

The use of bud caps (leading shoot tree guards) to relieve browsing pressure in remote areas of Caledonian pinewood at Mar Lodge Estate National Nature Reserve, UK

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SUMMARY: Bud caps can be used to reduce browsing pressure on isolated Scots pine *Pinus sylvestris* seedlings in outlying areas of Caledonian pinewood.

BACKGROUND: The National Trust for Scotland Mar Lodge Estate National Nature Reserve is a large, biodiverse estate in the Cairngorms National Park, Scotland. Mar Lodge Estate incorporates nationally significant areas of semi-natural Caledonian pinewood. Regeneration in these pinewoods has been suppressed by high numbers of herbivores for centuries (Steven & Carlisle 1959). The National Trust for Scotland has been successful in increasing woodland regeneration on the estate through a deer reduction programme. However, browsing by herbivores is still being recorded on isolated seedlings at high altitudes and in remote parts of the estate. The National Trust for Scotland has therefore been experimenting with solutions to alleviate the browsing pressure on these seedlings.

ACTION: In September 2014 we installed Grube PlantaGard® Cactus Pro bud caps on 65 Scots pine seedlings in Beacan Wood, an area of Caledonian pinewood that is among the remotest on the Mar Lodge Estate. Beacan Wood continues to experience browsing from red deer *Cervus elaphus*, roe deer *Capreolus capreolus* and less frequently by mountain hares *Lepus timidus*. We selected seedlings that were between 20 cm and 50 cm tall. Another 63 seedlings were marked as control trees and received no bud cap. In 2015-2017 each seedling was revisited annually in the spring to determine whether it had been browsed in the previous year or sustained any other type of damage. Each seedling was also revisited at the end of the growing season to move the bud cap up the leading stem of the seedling.

CONSEQUENCES & DISCUSSION: Over the three year monitoring period the bud caps significantly reduced browsing ($X^2 = 5.60$, $p < 0.05$). Cumulatively over the three year period, 29% of seedlings fitted with bud caps received some form of browsing damage, while 50% of monitored seedlings without bud caps were browsed at least once (Figure 1). Bud caps therefore reduced browsing on seedlings by 42%. Browsing pressure varied between years, but in each year browsing was between 39% and 55% lower on trees with bud caps. Eighty per cent of instances of browsing damage were caused by deer, with 10% caused by mountain hares and 10% caused by

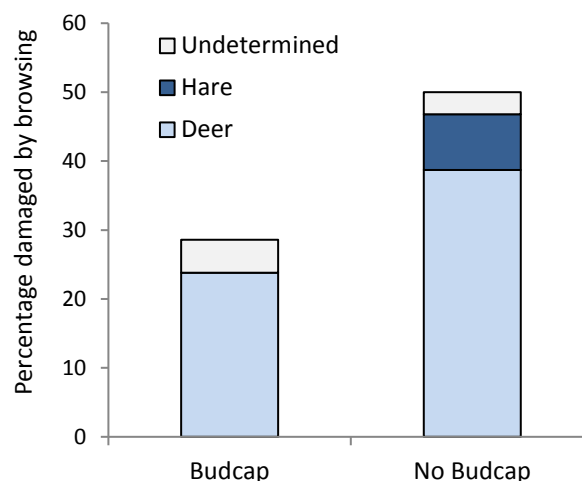


Figure 1. Percentage of seedlings with or without bud caps which sustained browsing damage from 2015-2017.

undetermined herbivores (either deer or mountain hares). This was determined by identifying the bite marks on affected seedlings. There were no recorded incidents of hares damaging seedlings fitted with bud caps over the monitoring period, while hares accounted for 20% of browsing instances on untreated seedlings. However, a proportion of the damage caused by undetermined herbivores may be attributed to hares.

Some of the trees were damaged or bent over by the bud caps. Over the three years of monitoring 15% of bud caps came off, 6% damaged or bent over the leading shoot of the seedling and 9% of were chewed through by herbivores. In total 26% of seedlings fitted with bud caps sustained at least one form of damage of these types. These seedlings were more likely to receive browsing pressure: 48% of seedlings which sustained some form of bud cap damage also sustained browsing damage, while 17% of seedlings with no bud cap damage sustained browsing damage. This suggests that optimum results due care should be given to the correct installation of bud caps and that some consideration should be given to the size and strength of a seedling prior to fitting it with a bud cap. There is anecdotal evidence that smaller seedlings are more likely to be damaged by bud caps, but we have not measured this parameter.

Bud caps can be used to reduce browsing pressure in remote, unfenced areas of Caledonian pinewood where herbivore control is difficult to achieve. They do require some work effort to check them and move the bud caps back up the lead shoot after the growing season. Correct instruction for workers on how to apply the bud caps and when to move them up the tree will improve success rates.

REFERENCES

Steven H.M. & Carlisle A. 1959. *The Native Pinewoods of Scotland*. Oliver & Boyd, Edinburgh.

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