

| | |
|---|-------------------------------|
| Taxon: <i>Phytolacca octandra</i> L. | Family: Phytolaccaceae |
| Common Name(s): | Synonym(s): |

| | | |
|--------------------------------|----------------------------------|-----------------------------|
| Assessor: Chuck Chimera | Status: Assessor Approved | End Date: 9 Mar 2016 |
| WRA Score: 19.0 | Designation: H(HPWRA) | Rating: High Risk |

Keywords: Tropical Herb, Disturbance Weed, Toxic, Bird-Dispersed, Resprouting

| 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 | n=0, y = 1*multiplier (see Appendix 2) | y |
| 303 | Agricultural/forestry/horticultural weed | n=0, y = 2*multiplier (see Appendix 2) | y |
| 304 | Environmental weed | | |
| 305 | Congeneric weed | n=0, y = 1*multiplier (see Appendix 2) | y |
| 401 | Produces spines, thorns or burrs | y=1, n=0 | n |
| 402 | Allelopathic | | |
| 403 | Parasitic | y=1, n=0 | n |
| 404 | Unpalatable to grazing animals | y=1, n=-1 | n |
| 405 | Toxic to animals | y=1, n=0 | y |
| 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 | | |
| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | | |

| Qsn # | Question | Answer Option | Answer |
|-------|--|---|--------|
| 411 | Climbing or smothering growth habit | y=1, n=0 | n |
| 412 | Forms dense thickets | y=1, n=0 | y |
| 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 | | |
| 604 | Self-compatible or apomictic | | |
| 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 | | |
| 703 | Propagules likely to disperse as a produce contaminant | | |
| 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 | y |
| 707 | Propagules dispersed by other animals (externally) | | |
| 708 | Propagules survive passage through the gut | y=1, n=-1 | y |
| 801 | Prolific seed production (>1000/m ²) | | |
| 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 | y |
| 805 | Effective natural enemies present locally (e.g. introduced biocontrol agents) | | |

Supporting Data:

| Qsn # | Question | Answer |
|-------|--|--|
| 101 | Is the species highly domesticated? | 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. | [No evidence of domestication] "Native to the Neotropics; in Hawai'i naturalized in dry pastures and mesic to wet forest, 10-1,280 m, on Kauai, Oahu, Molokai, Lana'i, and Maui" |

| | | |
|-----|---|-------|
| 102 | Has the species become naturalized where grown? | |
| | Source(s) | Notes |
| | WRA Specialist. 2016. Personal Communication | NA |

| | | |
|-----|--|-------|
| 103 | Does the species have weedy races? | |
| | Source(s) | Notes |
| | WRA Specialist. 2016. 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 |
| | USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 9 Mar 2016] | "Native: Northern America Northern Mexico: Mexico - Durango, - Sinaloa, - Sonora Southern Mexico: Mexico - Campeche, - Chiapas, - Guanajuato, - Guerrero, - Jalisco, - Mexico, - Nayarit, - Oaxaca, - Puebla, - Quintana Roo, - Veracruz, - Yucatan Southern America Caribbean: Bahamas; Cuba; Dominican Republic; Haiti; Jamaica; Trinidad and Tobago - Trinidad Mesoamerica: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: Venezuela Western South America: Bolivia; Colombia; Ecuador; Peru" |

| | | |
|-----|--|-------|
| 202 | Quality of climate match data | High |
| | Source(s) | Notes |
| | USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 9 Mar 2016] | |

| | | |
|-----|---|---|
| 203 | Broad climate suitability (environmental versatility) | y |
|-----|---|---|

| Qsn # | Question | Answer |
|-------|--|--|
| | Source(s) | Notes |
| | Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford | "Disturbed areas; 200-1000 m; Ariz, Wis.; Mexico; West Indies; Central America; South America; Asia; Africa; Pacific Islands." |
| | 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 pastures and mesic to wet forest, 10-1,280 m," [In Hawaii, elevation exceeds 1000 m, demonstrating environmental versatility] |

| | | |
|------------|--|---|
| 204 | Native or naturalized in regions with tropical or subtropical climates | y |
| | Source(s) | Notes |
| | Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford | "Ariz, Wis.; Mexico; West Indies; Central America; South America; Asia; Africa; Pacific Islands." |
| | 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 pastures and mesic to wet forest, 10-1,280 m," |

| | | |
|------------|---|---|
| 205 | Does the species have a history of repeated introductions outside its natural range? | y |
| | Source(s) | Notes |
| | Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford | "Phytolacca octandra is a species with nearly worldwide distribution. It is closely similar to, and perhaps not specifically distinct from, P. icosandra (J. I. Davis 1985)." |

| | | |
|------------|---|--|
| 301 | Naturalized beyond native range | 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. | "Native to the Neotropics; in Hawai'i naturalized in dry pastures and mesic to wet forest, 10-1,280 m, on Kaua'i, O'ahu, Moloka'i, Ulna'i, and Maui First collected on Moloka'i in 1910 (Faurie 1, BISH)." |
| | Queensland Government. 2011. Weeds of Australia - Inkweed - Phytolacca octandra. The University of Queensland. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Phytolacca_octandra.htm . [Accessed 9 Mar 2016] | "Widely naturalised in southern and eastern Australia (i.e. in eastern Queensland, in many parts of New South Wales and Victoria, in south-eastern South Australia and in the coastal districts of south-western Western Australia). Also naturalised on Norfolk Island and possibly naturalised in the Northern Territory. Naturalised overseas, including in New Zealand and on some Pacific islands (e.g. New Caledonia and Hawaii)." |

| | | |
|------------|--|--|
| 302 | Garden/amenity/disturbance weed | y |
| | Source(s) | Notes |
| | Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. 1988. Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand | "...commonest in more open habitats such as waste places, river beds, old pastures, neglected or abandoned fields and gardens. " |
| | Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI | "Habitat: A weed in cultivated areas and waste places." |

| Qsn # | Question | Answer |
|-------|---|---|
| | Esler, A. E. (1988). The naturalisation of plants in urban Auckland, New Zealand 4. The nature of the naturalised species. <i>New Zealand Journal of Botany</i> , 26(3), 345-385 | "Some woody plants such as <i>Ricinus communis</i> and <i>Phytolacca octandra</i> are predominantly plants of waste places." |
| | Queensland Government. 2011. Weeds of Australia - Inkweed - <i>Phytolacca octandra</i> . The University of Queensland. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Phytolacca_octandra.htm . [Accessed 9 Mar 2016] | [A disturbance weed with potential environmental impacts] "A weed of disturbed sites, waste areas, roadsides, crops, gardens, pastures, forest margins, open woodlands and creek banks in tropical, sub-tropical and warmer temperate regions." ... "Inkweed (<i>Phytolacca octandra</i>) is regarded as an environmental weed Queensland, New South Wales, Victoria and Western Australia. It was also recently listed as a priority environmental weed in at least one Natural Resource Management region." |

| 303 | Agricultural/forestry/horticultural weed | y |
|-----|---|---|
| | Source(s) | Notes |
| | Michael, P. (ed.). 2012. <i>The Master Weed Wackers Manual</i> . A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | "A weed of ruderal areas, degraded land, unmanaged stockyard areas, degraded natural areas." |
| | Loffler, L. & Loffler, P. 2005. <i>Swaziland Tree Atlas</i> —including selected shrubs and climbers. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria, S.A. | "General: A problem weed in most industrial timber plantations. The seeds are efficiently dispersed by birds." |
| | Dumbrell, I., McGrath, J., Fremlin, R., Jacob, H. S., Dodd, J., & Moore, J. H. (2002). Impacts of broadscale weed control and fertilisation at establishment on survival and growth of second rotation pines. In 13th Australian Weeds Conference: weeds "threats now and forever?", Perth, Western Australia, 8-13 Sep 2002. (pp. 35-38). Plant Protection Society of Western Australia Inc. | [Competes with pine seedlings in plantations] "One of the main differences between first and second rotation plantation sites on the Swan Coastal Plain is the difference in the suite of weeds. In the first rotation the weeds were mainly native woody weeds, however in the second rotation the weeds were mainly rapid growing annual and perennial exotics, similar to those found in agricultural areas. These weeds, in particular inkweed (<i>Phytolacca octandra</i> L.) and rose pelargonium (<i>Pelargonium capitatum</i> (L.) L'Her.) compete strongly for water and nutrients in the first few years after plantation establishment." |
| | Esler, A. E. (1988). The naturalisation of plants in urban Auckland, New Zealand 6. Alien plants as weeds. <i>New Zealand journal of botany</i> , 26(4), 585-618 | [Potential pasture weed] "Inkweed (<i>Phytolacca octandra</i>) is a common shrub of rough pasture, untended areas, and disturbed waste land. When it grows in close stands most other plants are excluded. Land cleared of scrub becomes infested from birdbome seeds lying in the soil." |

| 304 | Environmental weed | |
|-----|--|--|
| | Source(s) | Notes |
| | Atkinson, I. A. E. (1997). Problem weeds on New Zealand islands. <i>Science for Conservation</i> : 45. Department of Conservation, Wellington, New Zealand | "The problem status of some alien plants is difficult to assess. Inkweed (<i>Phytolacca octandra</i>), for example, is a very common subshrub that colonises canopy gaps in forest and scrub on northern offshore islands. However, it remains in any one gap for such a short time that it is doubtful whether it has any significant effect on the rates or trends of succession among the woody plants that fill these gaps. Such species are not included as problem weeds in this study." |

| Qsn # | Question | Answer |
|-------|--|--|
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "What damage does it do? Competes for space and nutrients in pioneer plant communities, and can temporarily inhibit the establishment of seedlings of native plant species. Normally followed by native species, but can also be followed by vines or other weeds." |
| | Queensland Government. 2011. Weeds of Australia - Inkweed - <i>Phytolacca octandra</i> . The University of Queensland. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Phytolacca_octandra.htm . [Accessed 9 Mar 2016] | [Potentially. Impacts unspecified] "A weed of disturbed sites, waste areas, roadsides, crops, gardens, pastures, forest margins, open woodlands and creek banks in tropical, sub-tropical and warmer temperate regions." ... "Inkweed (<i>Phytolacca octandra</i>) is regarded as an environmental weed Queensland, New South Wales, Victoria and Western Australia. It was also recently listed as a priority environmental weed in at least one Natural Resource Management region." |

| 305 | Congeneric weed | y |
|-----|--|---|
| | Source(s) | Notes |
| | DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA | " <i>Phytolacca americana</i> ... Impacts: Pokeweed is an occasional weed throughout much of the United States and is rapidly increasing in abundance in some areas. All plant parts, especially the root, contain numerous saponins and oxalates and can be fatally toxic to humans and livestock when ingested raw or with improper preparation. Severe digestive tract irritation is the primary symptom. Birds are reported to eat the berries without ill-effect and may occasionally become intoxicated following ingestion." |

| 401 | Produces spines, thorns or burrs | 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. | [No evidence] "Branched perennial herbs 4-6(-15) dm tall; stems often reddish, angular. Leaves elliptic-lanceolate to narrowly elliptic or lanceolate, 6-22 cm long, 1.7-7.5 cm wide. usually glabrous, sometimes lower surface sparsely puberulent along veins, margins entire, petioles 1-3 cm long." |

| 402 | Allelopathic | |
|-----|--|---------|
| | Source(s) | Notes |
| | WRA Specialist. 2016. Personal Communication | Unknown |

| 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. | "Branched perennial herbs 4-6(-15) dm tall; stems often reddish, angular." [Phytolaccaceae. No evidence] |

| 404 | Unpalatable to grazing animals | n |
|-----|--------------------------------|---|
|-----|--------------------------------|---|

| Qsn # | Question | Answer |
|-------|--|---|
| | Source(s) | Notes |
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Grazing stock control young plants." |
| | Rosa García, R., Celaya, R., García, U., & Osoro, K. 2012. Goat grazing, its interactions with other herbivores and biodiversity conservation issues. <i>Small Ruminant Research</i> , 107(2): 49-64 | "Table 2. Summary of plant species considered weeds and which are palatable to goats." [Includes <i>Phytolacca octandra</i>] |

| 405 | Toxic to animals | y |
|-----|---|--|
| | Source(s) | Notes |
| | Smith, B. P. 2014. <i>Large Animal Internal Medicine</i> . 5th Edition. Elsevier Mosby, St. Louis, MO | "Among common plant toxicities, renal dysfunction can be significant following consumption of bracken fern (<i>Pteridium aquilinum</i>), cocklebur (<i>Xanthium</i> spp.), inkweed (<i>Phytolacca octandra</i>), oak (<i>Quercus</i> spp.), pigweed (<i>Amaranthus retroflexus</i>) ..., jimsonweed ..., and all plants rich in oxalates." |
| | Invasive Species South Africa. 2016. Forest inkberry - <i>Phytolacca octandra</i> . http://www.invasives.org.za/video/item/916-forest-inkberry-phytolacca-octandra . [Accessed 9 Mar 2016] | "Why is it a problem? <i>Phytolacca octandra</i> contains phytolaccatoxin and phytolaccigenin, which are poisonous to mammals though they seldom graze it." |

| 406 | Host for recognized pests and pathogens | |
|-----|--|--|
| | Source(s) | Notes |
| | Aweke, G., 2007. <i>Phytolacca americana</i> L. In: Schmelzer, G.H. & Gurib-Fakim, A. (Editors). <i>PROTA (Plant Resources of Tropical Africa)</i> , Wageningen, Netherlands | [Information may be applicable to <i>P. octandra</i> as well] "In Africa diseases and pests have not been reported for <i>Phytolacca americana</i> . However, it is an alternative host to a number of viral diseases, including mosaic, ringspot and yellow viruses that affect <i>Amaryllidaceae</i> , <i>Liliaceae</i> and <i>Solanaceae</i> . In Italy wilt and die-back symptoms were observed on plants cultivated for ornamental purposes caused by <i>Phytophthora nicotianae</i> ." |

| 407 | Causes allergies or is otherwise toxic to humans | y |
|-----|---|--|
| | Source(s) | Notes |
| | Scott, S. & Thomas, C. 2000. <i>Poisonous Plants of Paradise: First Aid and Medical Treatment of Injuries from Hawaii's Plants</i> . University of Hawaii Press, Honolulu, HI | "Pokeberry and coral berry roots, leaves, berries and seeds contain the toxic alkaloid phytolaccine and other triterpene toxins. These toxins irritate the digestive system and can affect the central nervous system. Triterpene toxins also impair red blood cell formation and damage mature red blood cells." ... "People have died from eating pokeberry greens, either undercooked or when a portion of the roots were accidentally included in the pot. Others have become ill even when the greens were properly prepared. A two-year-old died from eating pokeberries. In a separate incident, a five-year-old died after drinking pokeberries that had been crushed and added to sugar and water to simulate grape juice." |

| 408 | Creates a fire hazard in natural ecosystems | n |
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| Qsn # | Question | Answer |
|-------|--|---|
| | 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 pastures and mesic to wet forest, 10-1,280 m" [May contribute to fuel load in dry pastures, but unlikely to contribute to fire risk relative to grasses & other fine fuels] |
| | Mutch, R. W. (1970). Wildland fires and ecosystems--a hypothesis. Ecology, 51(6): 1046-1051 | [Requires addition of Eucalyptus oil to burn] "Samples of <i>Phytolacca octandra</i> , a Queensland rain-forest species, would scarcely burn in their calorimeter. When the same leaves were exposed to an atmosphere of eucalypt vapor, taking up approximately 3% of the oil by weight, they burned readily." |

| 409 | Is a shade tolerant plant at some stage of its life cycle | |
|-----|---|--|
| | Source(s) | Notes |
| | Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. 1988. Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand | "...often in partial shade, but in moister areas commonest in more open habitats such as waste places, river beds, old pastures, neglected or abandoned fields and gardens." |
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "intolerant of deep shade" |

| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | |
|-----|---|---|
| | Source(s) | Notes |
| | Royal Botanic Gardens Victoria. 2015. VicFlora Flora of Victoria - <i>Phytolacca octandra</i> . http://data.rbv.vic.gov.au/vicflora/ . [Accessed 9 Mar 2016] | "Occasional in disturbed sites, wasteland and sometimes intact native communities on soils of low fertility" |
| | Western Australian Herbarium (1998–2016). FloraBase—the Western Australian Flora. Department of Parks and Wildlife. https://florabase.dpaw.wa.gov.au/ . [Accessed 9 Mar 2016] | "Sand, sandy loam. A weed of disturbed soils." |
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Soil: Prefers sandy soils." |
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "Tolerates damage, wind, fire, all loose soils, and wet to moderately dry conditions, but is intolerant of deep shade, deep humus and heavy frost." |

| 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. | "Branched perennial herbs 4-6(-15) dm tall; stems often reddish, angular." |

| 412 | Forms dense thickets | y |
|-----|----------------------|---|
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| Qsn # | Question | Answer |
|------------|--|--|
| | Source(s) | Notes |
| | Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. 1988. Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand | "Most abundant in cut-over scrub and forest where it can form dense stands" |
| 501 | Aquatic | 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. | [Terrestrial herb] "Branched perennial herbs 4-6(-15) dm tall" ... "in Hawai'i naturalized in dry pastures and mesic to wet forest, 10-1,280 m" |
| 502 | Grass | n |
| | Source(s) | Notes |
| | USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 9 Mar 2016] | Phytolaccaceae |
| 503 | Nitrogen fixing woody plant | 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. | "Branched perennial herbs 4-6(-15) dm tall; stems often reddish, angular." [Phytolaccaceae. No evidence] |
| 504 | Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers) | n |
| | Source(s) | Notes |
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Shallow, stout, taproot and spreading laterals." |
| 601 | Evidence of substantial reproductive failure in native habitat | n |
| | Source(s) | Notes |
| | Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 19+ vols. New York and Oxford | [No evidence. Widespread distribution] "Ariz, Wis.; Mexico; West Indies; Central America; South America; Asia; Africa; Pacific Islands. <i>Phytolacca octandra</i> is a species with nearly worldwide distribution." |
| 602 | Produces viable seed | 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. | "Berries purple, 7-8(-10)-ribbed, ca. 4-6 mm in diameter. Seeds black, lenticular, smooth, ca. 2 mm in diameter." |

| Qsn # | Question | Answer |
|-------|---|--|
| | Queensland Government. 2011. Weeds of Australia - Inkweed - <i>Phytolacca octandra</i> . The University of Queensland. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Phytolacca_octandra.htm . [Accessed 8 Mar 2016] | "Inkweed (<i>Phytolacca octandra</i>) reproduces by seed." |

| 603 | Hybridizes naturally | |
|-----|--|--|
| | Source(s) | Notes |
| | Yusuf, R., 1999. <i>Phytolacca</i> L. [Internet] Record from Proseabase. de Padua, L.S., Bunyaphrathatsara, N. and Lemmens, R.H.M.J. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 10 Mar 2016] | " <i>Phytolacca</i> species are often difficult to distinguish. Many of the morphological characters appear to be under weak genetic control. Moreover, many species hybridize readily, thus obscuring the characters by which they are recognized." |
| | 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. | [Unknown, but possible] " <i>Phytolacca sandwicensis</i> appears to intergrade with <i>P. octandra</i> in areas where they occur together, especially on Moloka'i, where it is often difficult to assign particular individuals to one or the other species. This intergradation should be studied." |

| 604 | Self-compatible or apomictic | |
|-----|---|---|
| | Source(s) | Notes |
| | Aweke, G., 2007. <i>Phytolacca americana</i> L. In: Schmelzer, G.H. & Gurib-Fakim, A. (Editors). PROTA (Plant Resources of Tropical Africa, Wageningen, Netherlands | [Unknown, but possibly similar for <i>P. octandra</i>] " <i>Phytolacca americana</i> ... Fruit set is usually high, suggesting a high degree of selfing. " |

| 605 | Requires specialist pollinators | 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. | "Flowers in racemes 7-14 cm long, usually moderately puberulent, peduncles 0.5-2(-3) cm long, pedicels 0.5-2 mm long, bract 2-2.5 mm long, bracteoles ca. 1 mm long; sepals 5, white to sometimes dark pink, oblong to ovate, ca. 2-3 mm long; stamens 8-10, in a single whorl; ovary 7-8(-10)-carpellate, the carpels connate throughout." |
| | Hurn, V. M. B., & Moller, H. (1995). An assessment of the contribution of honey bees (<i>Apis mellifera</i>) to weed reproduction in New Zealand protected natural areas. <i>New Zealand Journal of Ecology</i> , 19: 111-122 | "Table 1: (table opposite) Checklist of weeds probably used by honey bees in New Zealand Protected Natural Areas." [<i>Phytolacca octandra</i> nectar is utilized by honey bees] |

| Qsn # | Question | Answer |
|-------|--|---|
| 606 | Reproduction by vegetative fragmentation | n |
| | Source(s) | Notes |
| | Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI | "Propagation: By seed." |
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Reproduction: Mainly by seed. It will re shoot from the base." ... "Vegetative Propagules: None." |

| 607 | Minimum generative time (years) | 1 |
|-----|--|---|
| | Source(s) | Notes |
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Life cycle: Short lived perennial surviving 2-3 years. Flowers throughout the year with a peak in August to October." |
| | Esler, A. E. (1988). The naturalisation of plants in urban Auckland, New Zealand 4. The nature of the naturalised species. <i>New Zealand Journal of Botany</i> , 26(3), 345-385 | " <i>Phytolacca octandra</i> behaves like an annual by beginning flowering while it is still a herbaceous plant. In frosty parts of Auckland the life period is less than a year. Where frosts are not limiting it lives for two or three years." |

| 701 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | y |
|-----|--|--|
| | Source(s) | Notes |
| | Michael, P. (ed.). 2012. The Master Weed Wackers Manual. A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | "Dispersal: Seed spread by animals (mainly birds), humans (deliberate planting), contaminated soil (earthmoving equipment, car tyres etc) and, to a lesser degree, garden refuse dumping." |

| 702 | Propagules dispersed intentionally by people | |
|-----|--|--|
| | Source(s) | Notes |
| | Michael, P. (ed.). 2012. The Master Weed Wackers Manual. A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | "Dispersal: Seed spread by animals (mainly birds), humans (deliberate planting), contaminated soil (earthmoving equipment, car tyres etc) and, to a lesser degree, garden refuse dumping." [Possibly, although unlikely in Hawaiian Islands] |

| 703 | Propagules likely to disperse as a produce contaminant | |
|-----|--|--|
| | Source(s) | Notes |
| | Michael, P. (ed.). 2012. The Master Weed Wackers Manual. A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | [Possibly, although unlikely in Hawaiian Islands] "Dispersal: Seed spread by animals (mainly birds), humans (deliberate planting), contaminated soil (earthmoving equipment, car tyres etc) and, to a lesser degree, garden refuse dumping." |

| Qsn # | Question | Answer |
|-------|--|---|
| 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. | "Berries purple, 7-8(-10)-ribbed, ca. 4-6 mm in diameter. Seeds black, lenticular, smooth, ca. 2 mm in diameter." |
| 705 | Propagules water dispersed | y |
| | Source(s) | Notes |
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "How does it spread? Birds, soil and occasionally water movement spread the berries containing the seeds. Seed sources include infested waste places, neglected crops, and disturbed, burnt or sprayed farm or conservation land. " |
| 706 | Propagules bird dispersed | y |
| | Source(s) | Notes |
| | Ferguson, R. N., & Drake, D. R. (1999). Influence of vegetation structure on spatial patterns of seed deposition by birds. <i>New Zealand Journal of Botany</i> , 37(4), 671-677 | "A total of 42 093 bird-dispersed seeds from at least 24 fleshy-fruited plant species were found in the 45 traps of the forest sites over 2 months." ,, "Phytolacca octandra was the most abundant species in the seed rain, comprising 22.8% of the total. It was also the most widespread species, appearing in all the seed traps" |
| | Queensland Government. 2011. Weeds of Australia - Inkweed - <i>Phytolacca octandra</i> . The University of Queensland. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Phytolacca_octandra.htm . [Accessed 8 Mar 2016] | "Inkweed (<i>Phytolacca octandra</i>) reproduces by seed. These seeds are usually dispersed by birds and other animals (e.g. foxes) that eat its fruit." |
| | Stanley, M. C., & Lill, A. (2002). Avian fruit consumption and seed dispersal in a temperate Australian woodland. <i>Austral Ecology</i> , 2 (2), 137-148 | "Seeds from <i>Hymenanchera dentata</i> , <i>Solanum aviculare</i> and <i>Phytolacca octandra</i> were the seeds next most commonly recovered from silvereyes and yellow-faced honeyeaters" |
| 707 | Propagules dispersed by other animals (externally) | |
| | Source(s) | Notes |
| | Michael, P. (ed.). 2012. The Master Weed Wackers Manual. A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | [Possibly in mud stuck on animals, but most frequently by birds] "Dispersal: Seed spread by animals (mainly birds), humans (deliberate planting), contaminated soil (earthmoving equipment, car tyres etc) and, to a lesser degree, garden refuse dumping." |
| 708 | Propagules survive passage through the gut | y |
| | Source(s) | Notes |
| | Wotton, D. M. (2002). Effectiveness of the common gecko (<i>Hoplodactylus maculatus</i>) as a seed disperser on Mana Island, New Zealand. <i>New Zealand Journal of Botany</i> , 40 (4), 639-647 | "Over 95% of the seeds found in gecko droppings were from <i>C. propinqua</i> , with remaining seeds from <i>M. complexa</i> and <i>Phytolacca octandra</i> (<i>Phytolaccaceae</i> , inkweed)." |

| Qsn # | Question | Answer |
|-------|---|---|
| | Stanley, M. C., & Lill, A. (2002). Avian fruit consumption and seed dispersal in a temperate Australian woodland. <i>Austral Ecology</i> , 2 (2), 137-148 | "There was no reduction in the viability of <i>P. octandra</i> seeds in silvereyes' faeces" |
| | Stocker, G. C., & Irvine, A. K. (1983). Seed dispersal by cassowaries (<i>Casuaris casuarius</i>) in North Queensland's rainforests. <i>Biotropica</i> , 15(3): 170-176 | 'Table 1. Seed characteristics of plant propagules collected in Cassowary dung.' [Includes <i>Phytolacca octandra</i>] |

| 801 | Prolific seed production (>1000/m2) | |
|-----|---|--|
| | Source(s) | Notes |
| | Queensland Government. 2011. Weeds of Australia - Inkweed - <i>Phytolacca octandra</i> . The University of Queensland. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Phytolacca_octandra.htm . [Accessed 9 Mar 2016] | "These fruit contain eight black seeds (about 2 mm across) in a reddish juice. The seeds are lens shaped (i.e. lenticular), shiny in appearance, and smooth in texture." |

| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | y |
|-----|---|---|
| | Source(s) | Notes |
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "Grows and matures quickly, producing many well dispersed, long-lived seeds." |
| | Enright, N. J., & Cameron, E. K. 1988. The soil seed bank of a kauri (<i>Agathis australis</i>) forest remnant near Auckland, New Zealand. <i>New Zealand Journal of Botany</i> , 26(2): 223-236 | "Invasion of the forest soil seed bank at Huapai by adventive weedy species is evident. A number of common pasture and roadside weeds are present in the persistent seed bank. These include scotch thistle (<i>Cirsium vulgare</i>), inkweed (<i>Phytolacca octandra</i>), catsear (<i>Hypochoeris radicata</i>), and woolly nightshade (<i>Solanum mauritianum</i>)." |
| | Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 9 Mar 2016] | "Storage Behaviour: Orthodox Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 2 years" |

| 803 | Well controlled by herbicides | y |
|-----|---|---|
| | Source(s) | Notes |
| | Michael, P. (ed.). 2012. The Master Weed Wackers Manual. A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | "Control: HAND: Small plants are easily removed by hand, but larger plants develop a large tap-root from which it can resprout. CHEMICAL: Dense infestations or large plants can be foliar sprayed with glyphosate @ 20mL L-1 + metsulfuron methyl (eg Brushoff) at 1.5g 10L-1." |
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "Cut down and paint stump (all year round): metsulfuron-methyl 600g/kg (1g/L)." |

| Qsn # | Question | Answer |
|-------|--|---|
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Eradication strategies: Drag a railway iron or similar across heavy infestations to uproot the plants. Cut the roots about 5 cm below ground level with a mattock to control isolated or remaining plants. Cultivation with discs is also effective. In open areas, a blanket wiper applying 1 L glyphosate(450g/L) in 2 L water can be used. Single plants may be sprayed with diesel. Small infestations may be treated with 100 mL Tordon®75-D in 10 L water. This will control existing plants and has residual activity for control of seedlings. Larger infestations can be controlled with 50 g/ha metsulfuron(600g/kg) or 1 g in 10 L water for hand spraying. Half these rates will control seedlings." |

| 804 | Tolerates, or benefits from, mutilation, cultivation, or fire | y |
|-----|---|---|
| | Source(s) | Notes |
| | HerbiGuide. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.herbiguide.com.au/Descriptions/hg_Inkweed.htm . [Accessed 9 Mar 2016] | "Reproduction: Mainly by seed. It will re shoot from the base." |
| | Michael, P. (ed.). 2012. The Master Weed Wackers Manual. A compilation of the most common weeds found on Port Macquarie Landcare sites. Port Macquarie Landcare Group, Inc., Port Macquarie, NSW | "The plant can take on a more prostrate form if trampled or damaged and continue to flower and fruit. The tap-root will reshoot after slashing or burning." |
| | Weedbusters. 2016. Inkweed - <i>Phytolacca octandra</i> . http://www.weedbusters.org.nz/weed-information/phytolacca-octandra/59/ . [Accessed 9 Mar 2016] | "Tolerates damage, wind, fire, all loose soils, and wet to moderately dry conditions, but is intolerant of deep shade, deep humus and heavy frost." |

| 805 | Effective natural enemies present locally (e.g. introduced biocontrol agents) | |
|-----|--|---|
| | 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. | [Unknown, but distribution suggests no] "Native to the Neotropics; in Hawai'i naturalized in dry pastures and mesic to wet forest, 10-1,280 m, on Kauai, Oahu, Molokai, Lanai, and Maui." |

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely naturalized
- Disturbance adapted weed
- Weed of plantations, pastures & disturbed natural areas
- Other *Phytolacca* species have become invasive
- Toxic to animals & people
- Able to form dense thickets
- Reproduces by seeds
- Able to reach maturity in 1+ years
- Seeds dispersed by birds, mammals, water & as a contaminant of soil, or on machinery
- Seeds may persist in the soil for >1 years
- Able to resprout after cutting or fire

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Palatable to goats & possible other grazing animals (despite reports of toxicity)
- Not reported to spread vegetatively
- Herbicides may provide effective control