Taxon: Briza maxima L.

Family: Poaceae

Common Name(s):
big quaking grass
blowfly grass
da ling feng cao
great quaking grass
greater quaking grass
italienskt darrgräs
large quaking grass
quaking grass
rattlesnake grass
shelly grass

Synonym(s):
Briza dalmatica Gand. (1883)
Briza gracilescens Gand. (1883)
Briza maxima f. concolor Maire & Weiller (1955)
Briza maxima f. discolor Maire & Weiller (1955)
Briza maxima f. rubra (Lam.) Maire (1955)
Briza maxima f. unicolor Maire & Weiller (1955)
Briza maxima var. fusca Merino (1909)
Briza maxima var. glabriflora Rohlena (1911)
Briza maxima var. hirsuta Doum. (1886)
Macrobriza maxima (L.) Tzvelev (1993)

Assessor: Chuck Chimera **Status:** In Progress **End Date:** 5 Jun 2024

WRA Score: 19.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Annual Grass, Naturalized, Weedy, Self-Compatible, Readily Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y = -3, n = 0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	0 = low, 1 = intermediate, 2 = high (see Appendix 2)	Intermediate
202	Quality of climate match data	0 = low, 1 = intermediate, 2 = high (see Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y = 1, n = 0	y
204	Native or naturalized in regions with tropical or subtropical climates	y = 1, n = 0	y
205	Does the species have a history of repeated introductions outside its natural range?	y= -2, ? = -1, n = 0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n = question 205	y
302	Garden/amenity/disturbance weed		
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	y
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	y
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	y
401	Produces spines, thorns or burrs	y = 1, n = 0	n

Qsn #	Question	Answer Option	Answer
402	Allelopathic		
403	Parasitic	y = 1, n = 0	n
404	Unpalatable to grazing animals	y = 1, n = -1	n
405	Toxic to animals	y = 1, n = 0	n
406	Host for recognized pests and pathogens		
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	y
409	Is a shade tolerant plant at some stage of its life cycle	y = 1, n = 0	y
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	y
501	Aquatic	y = 5, n = 0	n
502	Grass	y = 1, n = 0	y
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	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	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	y = 1, n = -1	y
801	Prolific seed production (>1000/m2)	y = 1, n = -1	n
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	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Native to Europe, widely cultivated for its large, showy panicles; in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i. First collected on Maui in 1917 (Lyon s.n., BISH)."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2024). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2024). Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**Intermediate**
	Source(s)	**Notes**

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	"Native Africa NORTHERN AFRICA: Algeria (n.), Libya (n.), Morocco, Tunisia Asia-Temperate WESTERN ASIA: Cyprus, Israel, Jordan, Lebanon, Syria, Turkey Europe EASTERN EUROPE: Russian Federation [Volgogradskaja oblast'] SOUTHEASTERN EUROPE: Albania, Bulgaria, Greece (incl. Crete), Croatia, Italy (incl. Sicily), Slovenia SOUTHWESTERN EUROPE: Spain (incl. Baleares), France (incl. Corsica), Portugal Cultivated Asia-Temperate CHINA: China EASTERN ASIA: Japan Asia-Tropical INDIAN SUBCONTINENT: India Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: United Kingdom Northern America REGION: United States (w.) Naturalized Asia-Temperate CHINA: China Asia-Tropical INDIAN SUBCONTINENT: India Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: United Kingdom Northern America REGION: United States (w.) Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] Southern America CARIBBEAN: Jamaica CENTRAL AMERICA: Guatemala, Honduras WESTERN SOUTH AMERICA: Colombia SOUTHERN SOUTH AMERICA: Chile Uncertain Africa MACARONESIA: Portugal [Azores]"

202	Quality of climate match data	High
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	"Native Africa NORTHERN AFRICA: Algeria (n.), Libya (n.), Morocco, Tunisia Asia-Temperate WESTERN ASIA: Cyprus, Israel, Jordan, Lebanon, Syria, Turkey Europe EASTERN EUROPE: Russian Federation [Volgogradskaja oblast'] SOUTHEASTERN EUROPE: Albania, Bulgaria, Greece (incl. Crete), Croatia, Italy (incl. Sicily), Slovenia SOUTHWESTERN EUROPE: Spain (incl. Baleares), France (incl. Corsica), Portugal"

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	Native to or naturalized in regions with temperate and tropical climates

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to Europe, widely cultivated for its large, showy panicles; in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i. First collected on Maui in 1917 (Lyon s.n., BISH)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	"Naturalized Asia-Temperate CHINA: China Asia-Tropical INDIAN SUBCONTINENT: India Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: United Kingdom Northern America REGION: United States (w.) Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] Southern America CARIBBEAN: Jamaica CENTRAL AMERICA: Guatemala, Honduras WESTERN SOUTH AMERICA: Colombia SOUTHERN SOUTH AMERICA: Chile"

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Flora of North America Editorial Committee. (2007). Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	"Briza maxima is native to the Mediterranean region. Cultivated as an ornamental, it is possibly one of the earliest grasses grown for other than edible purposes. It occasionally becomes naturalized in dry to somewhat moist but well-drained, fine or sandy soil on banks, rocky places, open woodlands, and cultivated areas such as roadsides and pastures. In the Flora region, it is known from scattered locations, mostly in Oregon and California, where it is an invader of coastal dune habitat."
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to Europe, widely cultivated for its large, showy panicles; in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i."
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"widespread weed species, attractive, ornamental grass cultivated and naturalized elsewhere"

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**y**
	Source(s)	**Notes**
	Flora of North America Editorial Committee. (2007). Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	"Briza maxima is native to the Mediterranean region. Cultivated as an ornamental, it is possibly one of the earliest grasses grown for other than edible purposes. It occasionally becomes naturalized in dry to somewhat moist but well-drained, fine or sandy soil on banks, rocky places, open woodlands, and cultivated areas such as roadsides and pastures. In the Flora region, it is known from scattered locations, mostly in Oregon and California, where it is an invader of coastal dune habitat."
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to Europe, widely cultivated for its large, showy panicles; in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i. First collected on Maui in 1917 (Lyon s.n., BISH)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	"Naturalized Asia-Temperate CHINA: China Asia-Tropical INDIAN SUBCONTINENT: India Australasia AUSTRALIA: Australia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: United Kingdom Northern America REGION: United States (w.) Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] Southern America CARIBBEAN: Jamaica CENTRAL AMERICA: Guatemala, Honduras WESTERN SOUTH AMERICA: Colombia SOUTHERN SOUTH AMERICA: Chile"

302	**Garden/amenity/disturbance weed**	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[A disturbance weed in the Hawaiian Islands. In other regions, negatively impacts agriculture and the natural environment] "in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i."

303	**Agricultural/forestry/horticultural weed**	**y**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Cereals, Cotton, Orchards & Plantations, Pastures, Pome Fruits"

304	**Environmental weed**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Queensland Government. (2024). Weeds of Australia - Briza maxima. https://keyserver.lucidcentral.org/weeds/data/media/Html/briza_maxima.htm. [Accessed 4 Jun 2024]	"Quaking grass (Briza maxima) is a significant environmental weed in Victoria and Western Australia and an environmental weed in New South Wales, South Australia and Tasmania. This short-lived grass invades grasslands, grassy woodlands, heathlands, granite outcrops, open forests, riparian habitats and coastal habitats. It can form dense swards (i.e. more than 200 plants per square metre) that impede the growth and regeneration of native plants and significantly decrease species richness. In the southern parts of Western Australia it is listed as a weed of wetlands and aquatic habitats. It is also present in conservation areas (e.g. Gramatan Avenue Heathland Sanctuary in suburban Melbourne) and rehabilitation areas (e.g. in box-ironbark forests in the goldfields region) in Victoria. The remnant plant communities that are home to the threatened Eltham copper butterfly (Paralucia pyrodiscus lucida), which is found only in a few sites in Victoria, are under threat by invasion from environmental weeds including this species. Quaking grass (Briza maxima) is also one of the weeds that competes with sweet bursaria (Bursaria spinosa), the native food plant of this rare butterfly. It also thought to be reducing regeneration of the threatened whipstick westringia (Westringia crassifolia) in Victoria."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Quaking grass is invasive because it forms dense, species-poor swards impeding growth and regeneration of native plants. Large populations of B. maxima can develop in a short time and reach densities of more than 200 plants per square metre (Muyt, 2001). Species richness is reduced and the grass invades sensitive rehabilitation areas in box- ironbark forests of Victoria, Australia (State of Queensland, 2014), composed of various Eucalyptus species. B. maxima, together with other exotic plants, threatens some remnant plant communities that are home to the Eltham copper butterfly (Paralucia pyrodiscus lucida), an endemic and threatened species of Victoria. Its caterpillars feed on Bursaria spinosa, a shrub or small tree suffering from competition from quaking grass (State of Queensland, 2014). Another rare plant threatened by this grass is whipstick westringia (Westringia crassifolia)."
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Does not appear to be a significant environmental weed in the Hawaiian Islands] "in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i."

305	Congeneric weed	y
	Source(s)	**Notes**
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Briza minor] "naturalized elsewhere, widespread weed of gardens and disturbed areas"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Briza minor] "Weed of: Cereals, Cotton, Orchards & Plantations, Pastures, Pome Fruits"

Qsn #	Question	Answer
401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Glabrous annuals, culms 30-60 cm tall, erect or sometimes decumbent at base. Sheaths 4-8 cm long, usually scarious on margins; ligule 3-5 mm long, membranous; blades 10-30 cm long, 3-8 mm wide, thin. Panicles drooping, 5-8 cm long, with few spikelets; spikelets 10-20 mm long, 7-12 mm wide, 9-15-flowered, ovate, on flexuous pedicels; glumes prominently 7-nerved, broad, chartaceous, obtuse, scarious, margins usually brown, first glume 5-5.5 mm long, second glume 6-6.5 mm long; lemmas 8-9 mm long, 7-9-nerved, chartaceous, base cordate, acute, margins usually scarious and brown or purple, upper part pilose; palea cuneate or obtuse, 3-3.5 mm long, keels ciliate. Caryopsis dark brown, 2.5-2.7 mm long, 1.5-1.7 mm wide, keeled, beaked"

402	Allelopathic	
	Source(s)	Notes
	Rose, H., Kidston, J., Rose, C. & Edwards, C. (2018). Grasses of the NSW Tablelands. NSW Department of Primary Industries	[Unknown. Poor competitive ability suggests plants may not be allelopathic] "• An indicator of poor ground cover. • Of little agricultural importance as it produces little leaf before going to head and is uncompetitive in pastures. • Easily managed with dense pastures and by removing flowerheads at early flowering for 1-2 years."

403	Parasitic	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Glabrous annuals, culms 30-60 cm tall, erect or sometimes decumbent at base." [Poaceae]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"Fodder, palatable but poorly productive. Kangaroos eat the flower heads"
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"palatable, low grazing value"
	Shiponeni, N. N., & Milton, S. J. (2006). Seed dispersal in the dung of large herbivores: implications for restoration of Renosterveld shrubland old fields. Biodiversity & Conservation, 15(10): 3161-3175	"Table 1. Densities (seedlings per 1000 g of dung) of seedlings which emerged from animal dung." [Includes Briza maxima, which is presumably browsed and seeds ingested]

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	**Notes**
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "palatable, low grazing value, widespread weed species, attractive, ornamental grass cultivated and naturalized elsewhere"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Shen, J. Y., Xiong, L. M., Chen, Z. Y., Peng, J. M., Liu, X. Y., & Chen, X. Z. (1982). The host plants of wheat rosette stunt virus. Nature Journal, 5(1): 78-79	"Hosts of the virus, identified by electron microscopy and the passive haemagglutination test, covered a wide range including some cereals and common weeds. Briza maxima, grown in the glasshouse, is susceptible and a typical source plant of the virus."][Importance unclear]
	Townshend, J. L., & Davidson, T. R. (1989). Grass and legume hosts of Paratylenchus projectus. Nematologica, 35(1): 128-131	"Of 35 wild and cultivated grasses and cereals, and 4 forage legumes tested as hosts of P. projectus, Hordeum jubatum, Echinochloa pungens, E. crusgalli, Briza maxima, Lotus corniculatus and Lolium multiflorum supported the most numbers of nematodes. Millet (Panicum capillare), alfalfa [lucerne] and Leersia oryzoides were among the poorest hosts." [Importance of Briza maxima as a host is not known]

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"palatable, low grazing value, widespread weed species, attractive, ornamental grass cultivated and naturalized elsewhere" [No evidence]
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	y
	Source(s)	**Notes**
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"Increases fire risk."
	Popay, I. (2024). Briza maxima (large quaking grass). CABI Compendium. https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.112795. [Accessed 5 Jun 2024]	"Like most other annual grasses it can increase fire risk."

Qsn #	Question	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. & Leigh, J.H. (2011). Plants of Western New South Wales. CSIRO Publishing, Collingwood, Australia	"A very uncommon species in the region. although quite widespread and abundant in higher rainfall zones. Restricted to the extreme south-eastern corner where it occurs infrequently in shady places in years of high winter rainfall."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"Soil: Found on sands, loam and clays"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Glabrous annuals, culms 30-60 cm tall, erect or sometimes decumbent at base."

412	Forms dense thickets	y
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Quaking grass is invasive because it forms dense, species-poor swards impeding growth and regeneration of native plants. Large populations of B. maxima can develop in a short time and reach densities of more than 200 plants per square metre (Muyt, 2001)."

501	Aquatic	n
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Terrestrial] "Native habitats of Briza maxima include hillslopes, coastal scrub and disturbed sites."

502	Grass	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	"Genus: Briza Family: Poaceae (alt. Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Brizinae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch. [Accessed 3 Jun 2024]	"Genus: Briza Family: Poaceae (alt. Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Brizinae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Glabrous annuals; culms 30-60 cm tall, erect or sometimes decumbent at base."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "Mediterranean, Europe, Asia temperate. Annual, small, erect or geniculate at base, slender, glabrous, solitary or tufted, simple or branched, auricles absent, leaf sheath smooth and papery, ligule oblong and hyaline, flat linear leaves glabrous and tapering to an acute apex, panicles of translucent dangling seed heads on wiry stems, flowers in nodding and loose panicles simple or slightly branched, drooping spikelets cordate or ovate to oblong, filiform pedicels, glumes dark-brown or purplish or red and brown, lemmas glabrous and closely imbricate, paleas winged, ovary glabrous and without a conspicuous apical appendage, fruit ventrally compressed, palatable, low grazing value, widespread weed species, attractive, ornamental grass cultivated and naturalized elsewhere, common in disturbed areas, open sandy soil, along irrigated fields, wetlands and woodlands, well-drained soil, gardens, wasteland, granite rocks, shallow granitic soils, pastures, along roadsides, orchards"

602	Produces viable seed	y
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Native habitats of Briza maxima include hillslopes, coastal scrub and disturbed sites. The plant reproduces by seed only, which are abundantly produced."

603	Hybridizes naturally	y
	Source(s)	Notes
	Essi, L., Longhi-Wagner, H. M., & de Souza-Chies, T. T. (2008). Phylogenetic analysis of the Briza complex (Poaceae). Molecular Phylogenetics and Evolution, 47(3), 1018-1029	"Briza media is an outbreeding species, self-incompatible, but able to produce hybrids with other self-compatible species, like B. maxima and B. minor."

604	Self-compatible or apomictic	y
	Source(s)	Notes

Qsn #	Question	Answer
	Essi, L., Longhi-Wagner, H. M., & de Souza-Chies, T. T. (2008). Phylogenetic analysis of the Briza complex (Poaceae). Molecular Phylogenetics and Evolution, 47(3), 1018-1029	"Briza media is an outbreeding species, self-incompatible, but able to produce hybrids with other self-compatible species, like B. maxima and B. minor."
	Murray, B. G. (1974). Breeding systems and floral biology in the genus Briza. Heredity, 33(2), 285-292	"Secondly, that crosses between self-compatible species like B. minor and B. maxima are compatible."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Zomlefer, W.B. (1994). Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London	[Poaceae] "The reduced flowers are anemophilous, although pollen-gathering insects have been reported for some grass species"

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Native habitats of Briza maxima include hillslopes, coastal scrub and disturbed sites. The plant reproduces by seed only, which are abundantly produced."

607	Minimum generative time (years)	1
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Glabrous annuals"
	Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. & Leigh, J.H. (2011). Plants of Western New South Wales. CSIRO Publishing, Collingwood, Australia	"Restricted to the extreme south-eastern corner where it occurs infrequently in shady places in years of high winter rainfall. Its growth commences in autumn and is completed after flowering in spring; the plant is not drought tolerant and quickly succumbs to hot dry weather."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds may be dispersed by wind, water or in mud attached to animals and vehicles (Muyt, 2001). Some seeds may remain dormant for a few years (Muyt, 2001)."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Flora of North America Editorial Committee. (2007). Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	"Briza maxima is native to the Mediterranean region. Cultivated as an ornamental, it is possibly one of the earliest grasses grown for other than edible purposes. It occasionally becomes naturalized in dry to somewhat moist but well-drained, fine or sandy soil on banks, rocky places, open woodlands, and cultivated areas such as roadsides and pastures."
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"widespread weed species, attractive, ornamental grass cultivated and naturalized elsewhere"

Qsn #	Question	Answer
703	**Propagules likely to disperse as a produce contaminant**	y
	Source(s)	**Notes**
	Queensland Government. (2024). Weeds of Australia - Briza maxima. https://keyserver.lucidcentral.org/weeds/data/media/Html/briza_maxima.htm. [Accessed 5 Jun 2024]	"This species reproduces entirely by seed. Seeds may be dispersed by water, wind or in mud attached to animals and vehicles. They may also be spread about by mowers and slashers and dispersed larger distances in contaminated agricultural produce (e.g. fodder)."

704	**Propagules adapted to wind dispersal**	y
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds may be dispersed by wind, water or in mud attached to animals and vehicles (Muyt, 2001). Some seeds may remain dormant for a few years (Muyt, 2001)."

705	**Propagules water dispersed**	y
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds may be dispersed by wind, water or in mud attached to animals and vehicles (Muyt, 2001). Some seeds may remain dormant for a few years (Muyt, 2001)."

706	**Propagules bird dispersed**	n
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds may be dispersed by wind, water or in mud attached to animals and vehicles (Muyt, 2001). Some seeds may remain dormant for a few years (Muyt, 2001)."
	Queensland Government. (2024). Weeds of Australia - Briza maxima. https://keyserver.lucidcentral.org/weeds/data/media/Html/briza_maxima.htm. [Accessed 5 Jun 2024]	"This species reproduces entirely by seed. Seeds may be dispersed by water, wind or in mud attached to animals and vehicles. They may also be spread about by mowers and slashers and dispersed larger distances in contaminated agricultural produce (e.g. fodder)."

707	**Propagules dispersed by other animals (externally)**	y
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds may be dispersed by wind, water or in mud attached to animals and vehicles (Muyt, 2001). Some seeds may remain dormant for a few years (Muyt, 2001)."

708	**Propagules survive passage through the gut**	y
	Source(s)	**Notes**
	Shiponeni, N. N., & Milton, S. J. (2006). Seed dispersal in the dung of large herbivores: implications for restoration of Renosterveld shrubland old fields. Biodiversity & Conservation, 15(10): 3161-3175	"Table 1. Densities (seedlings per 1000 g of dung) of seedlings which emerged from animal dung." [Includes Briza maxima]

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	n
	Source(s)	**Notes**
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"110 - 180 seeds m-2 have been recorded in the soil after the first flush of germination (Raynor, 1989; Molnar et al, 1989)."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	y
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds may be dispersed by wind, water or in mud attached to animals and vehicles (Muyt, 2001). Some seeds may remain dormant for a few years (Muyt, 2001)."
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"Some seed can remain dormant for a 3 years, however most germinates in the season after production."

803	**Well controlled by herbicides**	y
	Source(s)	**Notes**
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"10 kg/ha 2,2-DPA applied in winter, glyphosate at 2 L/ha applied in winter or spring before flowering or 40 g/ha Achieve applied when the grass has 2-8 leaves in winter provides good control. Repeat annually or if a new emergence occurs for 3-4 years. For spot spraying, 10 mL glyphosate(450g/L) (or 200 g Propon® plus 25 mL wetting agent) in 10 L water in late winter to early spring before flowering provides good control. Propon® is preferred for early season use because it has some residual action. Most native plants will tolerate these herbicides but higher rates may cause damage. For highly selective control use 4 g Achieve® plus 10 mL Supercharge® oil per 10 L water and apply between the two leaf and tillering stage of the grass in winter. Herbicide resistance: None reported."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Chemical control is carried out by spraying non-selective or grass-selective herbicides, which is best done before the flowering stems emerge (Muyt, 2001)."

Qsn #	Question	Answer
804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**n**
	Source(s)	**Notes**
	HerbiGuide. (2024). Quaking Grass (Briza maxima L.). http://www.herbiguide.com.au/Descriptions/hg_Quaking_Grass.htm. [Accessed 5 Jun 2024]	"Eradication strategies: Prevent seed set for 3-4 years by hand weeding, mowing, cultivation or herbicides. Close mowing or scorching with a gas burner before flowering in spring and repeated if necessary usually provides good control. Swards with immature seed heads can be mown with a catcher in spring. Don't mow stands with ripe seed as this causes dispersal of the very fine seed. Mowing very close to the ground usually prevents regrowth. Flowering and seed set are synchronised in late spring to early summer which makes seed set control easier. However, this must be repeated for a number of years to deplete the seed bank in the soil. A cool burn in late spring to early summer provides reasonable control. Manual removal is effective for light infestations. Bag and burn plants that have seed. "
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Plants have shallow roots and are easy to hand-pull. Mowing before seeds are ripe prevents seed dispersal and kills the plant. Burning before the flowers open kills the grass and destroys seeds on the soil."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unknown] "Native to Europe, widely cultivated for its large, showy panicles; in Hawai'i cultivated and sparingly naturalized along roadsides, in pastures, and other disturbed areas, 610-1,070 m, on Kaua'i, Maui, and Hawai'i. First collected on Maui in 1917 (Lyon s.n., BISH)."

Summary of Risk Traits:

Briza maxima (big quaking grass) is a glabrous annual grass native to Europe. It is widely cultivated for its large, showy panicles and has become naturalized in several locations worldwide. It is reported to be a weed of several crops, and is regarded as an environmental weed in Australia, where it competes with native plants and reduces species richness. In the Hawaiian Islands, it is sparingly naturalized along roadsides, in pastures, and other disturbed areas, from 610-1,070 m (2000 – 3500 feet) on Kauai, Maui, and Hawaii.

High Risk / Undesirable Traits
• Naturalized in regions with temperate, Mediterranean and tropical climates Widely naturalized, including the Hawaiian Islands of Kauai, Maui, and Hawaii.
• A weed of several agricultural crops
• An environmental weed in Australia
• Other Briza species are invasive weeds
• May increase fire risk in invaded habitats
• Shade tolerant
• Tolerates many soil types
• Reported to form dense swards
• Reproduces by seeds
• Able to hybridize with other Briza species
• Self-compatible (able to self-seed)
• Reaches maturity in one growing season
• Seeds dispersed by wind, water or in mud attached to animals and vehicles, in contaminated agricultural produce, in animal droppings and through intentional cultivation
• Seeds may form a persistent seed bank (up to 3 years)

Low Risk Traits
• Although an agricultural and environmental weed elsewhere, in the Hawaiian Islands primarily found in roadsides, pastures and disturbed areas.
• Unarmed (no spines, thorns, or burrs)
• Palatable (but not preferred by animals)
• Non-toxic
• Herbicides may provide effective control
• Effectively controlled by hand pulling, mowing or fire.