at 54 mo; a small number still germinated at 4 yr."

803	Well controlled by herbicides	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	Excellent control, generally better than 95% reported for the following herbicides: 2,4-D; Aminocyclopyrachlor + chlorsulfuron; Aminopyralid; Clopyralid; Dicamba; Picloram. F = Fair control, 50-80% reported for Triclopyr. P = Poor control, below 50% reported for Chlorsulfuron; Glyphosate; Imazapic; Imazapyr; Metsulfuron; Paraquat; Rimsulfuron and Sulfosulfuron.

Qsn #	Question	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Master Gardener Program. (2012). Chicory, <i>Cichorium intybus</i> . University of Wisconsin-Madison. https://wimastergardener.org . [Accessed 18 Jan 2019]	"For chicory infesting lawns, mowing will cut off some of the leaves and the flowering stems, leaving hard stumps, but the plant will regrow from the tap root. Frequently mowed plants often end up with prostrate flowering stems not affected by the mower."
	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	NON-CHEMICAL CONTROL ... Grazing F often regrows after grazing and may be considered desirable forage; Mowing and cutting F can regrow after mowing but can prevent seed production; Grubbing, digging or hand pulling E remove as much of the plant and root as possible to prevent regrowth

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability
- Primarily a temperate species, but able to grow in regions with tropical climates
- Widely naturalized outside native range, but no evidence in Hawaiian Islands to date
- A disturbance weed with negative impacts on agriculture
- A potential environmental weed (reports from Australia are mostly anecdotal)
- Other *Cichorium* species are invasive
- Possibly toxic to pigs
- May cause contact dermatitis
- Tolerates many soil types (substrate not a limiting factor to spread)
- Reproduces by seeds and vegetatively from root fragments
- Hybridizes with other *Cichorium* species
- Some populations are self-compatible (although self-incompatibility is generally reported)
- A biennial that sometimes reaches maturity in first growing season
- Seeds dispersed by intentionally and unintentionally by people, animals, wind (short distances) and water
- Can become a seed contaminant of other crops
- Prolific seed production
- Some viable seeds persist in the soil for several years
- Resprouts from roots after cutting, mowing or grazing

Low Risk Traits

- Domesticated, self-incompatible forms exist that may reduce risk of escape and spread
- Unarmed (no spines, thorns, or burrs)
- Thrives in full sun (tolerates partial shade), which may limit spread into intact forests
- Provides fodder for livestock (palatable despite reports of toxicity to pigs)
- Economic value as crop may outweigh negatives in certain situations
- Some herbicides provide effective control