

Family: *Acanthaceae*

Taxon: *Crossandra infundibuliformis*

Synonym: *Justicia infundibuliformis* L. (*basionym*)

Common Name Crossandra
Firecracker Flower
Firecracker Plant

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| Questionnaire : | current 20090513 | Assessor: | Chuck Chimera | Designation: L |
| Status: | Assessor Approved | Data Entry Person: | Chuck Chimera | WRA Score 2 |
| 101 | Is the species highly domesticated? | | y=-3, n=0 | n |
| 102 | Has the species become naturalized where grown? | | y=1, n=-1 | |
| 103 | Does the species have weedy races? | | y=1, n=-1 | |
| 201 | Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical" | | (0-low; 1-intermediate; 2-high) (See Appendix 2) | High |
| 202 | Quality of climate match data | | (0-low; 1-intermediate; 2-high) (See Appendix 2) | High |
| 203 | Broad climate suitability (environmental versatility) | | y=1, n=0 | n |
| 204 | Native or naturalized in regions with tropical or subtropical climates | | y=1, n=0 | y |
| 205 | Does the species have a history of repeated introductions outside its natural range? | | y=-2, ?=-1, n=0 | y |
| 301 | Naturalized beyond native range | | y = 1*multiplier (see Appendix 2), n= question 205 | y |
| 302 | Garden/amenity/disturbance weed | | n=0, y = 1*multiplier (see Appendix 2) | |
| 303 | Agricultural/forestry/horticultural weed | | n=0, y = 2*multiplier (see Appendix 2) | n |
| 304 | Environmental weed | | n=0, y = 2*multiplier (see Appendix 2) | n |
| 305 | Congeneric weed | | n=0, y = 1*multiplier (see Appendix 2) | n |
| 401 | Produces spines, thorns or burrs | | y=1, n=0 | n |
| 402 | Allelopathic | | y=1, n=0 | n |
| 403 | Parasitic | | y=1, n=0 | n |
| 404 | Unpalatable to grazing animals | | y=1, n=-1 | |
| 405 | Toxic to animals | | y=1, n=0 | n |
| 406 | Host for recognized pests and pathogens | | y=1, n=0 | n |
| 407 | Causes allergies or is otherwise toxic to humans | | y=1, n=0 | n |
| 408 | Creates a fire hazard in natural ecosystems | | y=1, n=0 | n |
| 409 | Is a shade tolerant plant at some stage of its life cycle | | y=1, n=0 | y |
| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | | y=1, n=0 | y |

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

Designation: L

WRA Score 2

Supporting Data:

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| 101 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | Not highly domesticated |
| 101 | 2010. WRA Specialist. Personal Communication. | No evidence that the species is highly domesticated. |
| 102 | 2010. WRA Specialist. Personal Communication. | NA |
| 103 | 2010. WRA Specialist. Personal Communication. | NA |
| 201 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | "native to India and Sri Lanka (Ceylon)" |
| 202 | 2010. WRA Specialist. Personal Communication. | Quality of climate match data is high |
| 203 | 1995. Matthew, K. M.. An excursion flora of Central Tamilnadu, India. CRC Press, Boca Raton, FL | "Foothills to 1000(1300) m" [potentially broad elevational range] |
| 203 | 2010. Dave's Garden. PlantFiles: Firecracker Plant, Firecracker Flower, Kanakambaram, <i>Crossandra infundibuliformis</i> . Dave's Garden, http://davesgarden.com/guides/pf/go/1337/ | Hardiness: USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F) |
| 203 | 2010. Missouri Botanical Garden. PlantFinder - <i>Crossandra infundibuliformis</i> . http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A501 | Zone: 10 to 11 |
| 204 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | "native to India and Sri Lanka (Ceylon)" [native to region with tropical or subtropical climate] |
| 205 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | "widely cultivated for its pink to orange or red flowers with the corolla lobes all to one side..." |
| 301 | 1879. Eggers, B.H.F.A.. The flora of St. Croix and the Virgin Islands. Bulletin of the United States National Museum. 13: 1-133. | "Naturalized in gardens - St. Croix." |
| 301 | 2004. Meyer, J-Y./Lavergne, C.. Beautés fatales : Acanthaceae species as invasive alien plants on tropical Indo-Pacific Islands. Diversity and Distributions. 10: 333-347. | Appendix List of the 52 naturalized acanths in tropical Indo-Pacific islands and other tropical countries: [<i>Crossandra infundibuliformis</i> ...La Réunion (LNAT)...LNAT = locally or sparingly naturalized in secondary or primary forests, with isolated and small patches]..."we observed the cultivated species <i>Crossandra infundibuliformis</i> , <i>Megaskepasma erythrochlamys</i> , and <i>Thunbergia mysorensis</i> as subspontaneous in secondary vegetation." |
| 302 | 2007. Randall, R.P.. Global Compendium of Weeds - <i>Crossandra infundibuliformis</i> [Online Database]. Hawaii Ecosystems at Risk Project (HEAR), http://www.hear.org/gcw/species/crossandra_infundibuliformis/ | cultivation escape |
| 303 | 2007. Randall, R.P.. Global Compendium of Weeds - <i>Crossandra infundibuliformis</i> [Online Database]. Hawaii Ecosystems at Risk Project (HEAR), http://www.hear.org/gcw/species/crossandra_infundibuliformis/ | No evidence as a weed of Agricultural, forestry, or horticultural |
| 304 | 2007. Randall, R.P.. Global Compendium of Weeds - <i>Crossandra infundibuliformis</i> [Online Database]. Hawaii Ecosystems at Risk Project (HEAR), http://www.hear.org/gcw/species/crossandra_infundibuliformis/ | Listed as an environmental weed [but no evidence of impacts found in literature] |
| 305 | 2007. Randall, R.P.. Global Compendium of Weeds - <i>Crossandra infundibuliformis</i> [Online Database]. Hawaii Ecosystems at Risk Project (HEAR), http://www.hear.org/gcw/species/crossandra_infundibuliformis/ | No other species of <i>Crossandra</i> listed as weeds of any kind. |
| 401 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | No spines, thorns or burrs present |

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| 402 | 2010. WRA Specialist. Personal Communication. | No evidence of allelopathy |
| 403 | 2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI. | Not parasitic |
| 404 | 2010. WRA Specialist. Personal Communication. | Palatability to animals unknown |
| 405 | 2010. ASPCA. Crossandra. http://www.asPCA.org/pet-care/poison-control/plants/crossandra.html | Toxicity: Non-Toxic to Cats, Non-Toxic to Dogs, Non-Toxic to Horses [no evidence of toxicity of animals] |
| 406 | 2010. Missouri Botanical Garden. PlantFinder - Crossandra infundibuliformis. http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A501 | Problems: No serious insect or disease problems. |
| 407 | 2003. Lewis, W.H./Elvin-Lewis, M.P.F.. Medical botany: plants affecting human health. John Wiley and Sons, Hoboken, NJ | No evidence of toxicity to humans |
| 408 | 2010. WRA Specialist. Personal Communication. | No evidence that species creates a fire hazard in natural ecosystems |
| 409 | 1998. Dassanayake, M.D./Clayton, W.D. (eds.). A Revised handbook to the flora of Ceylon, Volume 12. A.A. Balkema, Rotterdam, Netherlands | "Under shade of shrubs close to watercourses in the lowlands and mid-country" [Sri Lanka] |
| 409 | 2010. Dave's Garden. PlantFiles: Firecracker Plant, Firecracker Flower, Kanakambaram, Crossandra infundibuliformis. Dave's Garden, http://davesgarden.com/guides/pf/go/1337/ | Sun Exposure: Sun to Partial Shade |
| 409 | 2010. Missouri Botanical Garden. PlantFinder - Crossandra infundibuliformis. http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A501 | Tolerates bright full shade. |
| 410 | 2010. AP Horticulture. Crossandra - (Crossandra infundibuliformis). Department of Horticulture, Government of Andhra Pradesh, http://www.aphorticulture.com/Cross.htm | A loamy soil is the best for this crop but can also be grown in all types of soils |
| 410 | 2010. Dave's Garden. PlantFiles: Firecracker Plant, Firecracker Flower, Kanakambaram, Crossandra infundibuliformis. Dave's Garden, http://davesgarden.com/guides/pf/go/1337/ | Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) |
| 411 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | "Subshrub to 1 m high" [not climbing or smothering] |
| 412 | 1998. Dassanayake, M.D./Clayton, W.D. (eds.). A Revised handbook to the flora of Ceylon, Volume 12. A.A. Balkema, Rotterdam, Netherlands | No evidence of dense thicket formation in native range |
| 412 | 2004. Meyer, J-Y./Lavergne, C.. Beautés fatales : Acanthaceae species as invasive alien plants on tropical Indo-Pacific Islands. Diversity and Distributions. 10: 333-347. | "cultivated species Crossandra infundibuliformis, Megaskepasma erythroclamy, and Thunbergia mysorensis...subspontaneous in secondary vegetation." [no evidence that Crossandra forms dense thickets where naturalizing] |
| 501 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | Terrestrial shrub |
| 502 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | Acanthaceae [not a grass] |
| 503 | 2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI. | Acanthaceae [not a nitrogen fixing plant] |
| 504 | 1995. Matthew, K. M.. An excursion flora of Central Tamilnadu, India. CRC Press, Boca Raton, FL | "Subshrubby to 1(2) m [not a geophyte]" |

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| 601 | 1995. Matthew, K. M.. An excursion flora of Central Tamilnadu, India. CRC Press, Boca Raton, FL | No evidence of substantial reproductive failure in native habitat. |
| 602 | 2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI. | "The seeds are forcibly ejected from the capsules, and seedling can appear in the garden some distance away from the parent plants; gardeners should be aware that crossandra could become invasive under the right conditions." |
| 602 | 2010. Dave's Garden. PlantFiles: Firecracker Plant, Firecracker Flower, Kanakambaram, Crossandra infundibuliformis. Dave's Garden, http://davesgarden.com/guides/pf/go/1337/ | Propagation Methods: From softwood cuttings From seed; sow indoors before last frost Seed Collecting: Allow pods to dry on plant; break open to collect seeds |
| 603 | 2010. WRA Specialist. Personal Communication. | Ability to hybridize naturally unknown |
| 604 | 2001. Dey, S.C.. Growing Shrubs and Climbers. Sterling Publishers Pvt. Ltd, New Delhi, India | "Seedlings are found to grow about the plant from self-sown seeds." [apparently single plants are self-compatible] |
| 605 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | "Fruit...infrequently formed in cultivation" [infrequent fruit formation may be due to specialized pollinator requirements, but pollination biology unknown] |
| 605 | 2010. wiseGEEK. What is a Firecracker Flower?. http://www.wisegeek.com/what-is-a-firecracker-flower.htm | "These flowers attract butterflies and hummingbirds, which help to pollinate the plant." |
| 606 | 2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI. | "Herb or sprawling subshrub 1(-3)' tall; stems rooting." [potentially able to spread vegetatively] |
| 607 | 2001. Dey, S.C.. Growing Shrubs and Climbers. Sterling Publishers Pvt. Ltd, New Delhi, India | "Though perennial, it is treated as an annual in many places because the old plants look shaggy." |
| 607 | 2010. AP Horticulture. Crossandra - (Crossandra infundibuliformis). Department of Horticulture, Government of Andhra Pradesh, http://www.aphorticulture.com/Cross.htm | Harvesting commences from the third month after planting. [refers to the availability of flowers] |
| 701 | 2010. WRA Specialist. Personal Communication. | Plants self-seed, but no evidence of inadvertent spread |
| 702 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | Popular ornamental |
| 703 | 2010. WRA Specialist. Personal Communication. | No evidence that seeds are dispersed as a contaminant of produce [and not grown with produce] |
| 704 | 2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI. | "The seeds are forcibly ejected from the capsules, and seedling can appear in the garden some distance away from the parent plants" [mechanically dispersed, but no evidence of adaptations for wind dispersal] |
| 705 | 1998. Dassanayake, M.D./Clayton, W.D. (eds.). A Revised handbook to the flora of Ceylon, Volume 12. A.A. Balkema, Rotterdam, Netherlands | "Under shade of shrubs close to watercourses in the lowlands and mid-country" [no direct evidence, but distribution suggest possible water dispersal] |
| 706 | 2005. Staples, G. W./Herbst, D. R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI. | Mechanical dispersal syndrome [not fleshy fruited] |
| 707 | 1998. Dassanayake, M.D./Clayton, W.D. (eds.). A Revised handbook to the flora of Ceylon, Volume 12. A.A. Balkema, Rotterdam, Netherlands | "Capsules ellipsoid, to 15 x 4.5 mm, compressed, glabrous; seeds orbicular, 3 mm in diam., covered with hygroscopic scales" [no evidence of external dispersal by animals, and no means of external attachment] |
| 708 | 2010. WRA Specialist. Personal Communication. | Unknown if seeds will survive passage through gut [unlikely to be consumed] |
| 801 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | Fruit an oblong capsule, infrequently formed in cultivation [infrequent fruit production suggests low seed production] |
| 802 | 2010. AP Horticulture. Crossandra - (Crossandra infundibuliformis). Department of Horticulture, Government of Andhra Pradesh, http://www.aphorticulture.com/Cross.htm | The seeds will loose their viability very soon and hence only freshly extracted seeds should be used. [no evidence that a persistence seed bank is formed] |
| 803 | 2010. WRA Specialist. Personal Communication. | Unknown [no information found on effects of herbicide on this species] |

804 2010. WRA Specialist. Personal Communication. Unknown [no information on effects of mutilation, cultivation or fire]

805 2010. WRA Specialist. Personal Communication. Unknown [no information on natural enemies]
