

**Australia/New Zealand Weed Risk Assessment adapted for Florida.**

**Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. Invasive Plant Science and Management 1: 178-195.**

| <i>Fortunella japonica (round kumquat)</i> |  |        |       |
|--|--|--------|-------|
| Question number                            | Question   | Answer | Score |
| 1.01                                       | Is the species highly domesticated?  | y      | -3    |
| 1.02                                       | Has the species become naturalised where grown?                                      | n      | -1    |
| 1.03                                       | Does the species have weedy races?   |        |       |
| 2.01                                       | Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high)       | 2      |       |
| 2.02                                       | Quality of climate match data (0-low; 1-intermediate; 2-high)                        | 2      |       |
| 2.03                                       | Broad climate suitability (environmental versatility)                                | n      | 0     |
| 2.04                                       | Native or naturalized in habitats with periodic inundation                           | n      | 0     |
| 2.05                                       | Does the species have a history of repeated introductions outside its natural range? | y      |       |
| 3.01                                       | Naturalized beyond native range  | n      | -2    |
| 3.02                                       | Garden/amenity/disturbance weed  | n      | 0     |
| 3.03                                       | Weed of agriculture  | n      | 0     |
| 3.04                                       | Environmental weed   | n      | 0     |
| 3.05                                       | Congeneric weed  | n      | 0     |
| 4.01                                       | Produces spines, thorns or burrs   | y?     | 1     |
| 4.02                                       | Allelopathic   | n      | 0     |
| 4.03                                       | Parasitic  | n      | 0     |
| 4.04                                       | Unpalatable to grazing animals   |        |       |
| 4.05                                       | Toxic to animals   | n      | 0     |
| 4.06                                       | Host for recognised pests and pathogens  | y      | 1     |
| 4.07                                       | Causes allergies or is otherwise toxic to humans                                     | n      | 0     |
| 4.08                                       | Creates a fire hazard in natural ecosystems  | n      | 0     |
| 4.09                                       | Is a shade tolerant plant at some stage of its life cycle                            | ?      |       |
| 4.1  | Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)     | y      | 1     |
| 4.11                                       | Climbing or smothering growth habit  | n      | 0     |
| 4.12                                       | Forms dense thickets   | n      | 0     |
| 5.01                                       | Aquatic  | n      | 0     |

|                    |  |   |           |
|--------------------|--|---|-----------|
| 5.02               | Grass  | n | 0         |
| 5.03               | Nitrogen fixing woody plant  | n | 0         |
| 5.04               | Geophyte   |   |           |
| 6.01               | Evidence of substantial reproductive failure in native habitat                                 |   |           |
| 6.02               | Produces viable seed   | y | 1         |
| 6.03               | Hybridizes naturally   | ? |           |
| 6.04               | Self-compatible or apomictic   | y | 1         |
| 6.05               | Requires specialist pollinators  |   |           |
| 6.06               | Reproduction by vegetative fragmentation   |   |           |
| 6.07               | Minimum generative time (years)  | 4 | -1        |
| 7.01               | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) |   |           |
| 7.02               | Propagules dispersed intentionally by people   | y | 1         |
| 7.03               | Propagules likely to disperse as a produce contaminant   | n | -1        |
| 7.04               | Propagules adapted to wind dispersal   | n | -1        |
| 7.05               | Propagules water dispersed   | n | -1        |
| 7.06               | Propagules bird dispersed  | y | 1         |
| 7.07               | Propagules dispersed by other animals (externally)   | n | -1        |
| 7.08               | Propagules dispersed by other animals (internally)   | y | 1         |
| 8.01               | Prolific seed production   |   |           |
| 8.02               | Evidence that a persistent propagule bank is formed (>1 yr)                                    |   |           |
| 8.03               | Well controlled by herbicides  |   |           |
| 8.04               | Tolerates, or benefits from, mutilation or cultivation   |   |           |
| 8.05               | Effective natural enemies present in Florida, or east of the continental divide                |   |           |
| <b>Total Score</b> |  |   | <b>-3</b> |

|                |                |
|----------------|----------------|
| <b>Outcome</b> | <b>Accept*</b> |
|----------------|----------------|

\*Used secondary screen from: Daehler, C. C., J.L. Denslow, S. Ansari, and H. Kuo. 2004. A risk assessment system for screening out harmful invasive pest plants from Hawaii's and other Pacific islands. *Conserv. Biol.* 18: 360-368.

| section | # questions answered | satisfy minimum? |
|---------|----------------------|------------------|
| A       | 9                    | yes              |
| B       | 10                   | yes              |
| C       | 13                   | yes              |
| total   | 32                   | yes              |

Data collected 2006-2007

| Question number | Reference  | Source data  |
|-----------------|--|--|
| 1.01            | 1. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 2. Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia. | 1. Cultivated in Japan since early 1700s. "Kumquats are rarely grown from seed as they do not do well on their own roots." Grafting is used for propagation. [certainly less weedy if grafting is often necessary] 2. "At present [it is] only known in cultivation, mainly in China, Japan and Taiwan." |
| 1.02            |  | no evidence  |
| 1.03            |  |  |
| 2.01            | Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia.  | "Most kumquat species need a cool subtropical or warm temperate climate".  |
| 2.02            |  |  |
| 2.03            | Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia.  | native to southern China [and no evidence of naturalization elsewhere]   |
| 2.04            | Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia.  | "They do not tolerate...flooding."   |
| 2.05            | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.   | Probably native to China; cultivated as an ornamental and for fruit in Japan, Europe, and North America.   |
| 3.01            |  | no evidence  |
| 3.02            |  | no evidence  |
| 3.03            |  | no evidence  |
| 3.04            |  | no evidence  |
| 3.05            |  | no evidence  |
| 4.01            | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.   | slightly thorny  |
| 4.02            |  | no evidence  |
| 4.03            | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.   | no description of this   |
| 4.04            |  |  |
| 4.05            | Crescent Bloom ( <a href="http://www.crescentbloom.com/Plants/Specimen/FO/Fortunella%20japonica.htm">http://www.crescentbloom.com/Plants/Specimen/FO/Fortunella%20japonica.htm</a> ).              | livestock poison: no   |
| 4.06            | 1. Araujo, Medeiros, Silva, Zucchi (2005) Fruit flies (Diptera: Tephritidae) in the semi-arid region of the State of Rio Grande do Norte, Brazil: host   | 1. <i>F. japonica</i> was the most infested host plant of the fruit fly <i>Ceratitidis</i>   |

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|      | plants and infestation indices. Neotropical Entomology 34: 889-894. 2. Queensland Government, Department of Primary Industries and Fisheries ( <a href="http://www2.dpi.qld.gov.au/health/4249.html">http://www2.dpi.qld.gov.au/health/4249.html</a> ). 3. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.  | <i>capitata</i> in a study done in Rio Grande do Norte, Brazil. 2. "The disease [citrus canker] affects plants in the Rutaceae family, including those from the genera <i>Citrus</i> , <i>Fortunella</i> and <i>Poncirus</i> ." BUT 3. "They [kumquats] are highly resistant or even immune to citrus canker." |
| 4.07 | 1. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 2. Crescent Bloom ( <a href="http://www.crescentbloom.com/Plants/Specimen/FO/Fortunella%20japonica.htm">http://www.crescentbloom.com/Plants/Specimen/FO/Fortunella%20japonica.htm</a> ).   | 1. fruits are eaten 2. Not an internal or dermatological poison.   |
| 4.08 |  | no evidence  |
| 4.09 | 1. Watkins, Sheehan, and Black (2005) Florida Landscape Plants: Native and Exotic. University Press of Florida. 2. Plants for a Future ( <a href="http://www.pfaf.org/database/plants.php?Fortunella+japonica">http://www.pfaf.org/database/plants.php?Fortunella+japonica</a> ).  | 1. full sun to partial shade 2. "It can grow in semi-shade (light woodland)"   |
| 4.1  | 1. Watkins, Sheehan, and Black (2005) Florida Landscape Plants: Native and Exotic. University Press of Florida. 2. Plants for a Future ( <a href="http://www.pfaf.org/database/plants.php?Fortunella+japonica">http://www.pfaf.org/database/plants.php?Fortunella+japonica</a> ).  | 1. most well-drained soils 2. "The plant prefers light (sandy), medium (loamy) and heavy (clay) soils."  |
| 4.11 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.   | growth habit: shrub/tree   |
| 4.12 |  | no evidence  |
| 5.01 |  | terrestrial  |
| 5.02 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.   | Rutaceae   |
| 5.03 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.   | Rutaceae   |
| 5.04 |  |  |
| 6.01 |  |  |
| 6.02 | 1. Crescent Bloom ( <a href="http://www.crescentbloom.com/Plants/Specimen/FO/Fortunella%20japonica.htm">http://www.crescentbloom.com/Plants/Specimen/FO/Fortunella%20japonica.htm</a> ). 2. Plants for a Future ( <a href="http://www.pfaf.org/database/plants.php?Fortunella+japonica">http://www.pfaf.org/database/plants.php?Fortunella+japonica</a> ). 3. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. | 1. "Propagation of round kumquat...can be achieved by seed." 2. "Seed - best sown as soon as it is ripe in a warm airy position in a greenhouse." BUT 3. "Kumquats are rarely grown from seed as they do not do well on their own roots."  |
| 6.03 | Saunt (1990) Citrus Varieties of the World. Sinclair International Limited, Norwich, England.  | Can be crossed with limes (artificially).  |
| 6.04 | Crescent Bloom ( <a href="http://www.crescentbloom.com/Plants/Specimen/">http://www.crescentbloom.com/Plants/Specimen/</a>   | " <i>Fortunella japonica</i> is self-fertile."   |

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|      | FO/Fortunella%20japonica.htm).                                 |  |
| 6.05 |  |  |
| 6.06 |  |  |
| 6.07 | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. | slow growing   |
| 7.01 |  |  |
| 7.02 | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. | Cultivated as an ornamental and for fruit in Japan, Europe, and North America.   |
| 7.03 |  | no evidence  |
| 7.04 | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. | "fruit is round, slightly oblate or obovate; to 1 1/4 in (3.2 cm) long" [no evidence of adaptations to wind dispersal] |
| 7.05 |  | no evidence  |
| 7.06 |  | fleshy fruit   |
| 7.07 | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. | "fruit is round, slightly oblate or obovate; to 1 1/4 in (3.2 cm) long" [no evidence of any means of attachment]       |
| 7.08 |  | fleshy fruit   |
| 8.01 | Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. | 1-3 seeds/fruit  |
| 8.02 |  |  |
| 8.03 |  |  |
| 8.04 |  |  |
| 8.05 |  |  |