**Taxon:** Datura stramonium L. **Family:** Solanaceae

**Common Name(s):** false castor oil
Jimson weed
kikania
kikania haole
la`au hano
moonflower
thorn apple

**Synonym(s):** Datura stramonium var. tatula (L.)

**Assessor:** Chuck Chimera **Status:** Assessor Approved **End Date:** 10 Feb 2023

**WRA Score:** 20.0 **Designation:** H(HPWRA) **Rating:** High Risk

**Keywords:** Annual Herb, Crop Weed, Toxic, Self-Fertile, Prolific Seeder

| Qsn # | Question | Answer Option | Answer |
|---|---|---|---|
| 101 | Is the species highly domesticated? | y=-3, n=0 | n |
| 102 | Has the species become naturalized where grown? | | |
| 103 | Does the species have weedy races? | | |
| 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 | y |
| 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 | | |
| 303 | Agricultural/forestry/horticultural weed | n=0, y = 2*multiplier (see Appendix 2) | y |
| 304 | Environmental weed | n=0, y = 2*multiplier (see Appendix 2) | n |
| 305 | Congeneric weed | n=0, y = 1*multiplier (see Appendix 2) | y |
| 401 | Produces spines, thorns or burrs | y=1, n=0 | y |
| 402 | Allelopathic | y=1, n=0 | y |
| 403 | Parasitic | y=1, n=0 | n |
| 404 | Unpalatable to grazing animals | y=1, n=-1 | y |
| 405 | Toxic to animals | y=1, n=0 | y |

| Qsn # | Question | Answer Option | Answer |
|---|---|---|---|
| 406 | Host for recognized pests and pathogens | | |
| 407 | Causes allergies or is otherwise toxic to humans | y=1, n=0 | y |
| 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 | 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 | y |
| 603 | Hybridizes naturally | y=1, n=-1 | y |
| 604 | Self-compatible or apomictic | y=1, n=-1 | y |
| 605 | Requires specialist pollinators | y=-1, n=0 | n |
| 606 | Reproduction by vegetative fragmentation | y=1, n=-1 | n |
| 607 | Minimum generative time (years) | 1 year = 1, 2 or 3 years = 0, 4+ years = -1 | 1 |
| 701 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | y=1, n=-1 | y |
| 702 | Propagules dispersed intentionally by people | y=1, n=-1 | n |
| 703 | Propagules likely to disperse as a produce contaminant | y=1, n=-1 | y |
| 704 | Propagules adapted to wind dispersal | y=1, n=-1 | n |
| 705 | Propagules water dispersed | y=1, n=-1 | y |
| 706 | Propagules bird dispersed | y=1, n=-1 | n |
| 707 | Propagules dispersed by other animals (externally) | y=1, n=-1 | y |
| 708 | Propagules survive passage through the gut | y=1, n=-1 | n |
| 801 | Prolific seed production (>1000/m2) | y=1, n=-1 | y |
| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | y=1, n=-1 | y |
| 803 | Well controlled by herbicides | y=-1, n=1 | y |
| 804 | Tolerates, or benefits from, mutilation, cultivation, or fire | y=1, n=-1 | n |
| 805 | Effective natural enemies present locally (e.g. introduced biocontrol agents) | y=-1, n=1 | n |

**Supporting Data:**

| Qsn # | Question | Answer |
|---|---|---|
| 101 | **Is the species highly domesticated?** | **n** |
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Datura stramonium is native to the Americas and has been introduced in many tropical, subtropical and even temperate regions. It is a naturalized weed in many African countries, but is probably seriously under-reported." ... "No attempts have been made to improve Datura stramonium for yield of alkaloids but the genetics of Datura spp. have been extensively studied. Interspecific crosses with Datura ferox yield F1-plants that have the capability to transform hyoscyamine into scopolamine; this characteristic is dominant and monofactorial. " [No evidence] |

| | | |
|---|---|---|
| 102 | **Has the species become naturalized where grown?** | |
| | **Source(s)** | **Notes** |
| | WRA Specialist. (2023). Personal Communication | NA |

| | | |
|---|---|---|
| 103 | **Does the species have weedy races?** | |
| | **Source(s)** | **Notes** |
| | WRA Specialist. (2023). Personal Communication | NA |

| | | |
|---|---|---|
| 201 | **Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"** | **High** |
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | "Native to North America; in Hawai'i naturalized in dry, disturbed sites, 0-690 m, on Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i." |
| | USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 6 Feb 2023] | "Native<br>Northern America<br>NORTHERN MEXICO: Mexico [Chihuahua, Coahuila de Zaragoza, Durango, Nuevo León, San Luis Potosí, Sinaloa, Sonora, Tamaulipas, Zacatecas, Baja California Sur]<br>SOUTHERN MEXICO: Mexico [Aguascalientes, Chiapas, Colima, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Nayarit, Oaxaca, Puebla, Querétaro, Quintana Roo, Tabasco, Tlaxcala, Veracruz de Ignacio de la Llave, Ciudad de México" |
| | Wu, Z. Y. & P. H. Raven, (eds). (1994). Flora of China. Vol. 17 (Verbenaceae through Solanaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. | "Throughout China [native of Mexico, now worldwide]" |

| | | |
|---|---|---|
| 202 | **Quality of climate match data** | **High** |

| Qsn # | Question | Answer |
|---|---|---|
| | **Source(s)** | **Notes** |
| | USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 6 Feb 2023] | |

| 203 | Broad climate suitability (environmental versatility) | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "As seen in Figure 33-1, the weed is very widely distributed in the temperate and tropical areas. It may be seen at sea level but it also grows to 2750 m in the Himalayas from Kashmir to Sikkim." |
| | Wu, Z. Y. & P. H. Raven, (eds). (1994). Flora of China. Vol. 17 (Verbenaceae through Solanaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. | "Near houses, roadsides, grasslands; 600-1600 m. Throughout China [native of Mexico, now worldwide]" |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | [Broad climate suitability elsewhere. In the Hawaiian Islands, most common in lower elevation disturbed, dry habitats] "in Hawai'i naturalized in dry, disturbed sites, 0-690 m, on Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i." |

| 204 | Native or naturalized in regions with tropical or subtropical climates | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "A weed of many crops, pastures, and other non-cropland areas in temperate to tropical zones." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is in more than 40 crops and is now a weed in almost l 00 countries, making it more widespread than Cyperus rotundus, the world's worst weed. It is often called jimson weed." |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | "Native to North America; in Hawai'i naturalized in dry, disturbed sites, 0-690 m, on Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i. Naturalized prior to 1871 (Hillebrand, 1888) ." |

| Qsn # | Question | Answer |
|---|---|---|
| **205** | **Does the species have a history of repeated introductions outside its natural range?** | **y** |
| | **Source(s)** | **Notes** |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "A weed of many crops, pastures, and other non-cropland areas in temperate to tropical zones." |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Datura stramonium is native to the Americas and has been introduced in many tropical, subtropical and even temperate regions. It is a naturalized weed in many African countries, but is probably seriously under-reported." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is in more than 40 crops and is now a weed in almost l 00 countries, making it more widespread than Cyperus rotundus, the world's worst weed. It is often called jimson weed." |

| 301 | Naturalized beyond native range | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is in more than 40 crops and is now a weed in almost l 00 countries, making it more widespread than Cyperus rotundus, the world's worst weed. It is often called jimson weed." |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | "Native to North America; in Hawai'i naturalized in dry, disturbed sites, 0-690 m, on Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i. Naturalized prior to 1871 (Hillebrand, 1888)." |
| | USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 10 Feb 2023] | "Naturalized (widely natzd. elsewhere)" |

| 302 | Garden/amenity/disturbance weed | |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | "in Hawai'i naturalized in dry, disturbed sites" |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | [A weed of disturbed sites that primarily impacts agriculture] "This weed requires disturbed sites for establishment and thus is found on cultivated land, in animal camps, barnyards, on roadsides, and in areas Jaid waste by man's activities." |

| 303 | Agricultural/forestry/horticultural weed | y |
|---|---|---|
| | **Source(s)** | **Notes** |

| Qsn # | Question | Answer |
|---|---|---|
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "A weed of many crops, pastures, and other non-cropland areas in temperate to tropical zones. Long thought to be native to Asia but Wagner et al. (70) suggests a North American origin. Occurs in dry disturbed sites on all inhabited islands except Niihau. Naturalized in Hawai'i prior to 1871 (17, 70)." |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Although the plant is primarily a weed of various crops, it spreads in disturbed natural sites. The plant is toxic to humans and animals. The species is variable in its native South American range, and a number of varieties have been described." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "D. stramonium is a serious weed of beans in Tanzania; cereals in Kenya; cotton in Peru; lucerne in Chile; maize in Guatemala, Kenya, Peru, South Africa, Tanzania, and Uganda; potatoes in Afghanistan; sugarcane in Peru; soybeans in the United States; and wheat in Guatemala. Also it is a principal weed of edible beans in Kenya; cassava in Madagascar; cotton in Mozambique and the United States; several dryland crops in Australia; forage crops in Kenya; horticultural crops in the former Soviet Union; irrigated crops in Australia; lucerne in Kenya; maize in Madagascar; pastures in Brazil and Zimbabwe; peas in Ethiopia; sorghum in South Africa; soybeans in Brazil and Australia; sugar beets in France; and vegetables in Bulgaria, Indonesia, and the former Soviet Union." |
| | Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). (1983) Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI | "Habitat: Found at lower elevations, often in dry regions. A weed in cultivated areas, pastures, and rangelands." ... "Note: Dangerously poisonous to man and beast." |

| 304 | Environmental weed | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "A weed of many crops, pastures, and other non-cropland areas in temperate to tropical zones." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is in more than 40 crops and is now a weed in almost l 00 countries, making it more widespread than Cyperus rotundus, the world's worst weed. It is often called jimson weed." |
| | Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall | "Weed of: Cereals, Cotton, Orchards and Plantations, Pastures, Sunflowers" |

| 305 | Congeneric weed | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | CABI. (2023). CABI Compendium Invasive Species. https://www.cabidigitallibrary.org/product/qi. [Accessed 10 Feb 2023] | "D. ferox is an annual plant that has become a significant weed of summer crops in many subtropical and warm temperate parts of the world. The plant can achieve high densities and is difficult to control. It is toxic to animals and humans, with all plant parts and seeds containing toxic alkaloids. Cases of livestock poisoning do occur, especially if animal feed is contaminated with D. ferox seeds." |

| 401 | Produces spines, thorns or burrs | y |
|---|---|---|

| Qsn # | Question | Answer |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wu, Z. Y. & P. H. Raven, (eds). (1994). Flora of China. Vol. 17 (Verbenaceae through Solanaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. | "Capsules erect, globose or ovoid, 3-4.5 × 2-4 cm, with copious prickles, rarely smooth, dehiscent by 4 equal valves, subtended by remnants of persistent calyx." |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Spiny capsules present] "Capsules erect, narrowly ovoid to ovoid, 2.5-4 cm long, 2-3 cm wide, opening by 4 valves when ripe, the valves 6-10 mm long, covered with numerous conical spines of various lengths, the persistent' calyx base 4-10 mm long, reflexed, margins irregular." |

| 402 | Allelopathic | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is a moderate to vigorous competitor for space and nutrients and in addition has allelopathic properties." |
| | Lovett, J. V., Levitt, J. U. D. Y., Duffield, A. M., & Smith, N. G. (1981). Allelopathic potential of Datura stramonium L. (Thorn-apple). Weed Research, 21(3-4), 165-170 | "The effects of different concentrations of aqueous leachate of Datura stramonium seeds and leaves on germination and radicle elongation of Linum usitatissimum were examined. Germination and radicle elongation of L. usitatissimum were depressed at high leachate concentrations. Radicle elongation usually appeared more sensitive to the effects of the leachate than did germination. Preliminary investigations showed that D. stramonium leaf leachate had similar effects to those of seed leachate. Chemical analysis of the leachates by spot-tests and by high-voltage electrophoresis indicated the presence of tropane alkaloids, in particular scopolamine. The presence of both scopolamine and hyoscyamine was confirmed by gas chromatography/mass spectrometry. It was shown that varying concentrations of pure scopolamine and scopolamine plus hyoscyamine solutions had effects similar to those of seed and leaf leachates on germination and radicle elongation of L. usitatissimum." |

| 403 | Parasitic | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | "Stout, malodorous, erect annual herbs; stems branched above, glabrous or sparsely pubescent with simple hairs." [Solanaceae. No evidence] |

| 404 | Unpalatable to grazing animals | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "Normally unpalatable to livestock, but poisonings have occurred during feed shortages." |
| | Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia | "The plant's bitter taste and disagreeable odour generally deter grazing animals, but problems may occur if plants, particularly when seeding, are included in hay." |

| Qsn # | Question | Answer |
|---|---|---|
| | Burrows, G. E., & Tyrl, R. J. (2013). Toxic Plants of North America. Second Edition. Wiley-Blackwell, Hoboken, NJ | "The poor value of D. stramonium as feed for livestock is reflected in the reference to the "lowly jimsonweed" in Gene Autry 's theme song, "Back in the Saddle Again." Disease in livestock from consumption of fresh plants seems rather limited in importance because it is generally unpalatable, and development of early signs diminishes the animals' appetite. Plants should be considered most toxic when mature, and they remain so after drying. This is important because, although fresh plants are quite unpalatable, dried material in hay may be eaten inadvertently. This is particularly true for ruminants." |

| 405 | Toxic to animals | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Burrows, G. E., & Tyrl, R. J. (2013). Toxic Plants of North America. Second Edition. Wiley-Blackwell, Hoboken, NJ | "Plants should be considered most toxic when mature, and they remain so after drying. This is important because, although fresh plants are quite unpalatable, dried material in hay may be eaten inadvertently. This is particularly true for ruminants. Up to 1% b.w./day of leaves or fruits fed to sheep or goats produced clinical signs after 2 or more days, but it was not lethal unless fed for several weeks or longer (El Dirdiri et al. 1981). Such a situation of prolonged daily ingestion is unlikely because of the plant 's effects on appetite. This is illustrated by an episode in which linseed meal contaminated with seeds of D. stramonium caused only decreased appetite and weight loss (Janssens and Wilde 1989). However, the species is capable of causing serious problems in some circumstances, as is indicated by the death of calves and a dog (Case 1956; Tostes 2002). When dried whole plants were administered to sows at 0.12% b.w./day, severe signs developed within a few days, and 1 sow died after 4 days (Keeler 1981). In rare instances, mass intoxications may occur; for example, in Czechoslovakia, of 510 cows at risk from eating D. stramonium, 44 died and 22 more had to be destroyed (Ofukany et al. 1983). Intoxications also occur in wildlife, as is documented by a case in which D. inoxia, introduced into South Africa, was suspected to be the cause of disease in springbok (Lindeque and Scheepers 1992). Congenital arthrogryposis in pigs has been reported to be caused by D. stramonium (Leipold et al. 1973). However, this has not been confirmed experimentally, even when plant material has been given for prolonged periods ranging from 28 to 90 days of gestation at a dosage sufficient to produce prominent signs of intoxication in the dams and death in 1 sow (Keeler 1981)." |
| | Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia | "Poisoning of horses was not uncommon in the early days of settlement but, on the other hand, cattle eat large amounts of thornapple in times of drought without apparent ill effect." |

| Qsn # | Question | Answer |
|---|---|---|
| **406** | **Host for recognized pests and pathogens** | |
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Many pests and diseases affecting solanaceous crops also affect Datura stramonium." |

| 407 | Causes allergies or is otherwise toxic to humans | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Booy, O., Wade, M. & Roy, H. (2015). Field Guide to Invasive Plants and Animals in Britain. Bloomsbury Publishing, London / New York | "All parts of the plant are very poisonous. Can cause dermatitis on contact with skin." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "An overdose of tea or any preparation of the Datura plant, or its alkaloids, or of several plant parts that may contaminate forage and feed grains, may poison humans and animals. Four or five grams of crude leaf or seed may contain enough atropine to kill a child. Symptoms in humans and farm animals have much in common and will vary with the relative amounts of the different alkaloids ingested. Symptoms may appear in minutes or hours, followed by thirst, flushed skin, blurred vision, fever, weak but rapid heartbeat, and then perhaps convulsions and coma. Humans become irritable, may be delirious and incoherent, and given to foolish picking and waving of arms. For overviews of world-wide poisoning incidents by Datura, see Everist (1974) and Watt and Breyer-Brandwijk (1962). For evidence of poisoning of specific livestock, see Chesney (1956), Haraszti et al. (1956), Whittet ( 1968), Evers and Link (1972), Leipold et al. (1973)." |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "Normally unpalatable to livestock, but poisonings have occurred during feed shortages. Humans have been poisoned upon consumption of the leaves as greens, or when seed-contaminated grain was subsequently ground into flour and consumed, or when consumed by children at play, or in deliberate attempts at suicide. Jimsonweed was also used to deliberately induce delirium in sacramental rituals. Contains several alkaloids common to the Solanaceae. Symptoms range from delirium to death(42)." |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "The plant is toxic to humans and animals." |
| | Nelson, L., Shih, R.D. & Balick, M.J. (2007). Handbook of Poisonous and Injurious Plants, The New York Botanical Garden. Springer, New York, NY | "Toxic Part: The whole plant is toxic, including the nectar; however, seeds are most often implicated in poisoning. Both the seeds and dried leaves are used to deliberately induce intoxications when a hallucinogenic action is sought. The dried leaves of Datura stramonium are used by herbalists in the treatment of a number of conditions, including asthma and spastic cough, even though the plant is known to be toxic." |

| 408 | Creates a fire hazard in natural ecosystems | n |
|---|---|---|
| | **Source(s)** | **Notes** |

| Qsn # | Question | Answer |
|---|---|---|
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "A weed of many crops, pastures, and other non-cropland areas in temperate to tropical zones." [No evidence] |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | [No evidence] "Although the plant is primarily a weed of various crops, it spreads in disturbed natural sites. The plant is toxic to humans and animals. The species is variable in its native South American range, and a number of varieties have been described." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | [No evidence] "This weed requires disturbed sites for establishment and thus is found on cultivated land, in animal camps, barnyards, on roadsides, and in areas Jaid waste by man's activities. It prefers rich soil and plentiful rainfall but can survive in sandy pastures and many such difficult places." |

| 409 | Is a shade tolerant plant at some stage of its life cycle | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Datura stramonium occurs in open locations such as grassland, roadsides, waste places, scrub vegetation and open forest." |
| | Plants for a Future. (2023). Datura stramonium. https://pfaf.org. [Accessed 10 Feb 2023] | "It cannot grow in the shade." |

| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It prefers rich soil and plentiful rainfall but can survive in sandy pastures and many such difficult places." |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "It tolerates various soil types but prefers clayey or loamy soils." |

| 411 | Climbing or smothering growth habit | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | "Stout, malodorous, erect annual herbs; stems branched above, glabrous or sparsely pubescent with simple hairs. Leaves simple, rhomboid to angularly ovate, in juvenile phase large and coarse, later leaves often 8-16 cm long, 4-10 cm wide, margins coarsely doubly lobed, apex acute to acuminate, base oblique, rarely equal, petioles 3-11 cm long." |

| 412 | Forms dense thickets | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Datura stramonium occurs in open locations such as grassland, roadsides, waste places, scrub vegetation and open forest." |

| Qsn # | Question | Answer |
|---|---|---|
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | "in Hawai'i naturalized in dry, disturbed sites" |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Sandy places, grassland, crop fields, pastures, disturbed sites." [No evidence] |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | [No evidence] "This weed requires disturbed sites for establishment and thus is found on cultivated land, in animal camps, barnyards, on roadsides, and in areas Jaid waste by man's activities." |

| 501 | Aquatic | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wu, Z. Y. & P. H. Raven, (eds). (1994). Flora of China. Vol. 17 (Verbenaceae through Solanaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis. | "Near houses, roadsides, grasslands; 600-1600 m." |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Terrestrial] "in Hawai'i naturalized in dry, disturbed sites, 0-690 m," |

| 502 | Grass | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 6 Feb 2023] | Family: Solanaceae<br>Subfamily: Solanoideae<br>Tribe: Datureae |

| 503 | Nitrogen fixing woody plant | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 6 Feb 2023] | Family: Solanaceae<br>Subfamily: Solanoideae<br>Tribe: Datureae |

| 504 | Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers) | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Annual or short-lived perennial erect herb up to 2 m tall, often much-branched; stem sparsely hairy to glabrous." [No evidence. Short-lived] |

| 601 | Evidence of substantial reproductive failure in native habitat | n |
|---|---|---|

| Qsn # | Question | Answer |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Datura stramonium has a wide geographical distribution, prefers anthropogenic habitats and is therefore not liable to genetic erosion." |

| 602 | Produces viable seed | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Datura stramonium is generally cultivated from seed sown either directly in the field or in a nursery bed. Soaking seed overnight improves germination. Per ha, 7–8 kg of seed is needed. Seed starts germinating after about 2 weeks, and germination is complete after one month. If the seed is sown in a nursery, seedlings are transplanted when 8–12 cm tall. Normal spacing is 70–100 cm, but in India a spacing of 3 m is common practice. " |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "The dispersal of Datura is almost wholly by seed. In heavily trampled pastures and cultivated fields, lower portions of older plants may regenerate when bruised or broken. It is, however, a very heavy seed producer, with isolated, well-nourished plants capable of producing up to 25,000 seeds. A capsule may contain several hundred seeds. Van der Pijl (1969) suggested that the spines of the fruit have no direct relation to dispersal of the weed but at most they are a deterrent to being eaten prematurely by animals." |

| 603 | Hybridizes naturally | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | DiTomaso, J. & Healy, E. A. (2007). Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA | "Chinese thornapple can hybridize with jimsonweed." |

| 604 | Self-compatible or apomictic | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | "Self-compatible." |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "The flowers are closed during the day and open in the evening, and are reported to be pollinated by hawk moths and to be largely self-fertile." |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "The plant is able to produce seeds by self-fertilization if pollination does not occur (van Kleunen et al., 2007)." |

| 605 | Requires specialist pollinators | n |
|---|---|---|
| | **Source(s)** | **Notes** |

| Qsn # | Question | Answer |
|---|---|---|
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "The flowers are closed during the day and open in the evening, and are reported to be pollinated by hawk moths and to be largely self-fertile." |
| | van Kleunen, M. V., Fischer, M., & Johnson, S. D. (2007). Reproductive assurance through self-fertilization does not vary with population size in the alien invasive plant Datura stramonium. Oikos, 116(8), 1400-1412 | "The large, scented, nocturnal flowers of D. stramonium with copious amounts of nectar suggest that hawkmoths are likely to be its primary pollinators. Although we have observed hawkmoths visiting the flowers, observations and the high levels of pollen removal from anthers of D. stramonium, which exceed levels of natural pollen shedding (Material and methods), indicate that plants of D. stramonium in its invasive range in South Africa are visited mainly by pollen-collecting honeybees. Similarly, Motten and Antonovics (1992) reported that flowers of D. stramonium in its invasive range in North America were visited during the evening by hawkmoths but during the late afternoons by honeybees that removed all pollen. Even though most• flowers are visited by potential pollinators, the low fruit set of emasculated flowers and the low actual outcrossing rates in our study, as well as in the study by Motten and Antonovics (1992), indicate that visitation by honeybees and hawkmoths does not result in effective cross pollination of D. stramonium. Our results show that the majority of offspring (>98%) of D. stramonium in its invasive range in South Africa originate from self-fertilization. High selfing rates have also been found in the invasive range of D. stramonium in North America (Motten and Antonovics 1992, Motten and Stone 2000, Stone 2000). This could indicate that its flower visitors mainly assist in self-pollination in both South Africa and North America." |

| 606 | Reproduction by vegetative fragmentation | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Datura stramonium is a large annual plant reproducing by seeds only. A single plant can release 30,000 seeds per year and seeds can remain viable in the soil for up to 40 years." |

| 607 | Minimum generative time (years) | 1 |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Schmelzer, G.H. & Gurib-Fakim, A. (Eds.). (2008). Plant Resources of Tropical Africa 11(1). Medicinal Plants 1. PROTA Foundation, Wageningen, Netherlands | "Annual or short-lived perennial erect herb up to 2 m tall, often much-branched; stem sparsely hairy to glabrous." |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "D. stramonium germinates in the field in early summer and flowers from summer through autumn. In the north temperate zone, for example, it flowers May through September and produces ripe fruit from August until frost in November. It is a moderate to vigorous competitor for space and nutrients and in addition has allelopathic properties." |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | "Stout, malodorous, erect annual herbs; stems branched above, glabrous or sparsely pubescent with simple hairs." |

| Qsn # | Question | Answer |
|---|---|---|
| **701** | **Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)** | **y** |
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is spread in agricultural seedstocks, in field grains, in the packed soil on the wheels and frames of farm machinery, and in the mud that clings to the fur and feathers of animals." |

| | | |
|---|---|---|
| **702** | **Propagules dispersed intentionally by people** | **n** |
| | **Source(s)** | **Notes** |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Seeds and capsules float on the water, and seeds are also dispersed by machinery and soil movement (Parsons and Cuthbertson, 2001)." |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | [Widely naturalized in the Hawaiian Islands. Unlikely to be intentionally spread but may be possible for medicinal or other uses] "Native to North America; in Hawai'i naturalized in dry, disturbed sites, 0-690 m, on Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i. Naturalized prior to 1871 (Hillebrand, I 888) ." |

| | | |
|---|---|---|
| **703** | **Propagules likely to disperse as a produce contaminant** | **y** |
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is spread in agricultural seedstocks, in field grains, in the packed soil on the wheels and frames of farm machinery, and in the mud that clings to the fur and feathers of animals." |
| | Booy, O., Wade, M. & Roy, H. (2015). Field Guide to Invasive Plants and Animals in Britain. Bloomsbury Publishing, London / New York | "Spread as garden escape, via bird seed and as contaminant of bags of South American fertiliser. Can reappear after long periods from dormant seeds." |

| | | |
|---|---|---|
| **704** | **Propagules adapted to wind dispersal** | **n** |
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | "Capsules erect, narrowly ovoid to ovoid, 2.5-4 cm long, 2-3 cm wide, opening by 4 valves when ripe, the valves 6-10 mm long, covered with numerous conical spines of various lengths, the persistent' calyx base 4-10 mm long, reflexed, margins irregular. Seeds numerous, black or dark brownish gray, angularly D-shaped, 3-4 mm long, coarsely pitted, embryo curved, endosperm present." [No adaptations for wind dispersal] |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is spread in agricultural seedstocks, in field grains, in the packed soil on the wheels and frames of farm machinery, and in the mud that clings to the fur and feathers of animals." |

| | | |
|---|---|---|
| **705** | **Propagules water dispersed** | **y** |
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "Capsules and seeds can float for 10 hours. As seen in Figure 33-1, the weed is very widely distributed in the temperate and tropical areas." |

| Qsn # | Question | Answer |
|---|---|---|
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Datura stramonium is a large annual plant reproducing by seeds only. A single plant can release 30,000 seeds per year and seeds can remain viable in the soil for up to 40 years. Seeds and capsules float on the water, and seeds are also dispersed by machinery and soil movement (Parsons and Cuthbertson, 2001)." |

| 706 | Propagules bird dispersed | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Seeds and capsules float on the water, and seeds are also dispersed by machinery and soil movement (Parsons and Cuthbertson, 2001)." |

| 707 | Propagules dispersed by other animals (externally) | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | "It is spread in agricultural seedstocks, in field grains, in the packed soil on the wheels and frames of farm machinery, and in the mud that clings to the fur and feathers of animals." |

| 708 | Propagules survive passage through the gut | n |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY | [Spiny capsules likely deter seed ingestion] "The dispersal of Datura is almost wholly by seed. In heavily trampled pastures and cultivated fields, lower portions of older plants may regenerate when bruised or broken. It is, however, a very heavy seed producer, with isolated, well-nourished plants capable of producing up to 25,000 seeds. A capsule may contain several hundred seeds. Van der Pijl (1969) suggested that the spines of the fruit have no direct relation to dispersal of the weed but at most they are a deterrent to being eaten prematurely by animals" |

| 801 | Prolific seed production (>1000/m2) | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Datura stramonium is a large annual plant reproducing by seeds only. A single plant can release 30,000 seeds per year and seeds can remain viable in the soil for up to 40 years." |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "Each plant capable of producing 25,000 long-lived seeds." |

| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | y |
|---|---|---|
| | **Source(s)** | **Notes** |

| Qsn # | Question | Answer |
|---|---|---|
| | Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Datura stramonium is a large annual plant reproducing by seeds only. A single plant can release 30,000 seeds per year and seeds can remain viable in the soil for up to 40 years." |
| | Dowsett, C. A., & James, T. K. (2012). Seed longevity of some cropping weeds in several New Zealand soils. Agronomy New Zealand, 42, 163-170 | "Large seeded grass species showed shorter seed bank persistence than the smaller seeded grass species when buried at 50 mm. All seed persisted for longer when buried at the greater depth of 200 mm. After 3 years burial, the viability of apple of Peru and thorn apple seed was largely unchanged. When buried at 50 mm, in most cases, seed buried in light soil persisted longer than those buried in heavy soil." |
| | Burnside, O. C., Wilson, R. G., Weisberg, S., & Kenneth G. Hubbard. (1996). Seed Longevity of 41 Weed Species Buried 17 Years in Eastern and Western Nebraska. Weed Science, 44(1), 74–86 | "Table 5. Seed germination of 41 weed species during burial 20 cm deep in untilled Tripp very fine sandy loam at Mitchell, Nebraska from 1976 to 1992." [90% of Jimsonweed seeds germinated after 17 years] |

| 803 | Well controlled by herbicides | y |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia | "Thornapples are susceptible to 2,4-D in the seedling and young growth stages but become resistant as they mature. Other herbicides, effective where non-selective control is acceptable, are atrazine., diquat, paraquat and glyphosate; all are much more effective on seedlings than on more advanced growth. Various chemicals are available for use in specific crops, for example, acifluorfen in soybeans and peanut s; bentazone in soybeans, several other beans and peanuts; 2,4-0B in certain varieties of peanuts; dicamba in grain sorghum and maize; dinoseb in peanuts; metolachlor in maize; and picloram + 2,4-D in summer cereals. Control in solanaceous crops is difficult because few selective herbicides are available." |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "Young plants susceptible to hormonetype herbicides and glyphosate and to soil-applied tebuthiuron(33). Also sensitive to metsulfuron(36). Isolated plants can be manually removed before fruiting. Larger infestation in arable lands can be cultivated prior to seed set(61)." |

| Qsn # | Question | Answer |
|---|---|---|
| **804** | **Tolerates, or benefits from, mutilation, cultivation, or fire** | **n** |
| | **Source(s)** | **Notes** |
| | Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia | "Isolated plants are best hand pulled or hoed before fruit are formed. Larger areas should be cultivated, preferably in the seedling stage. Once plants approach maturity, cultivation becomes more difficult and the roots may not be completely severed or disturbed, in which case the plants remain alive. Repeated cultivations are necessary because seedlings emerge over a long period. The problem with thornapple is perpetuated by crop harvesting practices which return trash, including weed seeds, to the field." |
| | Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI | "Management: Young plants susceptible to hormone-type herbicides and glyphosate and to soil-applied tebuthiuron(33). Also sensitive to metsulfuron(36). Isolated plants can be manually removed before fruiting. Larger infestation in arable lands can be cultivated prior to seed set(61)." |

| 805 | **Effective natural enemies present locally (e.g. introduced biocontrol agents)** | **n** |
|---|---|---|
| | **Source(s)** | **Notes** |
| | Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI. | "Native to North America; in Hawai'i naturalized in dry, disturbed sites, 0-690 m, on Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i. Naturalized prior to 1871 (Hillebrand, 1888)." [Widespread. No evidence of limiting factors] |

**Summary of Risk Traits:**

In the Hawaiian Islands, primarily a weed of dry, disturbed sites, cultivated areas, pastures, and rangelands, and not reported to be a significant weed of natural areas.

High Risk / Undesirable Traits
• Broad climate suitability
• Thrives and spreads in regions with tropical climates.
• Naturalized on Kauai, Oahu, Molokai, Maui, and Hawai'i (Hawaiian Islands) and widely naturalized elsewhere.
• A disturbance and agricultural weed of many crops worldwide
• Other Datura species are invasive weeds.
• Allelopathic properties
• Unpalatable to browsing and grazing animals
• Toxic to animals (if accidentally ingested) and people.
• Tolerates many soil types.
• Reproduces by seeds only.
• Hybridizes with other Datura species.
• Self-fertile
• Annual life cycle, reaching maturity in one growing season.
• Seeds dispersed by water, as a crop contaminant, and in soil stuck to machinery and animals.
• Prolific seed production (30,000/year)
• Seeds may form a persistent seed bank (up to 40 years)

Low Risk Traits
• Unarmed (no spines, thorns, or burrs)
• Grows best in high light environments (dense shade may inhibit spread)
• Herbicides may provide effective control.
• Mechanical control may also be effective.