

**Family:** *Lamiaceae*

**Taxon:** *Mentha spicata*

**Synonym:** *Mentha crispa* L.

**Common Name:** spearmint

*Mentha crispata* Schrad. ex Willd.

*Mentha pudina* Buch.-Ham. ex Benth.

*Mentha spicata* var. *viridis* L.

*Mentha viridis* (L.) L.

<b>Questionnaire :</b>	current 20090513	<b>Assessor:</b>	Assessor	<b>Designation:</b> H(HPWRA)
<b>Status:</b>	Assessor Approved	<b>Data Entry Person:</b>	Assessor	<b>WRA Score</b> 11.5
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"		(0-low; 1-intermediate; 2-high) (See Appendix 2)	Low
202	Quality of climate match data		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)		y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates		y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)	
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs		y=1, n=0	n
402	Allelopathic		y=1, n=0	
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	
405	Toxic to animals		y=1, n=0	n
406	Host for recognized pests and pathogens		y=1, n=0	
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	
408	Creates a fire hazard in natural ecosystems		y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0	y

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	
<b>Designation: H(HPWRA)</b>		<b>WRA Score</b>	<b>11.5</b>

## Supporting Data:

101	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Is the species highly domesticated? No] "in Hawaii, cultivated and occasionally escaping from gardens, usually in mesic areas, up to ca. 1,600 m, at least on Oahu and Hawaii. First collected on Hawaii in 1936 (Hosaka 1524, BISH)."
102	2013. WRA Specialist. Personal Communication.	NA
103	2013. WRA Specialist. Personal Communication.	NA
201	2013. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Species suited to tropical or subtropical climate(s) 0-Low] "Native: ASIA-TEMPERATE Western Asia: Cyprus; Lebanon; Syria; Turkey [w.] EUROPE Southeastern Europe: Albania; Bulgaria; Former Yugoslavia; Greece [incl. Crete]; Italy [s. & Sardinia, Sicily]"
202	2013. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Quality of climate match data 2-High]
203	2013. Dave's Garden. PlantFiles: Spearmint, English Mint - <i>Mentha spicata</i> . <a href="http://davesgarden.com/guides/pf/go/299/9">http://davesgarden.com/guides/pf/go/299/9</a> [Accessed 20 Aug 2013]	[Broad climate suitability (environmental versatility)? Yes] "USDA Zone 4a: to -34.4 °C (-30 °F) USDA Zone 4b: to -31.6 °C (-25 °F) USDA Zone 5a: to -28.8 °C (-20 °F) USDA Zone 5b: to -26.1 °C (-15 °F) USDA Zone 6a: to -23.3 °C (-10 °F) USDA Zone 6b: to -20.5 °C (-5 °F) USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15 °F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
204	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "in Hawaii, cultivated and occasionally escaping from gardens, usually in mesic areas, up to ca. 1,600 m, at least on Oahu and Hawaii. First collected on Hawaii in 1936 (Hosaka 1524, BISH)."
205	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Does the species have a history of repeated introductions outside its natural range? Yes] "Widely cultivated as a potherb and for its aromatic oils..."
301	1978. Sykes, W.R.. Checklist of dicotyledons naturalised in New Zealand 2. Lamiales. New Zealand Journal of Botany. 16(3): 391-396.	[Naturalized beyond native range? Yes] "North and South Islands, damp places, near habitations."
301	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Naturalized beyond native range? Yes] "in Hawaii, cultivated and occasionally escaping from gardens, usually in mesic areas, up to ca. 1,600 m, at least on Oahu and Hawaii. First collected on Hawaii in 1936 (Hosaka 1524, BISH)."
301	2007. Hussey, B.M.J./Keighery, G. J./Dodd, J./Lloyd, S.G./Cousens, R.D.. Western Weeds. A Guide to the Weeds of Western Australia. The Weed Society of Western Australia, Victoria Park, WA	[Naturalized beyond native range? Yes] "naturalised occasionally in drains, disturbed creeks and swamps throughout the south-west from Geraldton to Albany."
301	2013. Queensland Government. Weeds of Australia - Spearmint - <i>Mentha spicata</i> . <a href="http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Mentha_spicata.htm">http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Mentha_spicata.htm</a> [Accessed 19 Aug 2013]	[Naturalized beyond native range? Yes] "Widely naturalised in southern and eastern Australia (i.e. in many parts of eastern New South Wales, in the ACT and Victoria, in south eastern South Australia and in south western Western Australia). Also naturalised on Lord Howe Island and Norfolk Island, sparingly naturalised in Tasmania, and was previously naturalised in south-eastern Queensland. Also widely naturalised in other temperate regions of the world. It has been listed as a weed in New Zealand, Peru, the USA and Venezuela."

301	2013. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Naturalized beyond native range? Yes] Naturalized: AFRICA Macaronesia: Portugal - Azores, Madeira Islands; Spain - Canary Islands ASIA-TEMPERATE Western Asia: Afghanistan; Cyprus; Iran; Turkey Caucasus: Georgia; Russian Federation - Ciscaucasia Siberia: Russian Federation - Irkutsk Middle Asia: Turkmenistan Eastern Asia: Japan ASIA-TROPICAL Indian Subcontinent: Pakistan AUSTRALASIA Australia: Australia New Zealand: New Zealand EUROPE Northern Europe: Denmark; Ireland; Norway; Sweden; United Kingdom Middle Europe: Austria; Belgium; Czechoslovakia; Germany; Hungary; Netherlands; Poland East Europe: Belarus; Moldova; Ukraine [incl. Krym] Southeastern Europe: Albania; Bulgaria; Former Yugoslavia; Greece [incl. Crete]; Italy; Romania Southwestern Europe: France; Spain [incl. Balears] SOUTHERN AMERICA Brazil: Brazil [s.] Southern South America: Argentina
302	2002. Drake, S.J./Welkin, J.F./Parr, P.D.. Assessment of Nonnative invasive plants in the DOE Oak Ridge National Environmental Research Park. Oak Ridge National Laboratory, Oak Ridge, TN	[Garden/amenity/disturbance weed? Yes] "Spearmint is considered a Rank 3 "Lesser Threat" by the Tennessee Exotic Pest Plant Council which means that it "seems to principally spread and remain in disturbed corridors, not readily invading natural areas" (Tennessee Exotic Pest Plant Council 1996)."
302	2005. Euser, B.J. (ed.). Bay Area Gardening: 64 Practical Essays by Master Gardeners. Travelers' Tales, Palo Alto, CA	[Garden/amenity/disturbance weed? Yes] "Spearmint, <i>Mentha spicata</i> , in my garden, as well as many other species of mint, is aggressively invasive. I find myself pulling mint out of the area in which it serves as a ground cover, treating it as a weed when it moves to spots where I am encouraging other plants."
302	2013. Dave's Garden. PlantFiles: Spearmint, English Mint - <i>Mentha spicata</i> . <a href="http://davesgarden.com/guides/pt/go/299/9">http://davesgarden.com/guides/pt/go/299/9</a> [Accessed 20 Aug 2013]	[Garden/amenity/disturbance weed? Yes] "On Dec 10, 2010, ThomPotempa from Houston, TX wrote: Mistake putting this in the garden with other herbs... it took over." ... "On Mar 12, 2003, lyn55 wrote: Be aware, this plant will take over a large area. I made the mistake of planting this in my garden two years ago without realizing how intrusive it is. I am wondering on how I can get rid of it without affecting my other flowers in the same area."
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? Potentially] Listed as an agricultural weed, but no description or evidence of significant impacts was found.
304	2002. Bowen, B./Johnson, K./Franklin, S./Call, G./Webber, M.. Invasive Exotic Pest Plants in Tennessee. <i>Journal of the Tennessee Academy of Science</i> . 77(2): 45-48.	[Environmental weed?] "Watch List B: Exotic plants that naturalize and may become a problem in the future. At this time more information is needed, and there is no consensus about their status." [Includes <i>Mentha spicata</i> ]
304	2002. Drake, S.J./Welkin, J.F./Parr, P.D.. Assessment of Nonnative invasive plants in the DOE Oak Ridge National Environmental Research Park. Oak Ridge National Laboratory, Oak Ridge, TN	[Environmental weed? Not in Tennessee] "Spearmint is considered a Rank 3 "Lesser Threat" by the Tennessee Exotic Pest Plant Council which means that it "seems to principally spread and remain in disturbed corridors, not readily invading natural areas" (Tennessee Exotic Pest Plant Council 1996)."
304	2003. Invasive Plants Association of Wisconsin. IPAW Working List of the Invasive Plants of Wisconsin. <i>Plants Out of Place</i> . 4: 1-19.	[Environmental weed? Further evidence required] "The species is locally abundant in Wisconsin and warrants surveillance of whether it establishes aggressively in native plant communities." [ <i>Mentha spicata</i> placed in this invasive plant category]
304	2011. Richardson, F.J./Richardson, R.G./Shepherd, R.C.H.. Weeds of the South-East: An Identification Guide for Australia. Second Edition. RG and FJ Richardson, Victoria, Australia	[Environmental weed? Potentially] "A weed of creeks and swamps. [NSW, Tas, SA, WA]" [Negative environmental impacts are not specified]
304	2013. Queensland Government. Weeds of Australia - Spearmint - <i>Mentha spicata</i> . <a href="http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Mentha_spicata.htm">http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Mentha_spicata.htm</a> [Accessed 19 Aug 2013]	[Environmental weed? Potentially. No description of impacts] "Spearmint ( <i>Mentha spicata</i> ) is regarded as an environmental weed in Victoria and Western Australia, and as a "sleepier weed" in other parts of southern Australia."

305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? Yes] Several species and hybrids listed as invasive
305	2013. California Invasive Plant Council. Invasive Plants of California's Wildland - <i>Mentha pulegium</i> . <a href="http://www.cal-ipc.org/ip/management/ipcw/pages/detailreport.cfm?usernumber=62&amp;surveynumber=182.php">http://www.cal-ipc.org/ip/management/ipcw/pages/detailreport.cfm?usernumber=62&amp;surveynumber=182.php</a> [Accessed 20 Aug 2013]	[Congeneric weed? Yes] "Although pennyroyal is considered moderately invasive in wetlands (CalEPPC 1996), its ecological impacts are not well documented. It clearly prospers in habitats that were once dominated by native plants, suggesting that it may have displaced some species. In particular, the flora of vernal pools may have suffered loss of habitat through the introduction of pennyroyal. However, its capacity to displace native plant species is uncertain, especially given the frequent disturbance of habitats that it invades. Pennyroyal can be a nuisance for ranchers, since livestock can be poisoned by this unpalatable rangeland weed (Fuller and McClintock 1986)."
401	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Produces spines, thorns or burrs? No] "Perennial herbs with a strong sweet scent; stems 3-10 dm long. Leaves lanceolate to broadly lanceolate, (30-)50-90 mm long, (7-)15-30 mm wide, both surfaces smooth or slightly rugose, usually glabrous, sometimes sparsely villous on petioles and veins of lower surface, the hairs simple or branched, margins serrate, subsessile. "
402	2008. Azirak, S./Karaman, S.. Allelopathic effect of some essential oils and components on germination of weed species. Acta Agriculturae Scandinavica Section B-Soil and Plant Science. 58(1): 88-92.	[Allelopathic? Potentially Yes. Unknown from field conditions] "In this study, allelopathic effects of some essential oil plants ( <i>Carum carvi</i> L., <i>Coriandrum sativum</i> L., <i>Foeniculum vulgare</i> Mill., <i>Lavandula stoechas</i> L., <i>Mentha spicata</i> L., <i>Origanum onites</i> L., <i>Pimpinella anisum</i> L., <i>Rosmarinus officinalis</i> L., <i>Salvia officinalis</i> L. and <i>Thymbra spicata</i> L.) were investigated against some common weed species ( <i>Alcea pallida</i> Waldst. & Kit., <i>Amaranthus retroflexus</i> L., <i>Centaurea salsotialis</i> L., <i>Raphanus raphanistrum</i> L., <i>Rumex nepalensis</i> Spreng., <i>Sinapis arvensis</i> L. and <i>Sonchus oleraceus</i> L.) that grow in field and horticultural crops. Different concentrations (3, 6, 10 and 20 µl) of the essential oils were tested against weed seeds in vitro and their effect on germination was determined. Inhibitory effects of essential oils and concentrations were analysed with Freadman's test and they were found significant. Essential oils from <i>Carum carvi</i> , <i>Mentha spicata</i> , <i>Origanum onites</i> and <i>Thymbra spicata</i> showed high inhibitory effect against weed seeds at lower concentrations. The main components (carvacrol, thymol, carvone, limonene) of these four essential oils were tested for seed germination at four different concentrations (500, 250, 125 and 62.5 µg/ml) against the same weeds. Thymol, carvacrol and carvone showed high inhibition even at low concentrations against weed seeds. Only <i>Alcea pallida</i> seeds showed resistance against all essential oils and components."
403	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Parasitic? No] "Perennial herbs with a strong sweet scent; stems 3-10 dm long." [Lamiaceae]
404	2001. Jull, L.G.. Plants not favored by deer. A3727. University of Wisconsin Extension, Madison, WI <a href="http://www.bonelakewi.com/docs/LakeStewardship/PlantsNotFavByDeer.pdf">http://www.bonelakewi.com/docs/LakeStewardship/PlantsNotFavByDeer.pdf</a>	[Unpalatable to grazing animals? Deer Resistant] "If deer are hungry enough, they will eat almost anything. However, there are a number of woody and herbaceous plants that deer usually don't find appealing. Many of these plants are listed below, though this list is not definitive as deer preferences vary by region." [List includes <i>Mentha spicata</i> ]
404	2010. Jones-Lewey, S. (ed.). Your Remarkable Riparian. A field guide to riparian plants within the Nueces River Basin of Texas. Nueces River Authority, Corpus Christi, TX	[Unpalatable to grazing animals? Possibly] "Mint is readily grazed by deer and livestock." [Contradicts other references]
404	2013. Plants for a Future Database. <i>Mentha spicata</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Mentha+spicata">http://www.pfaf.org/user/Plant.aspx?LatinName=Mentha+spicata</a> [Accessed 20 Aug 2013]	[Unpalatable to grazing animals? Deer Resistant] "Members of this genus are rarely if ever troubled by browsing deer"
405	2010. Jones-Lewey, S. (ed.). Your Remarkable Riparian. A field guide to riparian plants within the Nueces River Basin of Texas. Nueces River Authority, Corpus Christi, TX	[Toxic to animals? No evidence] "Mint is readily grazed by deer and livestock."
405	2013. Paretts, S.. Are Mint Leaves Bad for Dogs?. <a href="http://homeguides.sfgate.com/mint-leaves-bad-dogs-71903.html">http://homeguides.sfgate.com/mint-leaves-bad-dogs-71903.html</a> [Accessed 20 Aug 2013]	[Toxic to animals? Not to dogs] "Mint species, including wild mint, spearmint and peppermint, are nontoxic to dogs, according to the Continental Kennel Club. The American Society for the Prevention of Cruelty to Animals warns that the only species of mint, in the genus <i>Mentha</i> , that is toxic to dogs is English pennyroyal ( <i>Mentha pulegium</i> )."
405	2013. Poppenga, R.H./Gwaltney-Brant, S.M.. Small Animal Toxicology Essentials. John Wiley & Sons, Chichester, UK	[Toxic to animals? No] "Table 28.2" ... " <i>Mentha spicata</i> " ... "Considered nontoxic. May be a gastrointestinal irritant."

406	2011. The Royal Horticultural Society. <i>Mentha spicata</i> . <a href="http://apps.rhs.org.uk/plantselector/plant?plantid=1272">http://apps.rhs.org.uk/plantselector/plant?plantid=1272</a> [Accessed 19 Aug 2013]	[Host for recognized pests and pathogens?] "Pests Can get leafhoppers and caterpillars Diseases May be subject to powdery mildews and mint rust"
407	2013. Dave's Garden. PlantFiles: Spearmint, English Mint - <i>Mentha spicata</i> . <a href="http://davesgarden.com/guides/pf/go/299/9">http://davesgarden.com/guides/pf/go/299/9</a> [Accessed 20 Aug 2013]	[Causes allergies or is otherwise toxic to humans? Possibly to susceptible individuals] "Handling plant may cause skin irritation or allergic reaction"
408	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	[Creates a fire hazard in natural ecosystems? No] "Spearmint inhabits moist, disturbed places in many plant communities throughout California, except Great Basin and desert regions, to 1650 m. It is designated an obligate wetlands indicator plant in California." [No evidence, and unlikely given occurrence in wet habitats]
408	2011. Richardson, F.J./Richardson, R.G./Shepherd, R.C.H.. Weeds of the South-East: An Identification Guide for Australia. Second Edition. RG and FJ Richardson, Victoria, Australia	[Creates a fire hazard in natural ecosystems? No] "A weed of creeks and swamps." [No evidence, and unlikely given occurrence in wet habitats]
409	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Is a shade tolerant plant at some stage of its life cycle? Yes] "It prefers rich, moist soil in protected, shady positions (Bodkin 1990)."
409	2013. Plants for a Future Database. <i>Mentha spicata</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Mentha+spicata">http://www.pfaf.org/user/Plant.aspx?LatinName=Mentha+spicata</a> [Accessed 20 Aug 2013]	[Is a shade tolerant plant at some stage of its life cycle? Yes] "It can grow in semi-shade (light woodland) or no shade. It prefers moist soil."
410	2011. The Royal Horticultural Society. <i>Mentha spicata</i> . <a href="http://apps.rhs.org.uk/plantselector/plant?plantid=1272">http://apps.rhs.org.uk/plantselector/plant?plantid=1272</a> [Accessed 19 Aug 2013]	[Tolerates a wide range of soil conditions? Yes] "Grow in any moist soil, in any situation. Can be invasive, so restrict root run"
411	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Climbing or smothering growth habit? No] "Perennial herbs with a strong sweet scent; stems 3-10 dm long." [Forms dense mats]
412	2007. The Los Angeles and San Gabriel Rivers Watershed Council. Weed Watch - <i>Mentha spicata</i> . <a href="http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf">http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf</a>	[Forms dense thickets? Yes] "Mentha spicata is an aromatic spreading perennial herb 1 to 3' tall. It has escaped cultivation and established throughout much of the United States and thrives in wet areas where it can form monocultures."
501	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Aquatic? No] "in Hawaii, cultivated and occasionally escaping from gardens, usually in mesic areas, up to ca. 1,600 m..."
501	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	[Aquatic? No, but occurs in wet habitats] "Spearmint inhabits moist, disturbed places in many plant communities throughout California, except Great Basin and desert regions, to 1650 m. It is designated an obligate wetlands indicator plant in California."
502	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Grass? No] Lamiaceae
503	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Nitrogen fixing woody plant? No] Lamiaceae
504	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Perennial herbs with a strong sweet scent; stems 3-10 dm long."
601	2013. WRA Specialist. Personal Communication.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	1983. Scorza, R.. Ecology and Genetics of Exotics. Pp 219-238 in C. Wilson and C. Graham (eds.). Exotic Plant Pests and North American Agriculture. Academic Press, New York	[Produces viable seed? Unknown] "Some weedy species, including <i>Hemerocallis fulva</i> , <i>Mentha spicata</i> , and <i>M. piperita</i> , are not known to produce seed in the United States."

602	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Produces viable seed? Presumably Yes] "Nutlets 0.7-1 mm long, smooth." [May be spread vegetatively]
602	2011. The Royal Horticultural Society. <i>Mentha spicata</i> . <a href="http://apps.rhs.org.uk/plantselector/plant?plantid=1272">http://apps.rhs.org.uk/plantselector/plant?plantid=1272</a> [Accessed 19 Aug 2013]	[Produces viable seed? Yes] "Propagate by seed or division in spring or autumn"
603	2002. Gobert, V./Moja, S./Colson, M./Taberlet, P.. Hybridization in the Section <i>Mentha</i> (Lamiaceae) Inferred from AFLP Markers. American Journal of Botany. 89(12): 2017-2023.	[Hybridizes naturally? Yes] "M. spicata often forms backcrosses with its diploid progenitors, indeed, hybrids like M. x villosa Hudson (M. spicata X M. suaveolens) and M. X villosa nervata Opiz (M. spicata X M. longifolia) are difficult to distinguish from "typical" M. spicata..."
603	2007. Bleeker, W./Schmitz, U./Ristow, M.. Interspecific hybridisation between alien and native plant species in Germany and its consequences for native biodiversity. Biological conservation. 137(2): 248-253.	[Hybridizes naturally? Yes] "Table 1 – Hybrids between threatened native and alien plant species" [Native species = <i>Mentha suaveolens</i> ; Hybridising alien = <i>Mentha spicata</i> ]
603	2013. Plants for a Future Database. <i>Mentha spicata</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Mentha+spicata">http://www.pfaf.org/user/Plant.aspx?LatinName=Mentha+spicata</a> [Accessed 20 Aug 2013]	[Hybridizes naturally? Yes] "Hybridizes freely with other members of this genus."
604	2002. Gobert, V./Moja, S./Colson, M./Taberlet, P.. Hybridization in the Section <i>Mentha</i> (Lamiaceae) Inferred from AFLP Markers. American Journal of Botany. 89(12): 2017-2023.	[Self-compatible or apomictic? Yes] "Harley and Brighton (1977) described some individuals of M. spicata that were close in appearance to its progenitor diploid species. They noted that M. spicata segregates parental characters in its progeny by selfing, which was impossible to distinguish from the hybrids it often forms with either M. suaveolens or M. longifolia."
605	1995. Roubik, D.W.. Pollination of cultivated plants in the tropics. FAO Services Bulletin 118. FAO, Rome, Italy	[Requires specialist pollinators? No] "Appendix I. <i>Mentha spicata</i> - Pollinators = fly, bee, Apis"
605	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Requires specialist pollinators? No] "Flowers in closely spaced, terminal verticillasters, these arranged in spike-like inflorescences 5-10 mm in diameter at anthesis; calyx campanulate, 1-3 mm long, glabrous to pubescent; corolla lilac, pink, or white, 2-4 mm long." [No evidence based on floral morphology]
606	2007. The Los Angeles and San Gabriel Rivers Watershed Council. Weed Watch - <i>Mentha spicata</i> . <a href="http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf">http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf</a>	[Reproduction by vegetative fragmentation? Yes] "It spreads by stolons, as well as seed that can sticks to animal fur, hooves, humans or vehicles."
606	2010. Jones-Lewey, S. (ed.). Your Remarkable Riparian. A field guide to riparian plants within the Nueces River Basin of Texas. Nueces River Authority, Corpus Christi, TX	[Reproduction by vegetative fragmentation> Yes] "Mint is a perennial plant that spreads effectively by rooting along any stems that touch wet soil."
607	2013. Shoot Gardening. <i>Mentha spicata</i> (Spearmint). <a href="http://www.shootgardening.co.uk/plant/mentha-spicata">http://www.shootgardening.co.uk/plant/mentha-spicata</a> [Accessed 20 Aug 2013]	[Minimum generative time (years)? 2+] "2-5 years To maturity"
701	2007. The Los Angeles and San Gabriel Rivers Watershed Council. Weed Watch - <i>Mentha spicata</i> . <a href="http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf">http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf</a>	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Yes] "It spreads by stolons, as well as seed that can sticks to animal fur, hooves, humans or vehicles."
702	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules dispersed intentionally by people? Yes] "Widely cultivated as a potherb and for its aromatic oils..."
703	2013. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? Unknown] Lack of or limited seed production may minimize potential for accidental dispersal, but cultivation as an herb in gardens may allow for inadvertent movement with other garden plants.
704	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules adapted to wind dispersal? No] "Nutlets 0.7-1 mm long, smooth." [Possibly for short distances, but no specific adaptations for wind dispersal other than small size. More likely gravity dispersed]

705	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Propagules water dispersed? Potentially Yes] "Most naturalised specimens occur along river banks, in damp areas and wet forest areas ( Carr et al. 1992, Swarbrick & Skarratt 1994). The plant is believed to have escaped from gardens."
705	2010. Jones-Lewey, S. (ed.). Your Remarkable Riparian. A field guide to riparian plants within the Nueces River Basin of Texas. Nueces River Authority, Corpus Christi, TX	[Propagules water dispersed? Yes] "Mint and other colonizers can spread from pieces of the plant that are broken off by flooding and wash downstream."
705	2010. Nawrocki, T./Carlson, M.L./Flagstad, L.A.. Alaska Non-Native Plant Invasiveness Ranking Form: <i>Mentha spicata</i> L. and <i>Mentha xpiperita</i> . Alaska Natural Heritage Program, Anchorage, AK <a href="http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/01/Mentha_spicat">http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/01/Mentha_spicat</a>	[Propagules water dispersed? Yes] "The fruits of <i>Mentha spicata</i> , which consist of four nutlets enclosed by the calyx, can be dispersed by water and can cling to animal fur"
706	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules bird dispersed? No] "Nutlets 0.7-1 mm long, smooth." [Not fleshy-fruited, and unlikely to be dispersed by birds]
707	2007. The Los Angeles and San Gabriel Rivers Watershed Council. Weed Watch - <i>Mentha spicata</i> . <a href="http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf">http://weedwatch.lasgrwc.org/docs/matrix/Mentha_spicata_042907.pdf</a>	[Propagules dispersed by other animals (externally)? Yes] "It spreads by stolons, as well as seed that can sticks to animal fur, hooves, humans or vehicles."
708	2010. Nawrocki, T./Carlson, M.L./Flagstad, L.A.. Alaska Non-Native Plant Invasiveness Ranking Form: <i>Mentha spicata</i> L. and <i>Mentha xpiperita</i> . Alaska Natural Heritage Program, Anchorage, AK <a href="http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/01/Mentha_spicat">http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/01/Mentha_spicat</a>	[Propagules survive passage through the gut? No] "The fruits of <i>Mentha spicata</i> , which consist of four nutlets enclosed by the calyx, can be dispersed by water and can cling to animal fur" [Not internally dispersed]
801	1983. Scorza, R.. Ecology and Genetics of Exotics. Pp 219-238 in C. Wilson and C. Graham (eds.). Exotic Plant Pests and North American Agriculture. Academic Press, New York	[Prolific seed production (>1000/m2)? Probably No] "Some weedy species, including <i>Hemerocallis fulva</i> , <i>Mentha spicata</i> , and <i>M. piperita</i> , are not known to produce seed in the United States."
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a>	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] Several <i>Mentha</i> species possess orthodox seeds, but there is no information for <i>Mentha spicata</i>
802	2013. WRA Specialist. Personal Communication.	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] Limited or lack of seed production within introduced range may prevent establishment of any seed bank
803	2013. DiTomaso, J.M./Kyser, G.B. et al.. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA	[Well controlled by herbicides? Unknown. Information provided for related species <i>Mentha pulegium</i> ] "There is little information on the chemical control of <i>Mentha pulegium</i> ." ... "2,4-D ... In Australia they recommend the ester formulation of 2,4-D, but this cannot be used when pennyroyal infests wetland areas. Only the amine formulation is registered for aquatic areas. Results from New Zealand show that 2,4-D provides only good control, not excellent control. 2,4-D is a broadleaf selective herbicide." ... "Triclopyr Garlon 3A ... Only the amine formulation should be used in wetland areas. Triclopyr is a broadleaf selective herbicide." ... "Glyphosate ... Glyphosate is a nonselective herbicide with no soil activity. Thus, it is best used in monotypic stands or as a spot treatment. Only aquatic formulations should be used in wetland areas. This will require the addition of a surfactant registered for use in aquatic sites." ... "Metsulfuron Escort ... Some evidence indicates that metsulfuron can be effective for control of pennyroyal. Although this herbicide is registered for use in aquatic systems in other countries, e.g. Australia, it is not registered for use in wetland habitats in the United States. On dry sites it can be effective. It is not registered for use in California."
804	2010. Nawrocki, T./Carlson, M.L./Flagstad, L.A.. Alaska Non-Native Plant Invasiveness Ranking Form: <i>Mentha spicata</i> L. and <i>Mentha xpiperita</i> . Alaska Natural Heritage Program, Anchorage, AK <a href="http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/01/Mentha_spicat">http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/01/Mentha_spicat</a>	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] " <i>Mentha spicata</i> and <i>Mentha xpiperita</i> can resprout from rhizomes following the removal of the aboveground growth. Rhizome fragments can form new plants (DiTomaso and Healy 2007)."
805	2013. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]



## **Summary of Risk Traits**

### **High Risk / Undesirable Traits**

- Broad climate suitability
- Widely naturalized (including Oahu and Hawaii islands)
- Garden and disturbance weed
- Potential environmental weed
- Other Mentha species have become invasive
- Possesses allelopathic properties
- Shade tolerant
- Tolerates many soil types
- Can form monocultures and possibly exclude other vegetation
- Hybridizes with other Mentha species
- Self-compatible
- Spreads vegetatively
- Seeds and vegetative fragments can be spread by water, or by clinging to animals or machinery
- Can resprout from rhizomes following the removal of the aboveground growth

### **Low Risk Traits**

- Unarmed (no spines, thorns or burrs)
- Ornamental and culinary uses
- May produce few or no seeds in introduced range