

# The use of copper rings to reduce losses of red helleborine *Cephalanthera rubra* to slug and snail herbivory in the Chiltern Hills, Buckinghamshire, England

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## SUMMARY

In an attempt to protect the nationally rare red helleborine *Cephalanthera rubra* from herbivory by slugs and snails during the growing season, copper rings were placed over emerging shoots in the spring and summer. Subsequent monitoring revealed that there was no evidence of any slug damage to plants protected by such rings.

## BACKGROUND

In Great Britain, the red helleborine *Cephalanthera rubra* is now known only from single localities in the three counties of Buckinghamshire, Gloucestershire and Hampshire, in southern England. In the UK this orchid is classified as Critically Endangered and is a fully protected species (Wigginton 1999). It occurs sporadically throughout much of Europe, where it is considered vulnerable. It typically inhabits deciduous woodlands, dominated by beech *Fagus sylvatica* on free-draining slopes with shallow calcareous soils and a short, patchy ground flora. At the Buckinghamshire locality, red helleborine plants produce up to 14 florets on a long spike up to 50 cm tall. Declines in its UK range have been attributed to habitat loss and lack of woodland management, neglect leading to problems of excessive shading. Slug damage has been a problem at each of the three extant English sites at some time, and at the Buckinghamshire locality slug damage had been evident on many occasions in the past. In order to try and prevent losses to slugs, molluscicide in the form of slug pellets have been applied during the spring and summer months (when the plant is visible above ground and hence vulnerable to slug herbivory) around plants in past years at the

this site. However, concern was raised that as the pellets contained a chemical attractant, they might be drawing in slugs and snails into the vicinity of the plants. Therefore a new technique was trialled; the placement of copper rings around individual helleborine spikes.

## ACTION

**Study site:** The experiment was undertaken at a woodland site in the Chiltern Hills, Buckinghamshire, southeast England, which supports a small population of red helleborines consisting of up to 10 plants.

**Placement of copper rings:** Between 22 May and 11 June 2007, as shoots emerged, seven copper rings were placed around all visible red helleborine plants, one ring per shoot. The rings were 15 cm in diameter and 4 cm deep, made of copper sheet approximately 0.5 mm thick. The rings were pushed gently into the soil surface and loose soil gently pushed against the base of the rings to ensure that any approaching slugs or snails could not pass underneath.

**Caging:** Each plant was further protected from possible browsing e.g. by small mammals, with a new, fine-meshed galvanised wire, open-topped cage, replacing those used previously of more crudely constructed (Figs. 1 and 2).



**Figure 1.** Red helleborine in bud surrounded by old mesh cage, 9 July 2007 (Photo: Roger Newman)



**Figure 2.** Red helleborine in bud surrounded by new mesh cage with copper ring in position, 9 July 2007 (Photo: Roger Newman)

**Monitoring:** Subsequent to the placement of the copper rings, the locality was visited every 3-4 days throughout the late spring and summer. All red helleborine plants that emerged were visually inspected for any signs of snail or slug damage (eaten foliage/flowers) or indications of their presence (characteristic 'slime trails' and droppings).

**Weather:** The relatively mild and sunny winter of 2006/7 was followed by the warmest, driest and sunniest April since 1914, with temperatures 5° C above normal. From May onwards, southeast England had the wettest and dullest early summer recorded, with exceptionally high rainfall very much above the average through to August. In consequence conditions for slugs and snails were very favourable with far more individuals evident than in recent years.

## CONSEQUENCES

Eight red helleborine plants emerged in 2007 (five non-flowering plants growing to a height of 10 cm; and three that went onto flower reaching up to 50 cm tall with 10-14 florets each), all of which were protected with a copper ring and a mesh cage.

Despite the very wet late spring and summer, and much evidence of slug presence in the vicinity, there was no evidence of any damage to any of the red helleborine plants, throughout the initial growth of the plants and the flowering period (Fig. 3), through to the withering of stems after flowering.

The copper rings were removed in the autumn after plants had naturally died back, to limit the potential for changing the soil chemistry from any interaction with copper.

**Conclusions:** The use of copper rings in the red helleborine growing season of 2007 was considered an effective barrier to slug predation. In future years, given the results of this trial, copper rings will again be used but with the introduction of a control (unringed) plant if there are sufficient shoots, to allow for a comparison between those protected by copper rings and one left unprotected.



**Figure 3.** One of the three red helleborine plants that flowered, most florets open and undamaged by herbivory, 26 June 2007 (Photo: Roger Newman)

## REFERENCES

Wigginton M.J. (1999) *British Red Data Books 1; Vascular Plants*. 3rd Edition. JNCC, Peterborough, UK.

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