

Family: *Costaceae*

Taxon: *Tapeinochilos ananassae*

Synonym: *Costus ananassae* Hassk. [basionym]
Tapeinochilos pungens (Teijsm. & Binn.) Miq

Common Name: Pineapple ginger
Indonesian ginger
back-scratcher-ginger
torch ginger

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation: L
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score -5
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	n
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)	n
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	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0	n

411	Climbing or smothering growth habit	y=1, n=0	n
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	n
602	Produces viable seed	y=1, n=-1	n
603	Hybridizes naturally	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -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	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	
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	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
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: L

WRA Score -5

Supporting Data:

101	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Is the species highly domesticated? No] No evidence
101	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	[Is the species highly domesticated? No] No evidence
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
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	[Species suited to tropical or subtropical climate(s) 2- High] "Native to the Moluccas..." ... "Pineapple ginger requires a junglelike environment to perform best..."
201	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of Tapeinochilos (Costaceae) in Wallacea. Blumea. 55: 61–64.	[Species suited to tropical or subtropical climate(s) 2- High] "Distribution — Moluccas, southern New Guinea, north-eastern Australia."
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	[Quality of climate match data 2-High] "Native to the Moluccas..." ... "Pineapple ginger requires a junglelike environment to perform best..."
203	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	[Broad climate suitability (environmental versatility)? No] "Pineapple ginger requires a junglelike environment to perform best: deep shade to filtered sun; protection from drying, damaging winds:"
203	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of Tapeinochilos (Costaceae) in Wallacea. Blumea. 55: 61–64.	[Broad climate suitability (environmental versatility)? No] "Distribution — Moluccas, southern New Guinea, north-eastern Australia. Ecology — Lowland primary and secondary forests, from sea level to 680 m altitude." [Tropical plant with elevational distribution that does not exceed 1000 m]
203	2012. CSIRO. Australian Tropical Rainforest Plants [online database] - Tapeinochilos ananassae. http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/html/taxon/Tapeinochilos_ananassae.htm	[Broad climate suitability (environmental versatility)? No] "Altitudinal range from near sea level to about 300 m. Grows as an understory plant in well developed lowland and upland rain forests which have been subjected to some disturbance. Also occurs in New Guinea."
203	2012. Dave's Gardern. PlantFiles: Indonesian Wax Ginger - Tapeinochilos ananassae. http://davesgarden.com/guides/pf/go/72594/	[Broad climate suitability (environmental versatility)? No] "Hardiness: USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
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	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Native to the Moluccas..." ... "Pineapple ginger requires a junglelike environment to perform best..."
204	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of Tapeinochilos (Costaceae) in Wallacea. Blumea. 55: 61–64.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Distribution — Moluccas, southern New Guinea, north-eastern Australia."
205	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Does the species have a history of repeated introductions outside its natural range? Yes] "...native from Malaysia to Australia but is widely cultivated for its red bracts and orange flowers."
301	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	[Naturalized beyond native range? No evidence from Hawaiian Islands] "Native to the Moluccas, T. ananassae was introduced to the Hawaiian Islands in 1959 by noted botanist J.F. Rock"
301	2005. Wagner, W.L./Herbst, D.R./Lorence, D.H.. Flora of the Hawaiian Islands website. Smithsonian Inst., Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm	[Naturalized beyond native range? No evidence from Hawaiian Islands]
301	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Naturalized beyond native range? No] No evidence

301	2009. Chong, K.Y./Tan, H.T.W./Corlett, R.T.. A Checklist of the Total Vascular Plant Flora of Singapore: Native, Naturalized and Cultivated Species. Raffles Museum of Biodiversity Research, National University of Singapore, Singapore	[Naturalized beyond native range? No evidence in Singapore] "Tapeinochilos ananassae (Hassk.) K. Schum.; Costaceae; cultivated only"
302	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Garden/amenity/disturbance weed? No] No evidence
302	2012. CSIRO. Australian Tropical Rainforest Plants [online database] - Tapeinochilos ananassae. http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Tapeinochilos_ananassae.htm	[Garden/amenity/disturbance weed? No] "Grows as an understory plant in well developed lowland and upland rain forests which have been subjected to some disturbance." [No evidence of weediness, but does occur in disturbed habitats in native range]
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	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Environmental weed? No] No evidence
305	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Congeneric weed? No] No evidence
401	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Produces spines, thorns or burrs? No] "Subshrub, coarse, erect, to 2.5 m high (8 1/4 ft), with cane-like stems growing from a rhizome. Leaves simple, alternate, spirally arranged, subsessile atop a sheath, blade oblanceolate to elliptic, usually 10-30 x 3-8 cm (4-12 x 1 1/4-3 1/2 in)."
402	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Allelopathic? No] "...native from Malaysia to Australia but is widely cultivated for its red bracts and orange flowers."
403	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Parasitic? No] "Subshrub, coarse, erect, to 2.5 m high (8 1/4 ft), with cane-like stems growing from a rhizome."
404	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of Tapeinochilos (Costaceae) in Wallacea. <i>Blumea</i> . 55: 61-64.	[Unpalatable to grazing animals? Unknown] "...the leaves are eaten raw as a vegetable." [Leaves palatable to people, so probably palatable to animals]
405	2005. Frohne, D./Pfander, H.J.. Poisonous plants: a handbook for doctors, pharmacists, toxicologists, biologists and veterinarians. Manson Publishing Ltd, London, UK	[Toxic to animals? No] No evidence
405	2007. Nelson, L./Shih, R.D./Balick, M.J.. Handbook of poisonous and injurious plants. The New York Botanical Garden. Springer, New York, NY	[Toxic to animals? No] No evidence
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No] No evidence
406	1979. Hara, A.H./Beardsley, Jr., J.W.. The Biology of the Black Twig Borer, <i>Xylosandrus compactus</i> (Eichhoff), in Hawaii. <i>Proceedings, Hawaiian Entomological Society</i> . 13(1): 55-70.	[Host for recognized pests and pathogens? Possibly] "X. compactus is a serious pest of shrubs and trees. It attacks the live twigs and branches, especially if the host has suffered some setback such as transplanting or drought." ... "Active brood galleries of X. compactus were field collected from various hosts for establishing laboratory cultures. They were collected on Oahu from Waiahole Valley on Koster's curse, <i>Clidemia hirta</i> (L.) D. Don, and from Manoa at the Lyon Arboretum on juniper berry, <i>Citharexylum caudatum</i> L.; bullocks-heart, <i>Annona reticulata</i> L.; and on Indonesian ginger, <i>Tapeinochilos ananassae</i> K. Schum." [X. compactus has a broad host range]

406	2004. Lins, S.R.O./Coelho, R.S.B.. Occurrence of diseases in ornamental tropical flowers in the state of Pernambuco [In Portuguese]. <i>Fitopatologia Brasileira</i> . 29(3): 332-335.	[Host for recognized pests and pathogens? Possibly. Unknown in Hawaiian Islands] "The climatic conditions in which tropical flowers are grown in Northeast Brazil, related to rainfall, humidity, temperature and cropping density factors, favor disease occurrence that limit and reduce the quality and yield of flowers. In this survey several diseases caused by fungi and nematodes were observed. Among them were the anthracnose (<i>Colletotrichum gloeosporioides</i>) on <i>Heliconia</i> spp, <i>Etilingera elatior</i> , <i>Tapeinochilos ananassae</i> , causing leaf and inflorescence lesions; leaf spots (<i>Bipolaris</i> spp., <i>Cercospora</i> sp., <i>Curvularia lunata</i> , <i>Glomerella cingulata</i> , <i>Guignardia</i> sp and <i>Deighthoniela torulosa</i>) on <i>Heliconia</i> app, <i>Calathea burle</i> – marx and <i>Musa coccinea</i> ; roots and rhizomes rots (<i>Rhizoctonia solani</i> and <i>Fusarium oxysporum</i> f. sp. cubense) on <i>E. elatior</i> and <i>Heliconia chartacea</i> cv. Sex Pink. Phytonematoses, caused by <i>Meloidogyne</i> spp., <i>Radopholus</i> sp. and <i>Helicotylenchus</i> sp. make up one of the main disease problems found in ornamental plants in the State of Pernambuco, usually occurring on <i>Alpinia purpurata</i> , <i>E. elatior</i> , <i>Zingiber spectabiles</i> , <i>Heliconia</i> spp. and <i>Musa</i> spp. <i>Alpinia purpurata</i> was found to be the most susceptible to <i>M. incognita</i> . On the other hand, the low incidence of bacterial wilt (<i>Ralstonia solanacearum</i> race 2) in the flower crop areas was associated with eradication carried out by flower producers."
407	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of <i>Tapeinochilos</i> (Costaceae) in Wallacea. <i>Blumea</i> . 55: 61–64.	[Causes allergies or is otherwise toxic to humans? No] "...the plant is used to treat snake bites (by applying a compress of the stem centre or drinking an infusion of the root), children with constipation, used against cuts to heal wounds, or the leaves are eaten raw as a vegetable." [No evidence]
408	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	[Creates a fire hazard in natural ecosystems? No] "Erect terrestrial herbs, leafy shoots often branched above." ... "Pineapple ginger requires a junglelike environment to perform best: deep shade to filtered sun; protection from drying, damaging winds:" [No evidence, and unlikely given herbaceous growth form and environment in which it grows]
409	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	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Pineapple ginger requires a junglelike environment to perform best: deep shade to filtered sun;"
410	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Tolerates a wide range of soil conditions? No] Fertile, moist, well-drained soils in shaded or partially shaded places are preferred."
410	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	[Tolerates a wide range of soil conditions? No] "...a deep, organically rich soil that has excellent drainage and ample moisture." ... "It is not salt tolerant and requires regular applications of organic humus, compost or an inorganic fertilizer blend, preferably with minor nutrients included."
411	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Climbing or smothering growth habit? No] "Subshrub, coarse, erect, to 2.5 m high (8 1/4 ft), with cane-like stems growing from a rhizome."
412	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	[Forms dense thickets? No] No evidence
412	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of <i>Tapeinochilos</i> (Costaceae) in Wallacea. <i>Blumea</i> . 55: 61–64.	[Forms dense thickets? No] "Lowland primary and secondary forests, from sea level to 680 m altitude." [No evidence]
501	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of <i>Tapeinochilos</i> (Costaceae) in Wallacea. <i>Blumea</i> . 55: 61–64.	[Aquatic? No] "Terrestrial herb in clump. Leafy shoots 1.5–3 m high with a main stem that may have several branches at apex. Leaves to 13–18 by 4–6 cm, spiralling, spike terminally on the leafy shoot or on a separate leafless shoot, cylindrical resembling a pineapple, to 30 by 11 cm, bracts red each subtending one flower. Flower yellow, hardly exceeding the bract, ovary 2 locular."
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	[Grass? No] Costaceae
503	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	[Nitrogen fixing woody plant? No] Costaceae
504	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Subshrub, coarse, erect, to 2.5 m high (8 1/4 ft), with cane-like stems growing from a rhizome."

504	2010. Gordon, D.R./Mitterdorfer, B./Pheloung, P.C. et al.. Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> . 25(2): 56-74.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "This question addresses taxa that have specialized organs and should not include plants with just rhizomes/ stolons (see 6.06). Answer 'yes' only for perennial taxa with tubers, corms, or bulbs. Answer 'no' for non geophytes, including those with rhizomes or stolons only (see 6.06)."
601	2010. Poulsen, A.D./Gideon, O.G./Ardiyani, M.. Names of <i>Tapeinochilos</i> (Costaceae) in Wallacea. <i>Blumea</i> . 55: 61–64.	[Evidence of substantial reproductive failure in native habitat? No] "Conservation status — Categorized as LC (least concern) because of its wide distribution and persistence in open or disturbed habitats (IUCN 2001)."
602	2000. Whistler, W.A.. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	[Produces viable seed? Presumably No in Hawaiian Islands] "Fruit a capsule. Propagate by root division." [No description of seeds given]
602	2005. Staples, G.W./Herbst, D.R.. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	[Produces viable seed? Presumably No in Hawaiian Islands] "Propagation is usually by rhizome division, or the short side branches can be detached and rooted like cuttings;" [No description of seeds given]
603	2012. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]
604	2012. WRA Specialist. Personal Communication.	[Self-compatible or apomictic? Unknown]
605	2006. Specht, C.D.. Systematics and Evolution of the Tropical Monocot Family Costaceae (Zingiberales): A Multiple Dataset Approach. <i>Systematic Botany</i> . 31(1): 89-106.	[Requires specialist pollinators? Yes] "Tapeinochilos palustris Gideon represents the Tapeinochilos type, which is sunbird pollinated and resembles that of the ornithophilous type with the exception that the bracts and calyx lobes are woody and often sharp." [Related species with similar floral structure pollinated by sunbirds. Possibly why apparently no seeds are produced in cultivated T. ananassae plants in Hawaii] "In the Asian Costaceae clade, the sunbird pollinated Tapeinochilos is derived from an open-flowered ancestor as evidenced by its sister relationship with the open-flowered Cheilocostus clade and the open-flowered Paracostus clade as sister to the Cheilo costus clade + Tapeinochilos. Ornithophily in this clade evolved only once in the common ancestor to all Tapeinochilos, and there are no reversals to an open flowered form within Tapeinochilos." ... "It is noteworthy that the most species rich clades in the family (Tapeinochilos and the New World Costus clade) include taxa that are adapted to pollination by birds. Of these two, the New World Costus clade, which has evolved the bird pollination syndrome multiple times, has 33% more taxa than Tapeinochilos, indicating a potential benefit to the alternation of pollination syndromes for increased speciation rates."
605	2012. Kinsey, T.B.. <i>Fawaiian Plants and Tropical Flowers - A Guide to the Flowers and Plants of Hawaii</i> . http://wildlifeofhawaii.com/flowers/	[Requires specialist pollinators? Yes] "In their native range, Sunbirds (Family Nectariniidae) help pollinate these plants, but Sunbirds are not found here in Hawaii."
606	2005. Staples, G.W./Herbst, D.R.. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	[Reproduction by vegetative fragmentation? No] "Under ideal conditions the rhizomes can spread out from the area where they are planted,"
607	2012. Plant this. <i>Tapeinochilos ananassae</i> . http://plantthis.com.au/plant-information.asp?gardener=23344&tabview=design&plantSpot=	[Minimum generative time (years)? Unknown] "Growth rate: average"
701	2005. Staples, G.W./Herbst, D.R.. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	[Propagules likely to be dispersed unintentionally? Potentially] "Under ideal conditions the rhizomes can spread out from the area where they are planted," ... "Propagation is usually by rhizome division, or the short side branches can be detached and rooted like cuttings;" [No evidence, but disposal of cuttings or garden waste could potentially result in inadvertent dispersal of this plant]
702	2000. Whistler, W.A.. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	[Propagules dispersed intentionally by people? Yes] "...native from Malaysia to Australia but is widely cultivated for its red bracts and orange flowers. Its inflorescence looks like a bright red plastic pineapple, <i>Ananas comosus</i> ."
703	2000. Whistler, W.A.. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	[Propagules likely to disperse as a produce contaminant? No] "Fruit a capsule. Propagate by root division." [Unlikely. Seeds apparently not produced in Hawaiian Islands, and no evidence that this plant has ever been inadvertently dispersed as a contaminant of produce]
704	2012. CSIRO. Australian Tropical Rainforest Plants [online database] - <i>Tapeinochilos ananassae</i> . http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Tapeinochilos_ananassae.htm	[Propagules adapted to wind dispersal? No] "Infructescence stalked, +/- cone-like, about 15-20 cm long consisting mainly of large bracts about 4.5 x 3.2 cm, bracts red but eventually turning brown. Each fruitlet about 30-35 mm long with three lobes at the apex. Each lobe about 7-8 x 6-8 mm. Seeds seated on a fleshy white mass. Aril translucent. Embryo +/- cylindrical." [Seeds, if produced, lack adaptations for wind dispersal]

705	2012. CSIRO. Australian Tropical Rainforest Plants [online database] - Tapeinochilos ananassae. http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Tapeinochilos_ananassae.htm	[Propagules water dispersed? No] "Infructescence stalked, +/- cone-like, about 15 20 cm long consisting mainly of large bracts about 4.5 x 3.2 cm, bracts red but eventually turning brown. Each fruitlet about 30-35 mm long with three lobes at the apex. Each lobe about 7-8 x 6-8 mm. Seeds seated on a fleshy white mass. Aril translucent. Embryo +/- cylindrical." [Arillate seeds, when produced, show adaptations for ant or bird dispersal]
706	2012. CSIRO. Australian Tropical Rainforest Plants [online database] - Tapeinochilos ananassae. http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Tapeinochilos_ananassae.htm	[Propagules bird dispersed? Possibly] "Infructescence stalked, +/- cone-like, about 15 20 cm long consisting mainly of large bracts about 4.5 x 3.2 cm, bracts red but eventually turning brown. Each fruitlet about 30-35 mm long with three lobes at the apex. Each lobe about 7-8 x 6-8 mm. Seeds seated on a fleshy white mass. Aril translucent. Embryo +/- cylindrical." [Arillate seeds either bird or ant-dispersed, but rarely, if ever, produced in Hawaiian Islands]
707	1972. Maas, P.J.M.. Costoideae (Zingiberaceae). Flora Neotropica. 8: 1-139.	[Propagules dispersed by other animals (externally)? Possibly ant dispersed if seeds are produced] "Nothing is known about the seed-dispersal of the Costoideae; they might be myrmecochores."
707	2010. Lengyel, S./Gove, A.D./Latimer, A.M./Majer, J.D./Dunn, R.R.. Convergent evolution of seed dispersal by ants, and phylogeny and biogeography in flowering plants: A global survey. Perspectives in Plant Ecology, Evolution and Systematics. 12: 43-55.	[Propagules dispersed by other animals (externally)? Possibly ant dispersed if seeds are produced] "Table 1...Genera with myrmecochory" [Includes Tapeinochilos]
708	2012. CSIRO. Australian Tropical Rainforest Plants [online database] - Tapeinochilos ananassae. http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Tapeinochilos_ananassae.htm	[Propagules survive passage through the gut? Unknown] "Infructescence stalked, +/- cone-like, about 15 20 cm long consisting mainly of large bracts about 4.5 x 3.2 cm, bracts red but eventually turning brown. Each fruitlet about 30-35 mm long with three lobes at the apex. Each lobe about 7-8 x 6-8 mm. Seeds seated on a fleshy white mass. Aril translucent. Embryo +/- cylindrical." [Arillate seeds possibly adapted for ant or bird dispersal. Unknown if capable of surviving passage through the gut]
801	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Prolific seed production (>1000/m ²)? No] "Fruit a capsule. Propagate by root division." [No description of seeds given. No evidence from Hawaiian Islands]
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	[Prolific seed production (>1000/m ²)? No] "Propagation is usually by rhizome division, or the short side branches can be detached and rooted like cuttings;" [No description of seeds given. No evidence from Hawaiian Islands]
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] No evidence of seed longevity in storage or field conditions
802	2012. WRA Specialist. Personal Communication.	[Evidence that a persistent propagule bank is formed (>1 yr)? No] No evidence of seed production in Hawaiian Islands
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	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	[Tolerates, or benefits from, mutilation, cultivation, or fire? Possibly] "Propagation is usually by rhizome division, or the short side branches can be detached and rooted like cuttings;" [Possibly able to reproduce if rhizomes are cut into fragments]
805	1979. Hara, A.H./Beardsley, Jr., J.W.. The Biology of the Black Twig Borer, <i>Xylosandrus compactus</i> (Eichhoff), in Hawaii. Proceedings, Hawaiian Entomological Society. 13(1): 55-70.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown] " <i>X. compactus</i> is a serious pest of shrubs and trees. It attacks the live twigs and branches, especially if the host has suffered some setback such as transplanting or drought." ... "Active brood galleries of <i>X. compactus</i> were field collected from various hosts for establishing laboratory cultures. They were collected on Oahu from Waiahole Valley on <i>Koster's curse</i> , <i>Clidemia hirta</i> (L.) D. Don, and from Manoa at the Lyon Arboretum on juniper berry, <i>Citharexylum caudatum</i> L.; bullocks-heart, <i>Annona reticulata</i> L.; and on Indonesian ginger, <i>Tapeinochilos ananassae</i> K. Schum." [No evidence that pests or pathogens, or the lack thereof, are preventing or facilitating the persistence or spread of this species]