Keywords: Low Risk, Naturalized, Spiny plant, Edible fruit, Often seedless

Family: ***Bromeliaceae***

Taxon: ***Ananas comosus***

Synonym: *Ananas ananassoides*
Ananas bracteatus
Ananas sativus

Common Name: pineapple
piña

Questionaire : current 20090513 **Assessor:** Assessor **Designation:** L
Status: Assessor Approved **Data Entry Person:** Assessor **WRA Score 3**

101	**Is the species highly domesticated?**	**y=-3, n=0**	**y**
102	**Has the species become naturalized where grown?**	**y=1, n=-1**	**y**
103	**Does the species have weedy races?**	**y=1, n=-1**	**y**
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)**	
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**	**n**
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**	**n**
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**	
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**	**n**
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**	**2**
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**	**n**
707	**Propagules dispersed by other animals (externally)**	**y=1, n=-1**	**n**
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**	
803	**Well controlled by herbicides**	**y=-1, n=1**	**y**
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**	**n**

Designation: L **WRA Score** 3

Supporting Data:

101	1988. Morton, J.F.. Fruits of warm climates - Pineapple (Ananas comosus). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/pineapple.html [Accessed 07 Dec 2013]	[Is the species highly domesticated? Yes] "Native to southern Brazil and Paraguay (perhaps especially the Parana-Paraguay River) area where wild relatives occur, the pineapple was apparently domesticated by the Indians and carried by them up through South and Central America to Mexico and the West Indies long before the arrival of Europeans."
101	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Is the species highly domesticated? Yes] "It is likely that modern pineapple originated in pre-Columbian times in South America; a mutation for seedlessness and selection for large fruit size, increased sweetness and juiciness and improved flavour occurred over time (Purseglove, 1972)."
102	2000. Porembski, S.. The invasibility of tropical granite outcrops ('inselbergs') by exotic weeds. Journal of the Royal Society of Western Australia. 83: 131-137.	[Has the species become naturalized where grown? Yes] "A survey is provided about the most important weeds on tropical inselbergs which shows that intentionally-introduced species, like Ananas comosus in West Africa, cause the most serious problems."
103	2000. Porembski, S.. The invasibility of tropical granite outcrops ('inselbergs') by exotic weeds. Journal of the Royal Society of Western Australia. 83: 131-137.	[Does the species have weedy races? Yes] "The invading bromeliad Ananas comosus has become a serious threat to native plants on inselbergs in the humid parts of West Africa."
201	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Species suited to tropical or subtropical climate(s) 2-High] "Pineapple is native to the South American Tropics and was widely introduced elsewhere during the sixteenth and seventeenth centuries."
202	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Quality of climate match data 2-High]
203	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Broad climate suitability (environmental versatility)? No] "Pineapples are grown mainly between latitudes 24°N and 25°S in the tropics and subtropics, principally at lower altitudes. The optimum temperature range for pineapple is 23–32°C, although it can be grown in areas where temperature drops as low as 10°C. However, the plant does not tolerate frost and the fruit is sensitive to sunburn. Pineapple is tolerant to drought and a wide range of rainfall; 1,000–1,500 mm per annum is considered optimal."
204	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Pineapple is native to the South American Tropics…"
205	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Does the species have a history of repeated introductions outside its natural range? Yes] "The crop is now widely grown throughout the tropics and subtropics. The international pineapple canning industry is based on plantations in Thailand, the Philippines, Malaysia and north Sumatra as well as in Hawaii, Brazil, Taiwan, South Africa, Kenya, Ivory Coast, Mexico and Puerto Rico."
301	2000. Porembski, S.. The invasibility of tropical granite outcrops ('inselbergs') by exotic weeds. Journal of the Royal Society of Western Australia. 83: 131-137.	[Naturalized beyond native range? Yes] "A survey is provided about the most important weeds on tropical inselbergs which shows that intentionally-introduced species, like Ananas comosus in West Africa, cause the most serious problems."
301	2013. Gonzalez, D.C./Schulte, K./Schmidt, M./Zizka, G.. Diversity and levels of endemism of the Bromeliaceae of Costa Rica–an updated checklist. PhytoKeys. 29: 17–62.	[Naturalized beyond native range? Yes] "Life form. Terrestrial. Cultivated and naturalized."
302	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Garden/amenity/disturbance weed? No evidence]
303	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Agricultural/forestry/horticultural weed? No] "Pineapple is an introduced crop in Australia and to date has not been classified as a 'naturalised' or 'agricultural' weed."
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No evidence]

304	2000. Porembski, S.. The invasibility of tropical granite outcrops (‘inselbergs’) by exotic weeds. Journal of the Royal Society of Western Australia. 83: 131-137.	[Environmental weed? Yes, in a fairly unique habitat] "Granitic and gneissic rock outcrops (‘inselbergs’) that rise abruptly from surrounding plains are of widespread occurrence on old crystalline shields. In the tropics this geologically old ecosystem occurs throughout a broad spectrum of vegetational and climatic zones. Inselbergs usually bear a vegetation that is drastically different from those of the surroundings due to their edaphic and microclimatic aridity. Because of their low agricultural potential, tropical inselbergs form in many regions the last refuges of natural vegetation types. However, there is increasing evidence for nonnative weeds getting established within inselberg plant communities by using roadsides and fallow land as stepping stones. In both Africa and South America, exotic weeds have become a severe danger for indigenous plant communities on rock outcrops because of their high competitive ability. A survey is provided about the most important weeds on tropical inselbergs which shows that intentionally-introduced species, like Ananas comosus in West Africa, cause the most serious problems. Moreover, different rock outcrop habitats are analysed in regard to their invasibility." … "Inselbergs occurring in the neighbourhood of villages and near pineapple plantations occasionally became infested by the bromeliad Ananas comosus that is able to colonize a broad range of habitats. When established (frequently due to dispersal by humans) on inselbergs in humid parts of West Africa, this South American species becomes highly competitive. Preliminary observations indicate that Ananas comosus is a strong competitor to the indigenous mat-forming Cyperaceae Afrotrilepis pilosa. At certain localities in the Ivory Coast Afrotrilepis pilosa has already succumbed to Ananas comosus which there is now the dominant mat-forming species" … "Plate 6. The invading bromeliad Ananas comosus has become a serious threat to native plants on inselbergs in the humid parts of West Africa."
304	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Environmental weed? Minor in Australia] "Pineapple may be a minor problem but is not considered important enough to warrant control at any location; its seeds are not listed in the Queensland weed seeds category (Friend 1983; Groves et al. 2003)."
305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? Possibly. Ananas bracteatus listed as a weed, but evidence of significant impacts not found]
401	2008. Kobayashi, K./Criley, R./Kaufman, A./Tsugawa, S./Ricordi, A./Clifford, P.. Barrier Plants. L-20. College of Tropical Agriculture and Human Resources (CTAHR, Honolulu, HI http://www.ctahr.hawaii.edu/freepubs	[Produces spines, thorns or burrs? Yes. No for some cultivars] "Narrow, tapering, pointed leaves up to 40 inches long are arranged in a spiral rosette on a central stem. The leaf margins usually (but not always) have saw-toothed spines. The common cultivar Smooth Cayenne does not have saw-toothed leaf edges."
401	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Produces spines, thorns or burrs? Yes, but not always] "A perennial or biennial, herbaceous, plant sometimes spinescent, succulent, up to 1 m tall (Plate 4). Leaves are long, up to 1 m or more, 5–8 cm wide, sword-like, arranged in a tight spiral around a short stem, margins coarsely and laxly spinose serrate, green, often variegated, or red or brown streaked (Plate 5)."
402	2005. Xuan, T.D./Shinkichi, T./Khanh, T.D./Chung, I.M.. Biological control of weeds and plant pathogens in paddy rice by exploiting plant allelopathy: an overview. Crop protection. 24(3): 197-206.	[Allelopathic? Unknown for vascular plants] "Allelochemicals isolated from Alpinia speciosa K. SCHUM, and Ananas comosus var. Cayenne (pine apple) were examined for their biological impact on fungi." … "Cinamic acid, pcoumaric acid, and ferulic acid were isolated from Ananas comosus…"
403	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Parasitic? No] "A. comosus is a tropical, herbaceous, perennial monocot, approximately 1-2 metres tall and wide, with leaves arranged spirally." [Bromeliaceae]
404	2011. Martinsen, M.. Introducing the pineapple. Pp 58-63 in La, K.C. et al. (eds.) Vienna Zocalo.. Academy of Fine Arts Vienna, Vienna	[Unpalatable to grazing animals? Plants may be palatable, but spiny leaves may deter browsing] "In the making of pineapple products, there is a large amount of material, i.e. the pineapple’s leathery outside, which, one may think, is not used for anything at all. This is however quite an important source of fodder for cattle, and many pineapple producing countries are economically dependant on it."
405	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Toxic to animals? No] "The pineapple plant does not contain any known toxins.
406	2007. Gilman, E.F.. Ananas comosus Pineapple (Revised). FPS039. University of Florida IFAS Extension, Gainesville, FL http://edis.ifas.ufl.edu/pdffiles/FP/FP03900.pdf	[Host for recognized pests and pathogens? No. Common pests of many crops] "Mites, scales, and mealy-bugs can be serious pest problems. No diseases are of major concern."

407	1988. Morton, J.F.. Fruits of warm climates - Pineapple (Ananas comosus). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/pineapple.html [Accessed 07 Dec 2013]	[Causes allergies or is otherwise toxic to humans? Unlikely] "When unripe, the pineapple is not only inedible but poisonous, irritating the throat and acting as a drastic purgative. Excessive consumption of pineapple cores has caused the formation of fiber balls (bezoars) in the digestive tract."
407	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Causes allergies or is otherwise toxic to humans? No] "The pineapple plant does not contain any known toxins. However, when eaten raw and in large quantities pineapple produces a burning sensation of the lips and mouth (Watt & Breyer-Brandwijk 1962) and can also produce angular stomatitis (inflammation of the mucous membranes of the mouth, cheeks, gums, lips, tongue and mouth) (Fasal 1945)." … "Pineapple pollen is relatively sticky and is not known to be wind dispersed and therefore not a wind borne allergen."
407	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Causes allergies or is otherwise toxic to humans? No] "Pineapple is best eaten fresh and raw as dessert fruit or in fruit salads." … "Young leaves in bud stage (the “heart” or cabbage) and the inflorescences or young fruit are also eaten. In Java, the cabbage is eaten raw or cooked as lalab or mixed in sayur. The flower spike and young spurious fruit are first peeled, sliced, steamed or cooked and eaten as lalab or mixed in sayur (lodeh) with rice. Half-ripe spurious fruits are peeled, sliced and eaten uncooked with a sambal paste like petis."
408	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Creates a fire hazard in natural ecosystems? No evidence. Unlikely given succulent habit] "A perennial or biennial, herbaceous, plant sometimes spinescent, succulent, up to 1 m tall "
409	2011. Paull, R.E./Duarte, O.. Tropical fruits. 2nd ed.. CABI, Wallingford, UK	[Is a shade tolerant plant at some stage of its life cycle? No] "Most pineapple is grown in regions with high insolation, at least in part because the crop is well adapted to areas with low rainfall. While the light level required to saturate photosynthesis of a pineapple leaf is believed to be less than 25% of full sunlight, high irradiance is required to sustain the high levels of productivity found in commercial plantations,…"
410	2008. Kobayashi, K./Criley, R./Kaufman, A./Tsugawa, S./Ricordi, A./Clifford, P.. Barrier Plants. L-20. College of Tropical Agriculture and Human Resources (CTAHR, Honolulu, HI http://www.ctahr.hawaii.edu/freepubs	[Tolerates a wide range of soil conditions? Yes] "A well-drained, sandy loam is preferred, with a high organic matter content and pH 4.5–6.5. However, plants can be grown over a wide range of soil types, such as the acid peats (pH 3–4.5) in Malaysia. Drainage should be perfect, because waterlogged plants quickly succumb to root rot."
410	2011. Paull, R.E./Duarte, O.. Tropical fruits. 2nd ed.. CABI, Wallingford, UK	[Tolerates a wide range of soil conditions? Yes] "Pineapple can be grown in a wide variety of soil types, with good drainage and aeration being crucial."
411	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Climbing or smothering growth habit? No] "A perennial or biennial, herbaceous, plant sometimes spinescent, succulent, up to 1 m tall…"
501	1988. Morton, J.F.. Fruits of warm climates - Pineapple (Ananas comosus). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/pineapple.html [Accessed 07 Dec 2013]	[Aquatic? No] "The pineapple plant is a terrestrial herb 2 1/2 to 5 ft (.75-1.5 m) high with a spread of 3 to 4 ft (.9-1.2 m); a very short, stout stem and a rosette of waxy, straplike leaves, long-pointed, 20 to 72 in (50-180cm) 1ong; usually needle tipped and generally bearing sharp, upcurved spines on the margins."
502	2011. Paull, R.E./Duarte, O.. Tropical fruits. 2nd ed.. CABI, Wallingford, UK	[Grass? No] "Pineapple is in the bromeliad family, which has about 45 genera and 2000 species."
503	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Nitrogen fixing woody plant? No] Bromeliaceae
504	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "A. comosus is a tropical, herbaceous, perennial monocot, approximately 1-2 metres tall and wide, with leaves arranged spirally. It bears flowers on a terminal inflorescence, which form a large, edible fruit characterised by a tuft of leaves at its apex."
601	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Evidence of substantial reproductive failure in native habitat? No evidence]
602	1988. Morton, J.F.. Fruits of warm climates - Pineapple (Ananas comosus). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/pineapple.html [Accessed 07 Dec 2013]	[Produces viable seed? Yes] "Seeds are desired only in breeding programs and are usually the result of hand pollination. The seeds are hard and slow to germinate. Treatment with sulfuric acid achieves germination in 10 days, but higher rates of germination (75-90 %) and more vigorous growth of seedlings results from planting untreated seeds under intermittent mist."
602	2005. Jaramillo, P./Bassantes, J./Tye, A.. Viability of seeds in food products proposed for field trips in Galapagos. Galapagos Research. 63: 16-18.	[Produces viable seed? Yes] "Fresh Apple Malus domestica, Naranjilla Solanum quitoense, Cucumber Cucumis sativus, Pineapple Ananas comosus, Pear Pyrus communis, Bell Pepper Capsicum annuum, Tomato Solanum lycopersicum, Grape Vinis vinifera all contained viable seeds. We recommend prohibiting any product with viable seeds from field trips to uninhabited areas."

603	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Hybridizes naturally? Artificial hybrids possible] "Under breeding and experimental conditions pineapple hybridises with other subspecies of A. comosus to produce fertile offsprings (refer Section1 for more details). Hand-pollinated crosses between A. comosus var. comosus (diploid, 2n=50) and A. macrodontes (tetraploid, 4n=100) produced 5-10% fertile seeds, most of which were tetraploid and grew to be fully fertile (Collins 1960)."
604	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Self-compatible or apomictic? No] "the flesh is pale to golden yellow, juicy and usually seedless due to self incompatibility and the use of triploid cultivars"
605	1988. Morton, J.F.. Fruits of warm climates - Pineapple (Ananas comosus). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/pineapple.html [Accessed 07 Dec 2013]	[Requires specialist pollinators? Yes] "Seeds are desired only in breeding programs and are usually the result of hand pollination"
605	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Requires specialist pollinators? Yes] "In Australia, honey bees (Apis mellifera), native bees, pineapple beetles (Nitidulid spp.), ants and honey eaters are occasional visitors that feed on the nectar and play a relatively minor role in pollen dispersal and cross pollination (Wee & Rao 1979) compared to Humming birds, which are the major pollinators in Hawaii but are not present in Australia (Purseglove 1972). Therefore, in Queensland, long distance pollen dispersal is unlikely because of the absence of major pollinators. Occasionally collected pollen has been reported on unprotected fruits, but this is not due to direct pollination (Garth Sanewski see1 pers comm)."
606	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Reproduction by vegetative fragmentation? Yes] "The root system is primarily adventitious, typical of monocots, and may spread up to 1-2 m laterally and 0.85 m in depth under optimal conditions (Purseglove 1972)."
606	2011. Paull, R.E./Duarte, O.. Tropical fruits. 2nd ed.. CABI, Wallingford, UK	[Reproduction by vegetative fragmentation? Yes] "Propagules used in commercial pineapple production include fruit tops (crowns), shoots borne on vestigial fruits at the base of the fruit (slips) and shoots borne at any position on the stem (suckers)"
607	1988. Morton, J.F.. Fruits of warm climates - Pineapple (Ananas comosus). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/pineapple.html [Accessed 07 Dec 2013]	[Minimum generative time (years)? 1-2+ years] "The seedlings are planted when 15-18 months old and will bear fruit 16-30 months later."
701	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No evidence. Unlikely] "The fruit of pineapple is a seedless syncarp and polygonal in shape. A syncarp is derived from the fusion of many individual flowers/fruitlets into one fruit. The fruit consists of the fused ovaries, bases of sepals and bracts, and cortex of the central core. In the mature fruit, the bract, sepal and ovary tissues are prominent (Medina & Garcia 2005)." … "Seeds are produced rarely and appear flat on one side and curved on the other, with a pointed end. They are approximately 3-5 mm in length and 1-2 mm in width, with a hard seed coat." …"In the unlikely event of successful pollination, the seeds, if produced remain contained in the fruit as pineapples have no seed releasing mechanisms."
702	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Propagules dispersed intentionally by people? Yes] "The crop is now widely grown throughout the tropics and subtropics."
703	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Propagules likely to disperse as a produce contaminant? No evidence. Unlikely] "The fruit of pineapple is a seedless syncarp and polygonal in shape. A syncarp is derived from the fusion of many individual flowers/fruitlets into one fruit. The fruit consists of the fused ovaries, bases of sepals and bracts, and cortex of the central core. In the mature fruit, the bract, sepal and ovary tissues are prominent (Medina & Garcia 2005)." … "Seeds are produced rarely and appear flat on one side and curved on the other, with a pointed end. They are approximately 3-5 mm in length and 1-2 mm in width, with a hard seed coat."
704	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Propagules adapted to wind dispersal? No] "The fruit is oval to cylindrical, yellowish to orange, often greenish; about 15–25 cm long and 14–17 cm in diameter, weighing 1–2.5 kg; the fruit is surmounted by a rosette of short, stiff spirally arranged leaves, called the ‘crown’"

705	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Propagules water dispersed? No evidence] "Depending on whether the flowers have been pollinated or not, small hard seeds or traces of undeveloped seeds may be present (Purseglove 1972; Bartholomew et al. 2003). Fruits are not normally dispersed and in commercial plantations seeds are not produced. Seeds are desired only in breeding programs and are usually the result of hand pollination. Seeds when produced naturally or by artificial pollination remain within the fruit and do not get dispersed naturally."
706	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Propagules bird dispersed? No evidence] "Given that seeds are produced rarely in the fruit with no natural means of dispersal, there is only a remote chance of seed persistence in the environment during commercial cultivation."
707	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Propagules dispersed by other animals (externally)? No evidence] "Given that seeds are produced rarely in the fruit with no natural means of dispersal, there is only a remote chance of seed persistence in the environment during commercial cultivation."
708	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Propagules survive passage through the gut? Possibly, if seeds are produced] "Pineapple seeds exhibit significant dormancy due to an impermeable seed coat. They are usually treated with a fungicide and concentrated sulphuric acid to reduce seed dormancy and improve the uniformity of germination."
801	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Prolific seed production (>1000/m2)? No] "Pineapple is largely vegetatively propagated. Sexual reproduction is rare in nature because pineapple is self sterile; seeds if produced by self fertilization germinate slowly with low vigour and young seedlings are fragile due to inbreeding depression (Purseglove 1972; Daniela 1999; Bartholomew et al. 2003)."
802	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Evidence that a persistent propagule bank is formed (>1 yr)? Possibly Yes] "Seeds when produced naturally or by artificial pollination remain within the fruit and do not get dispersed naturally. Such seeds are ready for harvest 5- 6 months after cross pollination (Purseglove 1972). They are usually obtained by slitting the fruit in longitudinal sections and removing the fruit flesh around the carpel cavities and then washing and drying them." … "Pineapple seeds exhibit significant dormancy due to an impermeable seed coat. They are usually treated with a fungicide and concentrated sulphuric acid to reduce seed dormancy and improve the uniformity of germination."
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)? Seeds persist in storage] "Storage Behaviour: Orthodox p Storage Conditions: Dry seeds stored in sealed metal cans for years (Collins, 1968)"
803	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Well controlled by herbicides? Yes] "Although stem pieces could theoretically survive outside the cultivated environment they are unlikely to become weeds as they are slow growing and sensitive to common herbicides…"
804	2008. Office of the Gene Technology Regulator. The Biology of Ananas comosus var. comosus (Pineapple). Australian Government OGTR, Canberra	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Pineapple plants can occasionally re-shoot from large pieces of stem that are left intact and buried within commercially cultivated areas if the plants from the previous crop are not completely destroyed."
805	2013. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? No] Several pests of pineapples, but no biological control agents introduced for this species

Summary of Risk Traits

High Risk / Undesirable Traits

- Grows in tropical climates
- Naturalized outside native range
- An environmental weed on inselbergs in the humid parts of West Africa
- Leaf margins usually (but not always) have saw-toothed spines.
- Tolerates many soil types
- Spreads vegetatively
- Can re-shoot from large pieces of stem

Low Risk Traits

- Edible fruit
- Rarely produces seeds
- Self=incompatible
- Requires specialized pollinators
- Requires full sun
- Lack of seed production and large fruit makes long distance and inadvertent dispersal unlikely