UF IFAS UNIVERSITY of FLORIDA

Assessment of Non-native Plants in Florida's Natural Areas

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Assessment date 10 July 2017

	Brassica napus **All ZONES**	**Answer**	**Score**
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	y	4
3.04	Environmental weed	unk	
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	?	
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	y	1
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
4.08	Creates a fire hazard in natural ecosystems	unk	0
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	n	0
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	unk	0
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	y	1

6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	y	1
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	n	-1
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y	1
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant	y	1
7.04	Propagules adapted to wind dispersal	y	1
7.05	Propagules water dispersed	n	-1
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)	unk	-1
7.08	Propagules dispersed by other animals (internally)	y	1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	y	1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
	Total Score	**22**	
	Implemented Pacific Second Screening	**NO**	
	Risk Assessment Results	**High**	

section	# questions answered	satisfy minimum?
A	10	yes
B	9	yes
C	19	yes
total	38	yes

	Reference	Source data
1.01	1. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 2. Canadian Food Inspection Agency. http://www.inspection.gc.ca/plants/plants-with-novel-traits/applicants/directive-94-08/biology-documents/brassica-napus-l-/eng/1330729090093/1330729278970 (Accessed: 9 December 2016)	Insufficient evidence of selection for reduced weediness 1. "It is believed that Brassica napus originated from a fortuitous hybridization between the turnip (B. rapa) and kale (B. oleracea acephala), probably in European gardens during the Middle Ages. Canola, a selected genetic variant of rape, was developed in the late 1970's in Manitoba, Canada, as a more nutritious source of vegetable oil than rapeseed." 2. "Although used widely as an edible oil in Asia, only through breeding for improved oil quality, and through the development of improved processing techniques, has rapeseed oil become important in western nations."
1.02		Skip to 2.01
1.03		Skip to 2.01
2.01	1. Global Plant Hardiness Zones for Phytosanitary Risk Analysis. http://naldc.nal.usda.gov/download/36586/PDF (Accessed: 1 December 2016) 2. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?7661 (Accessed: 7 December 2016) 3. Office of the Gene Technology Regulator. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/brassica.pdf (Accessed: 7 December 2016) 4. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 5. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016)	1. Figure 3. Florida North Zone: Hardiness zones 8 and 9. Central Zone: Hardiness zones 9 and 10. South Zone: Hardiness zone 10. 2. Naturalized in China, Japan, Afghanistan, Australia, New Zealand, Canada, Europe, Mexico, United States, Central America, Argentina, Chile, and Ecuador 3. "originated in either the Mediterranean area or Northern Europe" 4. "It is believed to be native to Scandanavia and Russia"; "Zone: 2 to 11" 5. "Hardiness: USDA Zones 3 - 10."
2.02		Range is well known
2.03	1. The University of Melbourne. Köppen-Geiger Climate Map of the Wolrd. http://people.eng.unimelb.edu.au/mpeel/koppen.html (Accessed: 1 December 2016) 2. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?7661 (Accessed: 7 December 2016) 3. Office of the Gene Technology Regulator. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/brassica.pdf (Accessed: 7 December 2016) 4. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016)	1. Native or naturalized to Köppen-Geiger Climate Zones: Af, Am, Aw, BWh, BWk, BSh, BSk, Csa, Csb, Cwa, Cwb, and Cfb 2. Naturalized in China, Japan, Afghanistan, Australia, New Zealand, Canada, Europe, Mexico, United States, Central America, Argentina, Chile, and Ecuador 3. "originated in either the Mediterranean area or Northern Europe" 4. "It is believed to be native to Scandanavia and Russia"

2.04	1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (Accessed: 1 December 2016) 2. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?7661 (Accessed: 7 December 2016) 3. Office of the Gene Technology Regulator. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/brassica.pdf (Accessed: 7 December 2016) 4. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016)	1. Native and naturalized in areas with rainfall within these ranges. 2. Naturalized in China, Japan, Afghanistan, Australia, New Zealand, Canada, Europe, Mexico, United States, Central America, Argentina, Chile, and Ecuador 3. "originated in either the Mediterranean area or Northern Europe" 4. "It is believed to be native to Scandanavia and Russia"
2.05	1. USDA Plants Database. https://plants.usda.gov/core/profile?symbol=BRNAN2 (Accessed: 7 December 2016) 2. GoBotany. https://gobotany.newenglandwild.org/species/brassica/napus/ (Accessed: 7 December 2016) 3. Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200009263 (Accessed: 9 December 2016)	1. Introduced to Mississippi 2. Present in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont 3. "introduced; Alta., B.C., Man., N.B., Nfld. and Labr., N.W.T., N.S., Ont., P.E.I., Que., Sask.; Alaska, Ariz., Ark., Calif., Colo., Conn., Del., D.C., Fla., Ga., Idaho, Ill., Ind., Iowa, Ky., La., Maine, Md., Mass., Mich., Miss., Mo., N.H., N.J., N.Y., N.C., Ohio, Okla., Oreg., Pa., Tenn., Utah, Vt., Va., Wash., W.Va., Wis.; Europe; Asia; Africa; introduced also in Mexico, Central America, South America, Atlantic Islands, Australia."
3.01	1. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?7661 (Accessed: 7 December 2016) 2. Calflora. http://www.calflora.org/cgi-bin/species_query.cgi?where-taxon=Brassica+napus (Accessed: 7 December 2016) 3. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 4. Webb, C.J.; Sykes, W.R. and Garnock-Jones, P.J. 1988. Flora of New Zealand Volume IV: Naturalised Pteridophytes, Gymnosperms, Dicotyledons. First electronic edition, Landcare Research, June 2004. Transcr. A.D. Wilton and I.M.L. Andres. http://FloraSeries.LandcareResearch.co.nz. (Accessed: 9 December 2016)	1. Naturalized in China, Japan, Afghanistan, Australia, New Zealand, Canada, Europe, Mexico, United States, Central America, Argentina, Chile, and Ecuador 2. "not native to California; it was introduced from elsewhere and naturalized in the wild" 3. "Cultivated in most European countries, but naturalized in most." 4. Locally naturalised on coasts, and an occasional casual escape from cultivation on roadsides and in cultivated fields in New Zealand

3.02	1. Calflora. http://www.calflora.org/cgi-bin/species_query.cgi?where-taxon=Brassica+napus (Accessed: 7 December 2016) 2. Canadian Food Inspection Agency. http://www.inspection.gc.ca/plants/plants-with-novel-traits/applicants/directive-94-08/biology-documents/brassica-napus-l-/eng/1330729090093/1330729278970 (Accessed: 9 December 2016) 3. Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200009263 (Accessed: 9 December 2016) 4. Global Compendium of Weeds. http://www.hear.org/gcw/species/brassica_napus/ (Accessed: 9 December 2016)	1. "Communities: weed, characteristic of disturbed places" 2. "It is found typically in crops, fields, gardens, roadsides and waste places."; "In Europe, predominantly the winter form has become a common yellow crucifer of roadsides, waste and cultivated ground, docks, cities and towns, tips, arable fields and riverbanks. In the British Isles, for instance, it has been naturalized wherever oil-seed rape is grown. It is a relatively recent introduction into Canada and the United States, and is described as an occasional weed, escape or volunteer in cultivated fields"; "In un-managed ecosystems these species may be considered "primary colonizers," i.e., plant species that are the first to take advantage of disturbed land where they would compete against plants of similar types for space. Unless the habitats are disturbed on a regular basis, such as on cliff edges, river edges and the edges of pathways made by animals, populations of these types of plants will become displaced by intermediaries and finally by plants that will form climax ecologies such as perennial grasses on prairies and tree species and perennial shrubs in forests." 3. "Roadsides, disturbed areas, waste places, cultivated and abandoned fields, escape from cultivation" 4. Classified as a garden thug
3.03	1. Canadian Food Inspection Agency. http://www.inspection.gc.ca/plants/plants-with-novel-traits/applicants/directive-94-08/biology-documents/brassica-napus-l-/eng/1330729090093/1330729278970 (Accessed: 9 December 2016) 2. Thornton, M.A., T.H. Thomas & N.C.B. Peters. 1999. The promotive effect of combustion products from plant vegetation on the release of seeds from dormancy. Plant Growth Regulation 28: 129–132. (Accessed: 9 December 2016) 3. Global Compendium of Weeds. http://www.hear.org/gcw/species/brassica_napus/ (Accessed: 9 December 2016)	1. "It is found typically in crops, fields, gardens, roadsides and waste places."; "In crop production systems, poor management practices may result in large numbers of seed of B. napus not being harvested, that may cause volunteer "weed" problems in succeeding crops, especially at high density." 2. "Volunteer oilseed rape is a major agricultural weed because its seeds can become dormant when buried in the soil." 3. Classified as an agricultural weed
3.04	1. Canadian Food Inspection Agency. http://www.inspection.gc.ca/plants/plants-with-novel-traits/applicants/directive-94-08/biology-documents/brassica-napus-l-/eng/1330729090093/1330729278970 (Accessed: 9 December 2016) 2. Global Compendium of Weeds. http://www.hear.org/gcw/species/brassica_napus/ (Accessed: 9 December 2016)	1. "Oilseed rape does not compete with weeds in the early growth stages, because it is slow growing and slow to cover the ground." 2. Classified as an environmental weed
3.05	1. California Invasive Plant Council. http://www.cal-ipc.org/ip/research/saharan/ (Accessed: 9 December 2016) 2. Global Compendium of Weeds. http://www.hear.org/gcw/scientificnames/scinameb.htm (Accessed: 9 December 2016)	1. Brassica tournefortii "Competes with and reduces the productivity of native plants" 2. Brassica alba, Brassica barrelieri, Brassica fruticulosa, Brassica hirta, Brassica kaber, Brassica oleracea, and Brassica rapa are classified as environmental weeds and Brassica arvensis, Brassica campestris, Brassica juncea, Brassica nigra, and Brassica tournefortii are classified as noxious weeds
4.01	1. Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200009263 (Accessed: 7 December 2016) 2. University of Florida IFAS Extension EDIS. http://edis.ifas.ufl.edu/mv123 (Accessed: 9 December 2016) 3. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1,2,&3. No evidence of these characteristics

4.02	1. Zaji and Majd. International Conference on Chemical, Ecology and Environmental Sciences. http://psrcentre.org/images/extraimages/14.%201211472.pdf (Accessed: 9 December 2016) 2. Jafariehyazdi and Javidfar. http://agriculturejournals.cz/publicFiles/35211.pdf (Accessed: 9 December 2016) 3. Choesin, D. N. and R. E. J. Boerner. 1991. Allyl Isothiocyanate Release and the Allelopathic Potential of Brassica napus (Brassicaceae). American Journal of Botany 78(8): 1083-1090. (Accessed: 9 December 2016)	Conflicting evidence 1. "Our experiments clearly demonstrate that canola residues incorporation in different densities had significantly ($p \leq 0.05$) affected on density, fresh weight and dry weight. Growth of weeds was reduced by increasing of canola density (Table 1)." 2. "Samples were air dried in shade for three weeks. The dried samples were stored in plastic bags before used for experiments. Straws of three species were collected in June. All samples were separately ground to fine powder to pass through a 3-mm sieve. Ten gram of each species from two different stages were mixed with 100 ml distilled water and left for 24 h at 25°C in dark for extraction. Aqueous extracts were obtained as filtrate of the mixture and final volume was adjusted to 100 ml."; "The results demonstrated that sunflower seeds are sensitive to allelopathic compounds released by B. napus, B. rapa and B. juncea. Thus future plans are to conduct field experiments to assess their potential to reduce sunflower growth and also their persistence in soil." 3. "Under our experimental conditions, B. napus showed no indication of being allelopathic, and Al concentrations typical of soils around B. napus plants did not inhibit target plants."
4.03		No evidence
4.04	1. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 2. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 3. University of Florida IFAS Extension EDIS. http://edis.ifas.ufl.edu/mv123 (Accessed: 9 December 2016)	1. "forage crops for livestock"; "Several cultivars of rape, especially 'Dwarf Essex', are grown for livestock forage in Europe, Australia and North America." 2. "grown as forage for livestock feed" 3. "Although rape is outlined here because of its usefulness as a vegetable, it has been grown primarily for green livestock fodder, its seed oil (called colza oil), and birdseed."
4.05	1. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 2. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 3. Cornell University College of Agriculture and Life Sciences. http://poisonousplants.ansci.cornell.edu/toxicagents/glucosin.html (Accessed: 9 December 2016) 4. Russel. British Society of Animal Science. https://www.cambridge.org/core/journals/animal-science/article/a-note-on-goitre-in-lambs-grazing-rape-brassica-napus/16AB723A7FB0D4EB4C8180C1E09F9E6A (Accessed: 9 December 2016)	1. "forage crops for livestock"; "Several cultivars of rape, especially 'Dwarf Essex', are grown for livestock forage in Europe, Australia and North America." 2. "grown as forage for livestock feed"; "Irritant poisoning of stock can occur with acute or hemorrhagic gastroenteritis. Rape seed, containing the goitrogenic L-5-vinyl-2-thiooxazolidone, can produce goiter in animals consuming modest quantities. Rape has been incriminated in several poisoning syndromes, i.e. respiratory, digestive, nervous, and urinary." 3. "How poisoning occurs Glycosinolates are hydrolyzed by either the enzyme glucosinolase or thioglucosidase into glucose, $HSO4^-$, and one of the following aglycone derivatives: isothiocynates, thiocyanates, nitriles, or related compounds such as oxazolidine-2-thiones. The enzymes for hydrolysis are produced by plants and by rumen organisms. They react with the glucosinolates when plant tissue is crushed, for example by mastication, or when the plant is consumed into the rumen of a ruminant animal."; "Plants involved... Brassica napus, Rutabaga, brown-hulled rape" 4. "Forage crops of the genus Brassica are known to contain goitrogens which under certain conditions can cause severe incidences of neonatal mortality in lambs and goitre in older sheep"

4.06	1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 2. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accesse	1. "Clubroot is a significant problem which not only destroys a crop but will also prevents planting future crops in the same location (spores remain in the soil for 20 years). Plantings are also susceptible to powdery mildew, anthracnose, alternaria, root knot and leaf spot. Aphids, cutworms, loopers, flea beetles, root maggots, and wireworms are potential insect problems." 2. "Following fungi are known to cause diseases in rape: Albugo candida, A. macrospora, Alternaria brassicicola, A. brassicae, A. oleracea, A. tenuis, Botrytis cinerea, Cercospora brassicicola, C. armoraciae, Cercosporella brassicae, Cylindrosporium brassicae, Cytopus candidus, Erysiphe communes, E. polygoni, Leptosphaerella napi, Mycosphaerella brassicicola, Ophiolobus graminis, Pernonospora parasitica, P. brassicae, Plasmodiophora brassicae, Phoma lingam, P. napobrassicae, P. oleracea, Phyllosticta brassicae, Pythium debaryanum, P. perniciosum, Rhizopus oryzae, Rhizoctonia solani, Sclerotinia libertiana, S. fuckeliana, S. sclerotiorum, Stemphylium consortiale, Tubercullariella brassicae. Viruses causing diseases of rape include: Argentine sunflower, Cabbage black-ring, Cauliflower mosaic, Cucumber mosaic, Trinidad cucumber mosaic, Turnip crinkle, Tobacco mosaic, Yellow spot of Nasturtium. Bacterial diseases are caused by Pseudomonas destructans, P. maculicola and Xanthomonas campestris. Insects are major pests of rape; sprayings should be planned and official recommendations followed. Fleabeetles, cutworms, red turnip beetles attack seedlings, and these, along with Diamondback moth, Beet webworm, Bertha armyworm and Imported cabbage worm, attack from bud stage until maturity. Red-legged earth mite (Halotydeus destructor), in western Australia, Cutworms (Agrotis spp.); Cabbage moth (Plutella xylostella); Rutherglen bug (Nysius vinitor); aphids; weevils (Listroderes costirostris); Cabbage white butterfly (Artogeia rapae); Australian budworm (Heliothis
4.07	1. Suh, Park, Nahm, and Kim. Clinical and Experimental Allergy. http://onlinelibrary.wiley.com/store/10.1046/j.1365-2222.1998.00349.x/asset/j.1365-2222.1998.00349.x.pdf;jsessionid=1BF28C48AB9F0E0A6B56DF502EAFAF31.f03t02?v=1&t=iy3yrc5z&s=f6c14cc4243a1672976ac42a7babc120efe805e5 (Accessed: 9 December 2016) 2. Bugur, I., Arner, B. (1978). Rape pollen allergy. Scandinavian Journal of Respiratory Diseases 59: 222-227. (Accessed: 9 December 2016) 3.Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016)	1. "These results suggest that the inhalation of oilseed rape dust, not pollen, can cause IgE mediated bronchoconstriction in an exposed worker of the grain industry" 2. High incidences of hay fever and/or bronchial asthma have been measured in B. napus growing areas in Europe during flowering. 3. "Sprouts are used dietetically and as seasoning."; "Rape oil is used in massage and oil baths, believed to strengthen the skin and keep it cool and healthy. With camphor it is applied for rheumatism and stiff joints. Medicinally, root used in chronic coughs and bronchial catarrh."
4.08	1. USDA Natural Resources Conservation Service Plant Guide. https://plants.usda.gov/plantguide/doc/pg_brrar.docx (Accessed: 9 December 2016)	No specific evidence for Brassica napus 1. "Mustards also may become a fire hazard when they dry at the end of the growing season", however this guide was specifically addressing Brassica rapa
4.09	1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 2. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 3. Plants for a Future. http://www.pfaf.org/USER/Plant.aspx?LatinName=Brassica+napus (Accessed: 9 December 2016)	1. "Sun: Full sun"; "Tolerates light shade." 2. "Light: All of the B. napus varieties should have full sun for maximum performance." 3. "It can grow in semi-shade (light woodland) or no shade."

4.10	1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 2. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 3. Canadian Food Inspection Agency. http://www.inspection.gc.ca/plants/plants-with-novel-traits/applicants/directive-94-08/biology-documents/brassica-napus-l-/eng/1330729090093/1330729278970 (Accessed: 9 December 2016)	1. "Easily grown in organically rich, consistently moist, well-composted, well-drained loams " 2. "Requires fertile, well-drained soils." 3. "It is widely adapted, and performs well in a range of soil conditions, providing that moisture and fertility levels are adequate."
4.11	1. Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200009263 (Accessed: 7 December 2016) 2. University of Florida IFAS Extension EDIS. http://edis.ifas.ufl.edu/mv123 (Accessed: 9 December 2016) 3. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016) 4. Oregon State University Forage Information System. http://forages.oregonstate.edu/ssis/plants/plant-types/forbs (Accessed: 9 December 2016)	1,2,&3. No evidence 4. Forb
4.12	1. Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200009263 (Accessed: 7 December 2016) 2. University of Florida IFAS Extension EDIS. http://edis.ifas.ufl.edu/mv123 (Accessed: 9 December 2016) 3. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1,2,&3. No evidence
5.01	1. USDA Plants Database. https://plants.usda.gov/core/profile?symbol=BRNAN2 (Accessed: 7 December 2016) 2. GoBotany. https://gobotany.newenglandwild.org/species/brassica/napus/ (Accessed: 7 December 2016)	1. "Family: Brassicaceae" 2. "Habitat: terrestrial"
5.02	1. USDA Plants Database. https://plants.usda.gov/core/profile?symbol=BRNAN2 (Accessed: 7 December 2016) 2. Oregon State University Forage Information System. http://forages.oregonstate.edu/ssis/plants/plant-types/forbs (Accessed: 9 December 2016)	1. "Growth habit: forb/herb" 2. Forb
5.03	1. USDA Plants Database. https://plants.usda.gov/core/profile?symbol=BRNAN2 (Accessed: 7 December 2016)	1. "Family: Brassicaceae"
5.04	1. USDA Plants Database. https://plants.usda.gov/core/profile?symbol=BRNAN2 (Accessed: 7 December 2016) 2. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016)	1. "Family: Brassicaceae" 2. "Tuberous edible roots"
6.01		No evidence
6.02	1. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 2. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 3. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "produce sickle shaped pods containing tiny round seeds" 2. Propagates by seed 3. "The normal means of canola reproduction is through seeds."

6.03	1. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 2. Bing, D. J., R. K. Downey and G. F. W. Rakow (1991) Potential of gene transfer among oilseed Brassica and their weedy relatives. GCIRC 1991 Congress. pp. 1022-1027. (Accessed: 9 December 2016) 3. Living Field. http://www.livingfield.co.uk/5000-plants/crop-weeds/the-brassica-complex/ (Accessed: 9 December 2016)	1. "It is believed that Brassica napus originated from a fortuitous hybridization between the turnip (B. rapa) and kale (B. oleracea acephala), probably in European gardens during the Middle Ages." 2. The following hybridizations were observed in field outcrossing studies: B. napus x B. juncea, B. juncea x B. napus, B. napus x B. rapa, B. rapa x B. napus 3. "Cross-pollination – all B. napus types can cross pollinate with each other and with forms of B. rapa but not normally with B. oleracea. Their genes are carried over many kilometers by wind and insects. They form an interacting, shifting network in the landscape."
6.04	1. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 2. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "Rape is 70% self-pollinating and 30% cross-pollinated. Even if wind and insects are absent, seed are still produced." 2. "Fertilisation of ovules usually results from self-pollination since in a flowering crop, each flower produces a large amount of pollen, which usually out competes the pollen from adjacent flowers."
6.05	1. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016) 2. Chambo, De Oliveira, Garcia, Duarte-Junior, Ruvolo-Takasuski, and Toledo. An Acad Bras Cienc. https://www.ncbi.nlm.nih.gov/pubmed/25590743 (Accessed: 9 December 2016) 3. Stanley, Gunning, and Stout. Journal of Insect Conservation. https://www.researchgate.net/publication/258163435_Pollinators_and_pollination_of_oilseed_rape_crops_Brassica_napus_L_in_Ireland_Ecological_and_economic_incentives_for_pollinator_conservation (Accessed: 9 December 2016)	1 "Even if wind and insects are absent, seed are still produced. Yield increases with honeybees. Competes with alfalfa and clover for insect pollination." 2. Pollinated by honeybees 3. "Our data showed that winter oilseed rape is visited by a wide variety of insect species, including the honeybee, bumblebees, solitary bees, and hoverflies. The honeybee, Eristalis hoverflies and bumblebees (especially Bombus sensu stricto and B. lapidarius) were the best pollinators of winter oilseed rape based on the number of pollen grains they carry, visitation rates per flower and their relative abundance per field."
6.06	1. Canadian Food Inspection Agency. http://www.inspection.gc.ca/plants/plants-with-novel-traits/applicants/directive-94-08/biology-documents/brassica-napus-l-/eng/1330729090093/1330729278970 (Accessed: 9 December 2016) 2. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "There are no reports of vegetative reproduction under field conditions in Canada. " 2. "There are no reports of vegetative reproduction under field conditions"
6.07	1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 2. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 3. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "For fall harvest, sow seed in June (100 days before first fall frost)" 2. "Rutabagas require about 90 days to reach harvestable size. Individual leaves of Siberian kale can be picked beginning about 30 days after planting." 3. "Canola is an annual crop in Australia, generally completing a lifecycle in at most 7 months"

7.01	1. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016) 2. Crawley, M. J. and S. L. Brown. 1995. Seed Limitation and the Dynamics of Feral Oilseed Rape on the M25 Motorway. Proceedings: Biological Sciences 259(1354): 49-54. (Accessed: 9 December 2016)	1. "The greatest potential for the movement of canola seeds is from post harvest spillage by agricultural machinery or during transportation away from the production areas. Seed may also be moved on electrostatically charged containers (eg tarpaulins and bags) in storage bins. It is also possible that small amounts of seed could be transported on or in clothing (eg pockets and pant cuffs) or boots (especially muddy boots) of workers." 2. Evidence for seed limitation in these motorway verge populations comes from the observation that population densities were significantly higher on the side of motorways carrying traffic towards the oilseed crushing factory at Erith in Kent. This pattern was similar in 1993 and 1994, and suggests that oilseed rape recruitment depends, at least in part, on the introduction of seed spilled from loaded lorries in transit. Consistent with this hypothesis is the further observation that population densities were higher at junctions (i.e. in the verges between the exit and entry slip roads), where braking and turning might be expected to cause more seed to be shed.
7.02	1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 2. Floridata. http://floridata.com/Plants/Brassicaceae/Brassica%20napus/648 (Accessed: 7 December 2016) 3. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016)	1. "Suggested Use: Vegetable"; "Smaller leaves make excellent additions to salads." 2. "Rape is generally grown in large fields for animal fodder or rapeseed oil (a.k.a. colza oil in Asia)." 3. "Rape is the most important oil seed crop in Western Europe, and Canada is encouraging more production. Almost all Canada's oil is exported. World production of rapeseed oil is about 5 million tons."
7.03	1. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016) 2. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?7661 (Accessed: 9 December 2016)	1. "seed may be dispersed with straw and chaff during mechanical harvest." 2. "potential seed contaminant"
7.04	1. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "Canola seed can be dispersed to neighbouring non-agricultural areas by mechanisms such as strong winds blowing canola windrows across"; "Although no data exists on wind dispersal of canola windrows, it is reasonable to expect, that seeds and pods of low moisture content, may be transported within the field or to adjacent fields during periods of unusually high winds."
7.05	1. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "It is likely however that seeds would be transported relatively easily as bed load sediment in rivers and creeks. There is a high likelihood that the majority of seed being transported by water would be carried to positions unfavourable for establishment. Prolonged exposure to water would likely render canola seed unviable. Under flooding or waterlogged conditions, there would not be sufficient oxygen present for cell respiration to provide energy for germination to proceed (that is for emergence of the radicle from the seed)."
7.06	1. Stanley, M., Marcroft, S. (1999). Canola: The Ute Guide. Potter, T., Miles, M., Carmody, P., Cummins, J., Wilhelm, N., Parker, P. (eds). Primary Industries and Resources South Australia, pp 1-98. (Accessed: 9 December 2016)	1. Given the large number and small size of seed produced by each plant, a number of animals other than humans may disperse canola seed (eg ants, birds, and grazing animals). Birds, such as cockatoos and sparrows can shred or remove pods during development and maturity
7.07		No evidence

7.08	1. Martens, G. (2001). From Cinderella to Cruela: volunteer canola. In "2nd Annual Manitoba Agronomists Conference". University of Manitoba, Winnipeg, Manitoba, Canada. pp. 151-154. (Accessed: 9 December 2016) 2. Stanton, R., Pratley, J., Hudson, D. (2003). Sheep are potential vectors for the spread of canola (Brassica napus) seed. Australian Journal of Experimental Agriculture 43: 535-538. (Accessed: 9 December 2016)	1. Anecdotal evidence from Canada suggests canola seed (Roundup Resistant® canola), mixed with wheat, remained viable and subsequently emerged after being fed to chickens and distributed as chicken manure spread on a field 12 months later 2. In an Australian study, sheep fed canola seed as part of their diet excreted approximately 1 to 1.5% of the canola seed and a portion of this was able to germinate. Germination rates of the excreted seed were highest (approximately40%) on the first day after feeding of canola seed began, but then dropped by approximately an order of magnitude thereafter. The percentage of viable seed excreted daily was therefore in the order of 0.1% of daily intake. Sheep continued to excrete viable canola seed for 6 days after canola was removed from the diet
8.01	1. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accessed: 7 December 2016)	1 "Seed yields vary from 900 to 3,000 kg/ha; in North Africa it may be only 300–350 kg/ha."
8.02	1. Australian Government Department of Health and Ageing. http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/canola-3/$FILE/biologycanola08_2.pdf (Accessed: 9 December 2016)	1. "Studies in the Northern Hemisphere have reported viable seeds of canola persisting in disturbed soils for at least 5 years and possibly up to 10 years or more in undisturbed soil"
8.03	1. Hall L, Topinka K, Huffman J, Davis L, Good A. 2000. Pollen flow between herbicide-resistant Brassica napus is the cause of multiple-resistant B. napus volunteers1. Weed Science 48(6): 688–694. (Accessed: 9 December 2016)	1. A field in which Brassica napus volunteers were not controlled by several applications of glyphosate was investigated in 1998. This field had been planted with glufosinate-resistant and imidazolinone-resistant B. napus in 1997 and was adjacent to a field that had grown glyphosate-resistant B. napus. Mature volunteer B. napus were collected on a 50- by 100-m grid in the field. Progeny from 34 volunteers were sprayed with glyphosate at 440 g ae ha−1, and the survivors were sprayed with either glufosinate or imazethapyr at 400 or 50 g ai ha−1, respectively. Where seed numbers permitted (14 volunteers), seedlings were also sprayed sequentially with glyphosate, glufosinate, and imazethapyr, at 440 g ae ha−1, 400 g ai ha−1, and 50 g ai ha−1, respectively. In total, 15 volunteers had progeny that were between 66 and 82% resistant to glyphosate, consistent with the predicted 3:1 resistant : susceptible ratio. Volunteer B. napus plants with glyphosate-resistant seedlings were most common close to the putative pollen source; however, a plant with glyphosate-resistant progeny was collected 500 m from the adjacent field edge. Seedlings from all nine volunteers collected from the glufosinate-resistant area showed multiple resistance to glyphosate and glufosinate, whereas seedlings from 10 of 20 volunteers collected from the imidazolinone-resistant area showed resistance to imazethapyr and glyphosate. DNA extraction and restriction fragment length polymorphism (RFLP) analysis of seedlings confirmed that mature B. napus volunteers were hybrids resulting from pollen transfer rather than inadvertent seed movement between fields. Two seedlings from the 924 screened were resistant to all three herbicides. Progeny from these self-pollinated individuals were resistant to glyphosate and glufosinate at the predicted 3:1 resistant : susceptible ratio and resistant to imazethapyr at the predicted 15:1 resistant : susceptible ratio. Sequential crossing of three herbicide-resistant
8.04	1. USDA Natural Resources Conservation Service Plant Guide. https://plants.usda.gov/plantguide/doc/pg_brrar.docx (Accessed: 9 December 2016)	In sufficient evidence for a yes. 1. "Managing stands with fire or other physical disturbance is not recommended for mustard species as this can increase populations."

8.05	1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=275022&isprofile=0& (Accessed: 7 December 2016) 2. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Brassica_napus.html (Accesse	1. "Clubroot is a significant probE51lem which not only destroys a crop but will also prevents planting future crops in the same location (spores remain in the soil for 20 years). Plantings are also susceptible to powdery mildew, anthracnose, alternaria, root knot and leaf spot. Aphids, cutworms, loopers, flea beetles, root maggots, and wireworms are potential insect problems." 2. "Following fungi are known to cause diseases in rape: Albugo candida, A. macrospora, Alternaria brassicicola, A. brassicae, A. oleracea, A. tenuis, Botrytis cinerea, Cercospora brassicicola, C. armoraciae, Cercosporella brassicae, Cylindrosporium brassicae, Cytopus candidus, Erysiphe communes, E. polygoni, Leptosphaerella napi, Mycosphaerella brassicicola, Ophiolobus graminis, Pernonospora parasitica, P. brassicae, Plasmodiophora brassicae, Phoma lingam, P. napobrassicae, P. oleracea, Phyllosticta brassicae, Pythium debaryanum, P. perniciosum, Rhizopus oryzae, Rhizoctonia solani, Sclerotinia libertiana, S. fuckeliana, S. sclerotiorum, Stemphylium consortiale, Tubercullariella brassicae. Viruses causing diseases of rape include: Argentine sunflower, Cabbage black-ring, Cauliflower mosaic, Cucumber mosaic, Trinidad cucumber mosaic, Turnip crinkle, Tobacco mosaic, Yellow spot of Nasturtium. Bacterial diseases are caused by Pseudomonas destructans, P. maculicola and Xanthomonas campestris. Insects are major pests of rape; sprayings should be planned and official recommendations followed. Fleabeetles, cutworms, red turnip beetles attack seedlings, and these, along with Diamondback moth, Beet webworm, Bertha armyworm and Imported cabbage worm, attack from bud stage until maturity. Red-legged earth mite (Halotydeus destructor), in western Australia, Cutworms (Agrotis spp.); Cabbage moth (Plutella xylostella); Rutherglen bug (Nysius vinitor); aphids; weevils (Listroderes costirostris); Cabbage white butterfly (Artogeia rapae); Australian budworm (Heliothis