

<i>Eucalyptus cloeziana</i> (Cloezianna Gum, Dead-Finish, Gympie Messmate, Queensland Messmate, Yellow Messmate) -- FLORIDA		Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to FL climates (USDA hardiness zones; 0-low, 1-intermediate, 2-high)	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in regions with an average of 11-60 inches of annual precipitation	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	n	-2
3.02	Garden/amenity/disturbance weed	n	0
3.03	Weed of agriculture	n	0
3.04	Environmental weed	n	0
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	?	
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	?	
4.05	Toxic to animals	?	
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans		
4.08	Creates a fire hazard in natural ecosystems	?	
4.09	Is a shade tolerant plant at some stage of its life cycle	?	
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	n	0
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat		
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	y	1
6.04	Self-compatible or apomictic	?	
6.05	Requires specialist pollinators	?	
6.06	Reproduction by vegetative propagation		
6.07	Minimum generative time (years)	9	-1

7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant		
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	?	
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	n	-1
8.01	Prolific seed production		
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	n	-1
8.03	Well controlled by herbicides	?	
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05	Effective natural enemies present in U.S.		
	Total Score		1
	Implemented Pacific Second Screening		Yes
	Risk Assessment Results		Accept

	Reference	Source data
1.01		Cultivated but no evidence of selection for reduced weediness.
1.02		Skip to 2.01
1.03		Skip to 2.01
2.01	1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnnd.tif) & USDA Plant Hardiness Zone Map, 2012. Agricultural Research Service, U.S. Department of Agriculture. Accessed from http://planthardiness.ars.usda.gov . 2. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]). 3. " <i>Eucalyptus cloeziana</i> ." hortocopia.com. Hortocopia, 2011. Web. 14 May 2012. 4. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm >. Accessed 15 May 2012.	No computer analysis was performed. 1. Global plant hardiness zones 9-11 (-12?); equivalent to USDA Hardiness zones 8b-11b+ (north, central, & south zones of Florida). 2. Native distribution in eastern Queensland, Australia. 3. Hardy range: 10A-11. 4. Native to Queensland.
2.02		No computer analysis was performed. 1. Native range is well known; refer to 2.01 source data.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf).	1. Native distribution in Queensland, Australia appears to be in at least five climatic groups (Am, Aw, BSh, Cwa, Cfa, and possibly Cfb).
2.04	1. Australia's Virtual Herbarium. 2009. http://chah.gov.au/avh/index.jsp . Accessed: 8 May 2012.	1. 500 mm-2000 mm (19.7"-86.6").
2.05	1. Pacific Island Ecosystems at Risk (PIER). Global Compendium of Weeds. http://www.hear.org . Accessed 14 May 2012. 2. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm >. Accessed 21 May 2012.	1. South Africa and Ecuador. 2. Among the most important plantation species in Zimbabwe. Plantations have been established in Zambia, <i>E. cloeziana</i> has also been planted in Nigeria, Congo, DR Congo, Kenya, Uganda, Malawi, Mozambique, Madagascar and South Africa.
3.01		No evidence.
3.02		No evidence.

3.03		No evidence.
3.04		No evidence.
3.05	1. Holm, L. et al. <i>A Geographical Atlas of World Weeds</i> . John Wiley and Sons, New York. 1979.	1. The following <i>eucalypts</i> are considered principal weeds in Australia (principal weed in this context is ranked according to the importance of the weed and is usually referring to about the five most troublesome species for the crop): <i>E. cambageana</i> , <i>E. ferruginea</i> , <i>E. gracilis</i> , <i>E. marginata</i> , <i>E. miniata</i> , <i>E. pilularis</i> , <i>E. populnea</i> , <i>E. tetradonta</i> .
4.01		No evidence.
4.02	1. Anonymous. 2009. "Focus on Eucalypts." <i>SAPIA NEWS No. 12</i> . ARC-Plant Protection Research Institute, South Africa. 2. Anonymous. October 2010. Scotland, Forestry Commission. Interim Guidance on the Grant Aiding and Planting of Eucalypts in Scotland. Accessed: 1 June 2012. 3. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i> . Berkeley: University of California Press.	1. It is likely that most <i>Eucalypts</i> are allelopathic-having the potential to suppress understory plants through chemical inhibitors that leach into the soil. 2. There are many reports in global literature of toxic inhibition of germination and growth of other plant species (allelopathic effects), which inhibits the growth of an understory. 3. Concerns expressed about suppression of ground vegetation due to possible allelopathic effects. Allelopathic effects are widely reported and these reports are largely based on laboratory bioassays. If not chemical inhibition then at least accumulation of dead material of the floor of eucalypt plantations hinders regeneration of native species.
4.03		No evidence.
4.04	1. United States Department of Agriculture Permit applications 08-11-106rm and 08-014-101rm received from ArborGen LLC. Field testing of genetically engineered <i>E. grandis</i> X <i>E. urophylla</i> (http://www.aphis.usda.gov/brs/aphisdocs/08_014101rm_ea2.pdf [Accessed: 8/19/2010]).	1. Eucalyptus species are known to produce chemical compounds that are required by the plant for defense against herbivores and pathogens.
4.05	1. <i>Medicinal Plants for Livestock: Eucalyptus spp.</i> Cornell University, Department of Animal Science. http://www.ansci.cornell.edu/plants/medicinal/eucalyp.html . 1 June 2012.	1. " <i>Eucalyptus spp.</i> contain high levels of phenolics and terpenoids which can be toxic. Animals such as the koala which eat Eucalyptus have developed methods for detoxifying the compounds in the liver. In addition, they have bacteria that degrade tannin-protein complexes. Most animals do not have this ability."
4.06		
4.07		

4.08	<p>1. Gill, A.M. Eucalypts and fires: interdependent or independent? In: <i>Eucalypt ecology: individuals to ecosystems</i>. Ed. J.E. Williams & J. Woinarski. Cambridge, New York: Cambridge University Press, 1997. 2. Anonymous. October 2010. Scotland, Forestry Commission. Interim Guidance on the Grant Aiding and Planting of Eucalypts in Scotland. Accessed: 1 June 2012. http://www.forestry.gov.uk/pdf/InterimEucalyptusGuidance.pdf/\$FILE/InterimEucalyptusGuidance.pdf. 3. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i>. Berkeley: University of California Press.</p>	<p>1. <i>Eucalypts</i> often are the major source of fuel for fires, but not always. 2. Leaves of eucalypts are relatively slow to breakdown and have a high volatile oil content, which contributes to the severity of fire events in their native Australia. 3. Accumulated litter in dense stands of eucalypt stands are extremely flammable.</p>
4.09	<p>1. "<i>Eucalyptus cloeziana</i> ." <i>horticopia.com</i>. Horticopia, 2011. Web. 13 December 2011. 2. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i>. Berkeley: University of California Press.</p>	<p>1. Exposure: partial shade or partial sun to full sun. 2. Shade-tolerant sub-canopy species are not known.</p>
4.10	<p>1. Boland, D.J. et al. <i>Forest Trees of Australia</i>. 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.</p>	<p>1. Best development on metasediments or loams of volcanic origin. Also occurs on shallow soils over coarse sandstone or on shallow to moderately deep coarse-textured soils derived from granite. Overall, the soils are generally well-drained, acidic and of low to moderate fertility.</p>
4.11	<p>1. "<i>Eucalyptus cloeziana</i> ." <i>horticopia.com</i>. Horticopia, 2011. Web. 1 June 2012.</p>	<p>1. "Tree".</p>
4.12	<p>1. Boland, D.J. et al. <i>Forest Trees of Australia</i>. 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.</p>	<p>No evidence. 1. 55 m in height, excellent stem form.</p>
5.01	<p>1. Boland, D.J. et al. <i>Forest Trees of Australia</i>. 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.</p>	<p>1. Occurs on tall open forests and woodlands.</p>
5.02	<p>1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]).</p>	<p>1. Family: <i>Myrtaceae</i>.</p>
5.03	<p>1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]).</p>	<p>1. Family: <i>Myrtaceae</i>.</p>
5.04	<p>1. "<i>Eucalyptus cloeziana</i> ." <i>horticopia.com</i>. Horticopia, 2011. Web. 1 June 2012.</p>	<p>1. "Tree".</p>
6.01		

6.02	1. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm >. Accessed 15 May 2012.	1. <i>Eucalyptus cloeziana</i> is propagated by seed.
6.03	1. Alfenas, R.F. et al. "Fourth International Workshop on the Genetics of Host-Parasite Interactions in Forestry." USDA. Valley River Inn. Eugene, Oregon. July 31 – August 5, 2011. Poster.	1. <i>E. cloeziana</i> does not interbreed naturally with other eucalypts. 2. A natural hybridization between <i>E. cloeziana</i> and <i>E. acmenoides</i> was confirmed in both molecular and morphological characters, making this the first occurrence between taxa from different eucalypt subgenera.
6.04	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/eucalyptus_cloeziana_htmlwra.htm . Via Forestry Compendium [Online Database]. CAB International, Wallingford, UK. 2005. Accessed 14 May 2012.	1. No detailed studies have been reported on the pollination and breeding system but observations suggest that <i>E. cloeziana</i> is predominantly outcrossing and insect pollinated (Turnbull, 1979).
6.05	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/eucalyptus_cloeziana_htmlwra.htm . Via Forestry Compendium [Online Database]. CAB International, Wallingford, UK. 2005. Accessed 14 May 2012.	1. No detailed studies have been reported on the pollination and breeding system but observations suggest that <i>E. cloeziana</i> is predominantly outcrossing and insect pollinated (Turnbull, 1979).
6.06		
6.07	1. " <i>Eucalyptus cloeziana</i> ." horticoxia.com. Horticoxia, 2011. Web. 14 May 2012. 2. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/eucalyptus_cloeziana_htmlwra.htm . Via Forestry Compendium [Online Database]. CAB International, Wallingford, UK. 2005. Accessed 14 May 2012.	1. Fast growth rate. 2. Trees begin flowering from about the ninth year (Poynton 1979).
7.01		

7.02	<p>1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]). 2. Ecocrop. Copyright 1993-2007. Food and Agriculture Organization of the United Nations. Web. 14 May 2012. http://ecocrop.fao.org/ecocrop/srv/en/home. 3. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm>. Accessed 15 May 2012.</p>	<p>Species is being considered for introduction as a biomass crop. 1. Economic importance: materials (wood). 2. Uses include materials (timber wood, honey), fuels (fuelwood), environmental (agroforestry). 3. <i>Eucalyptus cloeziana</i> produces very good poles. The wood is also used for construction, cladding, railway sleepers, bridge planking, piers, posts and mine props, and is suitable for flooring, joinery, ship building, vehicle bodies, handles, ladders, sporting goods, agricultural implements and turnery. It is used as fuelwood and it can be made into charcoal of good quality.</p>
7.03		
7.04	<p>1. "<i>Eucalyptus cloeziana</i> ." horticipia.com. Horticipia, 2011. Web. 14 May 2012. 2. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm>. Accessed 15 May 2012. 3. Potts, B. 1990. The response of eucalypt populations to a changing environment. <i>Tasforests</i>, December: 179-193. 4. Cremer, K.W. 1977. Distance of seed dispersal in Eucalypts estimated from seed weights. <i>Australian Forest Research</i>, 7(4): 225-228. 5. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In: D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i>. Berkeley: University of California Press.</p>	<p>1. No adaptations for wind dispersal (i.e., lacks wings). Fruit is dry, oval and round. 2. Seeds cube-shaped or elongated, yellow-brown. 3. Seed dispersal in most eucalypt species is mainly by wind and gravity. 4. Wind is probably the only important agent of seed dispersal in the eucalypts, except possibly in species growing on river margins or flood plains where water could also transport the seed. 5. Relatively limited seed dispersal; planted eucalypts are very small and have no adaptations for dispersal (wings or fleshy). The passive release of seeds is undoubtedly aided by wind; however all rigorous studies of eucalypt seed dispersal and seedling spatial distribution show that in general seeds are dispersed over quite short distances that are in agreement with measurement of terminal descent velocity.</p>
7.05	<p>1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i> . Berkeley: University of California Press.</p>	<p>1. Eucalypts should not be planted near rivers/streams. Temporarily flooded or eroded river/stream banks are suitable habitat for spontaneous establishment of seedlings. Additionally, their seeds can be dispersed for long distances by running water.</p>
7.06	<p>1. Southern, S.G. et al. 2004. Review of gene movement by bats and birds and its potential significance for eucalypt plantation forestry. <i>Australian Forestry</i> , 67(1): 44-53.</p>	<p>1. Dispersal in animal droppings does not occur, although many birds eat eucalypt seed, because the seed does not survive passage through the alimentary canal of mammals and birds (Joseph 1986).</p>

7.07	1. " <i>Eucalyptus cloeziana</i> ." horticultura.com. Horticultura, 2011. Web. 14 May 2012. 2. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm >. Accessed 15 May 2012.	1. No adaptations that would suggest that it could attach itself externally to animals. Fruit is dry, oval and round. 2. Seeds cube-shaped or elongated, yellow-brown.
7.08	1. Southern, S.G. et al. 2004. Review of gene movement by bats and birds and its potential significance for eucalypt plantation forestry. <i>Australian Forestry</i> , 67(1): 44-53.	1. Dispersal in animal droppings does not occur, although many birds eat eucalypt seed, because the seed does not survive passage through the alimentary canal of mammals and birds (Joseph 1986).
8.01		
8.02	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i> . Berkeley: University of California Press.	1. Eucalypt seeds do not have dormancy and seed storage in the soil lasts less than a year.
8.03	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In : D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i> . Berkeley: University of California Press.	1. Triclopyr or glyphosate applied to freshly cut stumps can greatly reduce resprouting.
8.04	1. Brink, M., 2008. <i>Eucalyptus cloeziana</i> F.Muell. [Internet] Record from Protabase. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://database.prota.org/search.htm >. Accessed 15 May 2012.	1. <i>Eucalyptus cloeziana</i> coppices well. When grown for poles, coppice rotations of 6–12 years are employed.
8.05		