

Family: *Brassicaceae*

Taxon: *Rapistrum rugosum*

Synonym: *Myagrum rugosum* L. (*basionym*)

Common Name: bastard cabbage
common giant mustard
turnipweed

Questionnaire :	current 20090513	Assessor:	Patti Clifford	Designation: EVALUATE
Status:	Assessor Approved	Data Entry Person:	Patti Clifford	WRA Score 5
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"		(0-low; 1-intermediate; 2-high) (See Appendix 2)	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	n
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs		y=1, n=0	n
402	Allelopathic		y=1, n=0	
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	n
405	Toxic to animals		y=1, n=0	n
406	Host for recognized pests and pathogens		y=1, n=0	
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0	
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0	y

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

Designation: EVALUATE

WRA Score **5**

Supporting Data:

101	2010. WRA Specialist. Personal Communication.	No evidence.
201	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	Portugal - Madeira Islands; Spain - Canary Islands; Algeria [n.]; Egypt; Libya [n.]; Morocco; Tunisia; Cyprus; Egypt - Sinai; Iran; Iraq; Israel; Lebanon; Syria; Turkey; Armenia; Azerbaijan; Georgia; Russian Federation - Ciscaucasia, Dagestan; Kazakhstan; Turkmenistan ; Russian Federation - European part [s.]; Ukraine [incl. Krym]; Albania; Bulgaria; Former Yugoslavia; Greece [incl. Crete]; Italy [incl. Sardinia, Sicily]; France [incl. Corsica]; Portugal; Spain [incl. Balears
202	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	Portugal - Madeira Islands; Spain - Canary Islands; Algeria [n.]; Egypt; Libya [n.]; Morocco; Tunisia; Cyprus; Egypt - Sinai; Iran; Iraq; Israel; Lebanon; Syria; Turkey; Armenia; Azerbaijan; Georgia; Russian Federation - Ciscaucasia, Dagestan; Kazakhstan; Turkmenistan ; Russian Federation - European part [s.]; Ukraine [incl. Krym]; Albania; Bulgaria; Former Yugoslavia; Greece [incl. Crete]; Italy [incl. Sardinia, Sicily]; France [incl. Corsica]; Portugal; Spain [incl. Balears
203	2010. eFloras. Flora of North America Rapistrum rugosum. 7: 440-441.	Elevation: 0 - 2000 m.
204	2007. Randall, R.. Global Compendium of Weeds. http://www.hear.org/gcw/	No evidence of naturalization in tropic or subtropical zones.
205	2010. Calflora. Rapistrum rugosum Calflora: Information on California plants for education, research and conservation, based on data contributed by the Consortium of Calif. Herbaria and dozens of other public and private institutions and individuals.. The	Introduced into California and naturalized in the wild.
205	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	Widely naturalized.
301	2010. Calflora. Rapistrum rugosum Calflora: Information on California plants for education, research and conservation, based on data contributed by the Consortium of Calif. Herbaria and dozens of other public and private institutions and individuals.. The	Introduced into California and naturalized in the wild.
302	2005. Simmons, M.T.. Bullying the bullies: the selective control of exotic, invasive annual (Rapistrum rugosum) by oversowing with a competitive native species (Gaillardia pulchella). Restoration Ecology. 13: 609-615.	"In central Texas, Rapistrum rugosum inhabits disturbed and nondisturbed areas such as agricultural fields, roadsides, forests, and riparian features, and appears to be expanding its range into the Edwards Plateau to the west and the Rio Grande valley in the southern regions of the state. Its rapid infestation along Texas' roadsides has become a high-profile problem due to its perceived replacement of the native spring wildflowers, which in the public eye are a prominent characteristic of Texas landscapes."
303	2005. Simmons, M.T.. Bullying the bullies: the selective control of exotic, invasive annual (Rapistrum rugosum) by oversowing with a competitive native species (Gaillardia pulchella). Restoration Ecology. 13: 609-615.	"In central Texas, Rapistrum rugosum inhabits disturbed and nondisturbed areas such as agricultural fields, roadsides, forests, and riparian features, and appears to be expanding its range into the Edwards Plateau to the west and the Rio Grande valley in the southern regions of the state. Its rapid infestation along Texas' roadsides has become a high-profile problem due to its perceived replacement of the native spring wildflowers, which in the public eye are a prominent characteristic of Texas landscapes."
303	2010. The Weed Society of Western Australia Inc.. Western Weeds Brassicaceae Family. Weed Society of WA Inc,	Rapistrum rugosum is a major weed of crops in western Australia.

304	2005. Simmons, M.T.. Bullying the bullies: the selective control of exotic, invasive annual (<i>Rapistrum rugosum</i>) by oversowing with a competitive native species (<i>Gaillardia pulchella</i>). <i>Restoration Ecology</i> . 13: 609-615.	"In central Texas, <i>Rapistrum rugosum</i> inhabits disturbed and nondisturbed areas such as agricultural fields, roadsides, forests, and riparian features, and appears to be expanding its range into the Edwards Plateau to the west and the Rio Grande valley in the southern regions of the state. Its rapid infestation along Texas' roadsides has become a high-profile problem due to its perceived replacement of the native spring wildflowers, which in the public eye are a prominent characteristic of Texas landscapes."
305	2010. WRA Specialist. Personal Communication.	No evidence.
401	2010. eFloras. Flora of North America <i>Rapistrum rugosum</i> . 7: 440-441.	No spines, thorns or burrs.
402	2010. WRA Specialist. Personal Communication.	Unknown.
403	2010. eFloras. Flora of North America <i>Rapistrum rugosum</i> . 7: 440-441.	Not parasitic.
404	2000. Simmonds, H./Holst, P./Bourke, C.. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton	<i>Rapistrum rugosum</i> has high palatability to goats.
405	2000. Simmonds, H./Holst, P./Bourke, C.. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton	Not toxic to goats.
406	2010. WRA Specialist. Personal Communication.	Unknown.
407	2010. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland http://www.ncbi.nlm.nih.gov/sites/entrez	No evidence of toxicity or allergies.
407	2010. Specialized Information Services, U.S. National Library of Medicine. TOXNET Toxicology Data Network [Online Database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	No evidence of toxicity or allergies.
408	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant Working Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	An annual, many-branched, herbaceous plant that grows from 1 to 5 feet.
409	2010. WRA Specialist. Personal Communication.	Unknown
410	2006. Chauhan, B.S./Gill, G./Preston, C.. Factors affecting turnipweed (<i>Rapistrum rugosum</i>) seed germination in Southern Australia. <i>Weed Science</i> . 54: 1032-1036.	"Seed germinated over a broad range of pH between 4 and 10."
411	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant Working Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	<i>Rapistrum rugosum</i> is an annual, many-branched, herbaceous plant that grows from 1 to 5 feet or more in height and has a taproot that can become quite large.
412	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant Working Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	<i>Rapistrum rugosum</i> is an annual, many-branched, herbaceous plant that grows from 1 to 5 feet or more in height and has a taproot that can become quite large.
501	2010. eFloras. Flora of North America <i>Rapistrum rugosum</i> . 7: 440-441.	Terrestrial.
502	2010. eFloras. Flora of North America <i>Rapistrum rugosum</i> . 7: 440-441.	Brassicaceae.
503	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant Working Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	<i>Rapistrum rugosum</i> is an annual, many-branched, herbaceous plant that grows from 1 to 5 feet or more in height and has a taproot that can become quite large.

504	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Rapistrum rugosum is an annual, many-branched, herbaceous plant that grows from 1 to 5 feet or more in height and has a taproot that can become quite large.
601	2010. WRA Specialist. Personal Communication.	No evidence.
602	2006. Chauhan, B.S./Gill, G./Preston, C.. Factors affecting turnipweed (Rapistrum rugosum) seed germination in Southern Australia. Weed Science. 54: 1032-1036.	"Seed germinated over a wide pH from 4-10."
603	2010. WRA Specialist. Personal Communication.	Unknown.
604	1996. Virtue, J.G.. Improving the assessment of new weed threats: developing techniques with cruciferous weeds of cropping. http://www.caws.org.au/awc/1996/awc199610851.pdf	Self-incompatible.
605	2005. Somerville, D.. Fat bees skinny bees - a manual on honey bee nutrition for bee keepers. RIRDC Publicaton No 05/054: .Rural Industries Research and Development Corporation, Kingston	Bee pollinated.
606	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Annual.
607	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Annual
701	2005. Simmons, M.T.. Bullying the bullies: the selective control of exotic, invasive annual (Rapistrum rugosum) by oversowing with a competitive native species (Gaillardia pulchella). Restoration Ecology. 13: 609-615.	"In central Texas, Rapistrum rugosum inhabits disturbed and nondisturbed areas such as agricultural fields, roadsides, forests, and riparian features, and appears to be expanding its range into the Edwards Plateau to the west and the Rio Grande valley in the southern regions of the state. Its rapid infestation along Texas' roadsides has become a high-profile problem due to its perceived replacement of the native spring wildflowers, which in the public eye are a prominent characteristic of Texas landscapes."
702	2010. WRA Specialist. Personal Communication.	No evidence of intentional dispersal.
703	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	"The history of introduction of Rapistrum rugosum into the U.S. is uncertain. It appears to be spreading through contaminated grass seed mixes or mulching materials. Because its seeds are similar in size to those of wheat and rye, weed seed screens may fail to remove it from grass seed mixes."
704	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Rapistrum rugosum can be identified more easily and certainly by its unusually shaped fruit - a two-segmented seed capsule, called a silique. The seed capsule is stalked, with a long beak at the tip, and contains 1-2 seeds. The seeds are oval-shaped, dark brown, smooth, and tiny (about 1/16-inch). [no adaptation for wind dispersal]
705	2010. WRA Specialist. Personal Communication.	Unknown.
706	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Rapistrum rugosum can be identified more easily and certainly by its unusually shaped fruit - a two-segmented seed capsule, called a silique. The seed capsule is stalked, with a long beak at the tip, and contains 1-2 seeds. The seeds are oval-shaped, dark brown, smooth, and tiny (about 1/16-inch). [no adaptation for bird-dispersal]
707	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant fworking Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Rapistrum rugosum can be identified more easily and certainly by its unusually shaped fruit - a two-segmented seed capsule, called a silique. The seed capsule is stalked, with a long beak at the tip, and contains 1-2 seeds. The seeds are oval-shaped, dark brown, smooth, and tiny (about 1/16-inch). [no adaptation for external attachment]
708	2010. WRA Specialist. Personal Communication.	Unknown.

801	2010. WRA Specialist. Personal Communication.	Unknown.
802	2005. Simmons, M.T.. Bullying the bullies: the selective control of exotic, invasive annual (<i>Rapistrum rugosum</i>) by oversowing with a competitive native species (<i>Gaillardia pulchella</i>). <i>Restoration Ecology</i> . 13: 609-615.	"Although short-term control of <i>R. rugosum</i> in roadside plant communities can be achieved through the use of a broad-spectrum herbicide, consequent pulses of germination from the existing seed bank into an early-successional site can maintain or even enhance the population. Furthermore, herbicidal treatment may have a compounding effect of sustaining these treated sites in an ecologically disturbed state, thereby facilitating further infestation from the remaining dormant seed bank."
802	2006. Chauhan, B.S./Gill, G./Preston, C.. Factors affecting turnipweed (<i>Rapistrum rugosum</i>) seed germination in Southern Australia. <i>Weed Science</i> . 54: 1032-1036.	"Regardless of the light condition, germination of naked seed (63 to 88%) was always greater than the seed in intact indehiscent silique (0 to 13%). This indicates that seed dormancy in this species is mainly due to the silique. The silique has also been implicated in seed dormancy in wild radish (another Brassicaceae weed species) (Cheam and Code 1995). Germination of seed in intact silique showed a small increase with seed age, which could be due to dry after-ripening conditions experienced in this study. Under field conditions, where summer rainfall events can occur, the silique wall may decay and allow for higher seed germination. Gradual decay in the silique wall is likely to extend the periodicity of germination in this species, which in turn would protect the seed bank from complete exhaustion by control tactics."
803	1997. Adkins, S.W./Wills, D./Boersma, M./Walker, S.R./Robinson, G./McLeod, R.J./Einam, J.P.. Weeds resistant to chlorsulfuron and atrazine from the north-east grain region of Australia. <i>Weed Research</i> . 37: 343-349.	"Studies showed that at least 6 weeds found in the grain region of north-east Australia evolved resistance to one or other of the herbicides chlorsulfuron and atrazine. Two collections of <i>Rapistrum rugosum</i> , three of <i>Sisymbrium orientale</i> , five of <i>Sonchus oleraceus</i> , one of <i>Fallopia convolvulus</i> and one of <i>Sisymbrium thellungii</i> were resistant to the recommended rate of chlorsulfuron (15 g a.i. ha ⁻¹). The resistance status of four weeds (<i>R. rugosum</i> , <i>F. convolvulus</i> , <i>S. thellungii</i> and <i>U. panicoides</i>) was confirmed using a multiple concentration-response screen and is the first report of resistance for these species. Herbicide usage records showed that resistance has developed after 3-10 years of selection with chlorsulfuron, and 2-15 years of selection with atrazine, with no correlation between the frequency of use and the degree of resistance for any of the species where eight or more collections were made."
803	2006. Enyedy, K.. Annual bastard cabbage. Plant Conservation Alliance, Alien Plant Working Group, http://www.pcmg-texas.org/invasive_or_aggressive_plants.pdf	Chemical control of <i>Rapistrum rugosum</i> may be difficult because of its ability to attain resistance to several selective herbicides. Research into effective herbicide control is ongoing.
804	1991. Trabaud, L.. Is fire an agent favouring plant invasions. Cambridge University Press, http://books.google.com/books?id=hQcUkPf37lcC&dq=rapistrum+rugosum+%2B+%22fire%22&source=gbs_navlinks_s	In this experiment to understand the effects of fire on plant composition, plots were burned in different seasons and frequencies. <i>Rapistrum rugosum</i> was originally recorded in the plots after the fire and then not recorded in the plots that were later protected from fire. <i>Rapistrum</i> plants appeared the first or second year after burning as individuals coming from seed.
805	2010. WRA Specialist. Personal Communication.	Unknown.