

# Weed Risk Assessment: *Crupina vulgaris*

## 1. Plant Details

Taxonomy: *Crupina vulgaris* (Pers.) Cass. Synonym: *Centaurea cuprina* L. Family Asteraceae.

**Common names:** common crupina, bearded creeper.

**Origins:** Native to Northern Africa (Algeria, Libya, Morocco), temperate Asia (Afghanistan, Iran, Iraq, Turkey, Armenia, Azerbaijan, Georgia, Russian Federation, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Europe, (Czechoslovakia, Hungary, Switzerland, Moldova, Ukraine, Albania, Bulgaria, Greece, Italy, Romania, Yugoslavia, France, Portugal, Spain) (GRIN database).

**Naturalised distribution:** United States of America (5 mostly north western states) (USDA website) and Australia (1 occurrence) (Cunningham et al, 2003).

**Description:** *C. vulgaris* is a winter annual that grows to about 1m tall. It is an erect and slender herb with open-branched flowering stems. Cotyledons are fleshy and often purplish-red, with a prominent mid-rib. The first rosette leaves are entire with toothed margins. Subsequent leaves become increasingly lobed and are covered with short, stiff hairs. Stems are ridged and bear short, stiff spines. Stem leaves are alternate, sessile and finely divided into lacy leaflets. Margins are also armed with short spines. Flower heads occur on stalks and are daisy-like and lavender to purple. An individual plant may produce up to 40 flower heads. Bracts are prominent. Each individual flower head produces 1-5 cylindrical, tapering seeds, covered in tiny hairs that give it a silvery appearance. Each seed has a dark, stiff pappus. The roots are dense and fibrous.



Two varieties of *C. vulgaris* are described. *C. vulgaris* var. *brachypappa* and *C. vulgaris* var. *typica* may be distinguished on the basis of seed size and length of pappus silk, the latter producing slightly larger seeds at 4-5mm long with longer pappus silks at 7-8mm whilst corresponding measures for *C. var. brachypappa* are 3.5-5mm and 4-5mm

respectively ([www.nwcb.wa.gov/weed\\_info/crupina.html](http://www.nwcb.wa.gov/weed_info/crupina.html)).

## **Biology and ecology:**

**Habitat.** *C. vulgaris* occurs mostly in open, unshaded situations across a wide range of soil, temperature and moisture conditions (Thill et al, 1987). In the USA it is found in deep canyons on dry, south facing slopes at elevations between 300 and 1000m. It grows well on slightly acidic, well drained rocky to silty loam soil. It is also found on grassy sites, pastures and in range lands, forested areas, neglected areas and roadsides.

**Life cycle.** *C. vulgaris* seed dormancy is broken by cooler temperatures and moisture so germination occurs mostly after autumn rains. The plant over-winters as a rosette but as temperatures becomes warmer and day length increases, the plant bolts, producing flowering stems (Roche et al, 1997a). Flowers form in late spring and early summer, the rosette leaves shrivelling during this period. Seed is ready for dispersal by mid to late summer. Seeds remain dormant until the following autumn.

**Reproduction and dispersal.** Reproduction occurs prolifically via seeds, germination rates of which are high at between 85-99%. Best germination occurs at around 10.5 °C and the base temperature is 1 °C (Roche et al, 1997b). Approximately 83% of plants produce viable seed (Zamora et al, 1989). Seed is not persistent and is in some cases is largely absent from the soil seed bank 25-26 months after it enters (Zamora and Thill, 1989) although other studies have shown that seeds may remain viable for up to 31 months (Thill et al, 1985). Between 90-98% of seeds germinate in the first autumn after dissemination (Zamoran and Thill, 1989). The seed is typically too heavy to be lifted by wind. Rather, seed dispersal is achieved via moving water, birds, wildlife and domestic livestock. Movement by rodents and wind dispersal are most common for dispersal over short distances. Seeds can pass through a variety of animals in a viable state, with the exception of sheep, although most stock do not eat it as it matures and becomes spiny. Cattle are thought to find it unpalatable (Blue Mountains Natural Resource Institute website). Seeds may also be distributed as a contaminant of hay or other fodder ([www.cdfa.ca.gov/phpps/icp/weedinfo/crupins.htm](http://www.cdfa.ca.gov/phpps/icp/weedinfo/crupins.htm)). Introduction into the USA, prior to its discovery in Idaho in 1968, is linked to Basque shepherds from northern Spain (Roche et al, 2003).

**Hybridisation.** *C. intermedia* is described as being a hybrid of *C. vulgaris* and *C. crupinastrum*. The hybrid is larger and more competitive than its parents and appears to be replacing them in parts of its native distribution in the Mediterranean (Courderc-LeVaillant and Roche, 1993).

**Competition.** In the USA *C. vulgaris* is described as an aggressive competitor because of its climate and soil adaptability, high reproductive rate and efficient dispersal. In the 22 years since it was first detected it has spread to and infested over 25 000 hectares, sometimes forming nearly solid stands that exclude desirable plants (Belles et al, 1981, Roche et al, 2003). Interestingly, Roche and Thill (2001) suggest *C. vulgaris* has a range of traits that favour persistence rather than rapid population growth compared with another Mediterranean annual (*Centaurea solstitialis*) that has also naturalised in the USA. They find that larger, heavier seeds with an after ripening requirement, lower fecundity but higher germination success and reproduction related to vernalisation and photo-period as well as thermal time mean *C. vulgaris* populations are likely to be more persistent and hence better adapted to invading less disturbed habitats. Miller and Thill (1983) describe *C. vulgaris* as strongly competitive against range land grasses and forbs and note that overgrazing of these increases invasion success.

**Harmful properties:** None.

**Economic benefit:** *C. vulgaris* has little contemporary economic benefit (GRIN database).

## 2. Weed Risk

### World weed status

*C. vulgaris* is considered a significant weed in parts of the USA where it is regulated in at least 15 states as well as being a Federal Noxious Weed (GRIN database). It is also considered a serious economic pest in Russia (Cunningham et al, 2003).

### Australian weed status

*C. vulgaris* is not naturalised in Australia apart from one known occurrence in Hope Valley, South Australia (Cunningham et al, 2003). It is not regulated in any state or territory and is currently permitted entry to Australia. It is listed as one of 17 significant weeds recommended for eradication from Australia (Cunningham et al, 2003).

### Weed potential in Tasmania.

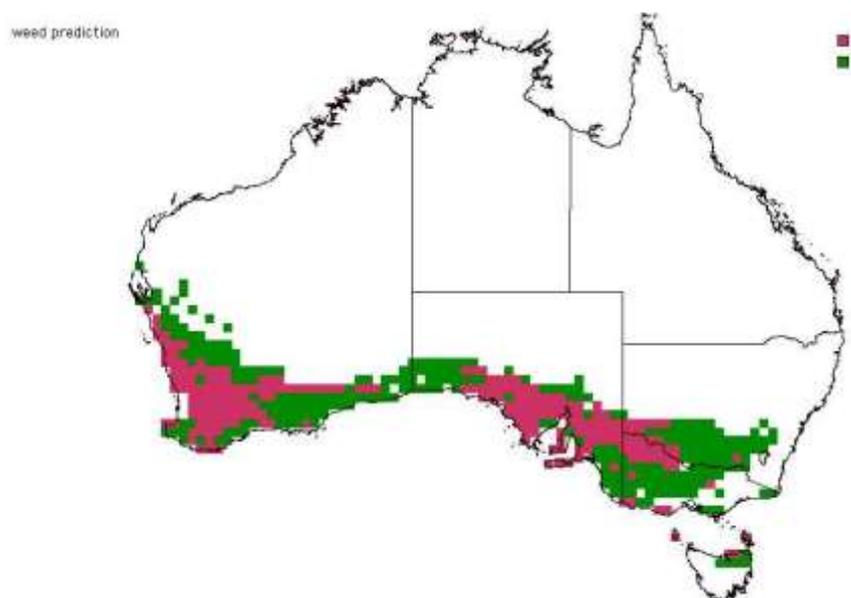
*C. vulgaris* is not naturalised in Tasmania at this time.

Climate matching indicates the plant is likely to grow well in a range of Tasmanian environments, in particular the north and north east of the state. The following analyses indicate the weed potential of *C. vulgaris* in Tasmania is significant.

### Weed risk assessment

Weed risk assessment undertaken by DPIWE involves use of a point scoring system devised by Pheloung (1996). *C. vulgaris* scores 23 on a scale that is positively correlated to weediness. The nominal score for rejection of a plant on this scale is 7 or greater (see Appendix 1 for risk assessment scoring).

Potential distribution of  
*Cuprina vulgaris* in Australia  
using CLIMATE (Pheloung,  
1995)



### 3. Weed Impact Assessment

Weed impact assessment is based on the DPIWE scoring system designed for that *C. vulgaris* scores 4 points on a scale where 4 points or more indicates a plant has significant potential impact. The impact scoring system requires that questions be answered with a particular land use and density in mind. *C. vulgaris* was assessed for its potential impacts upon agriculture, assuming a moderate density.

**Economic impact.** The potential economic impact of *C. vulgaris* in Tasmania is mostly relevant to agricultural situations. Whilst unlikely to establish in regularly cultivated areas, the plant could become a significant pasture weed in northern and northern midlands grazing areas and hence reduce carrying capacity. Seeds may also be readily transported as fodder contaminants and thus rapidly increase the distribution of the plant. *C. vulgaris* may also become a roadside weed. Cunningham et al. (2003) suggest it has potential to threaten more than \$3500 million worth of Australian agricultural value,

**Environmental impact:** *C. vulgaris* is described as invasive in natural environments in the USA. Whilst it does not appear to be shade tolerant, its appearance in natural areas after fire (Sowa, 2002) and evidence of an ability to invade undisturbed areas (Roche and Thill, 2001) suggest it may establish in native grasslands or open forest in Tasmania. Many communities in these vegetation types are already amongst the most compromised in the state. Groves et al. (2003) list it as primarily a weed of agriculture or a ruderal weed.

**Social impact.** *C. vulgaris* is unlikely to have significant social impacts in Tasmania although it may render certain natural areas or public amenity sites less useful for recreation or tourism.

### 4. Management Feasibility.

Since this plant is not naturalised in Tasmania at this time, management feasibility is not an issue. However, maintaining freedom from *C. vulgaris* is highly dependent upon effective import prohibition, early detection and reporting of any occurrences and, community and industry education.

### 5. Declaration Recommendation.

*C. vulgaris* appears to have potential to establish, reach moderate densities and cause significant harm in agricultural and natural grassland and other communities in Tasmania. It may also become a weed of roadsides. Therefore, it should be nominated for declaration under the *Weed Management Act 1999*. This will support import control and early eradication of any infestations that occur.

### 6. References.

Belles, W.S., Wattenbarger, D.W. and Lee, G.A., 1981, Chemical control of *Crupina vulgaris*, a new range weed in Idaho and the United States. *Journal of Range Management* 34 (6): 468-470.

Blue Mountains Natural Resources Institute website at [www.fs.fed.us/pnw/bmnrs](http://www.fs.fed.us/pnw/bmnrs).

Courderc-Le Vaillant, M. and Roche, C.T., 1993, Evidence of multiple introduction of *Crupina vulgaris* in infestations in the Western United States. *Madrona* 40 : 63-65.

Cunningham, D.C, Woldendorp, G, Burgess, M.B. and Barry, S.C., 2003, *Prioritising sleeper weeds for eradication: Selection of species based on potential impacts on agriculture and feasibility of eradication*. Bureau of Rural Sciences, Canberra.

Groves, R.H. (Convenor), Hosking, J.R., Batianoff, G.N., Cooke, D.A., Cowie, I.D., Johnson, R.W., Keighery, G.J., Lepschi, B.J., Mitchell, A.A., Moerkerk, M., Randall, R.P., Rozefelds, A.C., Walsh, N.G. and Waterhouse, B.M., 2003, *Weed categories for natural and agricultural ecosystem management*. Bureau of Rural Sciences, Canberra.

Miller, T and Thill, D.C., 1983, Today's weed: common crupina. *Weeds Today* 14 (3) 10-11.

Pheloung, P.C., 1995, *Determining the weed potential of new plant introductions to Australia*. A report commissioned by the Australian Weeds Committee. Agriculture Western Australia.

Pheloung, P.C., 1996, *Climate. A system to predict the distribution of an organism based on climate preference*. Agriculture Western Australia.

Roche, C.T., Thill, D.C and Shafii, B., 1997a, Estimation of base and optimum temperatures for seed germination in common crupina (*Crupina vulgaris*). *Weed Science* 45 (4): 529-533.

Roche, C.T., Thill, D.C and Shafii, B., 1997b, Prediction of flowering in common crupina (*Crupina vulgaris*). *Weed Science* 45 (4): 519-528.

Roche, C.T. and Thill, D.C., 2001, Biology of common crupina and yellow starthistle, two Mediterranean winter annual invaders in western North America. *Weed Science* 49 (4): 439-447.

Roche, C.T., Vilatersana, R., Garnatje, T., Gamarra, R., Garcis-Jacas, N, Susanna, A. and Thill, D.C., 2003, Tracking an invader to its origins: the invasion history of *Crupina vulgaris*. *Weed Research* 43(3): 177-189.

Sowa, R.W., 2002, Crupina vegetation management, Okanogan-Wenatchee National Forests, Chelan County. U.S. Environmental Protection Agency. *Federal Register Environmental Documents* 67 (201): 64082-64084.

Thill, D.C., Zamora, D.L. and Kambitsch, D.L., 1985, Germination and viability of common crupina (*Crupina vulgaris*) achenes buried in the field. *Weed Science* 33 (3): 344-348.

United States Department of Agriculture database at <http://plants.usda.gov>

USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN), online database at [www.ars.grin.gov/cgi-bin/ngps/html](http://www.ars.grin.gov/cgi-bin/ngps/html), National Germplasm Resources Laboratory, Beltsville, Maryland.

Zamora, D.L. and Thill, D.C., 1989, Seed bank longevity of common crupina (*Crupina vulgaris*) in natural populations. *Weed Technology* 3 (1) 166-169.