

Family: *Orchidaceae*

Taxon: *Vanda tricolor*

Synonym: *Vanda suavis* Lindl.

Common Name: NA

Vanda suaveolens Blume

Limodorum suaveolens Reinw. ex Blume

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation:	H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score	8
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)	
305	Congeneric weed			n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs			y=1, n=0	n
402	Allelopathic			y=1, n=0	n
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	
407	Causes allergies or is otherwise toxic to humans			y=1, n=0	n
408	Creates a fire hazard in natural ecosystems			y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle			y=1, n=0	
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)			y=1, n=0	

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

Designation: H(HPWRA)

WRA Score **8**

Supporting Data:

101	2007. Gardiner, L.M.. <i>Vanda tricolor</i> Lindl. Conservation in Java, Indonesia: Genetic and Geographic Structure and History. Lankesteriana. 7(1-2): 272-280.	[Is the species highly domesticated? No] "Conservation efforts to reintroduce and/or increase populations of <i>V. tricolor</i> should take into account the diversity of haplotypes in Java and Bali in order to conserve genetic diversity and potential. This study shows that not all specimens of <i>V. tricolor</i> in Java and Bali are genetically identical and that different regions have different genetic varieties." [May be cultivars that are highly domesticated]
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	2007. Gardiner, L.M.. <i>Vanda tricolor</i> Lindl. Conservation in Java, Indonesia: Genetic and Geographic Structure and History. Lankesteriana. 7(1-2): 272-280.	[Species suited to tropical or subtropical climate(s) 2-high] " <i>Vanda tricolor</i> Lindl. is widespread in cultivation in South East Asia, being relatively easily cultivated in the garden, and is often seen growing floriferously on garden trees, fence posts and verandas. Whilst the species is widespread in cultivation in its native regions of Java and Bali, wild populations are small and highly fragmented."
202	2007. Gardiner, L.M.. <i>Vanda tricolor</i> Lindl. Conservation in Java, Indonesia: Genetic and Geographic Structure and History. Lankesteriana. 7(1-2): 272-280.	[Quality of climate match data? 2-high] " <i>Vanda tricolor</i> Lindl. is widespread in cultivation in South East Asia, being relatively easily cultivated in the garden, and is often seen growing floriferously on garden trees, fence posts and verandas. Whilst the species is widespread in cultivation in its native regions of Java and Bali, wild populations are small and highly fragmented."
203	2008. Aubron, M.. The new encyclopedia of orchids: 1500 species in cultivation. Timber Press, Portland, OR	[Broad climate suitability (environmental versatility)? No] "Epiphytic on branches in open positions, 700-1600 m (2300-5300 ft.)" [Elevation range <1000 m]
203	2011. Plant this. <i>Vanda tricolor</i> . http://www.plantthis.com.au/plant-information.asp?gardener=25529	[Broad climate suitability (environmental versatility)? No] "Hardiness zones: 10-13"
204	2007. Gardiner, L.M.. <i>Vanda tricolor</i> Lindl. Conservation in Java, Indonesia: Genetic and Geographic Structure and History. Lankesteriana. 7(1-2): 272-280.	[Native or naturalized in regions with tropical or subtropical climates? Yes] " <i>Vanda tricolor</i> Lindl. is widespread in cultivation in South East Asia, being relatively easily cultivated in the garden, and is often seen growing floriferously on garden trees, fence posts and verandas. Whilst the species is widespread in cultivation in its native regions of Java and Bali, wild populations are small and highly fragmented."
205	2007. Gardiner, L.M.. <i>Vanda tricolor</i> Lindl. Conservation in Java, Indonesia: Genetic and Geographic Structure and History. Lankesteriana. 7(1-2): 272-280.	[Does the species have a history of repeated introductions outside its natural range? Yes] " <i>Vanda tricolor</i> Lindl. is widespread in cultivation in South East Asia..."
301	2006. Oppenheimer, H.L.. New Hawai'i Plant Records for 2004. Bishop Museum Occasional Papers. 88: 10-15.	[Naturalized beyond native range? Yes] "Recently this species was found nearly smothering an <i>Antidesma platyphyllum</i> tree, with masses of aerial roots. It is also sparingly naturalized in the Ha'iku area of East Maui, where it grows on <i>Eucalyptus</i> (J. Parker, pers. comm.). The inflorescence is axillary, with fragrant flowers about 6 cm across, spotted white and purple. Material examined. MAUI: West Maui, Lahaina Distr, E flank of Honolua peak, in <i>Metrosideros</i> Lowland Wet Forest, 616m, 30 Nov 2004, Oppenheimer & G. Hansen H110413 (BISH)."
301	2010. Frohlich, D./Lau, A.. New plant records from O'ahu for 2008. Bishop Museum Occasional Papers. 107: 3-18.	[Naturalized beyond native range? Yes] " <i>Vanda tricolor</i> , a native of Java, is a large, rock-dwelling, epiphytic or terrestrial orchid commonly used in horticulture (Staples & Herbst 2005). It was first collected as naturalized on Maui in 2004 (Oppenheimer 2006). This collection from Oahu was from an individual found growing several feet off the ground in a large tree. Many small clumps of this species can be seen in higher-elevation neighborhoods; however, it was most obvious that this particular individual was not planted in its location."
302	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Garden/amenity/disturbance weed? No] No evidence
303	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Agricultural/forestry/horticultural weed? No] No evidence
304	2006. Oppenheimer, H.L.. New Hawai'i Plant Records for 2004. Bishop Museum Occasional Papers. 88: 10-15.	[Environmental weed? Potentially] "Recently this species was found nearly smothering an <i>Antidesma platyphyllum</i> tree, with masses of aerial roots." [May compete with native epiphytic plants, or possibly harm plant upon which it is growing]
305	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Congeneric weed? No] No evidence

401	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	[Produces spines, thorns or burrs? No] No evidence
402	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	[Allelopathic? No] "...epiphytic, rock-dwelling, or terrestrial plants..." [No evidence. Popular ornamental]
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	[Parasitic? No] "...epiphytic, rock-dwelling, or terrestrial plants..."
404	2011. WRA Specialist. Personal Communication.	[Unpalatable to grazing animals? Unknown]
405	2011. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	[Toxic to animals? No] No evidence
406	1914. Masee, G.. Diseases of cultivated plants and trees. The Macmillan Company, New York, NY	[Host for recognized pests and pathogens? Unknown] "Nectria goroshankiniana (Wahlr.) is parasitic on the roots of Vanda tricolor. "
406	2004. NIIR Board. Cultivation of Fruits, Vegetables and Floriculture. National Institute Of Industrial Research, New Delhi, India	[Host for recognized pests and pathogens? Unknown] "A black spot disease on blooms of Vanda tricolor is caused by Glomerella sp. The diseases are controlled by spraying dithane M-45 or bavistin." [Importance of this pathogen unknown]
407	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	[Causes allergies or is otherwise toxic to humans? No] No evidence
407	2011. Plant this. Vanda tricolor. http://www.plantthis.com.au/plant-information.asp?gardener=25529	[Causes allergies or is otherwise toxic to humans? No] "No hazards currently listed."
407	2011. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	[Causes allergies or is otherwise toxic to humans? No] No evidence
408	1996. Taylor, N.. 1001 Questions Answered About Flowers. General Publishing Company, Toronto, Canada	[Creates a fire hazard in natural ecosystems? No] "What is the most spectacular orchid from Java? Many orchid growers would vote for Vanda tricolor, a tree-perching plant from hot, steaming forests." [Unlikely given natural distribution]
409	2010. How To Grow Orchids.com. Vanda Orchid And Growing. http://www.how-to-grow-orchid.com/vanda-orchid-and-growing.htm	[Is a shade tolerant plant at some stage of its life cycle? Possibly No] "When it comes to the vanda orchid and growing, the vanda's are considered sun worshipers, natives of India, the Philippines, and some Pacific islands. They will not thrive without adequate sun, and they must have corresponding amounts of heat and water. Care must be exercised to keep water from remaining in the growing crown."
409	2011. Backyard Gardener. Vanda tricolor. http://www.backyardgardener.com/plantname/pda_792b-2.html	[Is a shade tolerant plant at some stage of its life cycle? Unknown] "Light Range: Part Sun to Full Sun"
410	2011. Backyard Gardener. Vanda tricolor. http://www.backyardgardener.com/plantname/pda_792b-2.html	[Tolerates a wide range of soil conditions ? Possibly] "pH Range: .5 to 6.5 Soil Range: Any Water Range: Normal to Moist"
410	2011. Plant this. Vanda tricolor. http://www.plantthis.com.au/plant-information.asp?gardener=25529	[Tolerates a wide range of soil conditions ? Possibly] "Soil: orchid compost, mildly acidic to mildly alkaline" [Grows epiphytically]
411	2006. Oppenheimer, H.L.. New Hawai'i Plant Records for 2004. Bishop Museum Occasional Papers. 88: 10-15.	[Climbing or smothering growth habit? Yes] "Recently this species was found nearly smothering an Antidesma platyphyllum tree, with masses of aerial roots."
412	2006. Oppenheimer, H.L.. New Hawai'i Plant Records for 2004. Bishop Museum Occasional Papers. 88: 10-15.	[Forms dense thickets? No] "Recently this species was found nearly smothering an Antidesma platyphyllum tree, with masses of aerial roots." [Potentially smothering, however]
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	[Aquatic? No] "...epiphytic, rock-dwelling, or terrestrial plants..."

502	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Grass? No] Orchidaceae
503	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Nitrogen fixing woody plant? No] Orchidaceae
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	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "...epiphytic, rock-dwelling, or terrestrial plants..."
504	2010. How To Grow Orchids.com. Vanda Orchid And Growing. http://www.how-to-grow-orchid.com/vanda-orchid-and-growing.htm	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Vandas, since they are without pseudobulbs, must have water at all times, but their lusty aerial roots will take care of some deficiency in watering by taking moisture from the air."
601	2011. Dwiyulia, N./Budiharta, S.. Epiphytic orchids and host trees diversity at Gunung Manyutan Forest Reserve, Wilis Mountain, Ponorogo, East Java. Biodiversitas. 12(1): 22-27.	[Evidence of substantial reproductive failure in native habitat? Potentially due to overexploitation] "Preliminary communication indicated that Vanda tricolor was abundant at Gunung Manyutan Forest Reserve (Perhutani's forest rangers, pers. comm.). However, we only find V. tricolor at four plots with a total of 39 individuals, much fewer than F. angulata (277 individuals). The low abundance of V. tricolor is presumably caused either by illegal exploitation by outsiders or gathering by local communities to be planted at their home gardens. The survival of an epiphytic orchids depends on its host trees. In this study, 13 species of host trees were recorded, with 91 individuals (Table 2). The most important host trees were Pinus merkusii (24 individuals), Schima wallichii and Engelhardia spicata (19 individuals each)."
602	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Produces viable seed? Yes] "Seedlings of Vanda tricolor grown on culture media containing barbiturates such as sodium ethyl-(1-methyl-butyl) barbiturate, sodium cyclopentylallyl barbiturate, and phenyl ethyl barbituric acid have proliferated into masses of undifferentiated tissue."
603	2005. Teoh, Eng-Soon. Orchids of Asia. Marshall Cavendish, Singapore	[Hybridizes naturally? Hybridize in cultivation] "Its hybrids display mauve colour and spotting...Hybrids of Vanda may be grouped into three different categories: 1. Interspecific hybrids within the same section, such as the strap-leaf hybrid Vanda. 2. Interspecific hybrids between member of two sections, such as the semi-terete Vanda. 3. Intergeneric hybrids." [Unknown if Vanda tricolor can naturally hybridize]
604	2007. Gardiner, L.M.. Vanda tricolor Lindl. Conservation in Java, Indonesia: Genetic and Geographic Structure and History. Lankesteriana. 7(1-2): 272-280.	[Self-compatible or apomictic? Yes] "It could be advised that efforts should be made to self-pollinate these plants in order to preserve the genetic potential, rather than to cross pollinate them with each other whilst they are in cultivation and before they are reintroduced into the national park, and even to reintroduce plants into geographically separate sites in the park to reduce natural cross-pollination."
605	1992. Arditti, J.. Fundamentals of Orchid Biology. John Wiley & Sons, New York	[Requires specialist pollinators? No] "Table 6-9...All Vanda listed are bee pollinated" [Includes V. tricolor]
605	2001. TheOrchidSource.com. Orchid Forum - Seed being released from pod of Vanda tricolor var. suavis. http://forum.theorchidsource.com/ubbthreads.php/topics/76554/Re_Seed_being_released_from_pod.html	[Requires specialist pollinators? No] "I don't recall ever seeing anywhere a picture of the orchid seed being released from a seed capsule. So I decided to photograph the newly opened capsule of a Vanda tricolor Var. suavis that is near my shade house and to share the pictures with all of you that might want to see it. This seed capsule reached maturity after about a year of the flower being pollinated. It was naturally pollinated by a local species of solitary bee." [Comment from a grower in Puerto Rico]
606	2011. herbs2000.com. The Vanda Alliance Orchids. http://www.herbs2000.com/flowers/o_c_vanda.htm	[Reproduction by vegetative fragmentation? Possibly] "Vandas grow very tall in time. When they become too tall, cut off the top of the plant at a point where some roots have developed and it will make another plant. The original plant will usually make one or more new vegetative shoots in response to this. Often aerial growths develop on a vanda and these can be potted when they develop roots." [Fragments will presumably root and potentially spread]
607	1992. Arditti, J.. Fundamentals of Orchid Biology. John Wiley & Sons, New York	[Minimum generative time (years)? 1] "Table 12-5... V. tricolor... Time to maturity, weeks...47-71" [Time to reproductive maturity potentially under 1 year]

701	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Propagules likely to be dispersed unintentionally? Potentially] "Table 1...Seed Size, in mm...0.197 x 0.077" [Extremely tiny seeds could be inadvertently dispersed by sticking to mud on boots, or tires]
702	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	[Propagules dispersed intentionally by people? Yes] Ornamental species
703	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Propagules likely to disperse as a produce contaminant? Potentially] "Table 1...Seed Size, in mm...0.197 x 0.077" [No evidence, but small seeds could contaminate other potted plants in nurseries or greenhouses]
704	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Propagules adapted to wind dispersal? Yes] "Table 1...Seed Size, in mm...0.197 x 0.077" [Extremely tiny seeds presumably adapted for wind dispersal]
704	2001. TheOrchidSource.com. Orchid Forum - Seed being released from pod of Vanda tricolor var. suavis. http://forum.theorchidsource.com/ubbthreads.php/topics/76554/Re_Seed_being_released_from_po.html	[Propagules adapted to wind dispersal? Yes] "You can see as the light weight seed floats in the air as a cloud of reddish points." [Comment from a grower in Puerto Rico]
705	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Propagules water dispersed? Unknown] "Table 1...Seed Size, in mm...0.197 x 0.077" [Seeds small enough to potentially float on or be dispersed by water, but epiphytic habit suggests water is not the normal mode of dispersal]
706	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Propagules bird dispersed? No] Not fleshy-fruited, although seeds could potentially stick to feet or feathers of birds
707	1967. Arditti, J.. Factors Affecting the Germination of Orchid Seeds. Botanical Review. 33(1): 1-97.	[Propagules dispersed by other animals (externally)? Potentially] "Table 1...Seed Size, in mm...0.197 x 0.077" [Extremely tiny seeds could be inadvertently dispersed by sticking to mud on fur, hooves, or feathers]
708	2011. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? Unknown] Seeds unlikely to be ingested or dispersed internally
801	1992. Arditti, J.. Fundamentals of Orchid Biology. John Wiley & Sons, New York	[Prolific seed production (>1000/m2)? Unknown] "Table 7-2 ... Vanda tricolor ... Number of seeds per capsule" [Table entry was left blank. No estimates given]
801	2001. TheOrchidSource.com. Orchid Forum - Seed being released from pod of Vanda tricolor var. suavis. http://forum.theorchidsource.com/ubbthreads.php/topics/76554/Re_Seed_being_released_from_po.html	[Prolific seed production (>1000/m2)? Potentially Yes] "This seed capsule reached maturity after about a year of the flower being pollinated. It was naturally pollinated by a local species of solitary bee. The first time I moved the capsule an impressively dense red cloud of seed was released. Unfortunately I was not able to photograph this event. The photograph shows the second event of seed dispersal. I moved the capsule from side to side to stimulate the release of the seed. You can see as the light weight seed floats in the air as a cloud of reddish points. Every surface in the near proximity of the Vanda was sprinkled with some seed but the Phaius plants growing near had their leaves covered with a particularly generous dusting of seeds." [Comment from a grower in Puerto Rico]
801	2004. Motes, M.R.. Vandas: their botany, history, and culture. Timber Press, Portland, OR	[Prolific seed production (>1000/m2)? Unknown] "Vanda tricolor is a robust and attractive plant, more tolerant of cooler temperatures than any other large-flowered Vanda save V. coerulea. When well grown, it will flower three or more times a year. Although its flowering season is best described as indeterminate, there are definite seasons in which these plants bloom more strongly..."
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown]
803	2011. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	2011. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown]
805	2011. WRA Specialist. Personal Communication.	[Effective natural enemies present locally? Unknown]