Family: ***Cupressaceae***

Taxon: ***Thuja x 'Green Giant'***

Synonym: *Thuja plicata J. Donn ex D. Don x Thuja stan* ***Common Name:*** 'Green Giant'

Questionaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** L

Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score -14**

101	**Is the species highly domesticated?**	**y=-3, n=0**	**y**
102	**Has the species become naturalized where grown?**	**y=1, n=-1**	**n**
103	**Does the species have weedy races?**	**y=1, n=-1**	**n**
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)**	**Low**
202	**Quality of climate match data**	**(0-low; 1-intermediate; 2-high) (See Appendix 2)**	**Low**
203	**Broad climate suitability (environmental versatility)**	**y=1, n=0**	**y**
204	**Native or naturalized in regions with tropical or subtropical climates**	**y=1, n=0**	**n**
205	**Does the species have a history of repeated introductions outside its natural range?**	**y=-2, ?=-1, n=0**	**?**
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)**	
401	**Produces spines, thorns or burrs**	**y=1, n=0**	**n**
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**	
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**	**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**	**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**	**>3**
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**y=1, n=-1**	**n**
702	**Propagules dispersed intentionally by people**	**y=1, n=-1**	**y**
703	**Propagules likely to disperse as a produce contaminant**	**y=1, n=-1**	**n**
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**n**
705	**Propagules water dispersed**	**y=1, n=-1**	**n**
706	**Propagules bird dispersed**	**y=1, n=-1**	**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**	**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** **-14**

Supporting Data:

101	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Is the species highly domesticated? Yes] "In 1967, a single plant reputed to be Thuja (standishii x plicata) was received from D.T. Poulsen, Kvistgaard, Denmark, and planted at the U.S. National Arboretum. This plant exhibited exceptional landscape quality and propagations were distributed. In the distribution process, the name and identity of this clone became confused with that of another arborvitae from the same source, T. occidentalis 'Giganteoides'. The identity of the exceptional clone as the T. (standishii x plicata) hybrid was resolved by Susan Martin, USNA, Kim Trip, New York Botanic Garden, and Robert Marquard, Holden Arboretum, through extensive records searches, nursery inspections, and isozyme analysis. The name Thuja 'Green Giant' was selected to identify and promote this clone."
102	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Has the species become naturalized where grown? No] No evidence
102	2011. WRA Specialist. Personal Communication.	[Has the species become naturalized where grown? No] No evidence
103	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Does the species have weedy races? No] No evidence
103	2011. WRA Specialist. Personal Communication.	[Does the species have weedy races? No] No evidence
201	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Species suited to tropical or subtropical climate(s) -? 0-Low] "The cultivar is reported to be hardy to USDA Zone 5 and tolerant of a wide range of soils and climatic conditions (1, 2, 7, 9)."
202	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Quality of climate match data? 0-Low] "The cultivar is reported to be hardy to USDA Zone 5 and tolerant of a wide range of soils and climatic conditions (1, 2, 7, 9)."
203	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Broad climate suitability (environmental versatility)? Yes] "The cultivar is reported to be hardy to USDA Zone 5 and tolerant of a wide range of soils and climatic conditions (1, 2, 7, 9)."
204	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Native or naturalized in regions with tropical or subtropical climates? No] "In 1967, a single plant reputed to be Thuja (standishii x plicata) was received from D.T. Poulsen, Kvistgaard, Denmark, and planted at the U.S. National Arboretum. This plant exhibited exceptional landscape quality and propagations were distributed. In the distribution process, the name and identity of this clone became confused with that of another arborvitae from the same source, T. occidentalis 'Giganteoides'. The identity of the exceptional clone as the T. (standishii x plicata) hybrid was resolved by Susan Martin, USNA, Kim Trip, New York Botanic Garden, and Robert Marquard, Holden Arboretum, through extensive records searches, nursery inspections, and isozyme analysis. The name Thuja 'Green Giant' was selected to identify and promote this clone...U.S.D.A. Zones 5–7"
204	2011. Missouri Botanical Garden. Gardens & Gardening > Your Garden > Plant Finder > Plant Details - Thuja 'Green Giant'. http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/b443/thuja-green-giant.aspx	[Native or naturalized in regions with tropical or subtropical climates? No] "Zone: 5 to 8"
205	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Does the species have a history of repeated introductions outside its natural range? Possibly] "It has no serious pest or disease problems and has been widely grown and tested in commercial nursery production. 'Green Giant' is an excellent substitute for Leyland cypress."
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	2011. WRA Specialist. Personal Communication.	[Naturalized beyond native range? No] No evidence

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	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? Possibly] Thuja occidentalis, Thuja orientalis, Thuja plicata listed as naturalized and/or weeds, but evidence of negative impacts was not found
401	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Produces spines, thorns or burrs? No] "'Green Giant' arborvitae is a narrow, upright, pyramidal evergreen tree with a rapid growth rate, and lustrous dark green foliage."
402	1999. Singh, H.P./Kohli, R.K./Batish, D.R./Kaushal, P.S.. Allelopathy of Gymnospermous Trees. Journal of Forest Research. 4: 245-254.	[Allelopathic? Unknown] "Table 1. Available reports on the allelopathy of gymnosperms… Thuja occidentalis… Fresh leaf and litter leachates inhibited seed germination and seedling growth… Thuja plicata… Volatile inhibitors from leaves and inhibitors present in aqueous extracts of leaves, litter, and bark inhibited the seedling growth… Thuja spp… Aqueous extracts of bark inhibited growth of rye grass." [Unknown for Thuja "Green Giant", but other Thuja species exhibit allelopathic properties]
403	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Parasitic? No] "'Green Giant' arborvitae is a narrow, upright, pyramidal evergreen tree with a rapid growth rate, and lustrous dark green foliage." [Cupressaceae. Not parasitic]
404	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Unpalatable to grazing animals? Possibly Yes] "...no reports of damage by white tail deer (Odocoileus virginianus Zimm.)…"
405	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Toxic to animals? No] No evidence
405	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Toxic to animals? No] No evidence
406	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Host for recognized pests and pathogens? No] "Trees do not appear to be susceptible to windthrow and have few pest problems."
406	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Host for recognized pests and pathogens? No] "It has no serious pest or disease problems and has been widely grown and tested in commercial nursery production. 'Green Giant' is an excellent substitute for Leyland cypress."
406	2011. Missouri Botanical Garden. Gardens & Gardening > Your Garden > Plant Finder > Plant Details - Thuja 'Green Giant'. http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/b443/thuja-green-giant.aspx	[Host for recognized pests and pathogens? No] "No serious insect or disease problems. Bagworm and rots may occur. Watch for scale."
407	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Causes allergies or is otherwise toxic to humans? No] No evidence
407	2011. Floridata. Thuja plicata. http://www.floridata.com/ref/t/thuja_plicata.cfm	[Causes allergies or is otherwise toxic to humans? Yes for Thuja plicata] "Some people apparently are allergic to contact with redcedar foliage."

407	2011. Klingaman, G.L.. Planting With Allergies in Mind. Learn 2 Grow, http://www.learn2grow.com/gardeningguides/generalgardening/basics/plantingallergies.aspx	[Causes allergies or is otherwise toxic to humans? No evidence] "All of this said, that doesn't mean you can't enjoy other great plants in your garden during allergy season! Arborvitaes like 'Green Giant' (Thuja 'Green Giant'), for example, can provide the kind of screening junipers and pines provide without causing significant allergy "problems.
408	1997. Smith, J.K./Fischer, W.C.. Fire Ecology of the Forest Habitat Types of Northern Idaho. General Technical Report INT-GTR-363. USDA Forest Service Rocky Mountain Research Station, Ogden, UT	[Creates a fire hazard in natural ecosystems? Unknown] "Western redcedar has moderate fire resistance (table 5). Its thin bark, shallow root system, low and dense branching habit, and highly flammable foliage make it susceptible to fire damage." [T. plicata has highly flammable bark. Unknown if Thuja "Green Giant" retains flammability]
409	2011. Missouri Botanical Garden. Gardens & Gardening > Your Garden > Plant Finder > Plant Details - Thuja 'Green Giant'. http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/b443/thuja-green-giant.aspx	[Is a shade tolerant plant at some stage of its life cycle? Possibly] "Sun: Full sun to part shade… Best in full sun, but generally appreciates some light afternoon shade in hot summer climates such as the St. Louis area."
410	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] "Adaptability to a wide range of soil conditions' resistance to windthrow, absence of any significant pest problems, and no reports of damage by white tail deer (Odocoileus virginianus Zimm.) make 'Green Giant' arborvitae an ideal landscape plant."
411	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Climbing or smothering growth habit? No] "'Green Giant' arborvitae is a narrow, upright, pyramidal evergreen tree with a rapid growth rate, and lustrous dark green foliage."
412	1999. Griffin, J.J./Warren, S.L./Blazich, F.A./Ranney, T.G.. Nitrogen Nutrition of Containerized Thuja x 'Green Giant. Journal of Environmental Horticulture. 17(2): 76–79.	[Forms dense thickets? No] "Valued for its lustrous green summer foliage, rapid growth rate, and ease of propagation by stem cuttings, the tree is an attractive specimen when planted alone, or forms a dense evergreen screen when planted in rows." [No evidence of naturalization or dense thicket formation outside cultivation]
501	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Aquatic? No] "'Green Giant' arborvitae is a narrow, upright, pyramidal evergreen tree with a rapid growth rate, and lustrous dark green foliage." [Terrestrial]
502	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Grass? No] "Thuja L. x 'Green Giant' is a hybrid of Thuja plicata J. Donn ex D. Don (western red cedar) x Thuja standishii (Gord.) Carriere (Japanese arborvitae)" [Cupressaceae]
503	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Nitrogen fixing woody plant? No] "Thuja L. x 'Green Giant' is a hybrid of Thuja plicata J. Donn ex D. Don (western red cedar) x Thuja standishii (Gord.) Carriere (Japanese arborvitae)" [Cupressaceae]
504	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "'Green Giant' arborvitae is a narrow, upright, pyramidal evergreen tree with a rapid growth rate, and lustrous dark green foliage."
601	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Evidence of substantial reproductive failure in native habitat? No] "Thuja L. x 'Green Giant' is a hybrid of Thuja plicata J. Donn ex D. Don (western red cedar) x Thuja standishii (Gord.) Carriere (Japanese arborvitae) (7)."
602	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Produces viable seed? No] "Results herein indicate that regardless of growth stage, stem cuttings of 'Green Giant' arborvitae can be rooted successfully throughout the year at percentages >85%." [Apparently only propagated by cuttings]
602	2009. Epinions. Thuja Green Giant Arborvitae Tree – A Beautiful Fast Growing Dense Privacy Evergreen Tree. http://www.epinions.com/review/Thuja_Green_Giant_Arborvitae_Plants/content_484003122820	[Produces viable seed? No] "Thuja Giants are a hybrid and don't grow from seed. They are started by planting branch cuttings. "

603	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Hybridizes naturally? Unknown] "Thuja L. x 'Green Giant' is a hybrid of Thuja plicata J. Donn ex D. Don (western red cedar) x Thuja standishii (Gord.) Carriere (Japanese arborvitae)" [No evidence that this cultivar hybridizes naturally]
604	1990. Owens, J.N./Colangeli, A.M./Morris, S.J.. The effect of self-, cross-, and no pollination on ovule, embryo, seed, and cone development in western red cedar (Thujaplicata). Canadian Journal of Forest Research. 20(1): 66-75.	[Self-compatible or apomictic? Unknown] "The effects of self-, cross-, and no pollination on cone size, filled seed, pollination efficiency, ovule development, and seed efficiency were tested on rooted ramets of six western red cedar (Thuja plicata Donn) clones. To fully develop, ovules must be pollinated with viable pollen and cones must have a minimum of one developing seed. The seed potential was constant among clones and not affected by pollination. The greatest loss of potential seed resulted from a failure of ovules to be pollinated, followed closely by the low percent viability of pollen. Unpollinated ovules aborted at the megaspore or free-nuclear stages. Pollinated ovules may abort at any stage of development, but it was most common during the long free nuclear stage. Selfing had a limited effect on postzygotic loss owing to embryo abortion or on seed set. Western red cedar is well adapted for a high degree of selfing. Clonal differences occurred in seed efficiency and stages at which seed losses were most common. Seed set in western red cedar may be increased if cones on female parents having a history of high seed efficiency are pollinated several times within a 1 week peak pollination period with abundant pollen of known high percent viability. Potential seed losses are discussed with reference to pollination and ovule development." [Thuja plicata, one of the parents of Thuja "Green Giant", is self-compatible]
605	2009. Williams, C.G.. Conifer reproductive biology. Springer, New York	[Requires specialist pollinators? No] Thuja species are wind-pollinated.
606	2011. WRA Specialist. Personal Communication.	[Reproduction by vegetative fragmentation? Unknown] Propagated vegetatively only
607	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Minimum generative time (years)? 12] "'Green Giant' exhibits rapid height growth, which can reach 1 to 1.5 m (3 to 5 ft) per year, to a mature height of 18 m (60 ft), while maintaining a tightly pyramidal habit." [At a growth rate of 1.5 m per year, will reach maturity in approximately 12 years]
701	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Propagules likely to be dispersed unintentionally? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]
702	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Propagules dispersed intentionally by people? Yes] "Due to several desirable landscape attributes, there is currently great interest in propagation and culture of 'Green Giant' arborvitae."
702	1999. Griffin, J.J./Warren, S.L./Blazich, F.A./Ranney, T.G.. Nitrogen Nutrition of Containerized Thuja x 'Green Giant. Journal of Environmental Horticulture. 17(2): 76–79.	[Propagules dispersed intentionally by people? Yes] "'Green Giant' arborvitae is an exciting plant gaining in popularity throughout the nursery trade (7)."
703	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Propagules likely to disperse as a produce contaminant? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]
704	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Propagules adapted to wind dispersal? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]
704	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Propagules adapted to wind dispersal? Thuja plicata, one of the parent trees used to produce the hybrid, has wind-dispersed seeds] Two to 3 seeds beneath each scale, winged (Vidakovic, 1991).
705	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Propagules water dispersed? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]
706	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Propagules bird dispersed? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]

707	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Propagules dispersed by other animals (externally)? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]
708	2011. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? Unknown] But not known to produce viable seeds
801	1998. Griffin, J.J./Blazich, F.A./Ranney, T.G.. Propagation of Thuja x 'Green Giant' by Stem Cuttings: Effects of Growth Stage, Type of Cutting, and IBA Treatment. Journal of Environmental Horticulture. 16(4): 212-214.	[Prolific seed production (>1000/m2)? No] "Results herein indicate that regardless of growth stage, stem cuttings of 'Green Giant' arborvitae can be rooted successfully throughout the year at percentages >85%." [Apparently only propagated by cuttings]
801	2009. Epinions. Thuja Green Giant Arborvitae Tree – A Beautiful Fast Growing Dense Privacy Evergreen Tree. http://www.epinions.com/review/Thuja_Green_Giant_Arborvitae_Plants/content_484003122820	[Prolific seed production (>1000/m2)? No] "Thuja Giants are a hybrid and don't grow from seed. They are started by planting branch cuttings. "
801	2011. Missouri Botanical Garden. Gardens & Gardening > Your Garden > Plant Finder > Plant Details - Thuja 'Green Giant'. http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/b443/thuja-green-giant.aspx	[Prolific seed production (>1000/m2)? No] "Bloom Time: Non-flowering"
802	1998. Feller, M.C./Klink, K.. SeedfallS, eedG erminationa,n dI nitialS urvivaal ndG rowtho f Seedfall, Seed Germination, and Initial Survival and Growth of Seedlings of Thuja plicata in Southwestern British Columbia. Northwest Science. 72(3): 157-169.	[Evidence that a persistent propagule bank is formed (>1 yr)? Other Thuja seeds persist in seed bank] "Most Thuja seeds are reported to escape bird and animal predation (Minore 1990) and viable seeds, if they do not germinate, may enter the forest soil seed bank. Studies of seed banks in western North American forests containing Thuja have found viable Thuja seeds present (Harmon and Franklin 1995, McGee and Feller 1993, Yearsley 1993). Even if germination is unlikely after a year in the seedbank (Minore 1990), the widespread presence of viable Thuja seeds in soil seedbanks suggests that the low number of Thuja seedlings in Thuja forests can not be attributed to a lack of viable Thuja seeds."
802	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Fruit: Persistent, oblong cones, approximately 1/2 inch length. Cones emerge green and mature to brown." [No seeds produced]
803	2011. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No evidence that Thuja 'Green Giant' is being controlled with herbicides
804	1999. U.S. National Arboretum. Thuja 'Green Giant'. USDA Agricultural Research Service, Washington, DC www.usna.usda.gov/Newintro/grgiant.pdf	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown] "Requires little to no pruning."
804	2011. Missouri Botanical Garden. Gardens & Gardening > Your Garden > Plant Finder > Plant Details - Thuja 'Green Giant'. http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/b443/thuja-green-giant.aspx	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown] "Pruning is not required but may be used to keep plants more compact for use as screens or hedges."
805	2011. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown] Unlikely, given Hawaii's lack of native or invasive Cupressaceae