Maryland Department
of Agriculture

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Version 1

Weed Risk Assessment for *Ligustrum obtsifolium* Siebold and Zucc.(1846) (Oleaceae) – Border privet

Top: Flowers and fruits of *Ligustrum obtusifolium* (Zinovjev 2015); Bottom left: herbarium specimen (Thompson 1971); Bottom right: ornamental shrub: (King 2015).

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Introduction The Maryland Department of Agriculture regulates terrestrial ornamental invasive plants under the authority of Md. AGRICULTURE Code Ann. § 9.5-101 et seq. Invasive Plant Prevention and Control. An invasive plant is defined as a terrestrial plant species that a) did not evolve in the State, and b) if introduced within the State, will cause or is likely to cause, as determined by the Secretary: economic, ecological, environmental harm or harm to human health.

Maryland's Invasive Plant Advisory Committee (IPAC) was established by legislative mandate in October 2011. The IPAC's primary responsibility is to advise the Secretary of Agriculture on regulating the sale of invasive plants, and on preventing them from entering Maryland or from spreading further in the state. IPAC evaluates the risk potential of plants already present in Maryland, newly detected in the Maryland or the United States, those proposed for import, and those emerging as weeds elsewhere in the world.

IPAC evaluates the potential invasiveness of plants using the weed risk assessment (WRA) process developed by the Plant Protection and Quarantine (PPQ) Program of the US Department of Agriculture's Animal and Plant Health Inspection Service (Koop et al. 2012). PPQ's risk model uses information about a species' biological traits and behavior to evaluate its risk potential (Koop et al. 2012).

Because the PPQ WRA model is geographically and climatically neutral, it can be used to evaluate the baseline invasive/weed potential of any plant species for the entire United States, or for any specific region in the United States. In the PPQ process, the geographic potential of the species is evaluated separately so that risk managers can make decisions appropriate for their regions. With respect to Maryland's evaluation process, we use PPQ's Geographic Information System overlays of climate to evaluate the potential for a plant to establish and grow in Maryland. The PPQ weed risk assessment also uses a stochastic simulation to evaluate how the uncertainty associated with the assessments affects the model's predictions. Detailed information on the PPQ WRA process is available in the document, *Guidelines for the USDA-APHIS-PPQ Weed Risk Assessment Process* (APHIS PPQ 2015), which is available upon request.

IPAC uses a second tool, the Maryland Filter, to assign plant species that score as highly invasive either Tier 1 or Tier 2 status. Maryland regulations define Tier 1 plants as "invasive plant species that cause or are likely to cause severe harm within the State" and Tier 2 plants as "invasive plant species that cause or are likely to cause substantial negative impact within the State." The Maryland Filter considers the actual and potential distribution of the species in Maryland, its threat to threatened and endangered ecosystems and species in the state, the difficulty of control of the species, and whether added propagule pressure would be likely to increase its persistence and spread significantly. IPAC then recommends regulations to reduce the risk of the Tiered invasive plants in Maryland.

Ligustrum obtusifolium Siebold and Zucc. - Border privet

Species Information

Family: Oleaceae

Synonyms (The Plant List 2010; NGRP 2014): The genus, *Ligustrum* , is complicated and the species are often misidentified. *L. obtusifolium* may be understood as an inter-specific complex that includes *L. sinense* and *L. vulgare*, among others. The synonymy of *L. obtusifolium* itself can be confusing if care is not taken to consider the classifications completely. See Appendix C for detailed list of synonyms.

Ligustrum amurense Carrière
Ligustrum ibota Siebold
Ligustrum ibota var. *regelianum* Rehder
Ligustrum Siebold and Zucc.
Ligustrum subsp. *microphyllum* (Nakai) P. S. Green
Ligustrum ibota f. *microphyllum* Nakai
Ligustrum subsp. *obtusifolium*
Ligustrum var. *regelianum* Rehder
Ligustrum subsp. *suave* (Kitag.) Kitag.
Ligustrum regelianum Koehne

Common names: Amur privet; blunt-leaved privet; border privet; Ibota privet; Japanese deciduous privet; obtuse-leaved privet; regal privet (NGRP 2014)

Botanical description: Border privet is a deciduous shrub that can reach 10-12 feet tall and spread to 15 feet wide. *L. obtusifolium* readily establishes dense thickets in old fields, forest gaps, and disturbed urban and suburban forest remnants, and stream valleys, old fields, forest gaps, and disturbed urban and suburban forest remnants (Yatskievych and and Raveill 2001; Flory and Clay 2006; Herron et al. 2007; Martine et al. 2008; Reay and Moore 2009; Thompson and Green 2010; Boyce 2010; Maddox et al. 2010; Rhoads and Block 2011; Shannon, Flory, and Reynolds 2012). Complete botanical descriptions may be found at (Siebold and Zuccarini, 1846; eFloras.org 2006).

Initiation: *Ligustrum* is listed on the MD DNR Do Not Plant List. The Maryland Invasive Plant Advisory Committee (IPAC) requested an assessment of this species in the summer of 2014.

Foreign distribution: *L. obtusifolium* is indigenous to provinces of eastern China and to Japan (Editorial Committee of the Flora of China 2006; NGRP 2014). It has been introduced to numerous countries in Europe where it is found in managed gardens, arboreta, and landscapes in Europe (Hatch 2015).

U.S. distribution and status: In the United States *L. obtusifolium* is found in the United States from New England (except for Maine) to North Carolina and west through the Midwest to parts of the Mississippi River; it is also found in Washington State (USDA-NRCS 2012).

WRA area[1]: Entire United States, including territories.

Ligustrum obtusifolium Siebold and Zucc. – Privet
Family: Oleraceae

Summary Statement

The PPQ weed risk assessment for *Ligustrum* produced a result of High Risk after secondary screening. *L. obtusifolium* readily establishes dense thickets leading to a decline in biodiversity (Yatskievych and Raveill 2001; Flory and Clay 2006; Herron et al. 2007; Martine et al. 2008; Reay and Moore 2009; Thompson and Green 2010; Boyce 2010; Maddox et al. 2010; Rhoads and Block 2011; Shannon, Flory, and Reynolds 2012). In the Maryland Filter analysis, the species received a Tier II ranking because it is already widespread in Maryland and is not currently documented to threaten endangered species or ecosystems in the State. The species has been established for over 20 years in Maryland.

1. *Ligustrum obtusifolium* analysis

Establishment/Spread Potential *Ligustrum obtusifolium* has already demonstrated its ability to establish and spread in the United States (Yatskievych and Raveill 2001; Flory and Clay 2006; Herron et al. 2007; Martine et al. 2008; Reay and Moore 2009; Thompson and Green 2010; Boyce 2010; Maddox et al. 2010; Rhoads and Block 2011; Shannon, Flory, and Reynolds 2012). It spreads mainly by seed but also can readily resprout from roots and cut stems, which makes it capable of invading natural areas such as floodplain forests and woodlands (Prada and Arizpe 2008; Rhoads and Block 2011). *L. obtusifolium* forms dense thickets, preventing competition according to Rhoads and Block (2011), thus enabling establishment of new stands. We had a higher amount of uncertainty associated with this risk element, primarily because we were unable to answer four questions.
Risk score = 10 Uncertainty index = 0.22

Impact Potential *L. obtusifolioum* "can form dense thickets and could have impacts on native biodiversity in a number of locales" (Maybury 2014). *L. obtusifolium* negatively impacts plant communities according to Flory and Clay (2009, 2006). *L. obtusifolium* does not impact infrastructure. We found no evidence that it affects production systems. We had average uncertainty for this risk element.
Risk score = 2.0 Uncertainty index = 0.17

Geographic Potential Based on three climatic variables, we estimate that about 58 percent of the United States is suitable for the establishment of *Ligustrum obtusifolium* (Fig. 1). This predicted distribution is based on the species' known distribution

[1] "WRA area" is the area in relation to which the weed risk assessment is conducted [definition modified from that for "PRA area"] (IPPC 2012).

elsewhere in the world and includes point-referenced localities and areas of occurrence. The map for *L. obtusifolium* represents the joint distribution of Plant Hardiness Zones 3-11, areas with 10-100+ inches of annual precipitation, and the Köppen-Geiger climate classes Mediterranean, Humid subtropical, Marine west coast, Humid continental warm summers, and Humid continental cool summers.

The area of the United States shown to be climatically suitable (Fig. 1) is likely overestimated since our analysis considered only three climatic variables. Other environmental variables, such as soil and habitat type, may further limit the areas in which this species in likely to establish.

Entry Potential We did not assess the entry potential of *Ligustrum obtusifolium* because it has been present in the United States since the mid-19th century (Maddox, Byrd, and Serviss 2010).

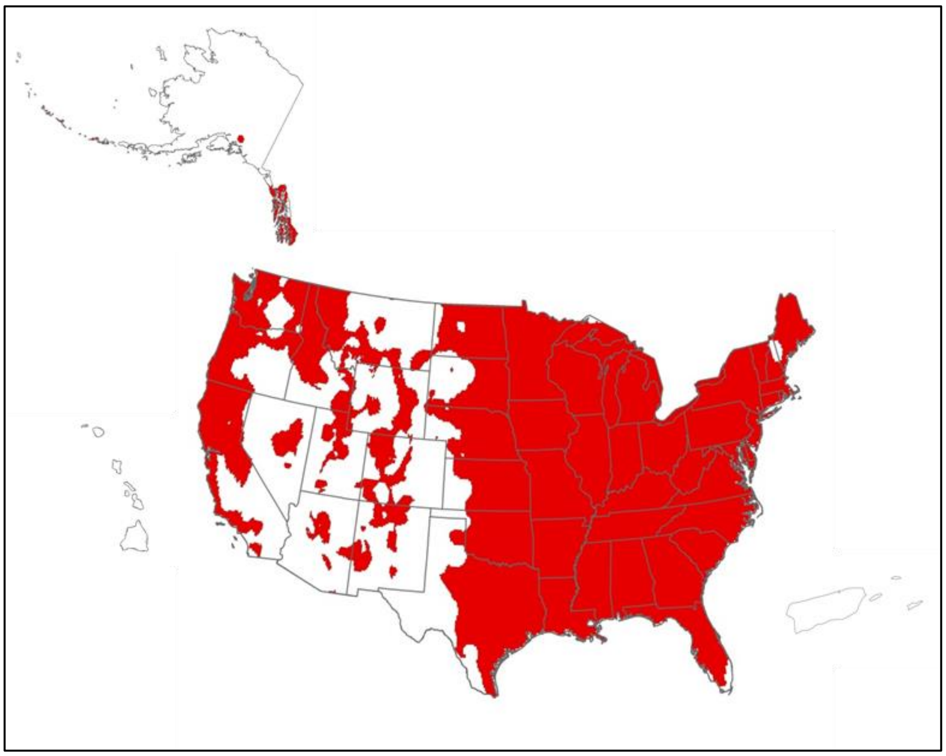

Figure 1. Predicted distribution of *Ligustrum obtusifolium* in the United States. Map insets for Alaska, Hawaii and Puerto Rico are not to scale.

2. Results

Model Probabilities: P(Major Invader) = 36.0%
P(Minor Invader) = 58.9%
P(Non-Invader) = 5.1%

Risk Result = Evaluate Further

Secondary Screening = Major Invader

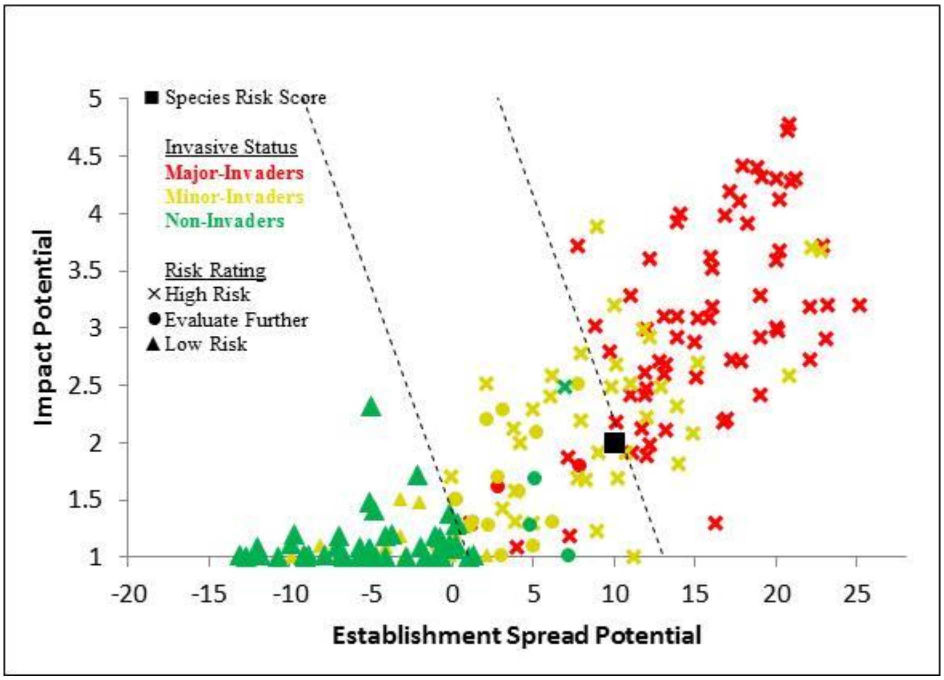

Figure 2. *Ligustrum obtusifolium* risk score (black box) relative to the risk scores of species used to develop and validate the PPQ WRA model (other symbols). See Appendix A for the complete assessment.

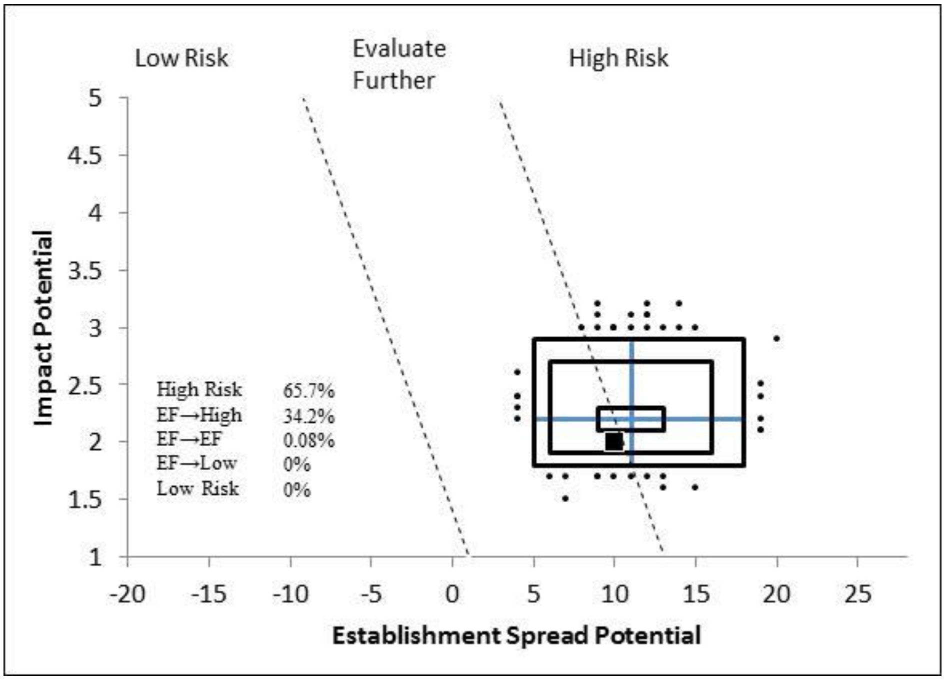

Figure 3. Monte Carlo simulation results (N = 5,000) for uncertainty around the risk score for *Ligustrum obtusifolium*. The blue "+" symbol represents the medians of the simulated outcomes. The smallest box contains 50 percent of the outcomes, the second 95 percent, and the largest 99 percent.

3. Discussion

The result of the weed risk assessment for *Ligustrum obtusifolium* was High Risk after secondary screening (Fig. 2). Overall, this species' profile is that of a minor-invader. The secondary screening tool classified it as high risk because it has demonstrated an ability to establish and spread elsewhere. We note that, had the species scored positively for one more question under establishment/spread potential or impact potential, the analysis would have resulted in a conclusion of High Risk without secondary screening. Because of its long established history in Maryland and the difficulty of control, it is assessed as a Tier 2 species in Maryland.

4. Literature Cited

Alien Invasive Landscape Plants in Virginia. 2014. Accessed online: http://www.virginia.edu/blandy/blandy_web/arboretum/virginia_invasive_plants.pdf.

Batcher, M. S. 2000. Element stewardship abstracts *Ligustrum* spp. - Privet.

BISON (U.S. Geological Survey). 2014. . Accessed online: http://bison.usgs.ornl.gov/.

Blume, C. L. von. 1850. *Museum Botanicum Lugduno-Batavum* (Mus. Bot.). Museum Botanicum Lugduno-Batavum (Mus. Bot.).

Boyce, R. L. 2010. Invasive shrubs in Kentucky. Northeastern Naturalist

17:1–32. Eagle Hill Institute.

Brand, M. (Ed.). 2001a. *Ligustrum obtusifolium*. Accessed online: http://www.hort.uconn.edu/plants/l/ligobt/ligobt1.html.

Brand, M. (Ed.). 2001b. UConn Plant Database. Accessed online: http://www.hort.uconn.edu/plants/index.html.

Carrière, É. A. 1861. *Ligustrum amurense*. Revue Horticole 33:352–353, f. 85.

Clements, A., M. David, D. Lee, and J. Krebs (Eds.). 2012. Privet (*Ligustrum obtusifolium*, *L. vulgare*, *L. ovalifolium*, *L. sinense*, and *L. amurense*). Accessed online: http://www.entm.purdue.edu/IISC/pdf/plants/Ligustrum_spp.pdf.

Dave's Garden (Ed.). 2014. PlantFiles: Border privet *Ligustrum obtusifolium*. Accessed online: http://davesgarden.com/guides/pf/go/78039/#b.

Dirr, M. 2011. Dirr's Encyclopedia of Trees and Shrubs. Timber Press.

Douce, G. K., D. J. Moorhead, C. T. Bargeron, and R. C. Reardon. 2005. Invasive.org: a web-based image archive and database system focused on north american exotic and invasive species. *in* K. W. Gottschalk, editor. Proceedings, XV U.S. Department of Agriculture interagency research forum on gypsy moth and other invasive species 2004. U.S. Department of Agriculture, Forest Service, Northeastern Research Station.

EDDMapS. 2015. Early Detection and Distribution Mapping System. Center for Invasive Species and Ecosystem Health. University of Georgia. Accessed online March 22, 2015: http://www.eddmaps.org/.

Editorial Committee of the Flora of China. 2006. Flora of China. Cambridge, USA. Accessed online: http://www.efloras.org/volume_page.aspx?volume_id=2022&flora_id=2.

Ehrenfeld, J. G. 2008. Exotic invasive species in urban wetlands: environmental correlates and implications for wetland management. Journal of Applied Ecology 45:1160–1169. doi: 10.1111/j.1365-2664.2008.01476.x.

Erdle, S. Y., and K. E. Heffernan. 2005. Management plan for Catlett Islands: Chesapeake Bay National Estuarine Research Reserve - Virginia.

Faxon, C. E. 1903. Trees and shrubs: illustrations of new or little known ligneous plants. (C. S. Sargent, Ed.). Houghton, Mifflin.

Felt, E. P. (Ed.). 1916. Journal of Economic Entomology. Entomological Society of America.

Flory, S. L., and K. Clay. 2006. Invasive shrub distribution varies with distance to roads and stand age in eastern deciduous forests in Indiana, USA. Plant ecology 184:131–141. Springer.

Forest Health Staff. 2005. Border Privet *Ligustrum obtusifolium* Sieb. & Zucc. Accessed online: http://www.na.fs.fed.us/fhp/invasive_plants/weeds/border_privet.pdf.

Francis, H. R. 1919. Trees in roadside treatment. Syracuse Univeristy, New York, New York, USA.

Franklin-Tong, V. E. 2008. Self-Incompatibility in flowering plants: evolution, diversity, and mechanisms. Springer Science & Business Media.

GBIF. 2015. Global Biodiversity Information Facility Data Portal. GBIF Secretariat. Accessed online: http://www.gbif.org/.

Gleditsch, J. M., and T. A. Carlo. 2011. Fruit quantity of invasive shrubs predicts the abundance of common native avian frugivores in central Pennsylvania. Diversity and Distributions 17:244–253. Blackwell Publishing Ltd.

Green, P. S. 1995. Taxonomic Notes relating to *Ligustrum* (Oleaceae). Kew Bulletin 50:379–386. Springer on behalf of Royal Botanic Gardens, Kew

Grove, E., and B. D. Clarkson. 2005. An ecological study of Chinese privet (*Ligustrum sinense* Lour.) in the Waikato Region. Hamilton, New Zealand.

Hanula, J. L., S. Horn, and J. W. Taylor. 2009. Chinese privet (*Ligustrum sinense)* Removal and its effect on native plant communities of riparian forests. Invasive Plant Science and Management 2:292–300. Weed Science Society of America.

Hara, H. 1944. *Ligustrum obtusifolium*. Journal of Japanese Botany (J. Jap. Bot.) 20:329.

Harrington, T. B., and J. H. MIller. 2005. Effects of application rate, timing, and formulation of glyphosate and triclopyr on control of Chinese privet (*Ligustrum sinense*). Weed Technology 19:47–54. Weed Science Society of America.

Hatch, L. C. 2015. Cultivars of woody plants:: *Lavandula, Lantana, Laurus*, and other genera. TCR Press.

Heap, I. 2012. The international survey of herbicide resistant weeds. Accessed online: http://www.weedscience.org/summary/home.aspx.

Hedges. 1918, May 11. . Fort Wayne News and Sentinel:9. Fort Wayne, Indiana, USA.

Heide-Jørgensen, H. S. 2008. Parasitic flowering plants. Brill.

Henry, R. D., and A. R. Scott. 1981. Time of introduction of the alien component of the spontaneous Illinois vascular flora. American Midland Naturalist 106:318–324. The University of Notre Dame.

Herron, P. M., C. T. Martine, A. M. Latimer, and S. A. Leicht-Young. 2007. Invasive plants and their ecological strategies: prediction and explanation of woody plant invasion in New England. Diversity and Distributions 13:633–644. Blackwell Publishing Ltd.

Hilty, J. (Ed.). 2012. Illinois wildflowers. Accessed online: http://www.illinoiswildflowers.info/.

HOSTS. 2014. No Title. Accessed online: http://www.nhm.ac.uk/index.html.

Hubick, B., and J. Brighton (Eds.). 2014. Maryland Biodiversity Project (MBP). Retrieved January 1, 2014, from http://www.marylandbiodiversity.com/index.php.

Hunter, J. C., and J. A. Mattice. 2002. The spread of woody exotics into the forests of a northeastern landscape, 1938-1999. Journal of the Torrey

Botanical Society 129:220–227. Torrey Botanical Society. doi: 10.2307/3088772.

Invasive Plants of Rhode Island. 2014. . Accessed online: http://www.urimastergardeners.org/2014-soil-testing.

ITIS. 2012. On-line Taxonomic Database. Accessed online: http://www.itis.gov/.

Jog, S. K., J. T. Kartesz, J. R. Johansen, and G. J. Wilder. 2005. Floristic study of highland heights community park, Cuyahoga County, Ohio. Castanea 70:136–145. Southern Appalachian Botanical Society.

Kelcey, J. G., and N. Müller. 2011. Plants and habitats of European cities. Springer.

Kerr, L. A., and W. J. Kelch. 1999. Fatal privet (*Ligustrum amurease*) toxicosis in Tennessee cows. Vet Hum Toxicol. 41:391–392.

King, G. J., C. P. Lindsey, and M. E. Zampardo. 2014. *Ligustrum obtusifolium* var. *regelianum*. Accessed online: http://woodyplants.nres.uiuc.edu/plant/ligobre.

King, G. L. 2015. Image: *Ligustrum obtusifolium* Border privet - Copyright @ 2015. UI Plants. Urbana-Champagne.

Kitagawa, M. 1934. *Ligustrum ibota* var. *suave*. Botanical Magazine 48:612–614, f. 18.

Kitagawa, M. 1965. *Ligustrum obtusifolium* subsp. *suave*. Journal of Japanese Botany 40:134–135.

Kitagawa, M. 1979. *Ligustrum suave*. Neo-Lineamenta Florae Manshuricae 510.

Koehne, B. A. E. 1896. *Ligustrum obtusifolium* var. *dubium.* Herb. Dendr.no. 191.

Koehne, B. A. E. 1904. *Ligustrum regelianum*. (Urb. & Graebn., Ed.) Festschr. Aschers.

Koidzumi, G. 1916. *Ligustrum ibota* var. *diabolicum*. Botanical Magazine (Bot. Mag. Tokyo) 30:82.

Koidzumi, G. 1926. *Ligustrum ibota* var. *obtusifolium*. Botanical Magazine (Bot. Mag. Tokyo) 40:342.

Kollmann, J., and S. A. Reiner. 1996. Light demands of shrub seedlings and their establishment within scrublands. Flora (Jena) 191:191–200.

Konno, K., C. Hirayama, H. Shinbo, and M. Nakamura. 2009. Glycine addition improves feeding performance of non-specialist herbivores on the privet, *Ligustrum obtusifolium*: *In vivo* evidence for the physiological impacts of anti-nutritive plant defense with iridoid and insect adaptation with glycine. Applied Entomology and Zoology 44:595–601.

Lavergne, C., J.-C. Rameau, and J. Figier. 1999. The invasive woody weed *Ligustrum robustum* subsp. *walkeri* threatens native forests on La Réunion. Biological Invasions 1:377–392. Kluwer Academic Publishers..

Lochmiller, R. L. 1978. Privet as a potential winter food supplement for songbirds. Bird-Banding 49:279–280 CR – Copyright © 1978 Association of. Wiley on behalf of Association of Field Ornithologists.

Mabberley, D. J. 2008. Mabberley's plant-book: A portable dictionary of plants, their Classifications, and Uses. Cambridge University Press.

Maddox, V., J. Byrd, and B. Serviss. 2010. Identification and control of invasive privets (*Ligustrum* spp.) in the middle southern United States. Invasive Plant Science and Management 3:482–488. Weed Science Society of America.

Mansfeld, R. 1924a. *Ligustrum ibota* var. *amurense*. Beibl. Bot. Jahrb. Syst. 132:65.

Mansfeld, R. 1924b. *Ligustrum ibota* var. *amurense* (Carrière). Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie. 132:32.

Martin, P. G., and J. M. Dowd. 1990. A protein sequence study of the dicotyledons and its relevance to the evolution of the legumes and nitrogen fixation. Australian Systematic Botany 3:91–100.

Martine, C. T., S. Leicht-Young, P. Herron, and A. Latimer. 2008. Fifteen woody species with potential for invasiveness in New England. Rhodora 110:345–353. The New England Botanical Club, Inc.

Maybury, K. 2014. *Ligustrum obtusifolium* (Sieb. & Zucc.) - border privet. Accessed online: http://explorer.natureserve.org/servlet/NatureServe?searchName=Ligustrum+obtusifolium.

Merriam, R., and E. Feil. 2002. The Potential Impact of an introduced shrub on native plant diversity and forest regeneration. Biological Invasions 4:369–373. Kluwer Academic Publishers.

Miller, J. H., E. B. Chambliss, and N. J. Loewenstein. 2010. A field guide for the identification of invasive plants in southern forests. Asheville, NC.

Missouri Botanical Gardens. 2013. Plant Finder. Accessed online: http://www.missouribotanicalgarden.org/.

Moorman, C. (Ed.). 2014. Japanese privet, Chinese privet, and Common privet. Accessed online: http://www.ncsu.edu/goingnative/howto/mapping/invexse/privets.html.

Munger, G. T. 2003. *Ligustrum* spp. Accessed online: http://www.fs.fed.us/database/feis/plants/shrub/ligspp/all.html.

Murata, G. 1962. *Ligustrum obtusifolium* f. *leiocalyx*. Acta Phytotaxonomica et Geobotanica (Acta Phytotax. Geobot.) 19:71.

Nakai, T. (Takenosin). 1911. *Ligustrum ibota* var. *tschonoskii*. Flora Koreana. Tokyo (Fl. Ko.) 2:89.

Nakai, T. (Takenosin). 1914. *Ligustrum ibota* var. *microphyllum*. Fl. Quelpart Is. 73.

Nakai, T. (Takenosin). 1918a. *Ligustrum ibota* f. *angustifolium*. Botanical Magazine (Bot. Mag. Tokyo) 32:123.

Nakai, T. (Takenosin). 1918b. *Ligustrum* ibota f. *tschonoskii*. Botanical Magazine (Bot. Mag. Tokyo) 32:1245.

Nakai, T. (Takenosin). 1922. Trees and shrubs indigenous in Japan proper, 1st edition. Seibido Shoten, Nihombashi, Tokyo, Japan.

Nakai, T. (Takenosin). 1931. *Ligustrum obtusifolium* var. *rubescens*.

Botanical Magazine (Bot. Mag. Tokyo) 45:130.
Nesom, G. L. 2009. Taxonomic overview of *Ligustrum* (Oleaceae) naturalized in North America North of Mexico. Phytologia 91:467–482.
NGRP. 2014. Germplasm Resources Information Network (GRIN). Online Database. National Germplasm Resources Laboratory, Beltsville, USA. Accessed online: http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?316751.
NH Department of Agriculture (Ed.). 2014. Blunt-Leaved / Boarder Privet Ligustrum obtusifolium. Accessed online: http://www.agriculture.nh.gov/publications-forms/documents/privet.pdf.
Nickrent, D. 2014. Parasitic plant classification. Accessed online: http://www.parasiticplants.siu.edu/.
Norton Brown Herbarium. 2015. University of Maryland College of Agriculture and Natural Resources. Accessed online April 11, 2015. http://www.nbh.psla.umd.edu/.
Oosterhout, E. van, J. Mowatt, L. Smith, and S. Johnson. 2010. Privet – broad-leaf, small-leaf and European. Accessed online: http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles/privet.
Orleans Conservation Trust (Ed.). 2014. Border privet (*Ligustrum obtusifolium*). Accessed online: http://orleansconservationtrust.org/.
OSU Pocket Gardener. 2015. *Ligustrum obtusifolium.* The Ohio State University. Accessed online: http://hvp.osu.edu/pocketgardener/source/description/li_olium.html.
PFAF (Ed.). 2014. *Ligustrum obtusifolium* - Siebold.& Zucc. Accessed online: http://www.pfaf.org/user/Plant.aspx?LatinName=Ligustrum+obtusifolium.
Plant Conservation Alliance’s Alien Plant Working Group (Ed.). 2014. No Title. Accessed online: http://www.nps.gov/plants/alien/index.htm.
Prada, M. A., and D. Arizpe. 2008. Riparian tree and shrub propagation handbook - an aid to riverine restoration in the Mediterranean region. (M. A. Prada and D. Arizpe, Eds.).
Reay, W. G., and K. A. Moore. 2009. Introduction to the Chesapeake Bay National Estuarine Research Reserve in Virginia. Journal of Coastal Research:1–9. Coastal Education and Research Foundation.
Regal Privet, Border privet *Ligustrum obtusifolium*. 2013. . Locke, New York, USA.
Rehder, A. 1899. *Ligustrum obtusifolium* var. *regelianum*. Möller’s Deutsche Gärtner-Zeitung 14:218.
Rehder, A. 1900. *Ligustrum ibota* var. *regelianum*. Page 912 *in* L. H. Bailey, editor. Cyclopedia of American Horticulture:
Rhoads, A. F., and T. A. Block. 2011. Obtuse-leaved privet, Border privet *Ligustrum obtusifolium* Siebold & Zucc. Accessed online: http://www.paflora.org/pdf/INV-Fact Sheets/Ligustrum obtusifolium.pdf.

Sargent, C. S. (Ed.). 1893. Garden and Forest. Garden and Forest Publishing Company.

Saunders, W. 1904. Trees and shrubes tested in Manitoba and the North-West Territories. Page 117 Bulletins. A. Angers, Minister of Agriculture, Ottowa, Canada.

Saunders, W., and W. T. Macoun. 1899. Catalogue of the trees and shrubs in the arboretum and botanic garden at the Central Experimental Farm, Ottawa. Ontario, Canada. Government Print. Bureau.

ScaleNet. 2014. . Accessed online: http://www.sel.barc.usda.gov/SCALENET/SCALENET.HTM.

Shelton, M. G., and M. D. Cain. 2002. Potential carry-over of seeds from 11 common shrub and vine competitors of loblolly and shortleaf pines. Can. J. For. Res. 32:412–419.

Siebold, P. F. (Balthasar) von. 1903. *Ligustrum ibota* var. *regelianum*. Page 418 *in* E. S. H. Z. L. Beissner, editor. Handbuch der Laubholzbenennung. Berlin, Germany.

Siebold, P. F. (Balthasar) von, and J. G. Zuccarini. 1846. *Ligustrum obtusifolium*. Abhandlungen der Mathematisch-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenschaften (Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.) 4:168.

Stevens, P. F. 2012. Angiosperm Phylogeny Website, version 13. Accessed online: http://www.mobot.org/MOBOT/research/APweb/.

Sukopp, H. 2006. Botanische Gärten und die Berliner Flora. Willdenowia 36:115–125. Botanischer Garten und Botanisches Museum, Berlin-Dahlem.

Swearingen, J., B. Slattery, K. Reshetiloff, and S. Zwicker. 2010a. Plant Invaders of Mid-Atlantic Natural Areas, 4th edition. Washington, District of Columbia.

Swearingen, J., B. Slattery;, K. Reshetiloff;, and S. Zwicker. 2010b. Plant Invaders of Mid-Atlantic Natural Areas, 4th edition. National Park Service and U.S. Fish and Wildlife Service, Washington, D. C.

The Plant List. 2010. The Plant List. Version 1. Accessed online: http://www.theplantlist.org/.

Thompson, O. 1971. Image: *Ligustrum obtusifolium* Sieb. & Zucc - Accession #18552. College Park. Accessed online: http://www.nbh.psla.umd.edu/detail.php?ID=000018552.

Thompson, R. L., and S. R. Green. 2010. Vascular plants of an abandoned limestone quarry in garrard County, Kentucky. Castanea 75:245–258. Southern Appalachian Botanical Society TVA Heritage Program, PO Box 1589, Norris, Tennessee 37828.

Tropicos Database. 2015. Missouri Botanical Garden: Tropicos database. Missouri Botanical Garden. Accessed online: http://www.tropicos.org/.

Uechi, N., and J. Yukawa. 2006. Host range and life History of *Asphondylia sphaera* (Diptera: Cecidomyiidae): Use of short-term alternate hosts. Annals of the Entomological Society of America 99:1165–1171. Entomological Society of America.

United States Bureau of Plant Industry. 1919. Inventory of seeds and plants imported. (D. Fairchild, Ed.). U.S. Government Printing Office, Washington, D.C.

United States. Agricultural Research Service. 1917. Plant Inventory.

USDA ARS. 2015. NC7 Woody Ornamental Trials. North Central Regional Plant Introduction Station, Ames, Iowa, USA. Accessed online: http://www.ars-grin.gov/ars/MidWest/Ames/repository/oldsitearchive/Ornamental_Trials/1999/1999pl~1.htm.

USDA NRCS. 2014. The PLANTS Database. Greensboro, NC 27401-4901 USA. Accessed online: http://plants.usda.gov.

Wagstaff, D. J. 2008. International Poisonous Plants Checklist: An Evidence-Based Reference. Taylor & Francis.

Wallender, E. 2014. Taxonomy and Systematics of the Plant Family Oleaceae. Accessed online: http://www.oleaceae.info/index.html.

WCPS. 2014. World Checklist of Selected Plant Families. Facilitated by the Royal Botanic Gardens, Kew. Retrieved January 1, 2014, from http://apps.kew.org/wcsp/.

Weldy, T., D. Werier, and A. Nelson. 2014. New York Flora Atlas.

Wieboldt, T. (Ed.). 2014. Digital Atlas of the Virginia Flora. Accessed online: http://vaplantatlas.org/news/about/about-digital-atlas/.

Williams, P. A., B. J. Karl, P. Bannister, and W. G. Lee. 2000. Small mammals as potential seed dispersers in New Zealand. Austral Ecology 25:523–532. Blackwell Science Pty.

Wyman, D. 1938. Hedges, Screens & windbreaks: their uses, selection and care. McGraw-Hill.

Wynne, J. W., A. J. Keaster, K. O. Gerhardt, and G. F. Krause. 1991. Plant species identified as food sources for adult Black cutworm (Lepidoptera: Noctuidae) in Northwestern Missouri. Journal of the Kansas Entomological Society 64:381–387. Allen Press on behalf of Kansas (Central States) Entomological Society.

Yatskievych, G., and J. A. Raveill. 2001. Notes on the increasing proportion of non-native angiosperms in the Missouri flora, with reports of three new genera for the state. SIDA, Contributions to Botany:701–709. JSTOR.

Zinovjev, A. 2015. Image: *Ligustrum obtusifolium* Sieb. & Zucc. Border privet - Copyright @ 2015. Retrieved May 20, 2003, from https://gobotany.newenglandwild.org/species/ligustrum/obtusifolium/.

Appendix A. Weed risk assessment for *Ligustrum obtusifolium* Siebold and Zucc.(1846) (Oleaceae). The following information came from the original risk assessment, which is available upon request (full responses and all guidance). The information has been modified to fit on the page.

Question ID	Answer - Uncertainty	Score	Notes (and references)
ESTABLISHMENT/SPREAD POTENTIAL			
ES-1 (Status/invasiveness outside its native range)	**f - negl**	**5**	USDA NRCS (2014) reports that *Ligustrum obtusifolium* is found in 21 states. It is recorded in the USDA plant inventories in 1917, and found in Illinois after 1922 (United States. Agricultural Research Service 1917; Henry and Scott 1981). *L. obtusifolium* may have been introduced as early as 1860 into the United States (Maddox, Byrd, and Serviss 2010). *L. obtusifolioum* has "demonstrated an invasive tendency in Connecticut, meaning it may escape from cultivation and naturalize in minimally managed areas (Brand 2001); is found to be invasive in Rhode Island (Invasive Plants of Rhode Island 2014). After its arrival in the United States in the 19th century, *L. obtusifolium* "quickly spread due to its use as hedging on private properties but it has made its way into the wild" in Massachusetts (Forest Health Staff 2005). The plant appears on the invasive watch list in Ohio as a "cultivated escape" (Jog et al. 2005). *L. obtusifolium* is established in North American stream valleys, old fields, forest gaps, and disturbed urban and suburban forest remnants (Yatskievych and Raveill 2001; Flory and Clay 2006; Herron et al. 2007; Martine et al. 2008; Reay and Moore 2009; Thompson and Green 2010; Boyce 2010; Maddox et al. 2010; Rhoads and Block 2011; Shannon, Flory, and Reynolds 2012). Early signs of potential establishment outside of garden settings were observed by Sargent (1893) who hoped that "Japanese Berberis Thunbergii and *Ligustrum* Ibota" would become as completely naturalized in some parts of the United States as *Ligustrum vulgare* and *Berberis vulgaris* had become naturalized in eastern New England noting that "when they [were] planted in semi wild situations numerous seedlings spring up and [were] able to hold their own against the encroachments of native plants (Sargent 1893). Alfred Rehder, Arnold Arboretum, wrote that "*Ligustrum* Amurense [syn. obtusifolium] was introduced according to Carrière in 1860 into the Jardin des Plantes in Paris from the Botanic Garden at St Petersburg, and [was reportedly] a native of Amurland" (Faxon 1903). Alternate choices for the Monte Carlo simulation were both "e."
ES-2 (Is the species highly domesticated)	**n - negl**	**0**	*L. obtusifolim* has been cultivated for ornamental use in the horticulture trade since the late 19th century in North America (Sargent 1893; Saunders and Macoun 1899; Rehder 1900; Faxon 1903; Saunders 1904); however, we found no evidence

Question ID	Answer - Uncertainty	Score	Notes (and references)
			of breeding or selection for traits associated with reduced weed potential
ES-3 (Weedy congeners)	**y - negl**	**1**	ITIS lists 12 species in the genus *Ligustrum*. USDA GRIN (NGRP 2012) lists 41 species in the genus. Wallender (2014) lists 45 species in the genus. Nesom (2009) lists eight species of *Ligustrum* that are known to be "naturalized in North America north of Mexico." *Ligustrum sinense* (Hanula, Horn, and Taylor 2009); *L. vulgare* (Hunter and Mattice 2002; ISSG 2012); *L. ovalifolium* (Herron et al. 2007), are listed as potentially invasive but not banned in Connecticut (USDA NRCS 2014). *L. sinense* and *L. vulgare* are noxious weeds in New South Wales, Australia (Oosterhout et al. 2010). *L. japonicum*, *L. sinense*, and *L. vulgare* invade lowland and upland sites in the North American Southeast (Swearingen et al. 2010; Moorman 2014).
ES-4 (Shade tolerant at some stage of its life cycle)	**n - high**	**0**	*Ligustrum obtusifolium* tolerates full sun to part shade (Kollmann and Reiner 1996; Brand 2001; Missouri Botanical Gardens 2013). Horticultural references consistently cite part shade, not full shade, therefore we answered "no" with high uncertainty because some ecological papers reference a shade regime; c.f. *L. robustum* subsp. walkeri (Lavergne, Rameau, and Figier 1999).
ES-5 (Climbing or smothering growth form)	**n - negl**	**0**	This species is a deciduous shrub, not a vine (eFloras.org 2006a; b).
ES-6 (Forms dense thickets)	**y - negl**	**2**	*L. obtusifolium* can form dense thickets (Miller, Chambliss, and Loewenstein 2010; Maddox, Byrd, and Serviss 2010). *L. obtusifoium* is "particularly abundant in stream valleys, old fields, forest gaps, and disturbed urban and suburban forest remnants" according to Rhoads and Block (2011).
ES-7 (Aquatic)	**n - negl**	**0**	*L. obtusifolium* is a terrestrial shrub (eFloras.org 2006; NGRP 2012) and not an aquatic plant.
ES-8 (Grass)	**n - negl**	**0**	*Ligustrum* is not a grass (Poaceae); it is in the Oleaceae (olive) family (USDA NRCS 2014).
ES-9 (Nitrogen-fixing woody plant)	**n - negl**	**0**	We found no evidence of nitrogen fixation in this species or the genus *Ligustrum* ; species is in the Oleaceae family which is not known to contain nitrogen-fixing species (Martin and Dowd 1990).
ES-10 (Does it produce viable seeds or spores)	**y - negl**	**1**	*Ligustrum* spp. reproduce by seed (Prada et al. 2008; United States Bureau of Plant Industry 1919; OSU Pocket Gardener 2015)
ES-11 (Self-compatible or apomictic)	**? - max**	**0**	We found no information on this question.
ES-12 (Requires special pollinators)	**n - mod**	**0**	*L. obtusifolium* flowers "offer nectar and pollen ...to floral visitors...[that] include honeybees and other bees, the Red Admiral and other butterflies, and probably other insects " (Hilty 2012).

Question ID	Answer - Uncertainty	Score	Notes (and references)
ES-13 (Minimum generation time)	**c - high**	**0**	Three years to maturity was cited in Hilty (2012). Because we found no other evidence, we answered "c" with high uncertainty The alternate answers for the Monte Carlo simulation were both "d" as it seems unlikely this species will produce the next generation within 2-3 years.
ES-14 (Prolific reproduction)	**? - max**	**-1**	Unknown for *L. obtusifolium*.
ES-15 (Propagules likely to be dispersed unintentionally by people)	**? - max**	**0**	Unknown.
ES-16 (Propagules likely to disperse in trade as contaminants or hitchhikers)	**? - max**	**0**	We found no evidence.
ES-17 (Number of natural dispersal vectors)	**1**	**-2**	Fruit and seed descriptions used to answer ES-17a through e: Drupes of *L. obtusifolium* are subglobose to broadly ellipsoid, 5–8 mm; seeds 1 (Nesom 2009); fruit purple-black, subglobose to broadly ellipsoid, 5-8 x 4-6 mm. (eFloras.org 2006a); fruit is a small black to blue-black oval to spherical drupe (i.e., a fleshy fruit with 1-several stony seeds inside) (Swearingen et al. 2010).
ES-17a (Wind dispersal)	**n - negl**		We found no evidence that fruit are or are not wind dispersed, however fruit seem too large for wind dispersal (Herron et al. 2007; Lenoir and Herron 2009).
ES-17b (Water dispersal)	**n - mod**		We found no direct evidence.
ES-17c (Bird dispersal)	**y - negl**		Seed dispersal is mainly from frugivorous birds (Gleditsch and Carlo 2011; NH Department of Agriculture 2014).Bird dispersal (Lochmiller 1978; Munger 2003).
ES-17d (Animal external dispersal)	**n - low**		There is no evidence, research or documentation that fruit are adapted for external dispersal on animals. Based on the morphology of fruit, this dispersal mechanism seems unlikely.
ES-17e (Animal internal dispersal)	**n - mod**		No direct evidence for this vector for *L. obtusifolium* specifically; some evidence that ingested seed would not survive ingestion for other *Ligustrum* spp. (Williams et al. 2000).
ES-18 (Evidence that a persistent (>1yr) propagule bank (seed bank) is formed)	**n - mod**	**-1**	No persistent seed bank for *Ligustrum* spp. (Shelton and Cain 2002; Munger 2003).
ES-19 (Tolerates/benefits from mutilation, cultivation or fire)	**y - low**	**1**	*L. obtusifolium* resprouts necessitating repeated control procedures (Rhoads and Block 2011); likely to benefit from fire disturbance but no documentation (Munger 2003). Because the plant is easily propagated clonally, we might surmise that it benefits from disturbance.
ES-20 (Is resistant	**n - negl**	**0**	No evidence of resistance in *Ligustrum* spp. (Heap 2012); no

Question ID	Answer - Uncertainty	Score	Notes (and references)
to some herbicides or has the potential to become resistant)			evidence of herbicide resistance in *L. obtusifolium* (Batcher 2000; Harrington and Miller 2005; Boyce 2010; Maddox et al. 2010).
ES-21 (Number of cold hardiness zones suitable for its survival)	**9**	**0**	
ES-22 (Number of climate types suitable for its survival)	**5**	**2**	
ES-23 (Number of precipitation bands suitable for its survival)	**10**	**1**	
IMPACT POTENTIAL			
General Impacts			
Imp-G1 (Allelopathic)	**n - high**	**0**	We found no evidence of allelopathy in *L. obtusifolium*. There is one study on *L. sinense* which suggests some allelopathic potential (Grove and Clarkson 2005).
Imp-G2 (Parasitic)	**n - negl**	**0**	We found no evidence that *L. obtusifolium* is parasitic. It is in the Oleaceae family (NGRP 2012) which is not known to contain parasitic plants (Heide-Jørgensen 2008; Nickrent 2014).
Impacts to Natural Systems			
Imp-N1 (Change ecosystem processes and parameters that affect other species)	**n - mod**	**0**	"No evidence of significant impacts on abiotic processes" (Maybury 2014).
Imp-N2 (Change community structure)	**n - high**	**0**	We did not find any direct evidence that it changes habitat structure. However, because it does form dense thickets (see ES-6), we suspect it may be able to. Consequently, we answered “no” but with high uncertainty.
Imp-N3 (Change community composition)	**y - low**	**0.2**	According to Maybury (2014), *L. obtusifolium* "generally invades lower quality disturbed habitats but it can form dense thickets and could have impacts on native biodiversity in a number of locales." *L. obtusifolium* negatively impacts plant communities according to Flory and Clay (2009, 2006) citing Merriam and Feil (2002), however, Merriam and Feil discuss *L.sinense* not *obtusifolium* in the 2002 paper. Maybury (2014) notes that *L. obtusifolium* thickets "can crowd out native species” citing IPANE, with no date given.
Imp-N4 (Is it likely to affect federal Threatened and	**y - negl**	**0.1**	Because this species invades natural systems in the United States, it has the potential to impact Tand E species. Erdle and Heffernan (2005) specifically list *L. obtusifolium* as a threat to

Question ID	Answer - Uncertainty	Score	Notes (and references)
Endangered species)			"[p]otential rare plant species include Virginia rare southern beach spurge (*Chamaesyce bombensis*), known from York County, the federally-listed (threatened) seabeach amaranth (*Amaranthus pumilus*), and the globally rare sea-beach knotweed (*Polygonum glaucum*).
Imp-N5 (Is it likely to affect any globally outstanding ecoregions)	**? - max**		We did not find any direct evidence that this species is likely to affect globally outstanding ecoregions in the United States. Because the congener, *L. sinense* threatens significant ecosystems (USDA NRCS 2014) we answered unknown.
Imp-N6 (Weed status in natural systems)	**c - negl**	**0.6**	*L. obtusifolium* is banned in Connecticut and prohibited in Massachusetts and New Hampshire (USDA NRCS 2014). Significant amount of control and management information exists (Batcher 2000; Bargeron et al. 2008; Maddox et al. 2010; Rhoads and Block 2011). The alternate answers for the Monte Carlo simulation were both choice "b."
Impact to Anthropogenic Systems (cities, suburbs, roadways)			
Imp-A1 (Impacts human property, processes, civilization, or safety)	n - mod		*Ligustrum obtusifolium* is primarily a weed of natural systems (see evidence above). We found no evidence that it is a weed of anthropogenic systems. Because it has been has been under cultivation for at least 150 years (Maddox, Byrd, and Serviss 2010) and is relatively well known, we answered no with moderate uncertainty for questions in this section).
Imp-A2 (Changes or limits recreational use of an area)	n - mod		No evidence found.
Imp-A3 (Outcompetes, replaces, or otherwise affects desirable plants and vegetation)	n - mod	0	No evidence found.
Imp-A4 (Weed status in anthropogenic systems)	a - mod	0	No evidence. One gardener reported a control and removal problem over a 20-year period (Dave's Garden 2014). Because that was just one report, we answered "a" with moderate uncertainty. Alternate answers for the Monte Carlo simulation were "b" and "c."
Impact to Production Systems (agriculture, nurseries, forest plantations, orchards, etc.)			
Imp-P1 (Reduces crop/product yield)	n - low	0	We found no evidence. *Ligustrum* is primarily a weed of natural systems (see evidence above). We found no evidence it is a

Question ID	Answer - Uncertainty	Score	Notes (and references)
			weed of productions systems. Because it has been has been under cultivation for at least 150 years (Maddox, Byrd, and Serviss 2010), is relatively well known, and is a woody shrub that is unlikely to establish in most production systems, we answered “no” with low uncertainty for most questions in this section.
Imp-P2 (Lowers commodity value)	n - mod	0	We found no evidence. Mabberley (2008) reports that the trimethylamines in *Ligustrum* spp. flowers taint honey of bees that feed on it.
Imp-P3 (Is it likely to impact trade)	n - low	0	We found no evidence.
Imp-P4 (Reduces the quality or availability of irrigation, or strongly competes with plants for water)	n - low	0	We found no evidence.
Imp-P5 (Toxic to animals, including livestock/range animals and poultry)	n - high	0.1	According to PFAF (2014), at least one member of the *Ligustrum* "genus is recorded as being mildly toxic." "Five of 24 cows pastured in a 40-acre field in east Tennessee died after they consumed leaves from a privet (*Ligustrum amurense*) hedge" (Kerr and Kelch 1999).
Imp-P6 (Weed status in production systems)	a - mod	0	We found no strong evidence to support consideration as an agricultural weed. Alternate answers for the Monte Carlo simulation are both "b.”
GEOGRAPHIC POTENTIAL			Unless otherwise indicated, the following evidence represents geographically-referenced points obtained from the Global Biodiversity Information Facility (GBIF), accessed in 2015. Geo-referenced points from sources other than GBIF are noted as (pt.) Non-geo-referenced locations from GBIF and other sources are notes as occurrences (occ.), that is, presence in a region.
Plant hardiness zones			
Geo-Z1 (Zone 1)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this zone.
Geo-Z2 (Zone 2)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this zone.
Geo-Z3 (Zone 3)	y - mod	N/A	(Dirr 2011); China: Heilongjiang (GBIF 2015, occ.)
Geo-Z4 (Zone 4)	y - negl	N/A	(Dirr 2011); (King, Lindsey, and Zampardo 2014); China: Heilongjiang (GBIF 2015, occ.)
Geo-Z5 (Zone 5)	y - negl	N/A	(Dirr 2011); Fort Leavenworth Military Reservation, KS; Lawrence, SE side, KS (GBIF 2015); China: Heilongjiang, Liaoning (GBIF 2015, occ.)
Geo-Z6 (Zone 6)	y - negl	N/A	(Dirr 2011); St. Joe State Park, MO; Bolton, MA, KS, IL, OH, VA Japan (GBIF 2015 (pt); Korea (GBIF 2015 occ.)
Geo-Z7 (Zone 7)	y - negl	N/A	(Dirr 2011); University of Maryland. College Park, MD; USDA ARS BARC, MD; CT, DC, KS, MA, MD, MO, NJ, NY, VA (GBIF, 2015); Germany (GBIF, 2015); Tsushima-shi. Japan

Question ID	Answer - Uncertainty	Score	Notes (and references)
			(GBIF 2015); Korea (GBIF 2015 occ.)
Geo-Z8 (Zone 8)	y - negl	N/A	Seattle, WA; Chico Creek, CA, MA, China; Japan (GBIF 2015); Korea (GBIF 2015 occ.)
Geo-Z9 (Zone 9)	y - negl	N/A	Taibaishan, China; Yamakami, Sugimori, Japan (GBIF 2015); Plummers Island, trail along Potomac River, MD, CA, China, Japan (GBIF 2015); Korea (GBIF 2015 occ.)
Geo-Z10 (Zone 10)	y - negl	N/A	Hamao, Hamao Retarding Basin., Japan (GBIF 2015)
Geo-Z11 (Zone 11)	y - negl	N/A	Ogasawara-mura, Japan (GBIF 2015)
Geo-Z12 (Zone 12)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this zone.
Geo-Z13 (Zone 13)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this zone.
Köppen -Geiger climate classes			
Geo-C1 (Tropical rainforest)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
Geo-C2 (Tropical savanna)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
Geo-C3 (Steppe)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
Geo-C4 (Desert)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
Geo-C5 (Mediterranean)	y - low	N/A	USA: CA, MA, WA (GBIF 2015.) We used low uncertainly rather than neglible because the Washington state location is in a park and could be deliberately planted.
Geo-C6 (Humid subtropical)	y - negl	N/A	Ogasawara-mura, Japan; USA: DC, KS, MD, MO, VA, China, Japan (GBIF 2015); Korea (GBIF 2015 occ.)
Geo-C7 (Marine west coast)	y - low	N/A	Germany (GBIF 2015)
Geo-C8 (Humid cont. warm sum.)	y - negl	N/A	USA: CT, IN, KS, MD, MO, NJ, NY, OH (GBIF 2015); China: Heilongjiang, Liaoning, Shandong (GBIF 2015 occ.)
Geo-C9 (Humid cont. cool sum.)	y - negl	N/A	USA: MA, MI (GBIF 2015) China: Heilongjiang (GBIF 2015 occ.); Japan (GBIF 2015); North Korea (GBIF 2015 occ.)
Geo-C10 (Subarctic)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
Geo-C11 (Tundra)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
Geo-C12 (Icecap)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this climate class.
10-inch precipitation bands			
Geo-R1 (0-10 inches; 0-25 cm)	n - negl	N/A	We found no evidence of *Ligustrum* occurring in this precipitation band.
Geo-R2 (10-20 inches; 25-51 cm)	y - low	N/A	Japan (Himao, Tsushima-shi); China: Heilongjiang, Liaoning, Shandong (GBIF 2015 occ.)
Geo-R3 (20-30 inches; 51-76 cm)	y - negl	N/A	USA: CA; Germany (GBIF 2015); China: Jiangsu (pt), Shandong (occ.) (GBIF 2015); Korea (GBIF 2015 occ.)
Geo-R4 (30-40 inches; 76-102 cm)	y - negl	N/A	USA: KS, MO, WA; China; Japan (GBIF 2015)

Question ID	Answer - Uncertainty	Score	Notes (and references)
Geo-R5 (40-50 inches; 102-127 cm)	y - negl	N/A	(Erdle and Heffernan 2005); USA: DC, IL, MD, MI, MO, OH, VA; China; Japan (GBIF 2015) Korea (GBIF 2015 occ.)
Geo-R6 (50-60 inches; 127-152 cm)	y - negl	N/A	USA: CT, MA, NJ; China; Japan (GBIF 2015); Korea GBIF 2015 occ.)
Geo-R7 (60-70 inches; 152-178 cm)	y - negl	N/A	China; Japan (GBIF 2015); Korea (GBIF 2015 occ.)
Geo-R8 (70-80 inches; 178-203 cm)	y - negl	N/A	China; Japan (GBIF 2015)
Geo-R9 (80-90 inches; 203-229 cm)	y - negl	N/A	China; Japan (GBIF 2015)
Geo-R10 (90-100 inches; 229-254 cm)	y - negl	N/A	China; Japan (GBIF 2015)
Geo-R11 (100+ inches; 254+ cm)	y - negl	N/A	China; Japan (GBIF 2015)
ENTRY POTENTIAL			
Ent-1 (Plant already here)	y - negl	1	*Ligustrum* is present in the United States (USDA NRCS 2014).
Ent-2 (Plant proposed for entry, or entry is imminent)	-	N/A	
Ent-3 (Human value and cultivation/trade status)	-	N/A	
Ent-4 (Entry as a contaminant)			
Ent-4a (Plant present in Canada, Mexico, Central America, the Caribbean or China)	-	N/A	
Ent-4b (Contaminant of plant propagative material (except seeds))	-	N/A	
Ent-4c (Contaminant of seeds for planting)	-	N/A	

Question ID	**Answer - Uncertainty**	**Score**	**Notes (and references)**
Ent-4d (Contaminant of ballast water)	-	N/A	
Ent-4e (Contaminant of aquarium plants or other aquarium products)	-	N/A	
Ent-4f (Contaminant of landscape products)	-	N/A	
Ent-4g (Contaminant of containers, packing materials, trade goods, equipment or conveyances)	-	N/A	
Ent-4h (Contaminants of fruit, vegetables, or other products for consumption or processing)	-	N/A	
Ent-4i (Contaminant of some other pathway)	-	N/A	
Ent-5 (Likely to enter through natural dispersal)	-	N/A	

Appendix B. Maryland filter assessment for *Ligustrum* Siebold and Zucc.(1846) (Oleaceae).

Maryland Filter questions	Answer	Notes
1. Is the plant a sterile cultivar or used only for root stock? yes OR no	no	Mature privet, *Ligustrum* spp., can produce hundreds of fruits per plant per year (Munger 2003).
2. What is the species potential distribution in Maryland? wide OR narrow	wide	Occurs in Harford County to Prince George's and Montgomery (EDDMapS 2015), but has the potential to occur in any physiographic province in Maryland according to the WRA geographic analysis.
3. Could the species harm threatened or endangered Maryland species or community types or CITES listed species occurring in MD? yes OR no	unknown	
4. How feasible is control of the species? easy OR difficult	difficult	Plants reproduce vegetatively from root sprouts (Rhoads and Block 2011).
5. Is added propagule pressure from sales significantly increasing potential of the species to persist and spread? yes OR no	Tier 2	*Ligustrum obtusifolium* has been present in Maryland since at least 1928 (Norton Brown Herbarium 2015).

Appendix C. Detailed list of synonyms (The Plant List 2010; NGRP 2014):

Ligustrum amurense Carrière
  Synonym of: *Ligustrum* subsp. *suave* (Kitag.) Kitag.
Ligustrum ciliatum Siebold ex Blume
  Synonym of: *Ligustrum ibota* Siebold
Ligustrum ibota Siebold
  Synonyms:
  Ligustrum ciliatum Siebold ex Blume
  Ligustrum ibota f. *microphyllum* Nakai
    Synonym of: *Ligustrum* subsp. *microphyllum* (Nakai) P. S. Green
Ligustrum ibota var. *regelianum* Rehder
  Synonym of: *Ligustrum* subsp. *obtusifolium*
Ligustrum Siebold and Zucc.
  Synonym:
  Ligustrum regelianum Koehne
Ligustrum subsp. *microphyllum* (Nakai) P. S. Green
Ligustrum ibota f. *microphyllum* Nakai
Ligustrum subsp. *obtusifolium*

Synonyms:
Ligustrum ibota var. *regelianum* Rehder
Ligustrum var. *regelianum* Rehder
Ligustrum var. *regelianum* Rehder
Synonym of: *Ligustrum* subsp. *obtusifolium*
Ligustrum subsp. *suave* (Kitag.) Kitag.
Synonym:
Ligustrum amurense Carrière
Ligustrum regelianum Koehne
Synonym of: *Ligustrum* Siebold and Zucc.