

<b>Taxon:</b> <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf	<b>Family:</b> Poaceae
<b>Common Name(s):</b> Manchurian water rice Manchurian wild rice water bamboo	<b>Synonym(s):</b> <i>Hydropyrum latifolium</i> Griseb. <i>Limnochloa caduciflora</i> Turcz. ex Trin., nom. inval. <i>Zizania caduciflora</i> Hand.-Mazz.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Approved	<b>End Date:</b> 18 Sep 2023
<b>WRA Score:</b> 20.0	<b>Designation:</b> H(HPWRA)	<b>Rating:</b> High Risk

**Keywords:** Aquatic Grass, Environmental Weed, Dense Stands, Spreads Vegetatively, Water-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)	High
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	y = 1*multiplier (see Appendix 2), n = 0	n
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	y
305	Congeneric weed		
401	Produces spines, thorns or burrs	y = 1, n = 0	n
402	Allelopathic		
403	Parasitic	y = 1, n = 0	n
404	Unpalatable to grazing animals	y = 1, n = -1	n
405	Toxic to animals	y = 1, n = 0	n
406	Host for recognized pests and pathogens	y = 1, n = 0	y
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		

Qsn #	Question	Answer Option	Answer
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	y
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		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y = -1, n = 0	n
606	Reproduction by vegetative fragmentation	y = 1, n = -1	y
607	Minimum generative time (years)		
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		
704	Propagules adapted to wind dispersal	y = 1, n = -1	n
705	Propagules water dispersed	y = 1, n = -1	y
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m <sup>2</sup> )		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y = 1, n = -1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y = 1, n = -1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	<b>Source(s)</b>	<b>Notes</b>
	Zhao, Y., Zhong, L., Zhou, K., Song, Z., Chen, J., & Rong, J. (2018). Seed characteristic variations and genetic structure of wild <i>Zizania latifolia</i> along a latitudinal gradient in China: implications for neo-domestication as a grain crop. <i>AoB Plants</i> , 10(6), ply072	"Although <i>Z. latifolia</i> eventually missed the chance to be domesticated as a grain crop in history, it is proved to be a valuable germplasm resource for the improvement of Asian cultivated rice ( <i>Oryza sativa</i> ) varieties (Chen et al. 2006). The success of American wild rice domestication and the elite agronomical traits found in <i>Z. latifolia</i> together suggest that it is possible to domesticate <i>Z. latifolia</i> to a new grain crop."
	Xie, Y. N. et al. (2023). Domestication, breeding, omics research, and important genes of <i>Zizania latifolia</i> and <i>Zizania palustris</i> . <i>Frontiers in Plant Science</i> , 14, 1183739	"As a grain, <i>Z. latifolia</i> primarily exists in a wild state and has not been artificially domesticated (Yan et al., 2022). Although the edible history of <i>Z. latifolia</i> traces back to the Zhou Dynasty (3 kya), <i>Z. latifolia</i> was gradually replaced by cultivated rice due to its strong seed shattering and low yield characteristics (Yan et al., 2022). <i>Z. latifolia</i> was subsequently used as a traditional Chinese medicinal crop that was categorized as a treatment for diabetes and gastrointestinal diseases in the Compendium of Materia Medica of Li Shizhen during the Ming Dynasty (Yu et al., 2022). <i>Z. latifolia</i> is classified as a whole grain with high nutritional value. In particular, it is rich in protein, essential amino acids, fatty acids, vitamins, and microelements (Yan et al., 2018). Due to its high nutritional value, developing germplasms resistant to seed shattering remains a top priority in the domestication and breeding of <i>Z. latifolia</i> (Xie et al., 2022)."
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). <i>Plant Resources of South-East Asia</i> . No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	" <i>Z. latifolia</i> is indigenous in north-eastern India, Burma, China, Japan, and in parts of eastern Siberia and the Russian Far East. Primarily used as a cereal in ancient times, its evolution and cultivation as a stem vegetable in China dates back at least to the 10th Century. It is now rather widespread in cultivation in eastern and south-eastern Asia (China, Korea, Japan, Taiwan, Indo-China, Thailand, Burma, Malaysia). In Indonesia it is cultivated locally by Chinese people. It has been introduced in Europe, New Zealand, and North America as well. "

102	Has the species become naturalized where grown?	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2023). Personal Communication	NA

103	Does the species have weedy races?	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2023). 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"	High
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 18 Sep 2023]</p>	<p>"Native Asia-Temperate SIBERIA: Russian Federation-Eastern Siberia [Eastern Siberia (s.e.)] RUSSIAN FAR EAST: Russian Federation [Habarovskij kraj, Primorye, Amur] CHINA: China EASTERN ASIA: Korea, Japan, Taiwan Asia-Tropical INDIAN SUBCONTINENT: India (n.e.) INDO-CHINA: Myanmar, Vietnam Europe EASTERN EUROPE: Russian Federation [Kalmykija, Respublika, Astrakhan, Volgogradskaja oblast] Cultivated Asia-Temperate CHINA: China EASTERN ASIA: Korea, Japan, Taiwan Asia-Tropical INDO-CHINA: Myanmar, Thailand MALESIA: Indonesia, Malaysia"</p>
	<p>Siemonsma, J. S. &amp; Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands</p>	<p>[Temperate to tropical] "Z. latifolia is indigenous in north-eastern India, Burma, China, Japan, and in parts of eastern Siberia and the Russian Far East. Primarily used as a cereal in ancient times, its evolution and cultivation as a stem vegetable in China dates back at least to the 10th Century. It is now rather widespread in cultivation in eastern and south-eastern Asia (China, Korea, Japan, Taiwan, Indo-China, Thailand, Burma, Malaysia). In Indonesia it is cultivated locally by Chinese people."</p>

202	Quality of climate match data	High
	Source(s)	Notes
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 18 Sep 2023]</p>	<p>"Native Asia-Temperate SIBERIA: Russian Federation-Eastern Siberia [Eastern Siberia (s.e.)] RUSSIAN FAR EAST: Russian Federation [Habarovskij kraj, Primorye, Amur] CHINA: China EASTERN ASIA: Korea, Japan, Taiwan Asia-Tropical INDIAN SUBCONTINENT: India (n.e.) INDO-CHINA: Myanmar, Vietnam Europe EASTERN EUROPE: Russian Federation [Kalmykija, Respublika, Astrakhan, Volgogradskaja oblast] Cultivated Asia-Temperate CHINA: China EASTERN ASIA: Korea, Japan, Taiwan Asia-Tropical INDO-CHINA: Myanmar, Thailand MALESIA: Indonesia, Malaysia"</p>

Qsn #	Question	Answer
203	<b>Broad climate suitability (environmental versatility)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	"The natural habitat of <i>Z. latifolia</i> includes borders of lakes, still-water bays and slow-running streams. It seems tolerant of a wide range of climatic and soil conditions. "
204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	" <i>Z. latifolia</i> is indigenous in north-eastern India, Burma, China, Japan, and in parts of eastern Siberia and the Russian Far East. "
	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.	" <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf probably was introduced by Chinese immigrants and cultivated as a vegetable. Documented from O'ahu and Hawai'i, it may persist, but its current status is unknown. It is robust and cane-like, up to 2-3 m tall, producing a large panicle in which the staminate and pistillate spikelets are segregated in the upper and lower portions of the inflorescence."
	Lorence, D. & Flynn, T. (1999). New naturalized plant records for the Hawaiian Islands. Bishop Museum Occasional Papers. 59: 3-6	[Kauai] " <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf New island record This collection represents a new island record for <i>Zizania latifolia</i> which has previously been noted as being naturalized on the islands of O'ahu and Hawai'i. Material examined. KAUA'I: Kōloa District: Lawa'i Valley. National Tropical Botanical Garden, large clump-forming grass along banks of Lawa'i Stream behind Stillwater Dam, ca. 36 m, 22 May 1997, T. Flynn 6157 (K, PTBG, US)."
205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	" <i>Z. latifolia</i> is indigenous in north-eastern India, Burma, China, Japan, and in parts of eastern Siberia and the Russian Far East. Primarily used as a cereal in ancient times, its evolution and cultivation as a stem vegetable in China dates back at least to the 10th Century. It is now rather widespread in cultivation in eastern and south-eastern Asia (China, Korea, Japan, Taiwan, Indo-China, Thailand, Burma, Malaysia). In Indonesia it is cultivated locally by Chinese people. It has been introduced in Europe, New Zealand, and North America as well. "
	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.	" <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf probably was introduced by Chinese immigrants and cultivated as a vegetable. Documented from O'ahu and Hawai'i, it may persist, but its current status is unknown."
301	<b>Naturalized beyond native range</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 18 Sep 2023]	"Naturalized Australasia NEW ZEALAND: New Zealand Europe EASTERN EUROPE: Estonia, Moldova, Ukraine"

Qsn #	Question	Answer
	Lorence, D. & Flynn, T. (1999). New naturalized plant records for the Hawaiian Islands. Bishop Museum Occasional Papers. 59: 3-6	[Kauai] " <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf New island record This collection represents a new island record for <i>Zizania latifolia</i> which has previously been noted as being naturalized on the islands of O'ahu and Hawai'i. Material examined. KAUA'I: Kōloa District: Lawa'i Valley. National Tropical Botanical Garden, large clump-forming grass along banks of Lawa'i Stream behind Stillwater Dam, ca. 36 m, 22 May 1997, T. Flynn 6157 (K, PTBG, US)."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[New Zealand] "Manchurian wild rice is an emergent aquatic perennial that spreads by seeds and rhizomes. The plant has become highly invasive in New Zealand. It forms dense stands displacing native aquatic vegetation and reducing species richness. In riparian habitats river-accompanying vegetation may be replaced with monospecific stands of <i>Zizania latifolia</i> (ISSG, 2014)."
	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.	[Oahu and Hawaii, persisting or naturalized] " <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf probably was introduced by Chinese immigrants and cultivated as a vegetable. Documented from O'ahu and Hawai'i, it may persist, but its current status is unknown."

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Zhenghao Xu & Meihua Deng. (2017). Identification and Control of Common Weeds: Volume 1. Zhejiang University Press, Hangzhou and Springer Nature, Singapore	"Harmfulness A shallow water or marshland weed."

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	Global Invasive Species Database (2023) Species profile: <i>Zizania latifolia</i> . <a href="http://www.iucngisd.org/gisd/species.php?sc=866">http://www.iucngisd.org/gisd/species.php?sc=866</a> . [Accessed 18 Sep 2023]	[May impact farmland and pastures] "The Auckland Regional Council (2002) reports that, <i>Zizania latifolia</i> is a very invasive plant. It can invade pastures causing good land to become waterlogged and form swampy areas. The rhizomes of the plant can also penetrate into and through stopbanks, opening them up and eventually destroying them. It can damage lakes and streamside plant communities by overtopping and suppressing other marginal species. <i>Z. latifolia</i> is difficult to eradicate because any root or rhizome fragments will regrow. Herbicides are the most effective control measure, but use of these is restricted because many chemicals can affect waterways. There are concerns that the spread of <i>Z. latifolia</i> could seriously affect the use of farmland, and freshwater and estuarine ecosystems. (The Auckland Regional Council 2002; Environment Waikato, 2002; The Northland Regional Council, 2002)."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Primarily an environmental weed] "Manchurian wild rice is an emergent aquatic perennial that spreads by seeds and rhizomes. The plant has become highly invasive in New Zealand. It forms dense stands displacing native aquatic vegetation and reducing species richness. In riparian habitats river-accompanying vegetation may be replaced with monospecific stands of <i>Zizania latifolia</i> (ISSG, 2014). The grass tolerates both standing and flowing waters and adapts its growth form to varying conditions. In waters with a high flow velocity, shoots are more clumped than in stagnant waters. A high shoot density traps litter and alters both the hydrology and chemistry of the water body (Asaeda et al., 2005)."

304	Environmental weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Manchurian wild rice is an emergent aquatic perennial that spreads by seeds and rhizomes. The plant has become highly invasive in New Zealand. It forms dense stands displacing native aquatic vegetation and reducing species richness. In riparian habitats river-accompanying vegetation may be replaced with monospecific stands of <i>Zizania latifolia</i> (ISSG, 2014). The grass tolerates both standing and flowing waters and adapts its growth form to varying conditions. In waters with a high flow velocity, shoots are more clumped than in stagnant waters. A high shoot density traps litter and alters both the hydrology and chemistry of the water body (Asaeda et al., 2005)."
	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	"New Zealand has designated <i>Z. latifolia</i> a prohibited plant because it "displaces all species by its dense growth, blocks drainage and access to water, and increases the chance of flooding. It forms dense colonies in swampy areas, thus affecting productive farm land" (Environment Waikato 2002-2007)."
	Global Invasive Species Database (2023) Species profile: <i>Zizania latifolia</i> . <a href="http://www.iucngisd.org/gisd/species.php?sc=866">http://www.iucngisd.org/gisd/species.php?sc=866</a> . [Accessed 18 Sep 2023]	"The Auckland Regional Council (2002) reports that, <i>Zizania latifolia</i> is a very invasive plant. It can invade pastures causing good land to become waterlogged and form swampy areas. The rhizomes of the plant can also penetrate into and through stopbanks, opening them up and eventually destroying them. It can damage lakes and streamside plant communities by overtopping and suppressing other marginal species. <i>Z. latifolia</i> is difficult to eradicate because any root or rhizome fragments will regrow. Herbicides are the most effective control measure, but use of these is restricted because many chemicals can affect waterways. There are concerns that the spread of <i>Z. latifolia</i> could seriously affect the use of farmland, and freshwater and estuarine ecosystems. (The Auckland Regional Council 2002; Environment Waikato, 2002; The Northland Regional Council, 2002)"

305	<b>Congeneric weed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	<i>Zizania aquatica</i> is listed as a weed in a number of locations.

401	<b>Produces spines, thorns or burrs</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	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	[No evidence] "Plants perennial; rhizomatous. Culms 1-2.5(4) m, erect, rooting at the lower nodes, emergent. Sheaths glabrous, lower sheaths tessellate; ligules 10-15 mm, triangular; blades (30)50-100 cm long, 1-3.5 cm wide, abaxial surfaces smooth, adaxial surfaces scabrous. Panicles 30-50 cm long, 10-15 cm wide; branches unisexual or bisexual, lower branches with staminate spikelets, middle branches with staminate and pistillate spikelets, upper branches with pistillate spikelets. Staminate branches spreading; pedicel apices 0.2-0.5 mm wide. Staminate spikelets 8-12 mm, elliptic-oblong, margins ciliate, awned, awns 2-8 mm, scabrous; anthers 5-8 mm. Pistillate branches erect; pedicel apices 0.3-0.6 mm wide. Pistillate spikelets 15-25 mm, linear, veins scabrous, awned, awns 15-30 mm, scabrous."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"It forms dense stands displacing native aquatic vegetation and reducing species richness. In riparian habitats river-accompanying vegetation may be replaced with monospecific stands of <i>Zizania latifolia</i> (ISSG, 2014)." [Unknown if allelopathy factors into formation of monospecific stands.]

403	Parasitic	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2006). Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Perennial, rhizomatous. Culms erect, 1-2.5 m, ca. 1 cm thick, rooting at lower nodes, nodes glabrous." [Poaceae]

404	Unpalatable to grazing 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	"fodder for horses, human food, cultivated as a vegetable, rhizomes and grains eaten in times of scarcity, young shoots and swollen shoots edible after the husks are removed"
	Shu, W. E., & Li, Y. B. (1990). The management and cultivation of <i>Zizania latifolia</i> . Agriculture and Horticulture, 65(2), 309-312	"The cultivation of <i>Z. latifolia</i> is discussed including consideration of the date and method of raising seedlings, transplanting, harvest date and method, transport and storage. Its uses are discussed and include use as fodder, as a vegetable, in mat production and in medicine. "

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	"fodder for horses, human food, cultivated as a vegetable, rhizomes and grains eaten in times of scarcity, young shoots and swollen shoots edible after the husks are removed, leaves woven into mats," [No evidence]
	Plants for a Future. (2023). <i>Zizania latifolia</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 18 Sep 2023]	"Known Hazards None known"



Qsn #	Question	Answer
406	Host for recognized pests and pathogens	y
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	"The major pests of Manchurian wild rice are similar to those of ordinary rice ( <i>Oryza sativa</i> L.): the green leaf hopper ( <i>Nephotettix bipunctatus</i> ), the brown plant hopper ( <i>Nilaparvata lugens</i> ), paddy army worm ( <i>Mythimna separata</i> ) and paddy swarming caterpillar ( <i>Spodoptera mauritia</i> )."
	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	"The rhizomes and basal parts of the culms of <i>Z. latifolia</i> are edible, and become swollen when infected with the fungus <i>Ustilago esculenta</i> Henn. The infection also prevents the plants from flowering and fruiting. If infected plants were introduced into North America, the fungus might also infect the native species of <i>Zizania</i> and likewise prevent their flowering (Terrell and Batra 1982), a possibility that should be strenuously resisted. Plants of <i>Z. latifolia</i> should not be brought into North America. Many states do not permit importation of plants of <i>Z. latifolia</i> from another state without examination by a state-approved plant pathology laboratory."

407	Causes allergies or is otherwise toxic to humans	n
	<b>Source(s)</b>	<b>Notes</b>
	Plants for a Future. (2023). <i>Zizania latifolia</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 18 Sep 2023]	"Known Hazards None known"
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "fodder for horses, human food, cultivated as a vegetable, rhizomes and grains eaten in times of scarcity, young shoots and swollen shoots edible after the husks are removed, leaves woven into mats,"
	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	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2006). Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Flammability unknown, but unlikely to increase fire risk in the Hawaiian Islands because of restriction to aquatic habitats] "Shallow water of lake margins and swamps, forming large patches."

409	Is a shade tolerant plant at some stage of its life cycle	
	<b>Source(s)</b>	<b>Notes</b>
	Plants for a Future. (2023). <i>Zizania latifolia</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 18 Sep 2023]	"It can grow in semi-shade (light woodland) or no shade."
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	"The natural habitat of <i>Z. latifolia</i> includes borders of lakes, still-water bays and slow-running streams. " [Grows in open, high light environments]

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	"The natural habitat of <i>Z. latifolia</i> includes borders of lakes, still-water bays and slow-running streams. It seems tolerant of a wide range of climatic and soil conditions. "
411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2006). Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Perennial, rhizomatous. Culms erect, 1-2.5 m, ca. 1 cm thick, rooting at lower nodes, nodes glabrous."
412	Forms dense thickets	y
	<b>Source(s)</b>	<b>Notes</b>
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"It forms dense stands displacing native aquatic vegetation and reducing species richness. In riparian habitats river-accompanying vegetation may be replaced with monospecific stands of <i>Zizania latifolia</i> (ISSG, 2014)."
	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	"New Zealand has designated <i>Z. latifolia</i> a prohibited plant because it "displaces all species by its dense growth, blocks drainage and access to water, and increases the chance of flooding. It forms dense colonies in swampy areas, thus affecting productive farm land" (Environment Walkato 2002-2007)."
501	Aquatic	y
	<b>Source(s)</b>	<b>Notes</b>
	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	[Semi-aquatic] "In its native range, it grows in the shallow waters of lakes and swamps, forming large patches."
502	Grass	y
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 18 Sep 2023]	"Genus: <i>Zizania</i> Family: Poaceae (alt. Gramineae) Subfamily: Oryzoideae Tribe: Oryzeae Subtribe: Zizaniinae"
503	Nitrogen fixing woody plant	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 18 Sep 2023]	"Genus: <i>Zizania</i> Family: Poaceae (alt. Gramineae) Subfamily: Oryzoideae Tribe: Oryzeae Subtribe: Zizaniinae"

Qsn #	Question	Answer
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2006). Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Perennial, rhizomatous. Culms erect, 1-2.5 m, ca. 1 cm thick, rooting at lower nodes, nodes glabrous."
601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	"Z. latifolia is indigenous in north-eastern India, Burma, China, Japan, and in parts of eastern Siberia and the Russian Far East. Primarily used as a cereal in ancient times, its evolution and cultivation as a stem vegetable in China dates back at least to the 10th Century. It is now rather widespread in cultivation in eastern and south-eastern Asia (China, Korea, Japan, Taiwan, Indo-China, Thailand, Burma, Malaysia). In Indonesia it is cultivated locally by Chinese people. It has been introduced in Europe, New Zealand, and North America as well. "
602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Zhenghao Xu & Meihua Deng. (2017). Identification and Control of Common Weeds: Volume 1. Zhejiang University Press, Hangzhou and Springer Nature, Singapore	"It mainly depends on rhizome propagation and also can reproduce by seeds."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Manchurian wild rice is an emergent aquatic perennial that spreads by seeds and rhizomes."
603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Wang, Z. H. et al. (2013). Genomewide variation in an introgression line of rice-Zizania revealed by whole-genome re-sequencing. PLoS One, 8(9), e74479	[Unknown. Artificial hybrids possible] "n this study, we have re-sequenced the genomes of <i>Oryza sativa</i> ssp. japonica cv. Matsumae and one of its derived introgressant RZ35 that was obtained from an introgressive hybridization between Matsumae and <i>Zizania latifolia</i> Griseb."
604	<b>Self-compatible or apomictic</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Chen, Y. Y., Chu, H. J., Liu, H., & Liu, Y. L. (2012). Abundant genetic diversity of the wild rice <i>Zizania latifolia</i> in central China revealed by microsatellites. Annals of Applied Biology, 161(2), 192-201	"As a wind-pollinated species, <i>Z. latifolia</i> may be thought to be outcrossing. However, with the reduction of population size, the present-day species may exhibit a selfing behaviour because of frequent mating events among either close relatives or intraclones (Gao et al., 2002; Gao, 2005). In this study, predominant outcrossing in <i>Z. latifolia</i> was proved by the no-significant or significant negative values of FIS."
	Zhao, Y., Zhong, L., Zhou, K., Song, Z., Chen, J., & Rong, J. (2018). Seed characteristic variations and genetic structure of wild <i>Zizania latifolia</i> along a latitudinal gradient in China: implications for neo-domestication as a grain crop. AoB Plants, 10(6), ply072	"This plant has an outcrossing mating system and well-developed rhizomes, and it can reproduce both sexually and asexually through seeds, rhizomes and tiller buds (Guo et al. 2007)." [Unknown if self-fertile]

Qsn #	Question	Answer
605	Requires specialist pollinators	n
	<b>Source(s)</b>	<b>Notes</b>
	Chen, Y. Y., Chu, H. J., Liu, H., & Liu, Y. L. (2012). Abundant genetic diversity of the wild rice <i>Zizania latifolia</i> in central China revealed by microsatellites. <i>Annals of Applied Biology</i> , 161(2), 192-201	"It is wind-pollinated and reproduces sexually by seeds or asexually by rhizomes."
606	Reproduction by vegetative fragmentation	y
	<b>Source(s)</b>	<b>Notes</b>
	Chen, Y. Y., Chu, H. J., Liu, H., & Liu, Y. L. (2012). Abundant genetic diversity of the wild rice <i>Zizania latifolia</i> in central China revealed by microsatellites. <i>Annals of Applied Biology</i> , 161(2), 192-201	"It is wind-pollinated and reproduces sexually by seeds or asexually by rhizomes. It expands rapidly through clonal reproduction in the wild and is pioneer weed species for dyke consolidation (Yang et al., 1999; Liu, 2002)."
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Reproduces through seed or vegetatively through tailoring and rhizome extension. Rhizomes spread slowly outwards."
607	Minimum generative time (years)	
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). <i>Plant Resources of South-East Asia. No. 8. Vegetables</i> . Pudoc Scientific Publishers, Wageningen, Netherlands	"Aquatic perennial tillering grass with strongly developed rhizomes and stolons, up to 3 m long." [Probably between 1-2 growing seasons]
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	<b>Source(s)</b>	<b>Notes</b>
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds."
702	Propagules dispersed intentionally by people	y
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). <i>Plant Resources of South-East Asia. No. 8. Vegetables</i> . Pudoc Scientific Publishers, Wageningen, Netherlands	"It is now rather widespread in cultivation in eastern and south-eastern Asia (China, Korea, Japan, Taiwan, Indo-China, Thailand, Burma, Malaysia). In Indonesia it is cultivated locally by Chinese people. It has been introduced in Europe, New Zealand, and North America as well. "
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (1999). <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	" <i>Zizania latifolia</i> (Griseb.) Turcz. ex Stapf probably was introduced by Chinese immigrants and cultivated as a vegetable. Documented from O'ahu and Hawai'i, it may persist, but its current status is unknown."
703	Propagules likely to disperse as a produce contaminant	
	<b>Source(s)</b>	<b>Notes</b>
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). <i>Plant Resources of South-East Asia. No. 8. Vegetables</i> . Pudoc Scientific Publishers, Wageningen, Netherlands	"It is now rather widespread in cultivation in eastern and south-eastern Asia (China, Korea, Japan, Taiwan, Indo-China, Thailand, Burma, Malaysia). In Indonesia it is cultivated locally by Chinese people. It has been introduced in Europe, New Zealand, and North America as well." [Unknown. It might be possible to be spread as a contaminant with other aquatic crops such as rice or taro]

Qsn #	Question	Answer
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds."
704	<b>Propagules adapted to wind dispersal</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds."
705	<b>Propagules water dispersed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Chen, Y. Y., Chu, H. J., Liu, H., & Liu, Y. L. (2012). Abundant genetic diversity of the wild rice <i>Zizania latifolia</i> in central China revealed by microsatellites. <i>Annals of Applied Biology</i> , 161(2), 192-201	"It is well known that hydrochory can result in long-distance seed or propagule dispersal events among populations. Xu et al. (2008) reported that rhizome fragments of <i>Z. latifolia</i> may float in the water and disperse with water current, which will facilitate the gene exchange among populations within the same water body. Additionally, though seeds of <i>Z. latifolia</i> readily shatter after maturing, they remain buoyant for about 1 day (Y.-Y. Chen & Y.-L. Liu, personal observation)."
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds."
706	<b>Propagules bird dispersed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds."
	Chen, Y. Y., Chu, H. J., Liu, H., & Liu, Y. L. (2012). Abundant genetic diversity of the wild rice <i>Zizania latifolia</i> in central China revealed by microsatellites. <i>Annals of Applied Biology</i> , 161(2), 192-201	[Potentially. If it occurs, it would likely be through external attachment] "Thus migratory waterfowl may be largely responsible for the seed flow among <i>Z. latifolia</i> populations. However, a few populations, including the most upstream population (YH) and the most downstream population (BD), were found to have greater genetic distinction compared with the other populations (Fig. 2; Table 3), which suggest that bird-mediated dispersal might be more effective within the centre of the area."
707	<b>Propagules dispersed by other animals (externally)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds." [Probably spread by birds through external attachment]

Qsn #	Question	Answer
708	Propagules survive passage through the gut	
	Source(s)	Notes
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	"Seeds and rhizome fragments spread via water, livestock, machinery, e.g. graders, dumping of green waste, eel nets, boats and trailers, clothing and possibly by birds." [Unknown if viable seeds are dispersed internally by birds or other animals]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Siemonsma, J. S. & Piluek, K. (Eds.). (1993). Plant Resources of South-East Asia. No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, Netherlands	[May not flower if infected with the fungus] "Under the stimulus of <i>Ustilago esculenta</i> (enhanced production of auxins and cytokinins), the apical 3 or 4 internodes of the immature culm swell to produce a conical to fusiform, succulent, rather compact, fleshy gall, 5-10 cm × 2-4 cm, which is used as a vegetable. It consists for the greater part of host tissue and a comparatively small amount of mycelium of the fungus. Parasitized plants do not flower. "
	New Zealand Plant Conservation Network. (2023). <i>Zizania latifolia</i> . <a href="https://www.nzpcn.org.nz/flora/species/zizania-latifolia/">https://www.nzpcn.org.nz/flora/species/zizania-latifolia/</a> . [Accessed 18 Sep 2023]	[Unknown if plants will produce large numbers of seeds in the Hawaiian Islands] "Plants are hermaphroditic with the female inflorescence borne above the male inflorescence. Large amounts of seed is produced which germinated quickly."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Plants for a Future. (2023). <i>Zizania latifolia</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 18 Sep 2023]	"Seed - it must not be allowed to dry out or it will quickly lose its viability, usually within 4 weeks[136]. Store collected seed in jars of water in a cool place such as the salad compartment of a fridge."

803	Well controlled by herbicides	
	Source(s)	Notes
	Champion, P. D., & Hofstra, D. E. (2010). Manchurian wild rice ( <i>Zizania latifolia</i> ) biomass allocation and implications for control. In 17th Australasian weeds conference. Christchurch, New Zealand, 26-30 September, 2010 (pp. 318-320). New Zealand Plant Protection Society	"Manchurian wild rice is notoriously difficult to control using herbicides, with glyphosate, or a combination of dalapon and amitrole, the most commonly used to date (P. Joynt, Northland Regional Council, pers. comm.). Neither gave long-term control even when used at very high rates, with strong regrowth persisting after many re-applications of these herbicides. NIWA trials have led to the use of haloxyfop-P methyl in the current eradication programme (Champion et al. 2001), with twice annual application (late spring, early autumn) at 700 g a.i. ha <sup>-1</sup> ."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"No specific control methods are available for this species."
	Global Invasive Species Database (2023) Species profile: <i>Zizania latifolia</i> . <a href="http://www.iucngisd.org/gisd/species.php?sc=866">http://www.iucngisd.org/gisd/species.php?sc=866</a> . [Accessed 18 Sep 2023]	[Efficacy unspecified, but claimed to be effective] "Chemical: The National Pest Plant Accord (2001) states that, "Where only a few plants are established they can be carefully dug out and disposed of, or can be treated with herbicide. Larger areas can be sprayed with herbicide, but follow up treatments are usually necessary."

Qsn #	Question	Answer
	Weedbusters. (2023). Manchurian rice grass - <i>Zizania latifolia</i> . <a href="https://www.weedbusters.org.nz/what-are-weeds/weed-list/manchurian-rice-grass/">https://www.weedbusters.org.nz/what-are-weeds/weed-list/manchurian-rice-grass/</a> . [Accessed 18 Sep 2023]	<p>What can I do to get rid of it?</p> <p>[Herbicides may require multiple treatments]                      "Always begin control work at the top of the catchment. Resource consent is usually required for spraying over water - contact your regional council for more information on this.                      1. Dig out only very small sites. Dispose of rhizomes and seedheads at a refuse transfer station, or burn them.                      2. Spray: 520g/L haloxyfop-P-methyl (10ml/L + 50ml crop oil). Initial spray September-April. Follow up 6-8 monthly (not in winter) before regrowth reaches 1m, to prevent rhizome recovery."</p>

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Weedbusters. (2023). Manchurian rice grass - <i>Zizania latifolia</i> . <a href="https://www.weedbusters.org.nz/what-are-weeds/weed-list/manchurian-rice-grass/">https://www.weedbusters.org.nz/what-are-weeds/weed-list/manchurian-rice-grass/</a> . [Accessed 18 Sep 2023]	"Extremely tolerant of damage, grazing, cold or heat, wind, fire, different soil types, moderate shade and moderate salinity."
	Champion, P. D., & Hofstra, D. E. (2010). Manchurian wild rice ( <i>Zizania latifolia</i> ) biomass allocation and implications for control. In 17th Australasian weeds conference. Christchurch, New Zealand, 26-30 September, 2010 (pp. 318-320). New Zealand Plant Protection Society	"This paper describes proposed field trials to pre-treat stands of this plant by burning, crushing or mowing prior to herbicide treatment. After these pre-treatments the efficacy of haloxyfop, imazapyr and glyphosate will be evaluated."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	Unknown

**Summary of Risk Traits:**

*Zizania latifolia* (Manchurian wild rice) is an aquatic grass native to north-eastern India, Burma, China, Japan, and in parts of eastern Siberia and the Russian Far East. The rhizomes and basal parts of the culms of are edible and become swollen when infected with the fungus *Ustilago esculenta*, which also prevents the plants from flowering and fruiting. Despite the lack of flowering and fruiting, the grass can spread vegetatively by rhizome fragments, enabling it to naturalize in several locations (including the Hawaiian Islands), and form dense stands that exclude all other vegetation. It is regarded as an environmental weed in New Zealand and may also negatively affect pastures and impact agriculture.

**High Risk / Undesirable Traits**

- Broad climate suitability (grows in temperate to tropical climates)
- Reported to be naturalized or persisting on Kauai, Oahu, and Hawaii (Hawaiian Islands) as well as New Zealand and Eastern Europe
- An environmental weed in New Zealand, where it can form dense stands that exclude other vegetation and reduce species diversity
- May impact pastures or agricultural operations by invading and causing good land to become waterlogged and form swampy areas.
- Tolerates many soil types (not substrate limited).
- Forms dense, monospecific stands.
- Establishes in and invades aquatic areas.
- Reproduces by seeds and vegetatively by rhizomes.
- Seeds and rhizome fragments dispersed by water, livestock, machinery, dumping of green waste, boats and trailers, clothing, possibly by birds, and through intentional cultivation.
- Reported to be tolerant of damage, grazing, cold or heat, wind, and fire.

**Low Risk Traits**

- Valued and cultivated for its edible, swollen culm.
- Unarmed (no spines, thorns, or burrs)
- Palatable and used as fodder for horses, and possibly other grazing animals.
- Non-toxic.
- The swollen, edible culm is the result of infection by a smut fungus that prevents flowering, and that would eliminate seed production and dispersal by seeds (although still capable of spreading vegetatively).
- Certain herbicides may provide effective control.



