

| | <i>Brugmansia × candida</i> | Answer | Score |
|------|--|--------|-------|
| 1.01 | Is the species highly domesticated? | n | 0 |
| 1.02 | Has the species become naturalised where grown? | | |
| 1.03 | Does the species have weedy races? | | |
| 2.01 | Species suited to FL climates (USDA hardiness zones; 0-low, 1-intermediate, 2-high) | 2 | |
| 2.02 | Quality of climate match data (0-low; 1-intermediate; 2-high) | 2 | |
| 2.03 | Broad climate suitability (environmental versatility) | y | 1 |
| 2.04 | Native or naturalized in regions with an average of 11-60 inches of annual precipitation | y | 1 |
| 2.05 | Does the species have a history of repeated introductions outside its natural range? | y | |
| 3.01 | Naturalized beyond native range | y | 2 |
| 3.02 | Garden/amenity/disturbance weed | n | 0 |
| 3.03 | Weed of agriculture | n | 0 |
| 3.04 | Environmental weed | n | 0 |
| 3.05 | Congeneric weed | n | 0 |
| 4.01 | Produces spines, thorns or burrs | n | 0 |
| 4.02 | Allelopathic | | |
| 4.03 | Parasitic | n | 0 |
| 4.04 | Unpalatable to grazing animals | | |
| 4.05 | Toxic to animals | y | 1 |
| 4.06 | Host for recognised pests and pathogens | | |
| 4.07 | Causes allergies or is otherwise toxic to humans | y | 1 |
| 4.08 | Creates a fire hazard in natural ecosystems | | |
| 4.09 | Is a shade tolerant plant at some stage of its life cycle | ? | |
| 4.10 | Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols. | n | 0 |
| 4.11 | Climbing or smothering growth habit | n | 0 |
| 4.12 | Forms dense thickets | | |
| 5.01 | Aquatic | n | 0 |
| 5.02 | Grass | n | 0 |
| 5.03 | Nitrogen fixing woody plant | n | 0 |
| 5.04 | Geophyte | n | 0 |
| 6.01 | Evidence of substantial reproductive failure in native habitat | n | 0 |
| 6.02 | Produces viable seed | y | 1 |
| 6.03 | Hybridizes naturally | | |
| 6.04 | Self-compatible or apomictic | n | -1 |
| 6.05 | Requires specialist pollinators | y | -1 |
| 6.06 | Reproduction by vegetative propagation | y | 1 |
| 6.07 | Minimum generative time (years) | 2 | 0 |
| 7.01 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | | |
| 7.02 | Propagules dispersed intentionally by people | y | 1 |
| 7.03 | Propagules likely to disperse as a produce contaminant | n | -1 |
| 7.04 | Propagules adapted to wind dispersal | n | -1 |
| 7.05 | Propagules water dispersed | ? | |
| 7.06 | Propagules bird dispersed | ? | |
| 7.07 | Propagules dispersed by other animals (externally) | n | -1 |
| 7.08 | Propagules dispersed by other animals (internally) | ? | |

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|---|---|-----------------|---|
| 8.01 | Prolific seed production | ? | |
| 8.02 | Evidence that a persistent propagule bank is formed (>1 yr) | | |
| 8.03 | Well controlled by herbicides | | |
| 8.04 | Tolerates, or benefits from, mutilation or cultivation | y | 1 |
| 8.05 | Effective natural enemies present in U.S. | | |
| Total Score | | 5 | |
| Implemented Pacific Second Screening | | yes | |
| Risk Assessment Results | | Evaluate | |

| section | # questions answered | satisfy minimum? |
|---------|----------------------|------------------|
| A | | 11 yes |
| B | | 6 yes |
| C | | 15 yes |
| total | | 32 yes |

| | Reference | Source data |
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| 1.01 | | cultivated, but no evidence of selection for reduced weediness |
| 1.02 | | |
| 1.03 | | |
| 2.01 | 1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif). 2. Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492). 3. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?8004). 4. Preissel, U and Preissel, H (2002) <i>Brugmansia and Datura: Angel's Trumpets and Thorn Apples</i> . Firefly Books, Buffalo, New York. | 1. Global plant hardiness zones (7?)-8-13. 2. Zone: 8 to 10. 3. Western South America: Ecuador; Peru [possibly native]; cultivated & naturalized elsewhere in tropics. 4. "In the wild, <i>B. × candida</i> grows only on the western and eastern slopes of the Ecuadorean Andes...Today, they are found in northern Chile, in Peru, Ecuador, and Colombia, in Mexico and on the Caribbean Islands. <i>B. × candida</i> was one of the first <i>Brugmansia</i> to be taken to Africa and Europe and is now widely cultivated in those places." |
| 2.02 | | |
| 2.03 | 1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?8004). 3. Preissel, U and Preissel, H (2002) <i>Brugmansia and Datura: Angel's Trumpets and Thorn Apples</i> . Firefly Books, Buffalo, New York. | 1. Distribution in the native and cultivated ranges is very widespread, so there are most likely at least 3 climatic groups. 2. Western South America: Ecuador; Peru [possibly native]; cultivated & naturalized elsewhere in tropics. 3. "In the wild, <i>B. × candida</i> grows only on the western and eastern slopes of the Ecuadorean Andes...Today, they are found in northern Chile, in Peru, Ecuador, and Colombia, in Mexico and on the Caribbean Islands. <i>B. × candida</i> was one of the first <i>Brugmansia</i> to be taken to Africa and Europe and is now widely cultivated in those places." |
| 2.04 | 1. World Trade Press (http://www.worldtradepress.com/Precipitation_Map_Ecuador.html). 2. Atlapedia Online (http://www.atlapedia.com/online/countries/peru.htm). 3. Atlapedia Online (http://www.atlapedia.com/online/countries/chile.htm). 4. World Trade Press (http://www.worldtradepress.com/Precipitation_Map_Colombia.html). 5. Microsoft Encarta World Precipitation and Average Rainfall (http://uk.encarta.msn.com/encnet/RefPages/RefMedia.aspx?refid=461530746&artrefid=761554737&pn=3&sec=-1). | 1. For Ecuador: average annual precipitation ranges from 3.9 in/yr to greater than 98.4 in/yr. 2. For Peru: average annual precipitation varies from 2,540 mm (100 inches) to 3,960 mm (156 inches) depending on the region. 3. Rainfall increases from almost nothing in the Atacama Desert in the north to 5,080 mm (200 inches) in the south. 4. Most of Colombia receives between 49.2 and 98.4 inches of rainfall per year, depending upon the region. 5. Ranges from under 10 inches to over 80 inches. |
| 2.05 | Preissel and Preissel (2002) <i>Brugmansia and Datura: Angel's Trumpets and Thorn Apples</i> . Firefly Books. | " <i>B. × candida</i> was one of the first <i>Brugmansia</i> to be taken to Africa and Europe and is now widely cultivated in those places." |
| 3.01 | 1. Villaseñor and Espinosa-Garcia (2004) <i>The alien flowering plants of Mexico. Diversity and Distributions</i> 10: 113-123. 2. McMullen (1999) <i>Flowering Plants of the Galapagos</i> . Cornell University Press, Ithaca. 3. New Zealand Plant Conservation Network (2005) <i>New Zealand Adventive Vascular Plant List</i> . | 1. Present in 13 Mexican states (considered naturalized). 2. Naturalized in the Galapagos. 3. Fully naturalized in New Zealand. |
| 3.02 | | no evidence |
| 3.03 | | no evidence |
| 3.04 | 1. Wagner, Herbst, and Sohmer (1999) <i>Manual of the flowering plants of Hawai'i</i> . University of Hawai'i Press/Bishop Museum Press, Honolulu. 2. McMullen (1999) <i>Flowering Plants of the Galapagos</i> . Comstock Publishing Associates, Ithaca. | 1. "In Hawai'i frequently cultivated and sparingly established". 2. Escaped from cultivation in the Galapagos [no mention of its being a problem]. |

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| 3.05 | | no evidence |
| 4.01 | Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | no description of these traits |
| 4.02 | | |
| 4.03 | Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | no description of parasitism |
| 4.04 | | |
| 4.05 | Bruneton (1999) Toxic Plants: Dangerous to Humans and Animals. Lavoisier Publishing, Paris. | "It is possible for contaminated fodder and grain to induce toxicosis". |
| 4.06 | | |
| 4.07 | Greene and Patterson (1996) Ingestion of angel's trumpet: an increasingly common source of toxicity. Southern Medical Journal 89: 365-369. | "Ingestion of the flowers, seeds, or leaves of this plant...can cause serious illness or death." |
| 4.08 | | |
| 4.09 | 1. Horticopia 4.0 2. Huxley (1992) The New Royal Horticultural Society Dictionary of Gardening. The MacMillan Press, London. 3. Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492). | 1. Exposure: partial shade or partial sun to full sun. 2. Sun or part shade BUT 3. Full sun (only). |
| 4.10 | 1. USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (http://soils.usda.gov/use/worldsoils/mapindex/order.html). 2. Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492). | 1. Histisols do not occur in the native habitat of this species and only potentially occur in some parts of the cultivated range. 2. "Organically rich, medium wet, well-drained soils...During the growing season, plants are heavy feeders that need regular fertilization to stimulate new growth and flowers." |
| 4.11 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | Tree, shrub. |
| 4.12 | | |
| 5.01 | | terrestrial |
| 5.02 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | Solanaceae |
| 5.03 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | Solanaceae |
| 5.04 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | Tree, shrub. |
| 6.01 | | no evidence |
| 6.02 | 1. Horticopia 4.0 2. Huxley (1992) The New Royal Horticultural Society Dictionary of Gardening. The MacMillan Press, London. | 1. "Seedlings may appear throughout the garden from this plant." 2. Propagate from seed. |
| 6.03 | | |
| 6.04 | Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | Self-incompatible. |

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| 6.05 | 1. Grant and Grant (1983) Behavior of hawkmoths on flowers of <i>Datura meteloides</i> . Botanical Gazette 144: 280-284. 2. Mildred E. Mathias Botanical Garden Newsletter, Spring 2001, vol. 4(2). The Plants That Love Hawkmoths (http://www.botgard.ucla.edu/html/MEMBGNewsletter/Volume4number2/Theplantsthatlovehawkmoths.html). | 1. " <i>Datura arborea</i> [synonym] in section <i>Brugmansia</i> appears to be a hawkmoth flower." 2. "Sphingophilous flowers [flowers adapted to pollination by hawkmoths, family Sphingidae] are largely unused by other classes of pollinators." [Large, trumpet-shaped flower morphology suggests specialist pollinators] |
| 6.06 | Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | "Often spreading clonally...it may persist as suckering clumps". |
| 6.07 | Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492) | "In the first year, plants will typically grow to 3' tall with minimal flowering. In the second year, plants will grow taller with more profuse flowering." [unknown when vegetative reproduction begins] |
| 7.01 | | |
| 7.02 | Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | "Widely cultivated as an ornamental". |
| 7.03 | | no evidence |
| 7.04 | Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books. | Fruit a large capsule; fruit/seeds do not appear adapted to wind dispersal. "...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds". |
| 7.05 | Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books. | "...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds" [and no evidence of water dispersal]. |
| 7.06 | Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books. | "...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds". |
| 7.07 | Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books. | "...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds" [no evidence of adaptations to external dispersal]. |
| 7.08 | Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books. | "...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds" |
| 8.01 | Iqbal, Wijesekera, and Hapukotuwa (2001) Fruits in <i>Brugmansia x candida</i> . Ceylon Journal of Science 28: 19-20. | over 50 seeds per pod |
| 8.02 | | |
| 8.03 | | |
| 8.04 | Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books. | "...cutting off the <i>Brugmansia</i> bushes aboveground is not the way to get rid of them, as numerous new bushes grow from the roots. What was intended to be a removal campaign actually results in spreading the stock further." |
| 8.05 | | |