

**Family:** *Valerianaceae*

**Taxon:** *Centranthus ruber*

**Synonym:** *Valeriana rubra* L.

**Common Name:** Fox's brush  
Jupiter's beard  
Red valerian

Questionnaire Status:	Assessor:	Data Entry Person:	Designation:
current 20090513 Assessor Approved	Chuck Chimera	Chuck Chimera	H(HPWRA) <b>WRA Score 10</b>
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)	Intermediate
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Low
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	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	
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	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	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	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 10

**Supporting Data:**

101	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Is the species highly domesticated? No] No evidence
101	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . <i>Plant Species Biology</i> . 25: 165–172.	[Is the species highly domesticated? No] No evidence
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Species suited to tropical or subtropical climate(s) 1-intermediate] "Distribution. Native of the Mediterranean region, but widely cultivated as an ornamental plant and now naturalized on old wall, cliffs, dry banks, and waste places. It is locally abundant, particularly in S.W. England and S.E. Ireland."
201	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . <i>Plant Species Biology</i> . 25: 165–172.	[Species suited to tropical or subtropical climate(s) 1-intermediate] " <i>Centranthus ruber</i> is probably native only in the Balkan Peninsula and parts of the Central Mediterranean region (Richardson 1975)."
202	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Quality of climate match data? 0-low] "Distribution. Native of the Mediterranean region, but widely cultivated as an ornamental plant and now naturalized on old wall, cliffs, dry banks, and waste places."
203	1996. Proctor, R.. <i>Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes</i> . Fulcrum Publishing, Golden, CO	[Broad climate suitability (environmental versatility)? Yes] "Can be established up to 9,000 feet in Colorado" [Plant demonstrates environmental versatility and could potentially establish at higher elevations of tropical islands]
203	2011. Missouri Botanical Garden. Kemper Center for Home Gardening PlantFinder - <i>Centranthus ruber</i> . <a href="http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950">http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950</a>	[Broad climate suitability (environmental versatility)? Yes. But prefers cooler temperatures] "Freely self-seeds in optimum growing conditions to the point of being weedy. Promptly remove (shear if large planting) spent flower stems to encourage additional bloom and to prevent seeds from forming. Plants are generally less vigorous in the hot and humid summers of the South than in cool summer climates."
204	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . <i>Plant Species Biology</i> . 25: 165–172.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "...now naturalized in many regions of Western and Central Europe, South-Western Asia, Macaronesia and Australia, as well as in North and South America, where it grows in disturbed habitats and rocky places (López Martínez & Devesa 2007)."
205	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Does the species have a history of repeated introductions outside its natural range? Yes] "...widely cultivated as an ornamental plant and now naturalized on old wall, cliffs, dry banks, and waste places."
301	1983. Webb, D.A./Scannell, M.J.P.. <i>Flora of Connemara and the Burren</i> . Cambridge University Press, Cambridge, UK	[Naturalized beyond native range? Yes] "Walls, waste ground and limestone pavement. Well naturalized in several places." [Ireland]
301	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Naturalized beyond native range? Yes] "Distribution. Native of the Mediterranean region, but widely cultivated as an ornamental plant and now naturalized on old wall, cliffs, dry banks, and waste places. It is locally abundant, particularly in S.W. England and S.E. Ireland."
301	1997. Swenson, U./Stuessy, T.F./Baeza, M./Crawford, D.J.. <i>New and Historical Plant Introductions, and Potential Pests in the Juan Fernandez Islands, Chile</i> . <i>Pacific Science</i> . 51(3): 233-253.	[Naturalized beyond native range? Yes] " <i>Centranthus ruber</i> (L.) DC., Valerianaceae, Masatierra. <i>Centranthus ruber</i> , red valerian, is a new introduction that adds a new genus and new family to the flora. On the expedition to Masatierra in 1996, we noted the species as an ornamental plant in several gardens but also naturalized along ditches in San Juan Bautista. Red valerian is native to the Mediterranean but also introduced elsewhere, such as New Zealand, Hawai'i, and California (Webb et al. 1988, Wagner et al. 1990, Hickman 1993). As a weed, it grows along roadsides, rock walls, and in disturbed places. It must have been introduced recently to Masatierra, has now escaped, and is beginning to spread. Possible future danger to the native flora is hard to assess. Specimen: Masatierra, San Juan Bautista, in a small ditch in center of village, 10 m, 17 January 1996, Swenson 423 (CONC, os, ups)."

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] "Naturalized and common in Pōhaku o Ka Lā Gulch, East Maui"
301	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . <i>Plant Species Biology</i> . 25: 165–172.	[Naturalized beyond native range? Yes] "...this species has been cultivated for ornamental purposes and is now naturalized in many regions of Western and Central Europe, South Western Asia, Macaronesia and Australia, as well as in North and South America, where it grows in disturbed habitats and rocky places (López Martínez & Devesa 2007). Currently in Sardinia this species is only found in the south part of the island."
302	2002. Pimentel, D.. Biological invasions: economic and environmental costs of alien plant, animal, and microbe species. CRC Press, Boca Raton, FL	[Garden/amenity/disturbance weed? Potentially No] "...escapes to colonize wall, disused railway land, and other waste places...It is unwanted in some places...but its national impact and cost are trivial, even though it can occur in native vegetation."
302	2006. Brown, K.. Weed Watch: Pretty Betsy and red valerian. <i>Ecoplan News</i> . 59: 3.	[Garden/amenity/disturbance weed? Yes. Potential environmental weed] "Over the past two years, two species of <i>Centranthus</i> , pretty Betsy ( <i>Centranthus macrosiphon</i> ) and red valerian ( <i>C. ruber</i> ) have appeared in the tuart and banksia woodlands of Paganoni Swamp. These weedy garden escapees can form dense monocultures and displace native herbs and geophytes (plants with underground storage organs)."
302	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 1. ANR Publications, Oakland, CA	[Garden/amenity/disturbance weed? Potentially] "ornamental escape; disturbed urban places, rock or wall crevices, roadsides; AZ, OR, UT"
302	2007. Lewis, A./Buchanan, S.. Butterfly Gardens: Luring Nature's Loveliest Pollinators to Your Yard. Brooklyn Botanic Garden, Brooklyn, NY	[Garden/amenity/disturbance weed? Potentially] "May be invasive; remove spent flowers to prevent self-sowing."
303	2007. Randall, R.P.. Global Compendium of Weeds - <i>Centranthus ruber</i> [Online Database]. <a href="http://www.hear.org/gcw/species/centranthus_ruber/">http://www.hear.org/gcw/species/centranthus_ruber/</a>	[Agricultural/forestry/horticultural weed? Potentially] " <i>Centranthus ruber</i> ... agricultural weed, casual alien, cultivation escape, environmental weed, garden thug, naturalised, weed" [Although listed as an agricultural weed, no references were found that documented adverse impacts to agriculture]
304	2005. de Montmollin, B./Strahm, W.. The top 50 Mediterranean Island plants: wild plants at the brink of extinction, and what is needed to save them. IUCN, Gland, Switzerland	[Environmental weed? Potentially in Corsica] "Although <i>Centranthus ruber</i> has not yet shown signs of being particularly invasive on Corsica, it could hybridize with <i>Centranthus trinervis</i> ...It is essential that the habitat be kept open by clearing competing species such as <i>Smilax aspera</i> , and by eliminating cultivation of <i>Centranthus ruber</i> and other invasive species grown in the area."
304	2006. Brown, K.. Weed Watch: Pretty Betsy and red valerian. <i>Ecoplan News</i> . 59: 3.	[Environmental weed? Potentially. Insufficient evidence to answer yes, but considered a garden escape and weed. See 3.02] "Red valerian, another garden escapee from the Mediterranean, is well-known as a weed of granitic soils around Albany. Under the right growing conditions it can spread quickly, by seed, into relatively undisturbed bushland. DEC rangers in Porongurup National Park have been battling red valerian invading the karri forest for a number of years. In the Perth region, red valerian is known only from isolated populations along the Darling Scarp and from the eastern side of the Swan Coastal Plain where, although uncommon, it has the potential to become a serious weed. Probably the only way to prevent it establishing and becoming increasingly widespread is to remove isolated populations as soon as they make an appearance. Hand-weeding when populations are small is an effective option. For larger populations, herbicide application may be necessary."
305	2006. Brown, K.. Weed Watch: Pretty Betsy and red valerian. <i>Ecoplan News</i> . 59: 3.	[Congeneric weed? Yes] "Pretty Betsy is an annual herb with attractive rounded pink flower heads and green, elliptic, opposite leaves with toothed margins. Originally from Spain, it has become naturalised on calcareous soils from Perth to Busselton. A significant weed of tuart woodlands, pretty Betsy was observed to be particularly prolific last winter/spring. Previously unrecorded populations were discovered not only at Paganoni Swamp (three large populations) but also at Lake Cooloongup and in sedgeland at Becher Point. Pretty Betsy reproduces by seed and appears to spread from the edges of tracks and disturbed areas into relatively undisturbed bushland."
305	2007. Randall, R.P.. Global Compendium of Weeds - <i>Centranthus macrosiphon</i> [Online Database]. <a href="http://www.hear.org/gcw/species/centranthus_macrosiphon/">http://www.hear.org/gcw/species/centranthus_macrosiphon/</a>	[Congeneric weed? Yes] " <i>Centranthus macrosiphon</i> ...casual alien, cultivation escape, environmental weed, naturalised"
401	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Produces spines, thorns or burrs? No] "An erect, glaucous, branching perennial 30-80 cm in height. The leaves are opposite, ovate or ovate-lanceolate, the upper sessile and sometimes dentate, the lower petiolate and entire."

402	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Allelopathic? No] No evidence. Well-studied species
403	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Parasitic? No] "An erect, glaucous, branching perennial 30-80 cm in height. The leaves are opposite, ovate or ovate-lanceolate, the upper sessile and sometimes dentate, the lower petiolate and entire."
404	2002. Loewer, H.P.. Solving deer problems: how to keep them out of the garden, avoid them on the road, and deal with them anywhere!. Globe Pequot, Guilford, CT	[Unpalatable to grazing animals? Possibly yes] "Deer-Resistant Plants for California's Central Coast" [Includes <i>Centranthus ruber</i> ]
405	2009. California Poison Control System. Know Your Plants. <a href="http://www.calpoison.org/hcp/KNOW%20YOUR%20PLANTS-plant%20list%20for%20CPCS%2009B.pdf">http://www.calpoison.org/hcp/KNOW%20YOUR%20PLANTS-plant%20list%20for%20CPCS%2009B.pdf</a>	[Toxic to animals? No] "Table 2. – Nontoxic Plants by Latin or Scientific Name" [Includes <i>C. ruber</i> ]
405	2011. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, <a href="http://toxnet.nlm.nih.gov/">http://toxnet.nlm.nih.gov/</a>	[Toxic to animals? No] No evidence
406	1997. Brickell, C./Zuk, J.D.. The American Horticultural Society A-Z Encyclopedia of Garden Plants. DK Publishing, Inc., New York, NY	[Host for recognized pests and pathogens? No] " <i>C. ruber</i> has very few pests and diseases" [No evidence]
406	2011. Missouri Botanical Garden. Kemper Center for Home Gardening PlantFinder - <i>Centranthus ruber</i> . <a href="http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950">http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950</a>	[Host for recognized pests and pathogens? No] "No serious insect or disease problems. Mealy bugs and aphids are occasional visitors"
407	2011. Plants For A Future Database. <i>Centranthus ruber</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Centranthus+ruber">http://www.pfaf.org/user/Plant.aspx?LatinName=Centranthus+ruber</a>	[Causes allergies or is otherwise toxic to humans? No. No evidence] "Known Hazards None known...Young leaves - raw or cooked as greens[2, 5, 52, 115]. Exceedingly good, either in salads or cooked as a vegetable[4]. This differs from our own experience, whilst the leaves can be added to salads they are rather bitter and rather less than desirable[8, 183, K]. Root - cooked[4]. Used in soups[4]."
407	2011. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, <a href="http://toxnet.nlm.nih.gov/">http://toxnet.nlm.nih.gov/</a>	[Causes allergies or is otherwise toxic to humans? No] No evidence
408	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Creates a fire hazard in natural ecosystems? No] No evidence
408	2005. Kent, D.. Firescaping: creating fire-resistant landscapes, gardens, and properties in California's diverse environments. Wilderness Press, Berkeley, CA	[Creates a fire hazard in natural ecosystems? No] <i>Centranthus ruber</i> recommended as a fire-resistant plant
409	1996. Proctor, R.. Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes. Fulcrum Publishing, Golden, CO	[Is a shade tolerant plant at some stage of its life cycle? Potentially] "Exposure: full sun to part shade."
409	2011. Missouri Botanical Garden. Kemper Center for Home Gardening PlantFinder - <i>Centranthus ruber</i> . <a href="http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950">http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950</a>	[Is a shade tolerant plant at some stage of its life cycle? Potentially] "Sun: Full sun to part shade...Prefers slightly alkaline soils in full sun"
409	2011. Plants For A Future Database. <i>Centranthus ruber</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Centranthus+ruber">http://www.pfaf.org/user/Plant.aspx?LatinName=Centranthus+ruber</a>	[Is a shade tolerant plant at some stage of its life cycle? Potentially No] "It cannot grow in the shade."
410	1996. Proctor, R.. Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes. Fulcrum Publishing, Golden, CO	[Tolerates a wide range of soil conditions? Yes] "Soil: adaptable to dry soil; does well in any well drained soil."
411	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Climbing or smothering growth habit? No] "An erect, glaucous, branching perennial 30-80 cm in height. The leaves are opposite, ovate or ovate-lanceolate, the upper sessile and sometimes dentate, the lower petiolate and entire."

412	2001. Benson, D./McDougall, L.. Ecology of Sydney plant species 8. Dicotyledon families Rutaceae to Zygophyllaceae. Cunninghamia. 7(2): 255-462.	[Forms dense thickets? Yes] "Cultivated and sometimes naturalised locally. Dense patches (up to 1000 plants) may form over 10 years (Herb. record)."
412	2006. Brown, K.. Weed Watch: Pretty Betsy and red valerian. Ecoplan News. 59: 3.	[Forms dense thickets? Yes] "These weedy garden escapees can form dense monocultures and displace native herbs and geophytes (plants with underground storage organs)."
412	2011. Missouri Botanical Garden. Kemper Center for Home Gardening PlantFinder - <i>Centranthus ruber</i> . <a href="http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950">http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=B950</a>	[Forms dense thickets? Unknown] "Red valerian or Jupiter's beard is a well branched, bushy, clump-forming, woody based perennial which is valued for its ability to produce a showy bloom in poor soils from spring to frost."
501	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Aquatic? No] Terrestrial
502	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Grass? No] Valerianaceae
503	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Nitrogen fixing woody plant? Yes] Valerianaceae
504	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "An erect, glaucous, branching perennial 30-80 cm in height. The leaves are opposite, ovate or ovate-lanceolate, the upper sessile and sometimes dentate, the lower petiolate and entire."
601	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . Plant Species Biology. 25: 165–172.	[Evidence of substantial reproductive failure in native habitat? No] "The present study provides new data on the germination ecology of the previously unstudied <i>C. amazonum</i> that may explain the rarity of this species when compared with the commonness of <i>C. ruber</i> ."
602	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . Plant Species Biology. 25: 165–172.	[Produces viable seed? Yes] " <i>Centranthus ruber</i> showed 'typical' germination behavior for Mediterranean plants, with an optimal range of germination temperatures of 5–15°C (Thanos et al. 1989, 1995)."
603	2005. de Montmollin, B./Strahm, W.. The top 50 Mediterranean Island plants: wild plants at the brink of extinction, and what is needed to save them. IUCN, Gland, Switzerland	[Hybridizes naturally? Potentially] "...planting of invasive ornamental plants such as Red Valerian <i>Centranthus ruber</i> and Pampas Grass <i>Cortaderia jubata</i> may pose other threats to this species. Although <i>Centranthus ruber</i> has not yet shown signs of being particularly invasive on Corsica, it could hybridize with <i>Centranthus trinervis</i> ."
603	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . Plant Species Biology. 25: 165–172.	[Hybridizes naturally? Potentially] "Although <i>C. ruber</i> is not currently considered an invasive in Sardinia (Celesti-Grapow et al. 2009) and no naturalized populations have been detected close to the Monte Corradi, the broader ecological range detected for this species confirms the potential threat resulting from the possible expansion of <i>C. ruber</i> on the Island and the risk of hybridization of this species with <i>C. amazonum</i> , as suggested by Fridlender (2006) and detected by Montmollin and Strahm (2005) for the closely related endemic species <i>C. trinervis</i> ."
604	2011. T.E.R.:R.A.I.N.. Spur Valerian ( <i>Centranthus ruber</i> ). <a href="http://www.terrain.net.nz/friends-of-tehenui-group/weeds/spur-valerian-centranthus-ruber.html">http://www.terrain.net.nz/friends-of-tehenui-group/weeds/spur-valerian-centranthus-ruber.html</a>	[Self-compatible or apomictic? Probably yes] "It self-seeds freely."
605	1906. Knuth, P./Müller, H.. Handbook of Flower Pollination: Introduction and literature. Princeton University, Princeton, NJ	[Requires specialist pollinators? No] "Class XIII. Regular open arrangements...The widely open flowers are visited by insects of the most varied kind (beetles, bees, flies, occasionally butterflies, &c.)...43. <i>Trachelium</i> type. <i>Trachelium coeruleum</i> , <i>Centranthus ruber</i> "
605	1997. Brickell, C./Zuk, J.D.. The American Horticultural Society A-Z Encyclopedia of Garden Plants. DK Publishing, Inc., New York, NY	[Requires specialist pollinators? No] "Numerous red, pink, and / or white funnel shaped flowers are born on erect stems, are attractive to insects and bees, and self seed, becoming naturalized where they are planted"
605	2011. Down Garden Services. Red Valerian. <a href="http://www.dgsgardening.btinternet.co.uk/valerian.htm">http://www.dgsgardening.btinternet.co.uk/valerian.htm</a>	[Requires specialist pollinators? No] "The flowers are red and sometimes pink or white, appearing from June to August. They have five petals, four facing in one direction and one facing backwards, all arising from a long tube with a single stamen protruding from the centre. They are pollinated by members of the Lepidoptera which have a long proboscis to probe the flowers."

605	2011. Plants For A Future Database. <i>Centranthus ruber</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Centranthus+ruber">http://www.pfaf.org/user/Plant.aspx?LatinName=Centranthus+ruber</a>	[Requires specialist pollinators? No] "The flowers are hermaphrodite (have both male and female organs) and are pollinated by Bees, lepidoptera. It is noted for attracting wildlife."
606	2011. Down Garden Services. Red Valerian. <a href="http://www.dsggardening.btinternet.co.uk/valerian.htm">http://www.dsggardening.btinternet.co.uk/valerian.htm</a>	[Reproduction by vegetative fragmentation? No] "The plant dies back to the basal leaves over winter. It does not have spreading roots, but remains as a clump which enlarges and becomes woody as it ages."
607	1991. Snyder, L.C.. Flowers for Northern Gardens. U of Minnesota Press, Minneapolis, MN	[Minimum generative time (years)? 1] "This is a short-lived perennial but it usually reseeds itself and seedlings can be transplanted to a desired location."
607	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 1. ANR Publications, Oakland, CA	[Minimum generative time (years)? 1] "Annual or perennial subshrub..."
701	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 1. ANR Publications, Oakland, CA	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Potentially] "ornamental escape; disturbed urban places, rock or wall crevices, roadsides; AZ, OR, UT" [Distribution along roadsides suggests this plant may be inadvertently moved along heavily trafficked areas, or it may simply prefer disturbed sites]
701	2010. NRM South & the Southern Tasmanian Councils Authority. A Guide to Environmental and Agricultural Weeds of Southern Tasmania. <a href="http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf">http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf</a>	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Yes] "Dispersal: Wind, dumped garden waste and contaminated soil."
702	1996. Proctor, R.. Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes. Fulcrum Publishing, Golden, CO	[Propagules dispersed intentionally by people? Yes] "Showy plant; attracts butterflies; good source for cut flowers."
703	1996. Proctor, R.. Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes. Fulcrum Publishing, Golden, CO	[Propagules likely to disperse as a produce contaminant? Potentially] "good source for cut flowers... Numerous seeds are produced and requires deadheading to impede spread." [If cut flowers contain viable seeds, plant could be inadvertently transported in flower trade]
704	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Propagules adapted to wind dispersal? Yes] "Fruit an achene, often with a persistent winged or plumose pappus." [Family description]
705	2010. NRM South & the Southern Tasmanian Councils Authority. A Guide to Environmental and Agricultural Weeds of Southern Tasmania. <a href="http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf">http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf</a>	[Propagules water dispersed? No] "Dispersal: Wind, dumped garden waste and contaminated soil." [No evidence]
706	1988. Hickey, M./King, C.. 100 Families of Flowering Plants. Cambridge University Press, Cambridge, UK	[Propagules bird dispersed? No] "Fruit an achene, often with a persistent winged or plumose pappus." [Family description]
707	2010. NRM South & the Southern Tasmanian Councils Authority. A Guide to Environmental and Agricultural Weeds of Southern Tasmania. <a href="http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf">http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf</a>	[Propagules dispersed by other animals (externally)? No] "Dispersal: Wind, dumped garden waste and contaminated soil." [No evidence]
708	2011. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? Unknown] Probably not, but seeds unlikely to be consumed by animals
801	2011. WRA Specialist. Personal Communication.	[Prolific seed production (>1000/m2)? Unknown]
802	2010. Mattana, E./Daws, M.I./Bacchetta, G.. Comparative germination ecology of the endemic <i>Centranthus amazonum</i> (Valerianaceae) and its widespread congener <i>Centranthus ruber</i> . <i>Plant Species Biology</i> . 25: 165–172.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes. Presumably forms a persistent seed bank (PSB)] "Experimental seed burials were carried out at the time of natural seed dispersal, following a modification of the protocol in Arroyo et al. (2004)...After 1 year, the replicates were exhumed. Any remaining, intact, non germinated seeds were sown immediately at 15°C in the light to check their viability and germination capacity...No buried seeds of <i>C. amazonum</i> were retrieved because they had decayed completely in the soil before being exhumed. In contrast, only 57.8 ± 24.6% of <i>C. ruber</i> seeds decayed in the soil and the remaining intact seeds, sown immediately after being exhumed, germinated to 83.3 ± 33.3% at 15°C in the light. The cut test carried out at the end of the germination test showed that all of the non-germinated seeds were still viable, suggesting that this species can form a PSB. No viable seedlings were retrieved for either species."
803	2011. Down Garden Services. Red Valerian. <a href="http://www.dsggardening.btinternet.co.uk/valerian.htm">http://www.dsggardening.btinternet.co.uk/valerian.htm</a>	[Well controlled by herbicides? Yes] "Weedkillers to use: - Glyphosate kills the whole plant, but it may be capable of shedding viable seed so remove any flowers that are present. A residual herbicide suppresses germination."

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| 804   | 2010. NRM South & the Southern Tasmanian Councils Authority. A Guide to Environmental and Agricultural Weeds of Southern Tasmania. <a href="http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf">http://www.nrmsouth.org.au/uploaded/287/15130842_66weedsbookletfinalweb.pdf</a>          | [Tolerates, or benefits from, mutilation, cultivation, or fire? No] "Control: Hand-pull or herbicides." [No evidence]   |
| <hr/> |   |   |
| 805   | 2003. Starr, F./Starr, K./Loope, L.L.. <i>Centranthus ruber</i> - Red valerian - Valerianaceae. USGS - Biological Resources Haleakala Field Station Maui, <a href="http://www.hear.org/starr/hiplants/reports/pdf/centranthus_ruber.pdf">http://www.hear.org/starr/hiplants/reports/pdf/centranthus_ruber.pdf</a> | [Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown] "Biological control: There are no known biological control agents for <i>C. ruber</i> ." |
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