

Assessment date 15 August 2016

<i>Hedera helix</i> North ZONE		Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	unk	
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	?	
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
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	y	1
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1

6.03	Hybridizes naturally	unk	-1
6.04	Self-compatible or apomictic	?	
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	4	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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	unk	-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)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	n	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
Total Score			11
Implemented Pacific Second Screening			no
Risk Assessment Results			High

section	# questions answered	satisfy minimum?
A		10 yes
B		10 yes
C		15 yes
total		35 yes

Assessment date 15 August 2016

<i>Hedera helix</i> Central ZONE		Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	1	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	unk	
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	?	
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
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	y	1
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1

6.03	Hybridizes naturally	unk	-1
6.04	Self-compatible or apomictic	?	
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	4	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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	unk	-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)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	n	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
Total Score			11
Implemented Pacific Second Screening			no
Risk Assessment Results			High

section	# questions answered	satisfy minimum?
A		10 yes
B		10 yes
C		15 yes
total		35 yes

Assessment date 15 August 2016

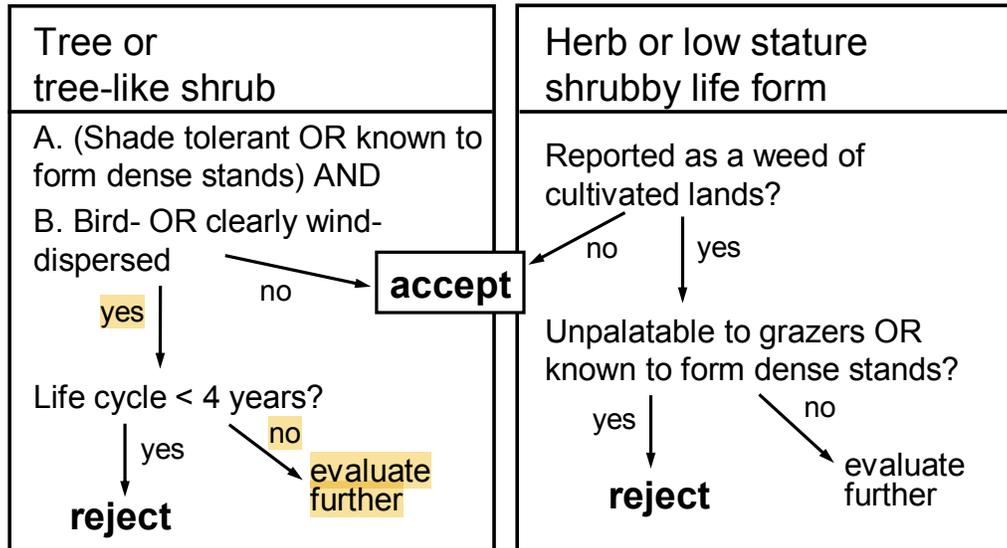
<i>Hedera helix</i> South ZONE		Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	0	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	1
3.02	Garden/amenity/disturbance weed	y	1
3.03	Weed of agriculture	unk	
3.04	Environmental weed	y	1
3.05	Congeneric weed	y	1
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	?	
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
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	y	1
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1

6.03	Hybridizes naturally	unk	-1
6.04	Self-compatible or apomictic	?	
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	4	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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	unk	-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)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	n	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
Total Score		5	
Implemented Pacific Second Screening		yes	
Risk Assessment Results		Evaluate	

section	# questions answered	satisfy minimum?
A		10 yes
B		10 yes
C		15 yes
total		35 yes

Pacific second screening: decision rules for species with WRA scores between 1 and 6

(from Daehler *et al.* 2004)



Vines must pass both tests

	Reference	Source data
1.01		Cultivated but no evidence of selection for reduced weediness
1.02		Skip to question 2.01
1.03		Skip to question 2.01
2.01	<p>1. PERAL NAPPFAST Global Plant Hardiness. http://www.nappfast.org/Plant_hardiness/2012/PHZ%20update%201230%20yr%20%20300dpi.tif (Accessed: 27 April 2016) 2. Learn2Grow. http://www.learn2grow.com/plants/hedera-helix/ (Accessed: 2 May 2016) 3. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 4. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 5. Dave's Garden. http://davesgarden.com/guides/pf/go/1637/ (Accessed: 14 July 2016) 6. NC State University and A&T State University Cooperative Extension. https://plants.ces.ncsu.edu/plants/all/hedera-helix/ (Accessed: 14 July 2016) 7. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?300252 (Accessed: 16 July 2016)</p>	<p>1. Florida North Zone: Hardiness zones 8 and 9. Central Zone: Hardiness zones 9 and 10. South Zone: Hardiness zone 10. 2. "USDA Hardiness Zone3 - 10" 3. "Hedera helix is native to western, central and southern Europe. Its distribution extends from southern Scandinavia (Norway and Sweden) in the north to Latvia and the Ukraine in the east and southeast to Bulgaria, western Turkey, Greece (including Crete) and Cyprus." 4. "Native range: English ivy is native to Eurasia [46,52,103,104,186,192,196], occurring from the Caucasus Mountains [184,186] to Norway [52,145] and south to Iran [97] and northern Africa [97,184]. It tends to be less abundant north of the Alps [145]." 5. Hardiness: USDA Zones 5a to 9b 6. "Hardiness: 5 to 9" 6. Native to Africa: Algeria, Libya, Morocco, Tunisia, Asia: Armenia, Georgia, Russian Federation-Ciscaucasia, Cyprus, Iran, Iraq, Israel, Lebanon, Syria, Turkey, Europe: Belarus, Latvia, Lithuania, Moldova, Ukraine, Austria, Belgium, Czechoslovakia, Germany, Hungary, Netherlands, Poland, Switzerland, Denmark, Ireland, Norway, Sweden, United Kingdom, Albania, Bulgaria, Former Yugoslavia, Greece, Italy, Romania, France, Portugal, Spain. Naturalized in Australia, New Zealand, Canada, United States, Hawaii.</p>
2.02		Native range is well known. This species is not suited for Zone 10.
2.03	<p>1. The University of Melbourne. Köppen-Geiger Climate Map of the World. http://people.eng.unimelb.edu.au/mpeel/koppen.html (Accessed: 27 April 2016) 2. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?300252 (Accessed: 16 July 2016) 3. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 4. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. Native or naturalized in Köppen-Geiger Climate Zones BWh, BWk, BSh, BSk, Csa, Csb, Cfa, Cfc, Dfa, Dfb, and Dfc. 2. Native to Africa: Algeria, Libya, Morocco, Tunisia, Asia: Armenia, Georgia, Russian Federation-Ciscaucasia, Cyprus, Iran, Iraq, Israel, Lebanon, Syria, Turkey, Europe: Belarus, Latvia, Lithuania, Moldova, Ukraine, Austria, Belgium, Czechoslovakia, Germany, Hungary, Netherlands, Poland, Switzerland, Denmark, Ireland, Norway, Sweden, United Kingdom, Albania, Bulgaria, Former Yugoslavia, Greece, Italy, Romania, France, Portugal, Spain. Naturalized in Australia, New Zealand, Canada, United States, Hawaii. 3. "Hedera helix is native to western, central and southern Europe. Its distribution extends from southern Scandinavia (Norway and Sweden) in the north to Latvia and the Ukraine in the east and southeast to Bulgaria, western Turkey, Greece (including Crete) and Cyprus." 4. "Native range: English ivy is native to Eurasia [46,52,103,104,186,192,196], occurring from the Caucasus Mountains [184,186] to Norway [52,145] and south to Iran [97] and northern Africa [97,184]. It tends to be less abundant north of the Alps [145]."</p>

2.04	<p>1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (Accessed: 27 April 2016) 2. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?300252 (Accessed: 16 July 2016) 3. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 4. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. Native or naturalized in areas with rainfall within these ranges. 2. Native to Africa: Algeria, Libya, Morocco, Tunisia, Asia: Armenia, Georgia, Russian Federation-Ciscaucasia, Cyprus, Iran, Iraq, Israel, Lebanon, Syria, Turkey, Europe: Belarus, Latvia, Lithuania, Moldova, Ukraine, Austria, Belgium, Czechoslovakia, Germany, Hungary, Netherlands, Poland, Switzerland, Denmark, Ireland, Norway, Sweden, United Kingdom, Albania, Bulgaria, Former Yugoslavia, Greece, Italy, Romania, France, Portugal, Spain. Naturalized in Australia, New Zealand, Canada, United States, Hawaii. 3. "Hedera helix is native to western, central and southern Europe. Its distribution extends from southern Scandinavia (Norway and Sweden) in the north to Latvia and the Ukraine in the east and southeast to Bulgaria, western Turkey, Greece (including Crete) and Cyprus." 4. "Native range: English ivy is native to Eurasia [46,52,103,104,186,192,196], occurring from the Caucasus Mountains [184,186] to Norway [52,145] and south to Iran [97] and northern Africa [97,184]. It tends to be less abundant north of the Alps [145]."</p>
2.05	<p>1. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 2. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (Accessed: 24 June 2016) 3. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 4. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?300252 (Accessed: 14 July 2016)</p>	<p>1. "European colonists introduced English ivy as early as 1727." 2. "U.S. Nativity: Introduced to U.S." 3. "English Ivy has been introduced to South Africa, India, Australia, New Zealand, Brazil, and Mexico [97,190]." 4. Naturalized: Australia, New Zealand, Canada, United States, Hawaii</p>
3.01	<p>1. US National Plant Germplasm System. https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?300252 (Accessed: 14 July 2016) 2. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=r450 (Accessed: 15 July 2016)</p>	<p>1. Naturalized: Australia, New Zealand, Canada, United States, Hawaii 2. "It has escaped gardens and naturalized in a large number of eastern, midwestern and pacific coast states."</p>
3.02	<p>1. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 2. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. "Habitats invaded include forest openings and edges, fields, cliffs, steep slopes, and disturbed areas." 2. "In North America, English ivy is widespread in urban and disturbed forests and is commonly associated with other nonnative species [107,114,116,117,162,170,183,194]"; "In North America, English ivy commonly occurs in deciduous forest and occasionally in conifer forest ([194], Waggy 2000 personal observation [185]), particularly in the Pacific Northwest (Waggy 2000 personal observation [185]). English ivy occurs in both riparian [86,93,94,119,128,147,157,170] and upland forests and woodlands ([125,137,170], Waggy 2000 personal observation [185]), on forest edges [154,190], roadsides [154], and rocky sites [83,190]. In California, English ivy occurs in wetlands [35] and in valley grasslands and foothill oak woodlands [137]. In the mid-Atlantic states, it occurs in coastal areas, salt marsh edges, and fields in addition to other habitats listed above [159]. Its occurrence is often associated with natural or anthropogenic disturbance [43,104,127,130,160,169,170,197,198], buildings and gardens [30,93,143,170,184,192,197], and urban forests ([50,86,170,183], Waggy 2000 personal observation [185])."</p>

3.03	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. CABI Invasive Species Compendium. http://www.cabi.org/isc/datasheet/26694 (Accessed: 15 July 2016)</p>	<p>1. " Loss of shade trees, increased erosion, decreased water quality, and a loss of forest production due to the invasion of English ivy may be costly for public agencies as well as private land owners [146]."; "Soll [146] cautions that hand removal of English ivy may be costly. In the Pacific Northwest, 2002 cost estimates ranged from \$2,000 to \$8,000 per acre when paying minimum wage [146]." 2. "Although generally an environmental weed, it may also affect plantation trees, though costs of <i>H. helix</i> control in commercial forestry plantations have not been documented."</p>
3.04	<p>1. Center for Invasive Species and Ecosystem Help. http://www.invasive.org/browse/subinfo.cfm?sub=3027 (Accessed: 2 May 2016) 2. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (2 May 2016) 3. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. "<i>Hedera helix</i> is an aggressive invader threatening all levels of forested and open areas, growing along the ground as well as into the forest canopy. Vines climb up tree trunks and envelop branches and twigs, blocking sunlight from the host tree's foliage, impeding photosynthesis. An infested tree will exhibit decline for years before it dies. The weight of vines also makes trees susceptible to blowing over in storms." 2. "Although recognized as a serious weed of natural ecosystems, parks, landscapes and other areas, it continues to be sold and marketed as an ornamental plant in the United States." 3. "In North America, English ivy is widespread in urban and disturbed forests and is commonly associated with other nonnative species [107,114,116,117,162,170,183,194]. Forests containing English ivy may have a diverse assemblage of plant species but may become less diverse as English ivy spreads (see Potential successional stage and Impacts)."; "In North America, English ivy commonly occurs in deciduous forest and occasionally in conifer forest ([194], Waggy 2000 personal observation [185]), particularly in the Pacific Northwest (Waggy 2000 personal observation [185]). English ivy occurs in both riparian [86,93,94,119,128,147,157,170] and upland forests and woodlands ([125,137,170], Waggy 2000 personal observation [185]), on forest edges [154,190], roadsides [154], and rocky sites [83,190]. In California, English ivy occurs in wetlands [35] and in valley grasslands and foothill oak woodlands [137]. In the mid-Atlantic states, it occurs in coastal areas, salt marsh edges, and fields in addition to other habitats listed above [159]. Its occurrence is often associated with natural or anthropogenic disturbance [43,104,127,130,160,169,170,197,198], buildings and gardens [30 93 143 170 184 192 197] and urban forests</p>
3.05	<p>1. Clarke, M. M., S. H. Reichard, and C. W. Hamilton. 2006. Prevalence of different horticultural taxa of ivy (<i>Hedera</i> spp., Araliaceae) in invading populations. <i>Biological Invasions</i> 8 (2) : 149-157. 2. HEAR Global Compendium of Weeds. http://www.hear.org/gcw/species/hedera_hibernica/ (Accessed: 15 July 2016)</p>	<p>1. "Abstract: 'English' ivy (<i>Hedera</i> spp.) is a complex of invasive plant pests that are separated into several distinct taxa. To better understand the invasion by ivy of Pacific Northwest native forests, we investigated the taxonomic identity of 58 selected invasive populations in the Pacific Northwest. Random amplified polymorphic DNA (RAPD) markers revealed that 83% of the 119 samples from invading populations were derived from <i>H. hibernica</i> (Kirchner) Bean, which has been frequently sold as English ivy, although this apparently is an incorrect common name. It is used widely in urban landscapes in the Northwest. The remaining 20 samples were either <i>H. helix</i> 'California,' 'Pittsburgh,' 'Star,' other cultivars not investigated in the study or possible hybrids." 2. <i>Hedera hibernica</i> classified as a noxious weed</p>

4.01	<p>1. NC State University and A&T State University Cooperative Extension. https://plants.ces.ncsu.edu/plants/all/hedera-helix/ (Accessed: 14 July 2016) 2. University of Tennessee Extension. https://extension.tennessee.edu/publications/Documents/W231.pdf (Accessed: 14 July 2016) 3. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	No description of these characteristics
4.02	<p>1. Biggerstaff, M. S. and C. W. Beck. 2007. Effects of English ivy (<i>Hedera helix</i>) on seed bank formation and germination. <i>American Midland Naturalist</i> 157 (2) : 250-257 2. CABI Invasive Species Compendium. http://www.cabi.org/isc/datasheet/26694 (Accessed: 15 July 2016)</p>	<p>1. "The germination of <i>Coreopsis</i> reduced to a marginally significant degree when exposed to English ivy. While physical competition is still a possibility, our experimental design removed competition for light, water and nutrients. Thus, the reduction in germination of <i>Coreopsis</i> suggests a possible allelopathic effect of ivy. Our results coincide with those of Hines (1995), who found decreased germination of radish (<i>Raphanus</i> sp.) and pansy (<i>Viola</i> sp.) in soil mixed with ivy leaves. The possible allelopathic effects of ivy on germination of native plants suggests a mechanism in addition to decreasing light levels (Thomas, 1980; Harmer et al, 2001) by which ivy may exclude native herbaceous species. Even though ivy did have a marginally significant effect on germination rates when present, the allelopathic effects of ivy do not appear to remain in the soil after ivy is removed, as we found no significant difference between the germination rates of seeds sown in soil where ivy had and had not been present. In contrast, Wardle et al (1991) used a similar experimental approach and found significant residual allelopathic effects of six species of pasture grass on seedling emergence of nodding thistle (<i>Carduus nutans</i>). In many cases, the residual allelopathic effect increased in strength with time since removal of the grasses, perhaps due to the decomposition of exudates from the roots of the grasses (Wardle et al, 1991). Therefore, we might have found a residual allelopathic effect of ivy if we had stored the soil from ivy plots for a period of time before sowing the <i>Coreopsis</i> seed. However, in a field study, we found that native seedlings returned rapidly after removal of ivy (Biggerstaff and Beck, in press), which suggests that any allelopathic chemicals produced by ivy degrade rapidly, rather than increase in strength over time." 2. "There is some evidence to suggest that <i>H. helix</i> has an allelopathic effect on seed germination (Le and Sonu, 2002)."</p>
4.03	<p>1. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016)</p>	1. "Ivy is not a parasite"
4.04	<p>1. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 2. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. "Ivy is browsed by cattle and sometimes used as an emergency winter fodder." 2. "In South Carolina, the leaves of English ivy were important forage for white-tailed deer during the summer [55]. In various parts of its European range, English ivy fruit is eaten by numerous native birds including blackcap, European robin, thrushes, and European starling [14,145]. Wood pigeons are the only known predator of English ivy seed [145]. English ivy foliage is subject to extremely low rates of herbivory in Great Britain [52]. In Denmark, farm animals including cattle, domestic sheep, geese, and peafowl eat the juvenile form of English ivy [14]."</p>

4.05	<p>1. Plants for a Future. http://www.pfaf.org/user/Plant.aspx?LatinName=Hedera+helix (Accessed: 2 May 2016) 2. National Park Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 3. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (24 June 2016) 4. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 5. The American Society for the Prevention of Cruelty to Animals. http://www.aspc.org/pet-care/animal-poison-control/toxic-and-non-toxic-plants/english-ivy (Accessed: 14 July 2016)</p>	<p>1. " The plant is said to be poisonous in large doses[7, 10, 65, 76] although the leaves are eaten with impunity by various mammals without any noticeable harmful affects. The leaves and fruits contain the saponic glycoside hederagenin which, if ingested, can cause breathing difficulties and coma[274]. The sap can cause dermatitis with blistering and inflammation. This is apparently due to the presence of polyacetylene compounds[274]." 2. "NOTE: The leaves and berries of English ivy contain the glycoside hederin which may cause toxicosis if ingested. Symptoms include gastrointestinal upset, diarrhea, hyperactivity, breathing difficulty, coma, fever, polydipsia, dilated pupils, muscular weakness, and lack of coordination. This feature also helps ensure effective seed dispersal by birds." 3. "Toxic to humans when eaten and triggering dermatitis in sensitive individuals." 4. "In South Carolina, the leaves of English ivy were important forage for white-tailed deer during the summer [55]. In various parts of its European range, English ivy fruit is eaten by numerous native birds including blackcap, European robin, thrushes, and European starling [14,145]. Wood pigeons are the only know predator of English ivy seed [145]. English ivy foliage is subject to extremely low rates of herbivory in Great Britain [52]. In Denmark, farm animals including cattle, domestic sheep, geese, and peafowl eat the juvenile form of English ivy [14]." 5. "Toxicity: Toxic to Dogs, Toxic to Cats, Toxic to Horses"; "Clinical Signs: Vomiting, abdominal pain, hypersalivation, diarrhea. Foliage is more toxic than berries"</p>
4.06	<p>1. Center for Invasive Species and Ecosystem Help. http://www.invasive.org/browse/subinfo.cfm?sub=3027 (Accessed: 2 May 2016) 2. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (24 June 2016) 3. Metcalfe, D. J. 2005. <i>Hedera helix</i> L. <i>Journal of Ecology</i> 93(3): 632–648.</p>	<p>1. "This plant has been confirmed as a reservoir for bacterial leaf scorch (<i>Xylella fastidiosa</i>), which affects a wide variety of trees." 2. "English ivy also serves as a reservoir for Bacterial Leaf Scorch (<i>Xylella fastidiosa</i>), a plant pathogen that is harmful to elms, oaks, maples and other native plants." 3. "A large number of fungi has been isolated from ivy, some pathogenic and others associated with the breakdown of dead leaves and stem fragments. The main diseases of horticulturally grown ivies are bacterial leaf spot caused by <i>Xanthomonas hederae</i> and <i>X. campestris</i> pv. <i>hedera</i>, and ivy leaf spot fungus <i>Colletotrichum trichellum</i> (Fr.) Duke (Rose 1980; Osborne & Chase 1985; Lopez Carbonell et al. 1998). There is also a rhabdovirus that causes ivy vein clearing virus (IVCV; Russo et al. 1979)."</p>
4.07	<p>1. Plants for a Future. http://www.pfaf.org/user/Plant.aspx?LatinName=Hedera+helix (Accessed: 2 May 2016) 2. National Park Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 3. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (24 June 2016)</p>	<p>1. " The plant is said to be poisonous in large doses[7, 10, 65, 76] although the leaves are eaten with impunity by various mammals without any noticeable harmful affects. The leaves and fruits contain the saponic glycoside hederagenin which, if ingested, can cause breathing difficulties and coma[274]. The sap can cause dermatitis with blistering and inflammation. This is apparently due to the presence of polyacetylene compounds[274]." 2. "NOTE: The leaves and berries of English ivy contain the glycoside hederin which may cause toxicosis if ingested. Symptoms include gastrointestinal upset, diarrhea, hyperactivity, breathing difficulty, coma, fever, polydipsia, dilated pupils, muscular weakness, and lack of coordination. This feature also helps ensure effective seed dispersal by birds." 3. "Toxic to humans when eaten and triggering dermatitis in sensitive individuals."</p>

4.08	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016)</p>	<p>1. "Fuels: As of this writing (2010), information pertaining to English ivy's fuel characteristics was limited to anecdotal evidence and inference. Given English ivy's abundance near populated areas, further research on its fuel characteristics may be warranted [4]. Because English ivy is evergreen and has a relatively high water content (230 g of water/100 g dry leaf mass (65-70% wet mass)), it may not readily ignite and may burn slowly. Planting English ivy has been recommended to reduce fire risk in seasonally dry areas such as in Utah [80,97], and in chaparral-urban interfaces in California [123]. While dense populations of English ivy clearly affect the structure of surface and crown fuels (see Stand structure), their impact on fire behavior has not been documented. Researchers in the northeastern United States speculated that English ivy may contribute to ladder fuels [29]. A state forester in Delaware also suggested English ivy contributes to ladder fuels and considered it a serious fire hazard near urban communities [166]. Conversely, an ecologist in Portland, Oregon, speculated that English ivy does not contribute to ladder fuels because of its high moisture content. One researcher in that area attempted to burn English ivy that was growing on cliffs with various grasses. The grasses burned but the English ivy did not, presumably because it was "too green" (personal communication [40]). It has been speculated that English ivy may increase fuel loading and continuity by growing up and over supporting vines, shrubs, and trees and by killing the vegetation beneath it [29]."</p>
4.09	<p>1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=r450 (Accessed: 1 May 2016) 2. The Ohio State University. http://hvp.osu.edu/pocketgardener/source/description/he_helix.html (Accessed: 1 May 2016) 3. Plants for a Future. http://www.pfaf.org/user/Plant.aspx?LatinName=Hedera+helix (Accessed: 2 May 2016)</p>	<p>1. "well-drained soils in part shade to full shade. Will also grow in full sun." 2. "full sun to full shade" 3. "It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade."</p>
4.10	<p>1. The Ohio State University. http://hvp.osu.edu/pocketgardener/source/description/he_helix.html (Accessed: 1 May 2016) 2. Plants for a Future. http://www.pfaf.org/user/Plant.aspx?LatinName=Hedera+helix (Accessed: 2 May 2016) 3. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 4. University of Florida Institute of Food and Agricultural Sciences. https://soils.ifas.ufl.edu/faculty/grunwald/research/projects/NRC_2001/STATSGO.gif (Accessed: 15 July 2016) 4. Atlas of Florida Plants. http://florida.plantatlas.usf.edu/Plant.aspx?id=1748 (Accessed: 15 July 2016)</p>	<p>1. "performs best in moist, well-drained soils of average fertility in partial sun, but is adaptable to many adverse conditions, including heat, drought, poor soils, soils of various pH, compacted soils, dry soils, and sun or shade conditions" 2. "Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: acid, neutral and basic (alkaline) soils and can grow in very alkaline soils." 3. "Substrate: English ivy occurs on a variety of soil types and textures in North America [146,151] and Europe [133,145,188,189]. In the Willamette Valley in Oregon, English ivy occurred in a conifer-deciduous mixed forest in silt loam [66]. In the United Kingdom, it may be abundant on heavy clay soils in low-lying areas [145]. In France, English ivy grows best in sandy soils (Beekman 1984 cited in [135]). In Spain, English ivy seedlings grew on 2 sites in mixed sand, clay, and silt. One site was nearly 50% clay, while the other site was a near-even mixture of the 3 soil textures [133]. In England [38] and the Czech Republic [63], English ivy occurs on limestone and in England [188] and France [135], it occurs on calcareous soil." 3. See Florida soil map. 4. See Florida distribution map. Present in areas with histosols.</p>

4.11	<p>1. The Ohio State University. http://hvp.osu.edu/pocketgardener/source/description/he_helix.html (Accessed: 1 May 2016) 2. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 3. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016)</p>	<p>1. "prostrate mat growth habit or climbing vine growth habit" 2. "A woody climber" 3. "Plant: evergreen perennial climbing vine that attaches to bark of trees, brickwork and other surfaces by root-like structures that exude a glue-like substance to aid in adherence."</p>
4.12	<p>1. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (Accessed: 24 June 2016) 2. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 16 July 2016)</p>	<p>1. "On the ground, English ivy forms dense and extensive monocultures that exclude native plants." 2. "In woodlands, English ivy frequently forms a dense ground cover that may occupy large areas made up of numerous individuals [97]. In North America, English ivy has been described as forming an "ivy desert" [125]. In the Green River Gorge in North Carolina, English ivy completely covered the ground in a deciduous forest [120]. In floodplain forests along the Rhine River in France, English ivy "carpets" the forest floor until it eventually reaches a tree and begins to ascend [135]."</p>
5.01	<p>1. Invasive Species of Concern in Maryland. http://www.mdinvasivesp.org/species/terrestrial_plants/English_Ivy.html (Accessed: 14 July 2016)</p>	<p>1. Classified as terrestrial</p>
5.02	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016)</p>	<p>1. "Aboveground: English ivy is a woody [184], evergreen [30,46,52,60,99,184], trailing or climbing liana [30,92] or shrub [129]." 2. "Growth Habit: Vine"</p>
5.03	<p>1. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 2. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. "A woody climber" 2. "Aboveground: English ivy is a woody [184], evergreen [30,46,52,60,99,184], trailing or climbing liana [30,92] or shrub [129]."; No evidence of nitrogen fixation</p>
5.04	<p>1. NC State University and A&T State University Cooperative Extension. https://plants.ces.ncsu.edu/plants/all/hedera-helix/ (Accessed: 14 July 2016) 2. University of Tennessee Extension. https://extension.tennessee.edu/publications/Documents/W231.pdf (Accessed: 14 July 2016) 3. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>No description of these special underground structures</p>
6.01		<p>No evidence</p>
6.02	<p>1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=r450 (Accessed: May 1, 2016) 2. Royal Botanic Garden. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 3. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (Accessed: 24 June 2016)</p>	<p>1. "Plants may be propagated vegetatively or by seed." 2. "Yellow-orange to black berries, up to 9 mm in diameter, each containing five seeds." 3. "It disperses longer distances via seed which is carried to new areas by frugivorous birds including the Cedar Waxwing, Northern Robin, Stellar Jay, Mockingbird, European Starling, and House Sparrow."</p>
6.03	<p>1. Metcalfe, D. J. 2005. <i>Hedera helix</i> L. <i>Journal of Ecology</i> 93(3): 632–648.</p>	<p>1. "Wild populations show considerable variation, which may in part be due to hybridization, but also to the tendency of juvenile shoots to mutate freely, giving rise to various foliage and growth habits. These may be propagated by cuttings or layers by horticulturists to provide the many commercially available cultivars, of which at least 89 are commonly available (Bailey & Bailey 1976). <i>Hedera helix</i> ssp. <i>helix</i> is a diploid, and although it frequently grows in close proximity to the tetraploid (ssp. <i>hibernica</i>), no triploids have yet been identified (McAllister & Rutherford 1990). However, chloroplast microsatellite markers show some genetic mixing, and shifts in ploidy or hybridization and introgression are possible (Grivet & Petit 2002; references therein). The intergeneric hybrid \times <i>Fatsyhedera lizei</i>, which arose in Lizé Frères nursery, Nantes, in 1910, occurred between <i>Fatsy japonica</i> 'Moseri' \times <i>Hedera helix</i> cv, but has not been repeated (Mabberley 1997)."</p>

6.04	<p>1. Plants for a Future. http://www.pfaf.org/user/Plant.aspx?LatinName=Hedera+helix (Accessed: 2 May 2016) 2. Learn2Grow. http://www.learn2grow.com/plants/hedera-helix/ (Accessed: 2 May 2016) 3. Butz Huryn, V. M. and H. Moller. 1995. AN ASSESSMENT OF THE CONTRIBUTION OF HONEY BEES (APIS MELLIFERA) TO WEED REPRODUCTION IN NEW ZEALAND PROTECTED NATURAL AREAS. <i>New Zealand Journal of Ecology</i> 19(2): 111-122.</p>	<p>1. "The flowers are hermaphrodite (have both male and female organs) and are pollinated by Bees, flies, lepidoptera." 2. "Self-Sowing: Yes" 3. "Potential for self-pollination or apomixis: None"</p>
6.05	<p>1. Plants for a Future. http://www.pfaf.org/user/Plant.aspx?LatinName=Hedera+helix (Accessed: 2 May 2016) 2. Royal Botanic Garden. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016)</p>	<p>1. "The flowers are hermaphrodite (have both male and female organs) and are pollinated by Bees, flies, lepidoptera." 2. "Hedera helix flowers open late in the year (September to November) and are pollinated by insects such as wasps and moths. They are an important source of nectar and pollen for bees when other sources such as heather are not available."</p>
6.06	<p>1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=r450 (Accessed: 1 May 2016) 2. Center for Invasive Species and Ecosystem Health. http://www.invasive.org/browse/subinfo.cfm?sub=3027 (Accessed: 2 May 2016) 3. National Park Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016)</p>	<p>1. "Plants may be propagated vegetatively or by seed." 2. "New plants grow easily from cuttings or stem fragments that make contact with the soil." 1. "Spreads: vegetatively by vigorous growth at tip of stems; new plants grow easily from cuttings or stem fragments that make contact with the soil."</p>
6.07	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016) 2. Plant Conservation Alliance's Alien Plant Working Group. https://www.nps.gov/plants/ALIEN/fact/hehe1.htm (Accessed: 15 July 2016)</p>	<p>1. "A publication from North America suggests that the juvenile period is long, often lasting 10 years or more [126]." 2. "Vines may grow for up to ten years before producing flowers."</p>
7.01	<p>1. National Parks Service. http://www.nature.nps.gov/water/marineinvasives/assets/PDFs/Hedera_helix.pdf (Accessed: 15 July 2016) 2. Pacific Islands Ecosystems at Risk Risk Assessment. http://www.hear.org/pier/wra/pacific/hedera_helix_htmlwra.htm (Accessed: 15 July 2016)</p>	<p>1. "Garden escape/garden waste" 2. "English ivy grows easily in many types of soil and in sun or shade, and is fairly drought tolerant once established. It is usually found in the wild where people have dumped garden waste."</p>
7.02	<p>1. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 2. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 3. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (Accessed: 24 June 2016)</p>	<p>1. "common ivy has long been collected for winter decorations" 2. "It is widely planted for its evergreen foliage and dependability as a year-round "carefree" groundcover. Although recognized as a serious weed of natural ecosystems, parks, landscapes and other areas, it continues to be sold and marketed as an ornamental plant in the United States." 3. "Introduced from Europe in colonial times. Traditional ornamental and still widely planted as an ornamental. Source of varnish resin, dye, and tanning substances."</p>
7.03		No evidence
7.04	<p>1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=r450 (Accessed: May 1, 2016) 2. Royal Botanic Garden. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 3. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 4. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (Accessed: 24 June 2016)</p>	<p>1. See photos. Seeds and fruits have no traits indicating wind dispersal.</p>
7.05		No evidence

7.06	<p>1. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=r450 (Accessed: May 1, 2016) 2. Royal Botanic Garden. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 3. National Parks Service. https://www.nps.gov/plants/alien/pubs/midatlantic/hehe.htm (Accessed: 2 May 2016) 4. Texas Invasives. http://texasinvasives.org/plant_database/detail.php?symbol=HEHE (Accessed: 24 June 2016)</p>	<p>1. "Birds help disperse seed." 2. "Ivy berries are a favoured winter food for blackbirds and if not eaten remain on the plant until spring, providing an important food-source for young birds." 3. "by seed which is consumed by birds and dispersed to new areas; fruits contain glycosides that may be mildly toxic and cause some birds to regurgitate them" 4. "It disperses longer distances via seed which is carried to new areas by frugivorous birds including the Cedar Waxwing, Northern Robin, Stellar Jay, Mockingbird, European Starling, and House Sparrow."</p>
7.07	<p>1. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 15 July 2016)</p>	<p>1. See photos. No mechanism of attachment.</p>
7.08	<p>1. "Metcalf, D. J. 2005. <i>Hedera helix</i> L. <i>Journal of Ecology</i> 93(3): 632–648." 2. Royal Botanic Gardens. http://www.kew.org/science-conservation/plants-fungi/hedera-helix-common-ivy (Accessed: 2 May 2016) 3. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016)</p>	<p>1. "Roe deer will take some ripe fruit, so may act as dispersers also (Hélène Verheyden-Tixier, pers. comm.), as do martens (Trémolières et al. 1988)." 2. "Ivy is browsed by cattle and sometimes used as an emergency winter fodder." 3. "In South Carolina, the leaves of English ivy were important forage for white-tailed deer during the summer [55]. In various parts of its European range, English ivy fruit is eaten by numerous native birds including blackcap, European robin, thrushes, and European starling [14,145]. Wood pigeons are the only known predator of English ivy seed [145]. English ivy foliage is subject to extremely low rates of herbivory in Great Britain [52]. In Denmark, farm animals including cattle, domestic sheep, geese, and peafowl eat the juvenile form of English ivy [14]."</p>
8.01		<p>No evidence</p>
8.02	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016)</p>	<p>1. "Publications from the United Kingdom indicate that English ivy seed is short-lived and does not form a persistent seed bank [52,97]. Because English ivy's flowering and fruiting is limited by shade (see Pollination and breeding system), accumulation of English ivy seed in woodlands may be an "expensive luxury" [171]. Under experimental conditions, English ivy seed planted in various size containers and soil types continued to germinate for 1 year after planting; however, germination and seedling survival generally declined over time, particularly for seed buried 5 months or longer [152]."</p>
8.03	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016)</p>	<p>1. "Information pertaining to the chemical control of English ivy is inconsistent. An invasive species report indicated that at best, chemicals offer incomplete control of English ivy [146]. English ivy may be tolerant of preemergent herbicides (Derr 1993 cited in [126]), and its waxy leaves make effective application of postemergent herbicide difficult [190] even when a surfactant is added [126]. Researchers in Portland, Oregon, suggest the under some circumstances, herbicides may provide safe and effective control of English ivy, even during the winter. English ivy's response to chemical control may be influenced by the type of herbicide used, herbicide concentration, and application timing. Herbicide may be most effective when used as a part of an integrated management plan. Researchers evaluating various chemicals for English ivy control have obtained variable results [13,97,109,161]. For information on using herbicides to control English ivy, see these publications [13,25,109,146,161]."</p>

8.04	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016)</p>	<p>1. "Immediate fire effect on plant: As of this writing (2010), information pertaining to the immediate fire effects on English ivy was limited. One literature review indicated English ivy may have low tolerance to fire [97]. Based on its ability to sprout when cut [25,159], English ivy may sprout from fire-damaged stumps; however, its root system may be too shallow to survive surface fire (see Botanical Description). Because English ivy seed is short-lived (see Seed banking), there may be little opportunity for postfire germination from the seed bank. Researchers in Spain found no evidence of rapid postfire establishment of English ivy from the seed bank [181]."</p>
8.05	<p>1. US Forest Service. http://www.fs.fed.us/database/feis/plants/vine/hedhel/all.html (Accessed: 14 July 2016) 2. USDA Plants Database. http://plants.usda.gov/core/profile?symbol=hehe (Accessed: 14 July 2016)</p>	<p>1. "There are no biological control agents for English ivy. Because English ivy is an important landscape plant and has strong support from the horticultural community, it is extremely unlikely that one will be developed [146]. A study from Oregon evaluated the use of domestic goat browsing to control English ivy in a mixed-deciduous forest where English ivy formed a near monoculture in the groundlayer vegetation. English ivy's average cover declined significantly ($P=0.0002$) in plots that were browsed by domestic goats compared to unbrowsed plots. Average cover of English ivy was reduced to 23% on sites browsed for 1 year and to 4% on plots browsed for 2 years [66]. In the Netherlands, English ivy invaded a forest and began to climb trees soon after domestic sheep browsing was discontinued [14]."</p>