Family: ***Rutaceae***

Taxon: ***triphasia trifolia***

Synonym: *Limonia trifoliata*
Triphasia trifoliata DC.
Limonia trifolia Burm. f. (basionym)

Common Name: limeberry
trifoliate limeberry
triphasia
myrtle lime
Chinese lime

Questionaire : current 20090513 **Assessor:** Patti Clifford **Designation:** H(HPWRA)
Status: Assessor Approved **Data Entry Person:** Patti Clifford **WRA Score 9**

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)**	**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**	**n**
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**	**n=0, y = 1*multiplier (see Appendix 2)**	**n**
303	**Agricultural/forestry/horticultural weed**	**n=0, y = 2*multiplier (see Appendix 2)**	**n**
304	**Environmental weed**	**n=0, y = 2*multiplier (see Appendix 2)**	**y**
305	**Congeneric weed**	**n=0, y = 1*multiplier (see Appendix 2)**	**n**
401	**Produces spines, thorns or burrs**	**y=1, n=0**	**y**
402	**Allelopathic**	**y=1, n=0**	
403	**Parasitic**	**y=1, n=0**	**n**
404	**Unpalatable to grazing animals**	**y=1, n=-1**	
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**	
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**	**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**	
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**	**>3**
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**y=1, n=-1**	**n**
702	**Propagules dispersed intentionally by people**	**y=1, n=-1**	**y**
703	**Propagules likely to disperse as a produce contaminant**	**y=1, n=-1**	**n**
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**n**
705	**Propagules water dispersed**	**y=1, n=-1**	**n**
706	**Propagules bird dispersed**	**y=1, n=-1**	**y**
707	**Propagules dispersed by other animals (externally)**	**y=1, n=-1**	**n**
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**	
803	**Well controlled by herbicides**	**y=-1, n=1**	
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)**	**y=-1, n=1**	

Designation: H(HPWRA) **WRA Score** **9**

Supporting Data:

101	2010. WRA Specialist. Personal Communication.	No evidence.
201	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Probably native to the Malay Peninsula.
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/taxon.pl?28398	Widely cultivated and naturalized. Perhaps native to s.e. Asia.
202	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Probably native to the Malay Peninsula.
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/taxon.pl?28398	Widely cultivated and naturalized. Perhaps native to s.e. Asia.
203	2009. Dave's Garden. PlantFiles: Lime Berry Triphasia trifolia Triphasia trifolia. Dave's Garden,	USDA zones 9b-11.
204	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Probably native to the Malay Peninsula.
204	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/taxon.pl?28398	Widely cultivated and naturalized. Perhaps native to s.e. Asia.
205	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Triphasia trifolia is a much-cultivated hedge plant throughout the tropics, growing well in both the wet and dry tropics and under shade.
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/taxon.pl?28398	Widely cultivated and naturalized. Perhaps native to s.e. Asia.
301	2003. Clark, D.. Weeds are still "weeds" in paradise. Wildland Weeds. Winter: 16-17.	Triphasia trifolia is naturalized on the U.S. Virgin Islands.
302	2007. Randall, R.P.. Global Compendium of Weeds. http://www.hear.org/gcw/	No evidence.
303	2007. Randall, R.P.. Global Compendium of Weeds. http://www.hear.org/gcw/	No evidence.
304	. Kairo, M./Ali, B./Cheesman, O./Haysom, K./Murphy, S.. Invasive species threates in the Caribbean region report to the Nature Conservancy. CAB International, Curepe http://www.invasivespecies.net/database/species/reference_files/Kairo%20et%20al,%202003.p	Naturalized and invasive in Barbados.
304	2001. Bolusky, B./Mott, M.. FNGA urges Florida's nursery and landscape industry to phase out 34 invasive plants. The Florida Nurserymen and Growers Association, http://www.fleppc.org/FNGA/FNGA_Pressrelease.htm	The Florida Exotic Pest Council requested that Florida nursery growers, landscape professionals and garden center retailers voluntarily stop using Triphasia trifolia because it is an invasive weed in Florida's natural areas.

304	2006. Wehling, W./Nunez, C.A./Glassberg, J.. Lime swallowtails in aNew World. American Butterflies. Summer/Fall: 31-35.http://www.naba.org/pubs/ab142/ab142lime_swallowtail_in_the_new_world.pdf	Triphasia trifolia is treated as an invasive weed in Puerto Rico, Florida and Texas.
304	2010. Florida Gardening. Invasive Plants to Avoid. The Florida Nursery, Growers & Landscape Association, http://www.floridagardening.org/invasive.asp	On the Florida "do not sell" list because it is invasive in natural areas.
305	2007. Randall, R.P.. Global Compendium of Weeds. http://www.hear.org/gcw/	No evidence.
401	2009. Stuartxchange.org. Philippine medicinal plants family Rutaceae limonsito Triphasia trifolia P.Wils. Lime berry. Stuartxchange.org, http://www.stuartxchange.org/Limonsito.html	Smooth shrub growing to a height of 2 meters. The leaf has two sharp and slender spines at the base.
402	2010. WRA Specialist. Personal Communication.	Unknown.
403	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Not parasitic.
404	2010. WRA Specialist. Personal Communication.	Unknown.
405	2010. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland http://www.ncbi.nlm.nih.gov/sites/entrez	No known toxicity in PubMed.
405	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 toxicity mentioned in ToxNet.
406	2004. Halbert, S.E./Manjunath, K.L.. Asian citrus psyllids (Sternorrhyncha: Psyllidae) and greening disease of citrus: a literature review and assessment of risk in Florida. Florida Entomologist. 87: 330-352.	Triphasia trifolia is a host for the Asian citrus psyllid, Diaphorina citri. It can be one of the most serious pests of citrus if the pathogens that cause citrus greening disease are present. Transmission of citrus greening occurs primarily via infective citrus psyllids and grafting. It is transmissible experimentally through dodder and might be transmitted by seed from infected plants and transovarially in psyllid vectors. Citrus greening disease is restricted to Citrus and close citrus relatives because of the narrow host range of the psyllid vectors. Management of citrus greening disease is difficult and requires an integrated approach including use of clean stock, elimination of inoculum via voluntary and regulatory means, use of pesticides to control psyllid vectors in the citrus crop, and biological control of psyllid vectors in non-crop reservoirs. There is no place in the world where citrus greening disease occurs that it is under completely successful management.
407	2008. Carvalho Stow, S.J.. Non-native plant distribuition in Montserrat conservation and ecological aspects. Imperial College of London, http://www.iccs.org.uk/thesis/consci/msc08-stow,sarah.pdf	The berries are edible and the juice is used for nail polish. The leaves and fruit can be made into a beverage and a treatment for colds. Medicinal.
407	2009. Stuartxchange.org. Philippine medicinal plants family Rutaceae limonsito Triphasia trifolia P.Wils. Lime berry. Stuartxchange.org, http://www.stuartxchange.org/Limonsito.html	A Philippine medicinal plant. The fruit is edible. The leaves are used externally for skin afflictions and cosmetics.
408	2010. WRA Specialist. Personal Communication.	Unknown.
409	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Triphasia trifolia is a much-cultivated hedge plant throughout the tropics, growing well in both the wet and dry tropics and under shade.
410	1987. Wiles, G.J.. The status of fruit bats on Guam. Pacific Science. 41: 148-157.	Limestone forest is found over much of northern Guam and in isolated patches in the southern part of the island. Triphasia trifolia is a common species in primary limestone forests.
411	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Triphasia trifolia is a slow grower but eventually forms a stiff impenetrable hedge and stands pruning well.

411	2008. Carvalho Stow, S.J.. Non-native plant distribuition in Montserrat conservation and ecological aspects. Imperial College of London, http://www.iccs.org.uk/thesis/consci/msc08-stow,sarah.pdf	Can form thickets and shade out lower vegetation. [see 4.12].
412	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Triphasia trifolia is a slow grower but eventually forms a stiff impenetrable hedge and stands pruning well.
412	2008. Carvalho Stow, S.J.. Non-native plant distribuition in Montserrat conservation and ecological aspects. Imperial College of London, http://www.iccs.org.uk/thesis/consci/msc08-stow,sarah.pdf	Can form thickets and shade out lower vegetation.
501	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Glabrous shrub with zig zag branches. The alternate, trifoliate leaves have wingless petioles and bear paired spines in their axils. The fruit is oval, red, about 0.5" in diameter.
502	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Rutaceae.
503	2010. www.nationmaster.com. Encyclopedia Nitrogen fixation. Nationmaster.com, http://www.nationmaster.com/encyclopedia/Nitrogen-fixation	Not a nitrogen fixer. Rutaceae.
504	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Glabrous shrub with zig zag branches. The alternate, trifoliate leaves have wingless petioles and bear paired spines in their axils. The fruit is oval, red, about 0.5" in diameter.
601	2010. WRA Specialist. Personal Communication.	No evidence.
602	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Propagation of Triphasia trifolia is usually by seeds.
602	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Usually propagated by seed with select forms propagated by cuttings.
603	2010. WRA Specialist. Personal Communication.	Unknown.
604	2010. WRA Specialist. Personal Communication.	Unknown.
605	2006. Pacific Islands Ecosystems at Risk. Triphasia trifolia (Burm.f.) Paul G.Wilson, Rutacea. Pacific Islands Ecosystems at Risk, http://www.hear.org/Pier/species/triphasia_trifolia.htm	flowers 1-3 in axils on peduncles 3-4 mm long; flowers 3-parted, white; stamens 6; ovary 3-locular; locules 1-seeded.
606	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Propagation of Triphasia trifolia is usually by seeds.
606	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Usually propagated by seed with select forms propagated by cuttings.
607	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Triphasia trifolia is a slow grower but eventually forms a stiff impenetrable hedge and stands pruning well.
701	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Widely grown in the tropics as a hedge plant.
701	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Fruit is oval, about 0.5" in diameter, glabrous, usually 1 seeded with mucilaginous pulp.
702	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Widely grown in the tropics as a hedge plant.

702	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/taxon.pl?28398	Widely cultivated and naturalized. Perhaps native to s.e. Asia.
703	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Widely grown in the tropics as a hedge plant.
703	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	Fruit is oval, about 0.5" in diameter, glabrous, usually 1 seeded with mucilaginous pulp.
704	1983. Jenkins, J.M.. The native forest birds of Guam. Ornithological Monographs. 31: 1-61.	[no adaptation for wind dispersal] Gallicolumba xanthonura, Ptilinopus roseicapilla and Aplonis opaca guami, native forest birds of Guam use the berries of Triphasia trifolia as a food source.
704	2006. Simpson, T.. Guam CSP invasive weed management guide. United States Department of Agriculture, Natural Resources Conservation Service. Pacific Islands Area - West, http://www.docstoc.com/docs/737229/Guam-CSP-Invasive-Weed-Management-Guide	Reproduces from bird dispersed seed.
705	1983. Jenkins, J.M.. The native forest birds of Guam. Ornithological Monographs. 31: 1-61.	[no adaptation for water dispersal] Gallicolumba xanthonura, Ptilinopus roseicapilla and Aplonis opaca guami, native forest birds of Guam use the berries of Triphasia trifolia as a food source.
705	2006. Simpson, T.. Guam CSP invasive weed management guide. United States Department of Agriculture, Natural Resources Conservation Service. Pacific Islands Area - West, http://www.docstoc.com/docs/737229/Guam-CSP-Invasive-Weed-Management-Guide	Reproduces from bird dispersed seed.
706	1983. Jenkins, J.M.. The native forest birds of Guam. Ornithological Monographs. 31: 1-61.	Gallicolumba xanthonura, Ptilinopus roseicapilla and Aplonis opaca guami, native forest birds of Guam use the berries of Triphasia trifolia as a food source.
706	2006. Simpson, T.. Guam CSP invasive weed management guide. United States Department of Agriculture, Natural Resources Conservation Service. Pacific Islands Area - West, http://www.docstoc.com/docs/737229/Guam-CSP-Invasive-Weed-Management-Guide	Reproduces from bird dispersed seed.
707	1983. Jenkins, J.M.. The native forest birds of Guam. Ornithological Monographs. 31: 1-61.	[no means of attachment, berry]Gallicolumba xanthonura, Ptilinopus roseicapilla and Aplonis opaca guami, native forest birds of Guam use the berries of Triphasia trifolia as a food source.
707	2006. Simpson, T.. Guam CSP invasive weed management guide. United States Department of Agriculture, Natural Resources Conservation Service. Pacific Islands Area - West, http://www.docstoc.com/docs/737229/Guam-CSP-Invasive-Weed-Management-Guide	Reproduces from bird dispersed seed.
708	1983. Jenkins, J.M.. The native forest birds of Guam. Ornithological Monographs. 31: 1-61.	Gallicolumba xanthonura, Ptilinopus roseicapilla and Aplonis opaca guami, native forest birds of Guam use the berries of Triphasia trifolia as a food source.
708	2006. Simpson, T.. Guam CSP invasive weed management guide. United States Department of Agriculture, Natural Resources Conservation Service. Pacific Islands Area - West, http://www.docstoc.com/docs/737229/Guam-CSP-Invasive-Weed-Management-Guide	Reproduces from bird dispersed seed.
801	2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI.	[Unlikely] Fruit is oval, about 0.5" in diameter, glabrous, usually 1 seeded with mucilaginous pulp.
802	2010. WRA Specialist. Personal Communication.	Unknown.
803	2010. WRA Specialist. Personal Communication.	Unknown.

804	1946. Howes, F.N.. Fence and barrier plants in warm climates. Kew Bulletin. 1: 51-87.	Triphasia trifolia is a slow grower but eventually forms a stiff impenetrable hedge and stands pruning well.
805	2010. WRA Specialist. Personal Communication.	Unknown.