# The effect of chisel ploughing to create nesting habitat for breeding lapwings *Vanellus vanellus* at Ynys-Hir RSPB reserve, Powys, Wales

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**SUMMARY**

On an area of improved grassland, chisel ploughing was used on a two year rotation to break up the surface of the sward to create small hummocks and divots amongst which it was hoped lapwings *Vanellus vanellus* would nest. The water level was also increased and a seasonal sheep and cattle grazing regime introduced. Between 2000 and 2005, lapwings increased from 10 to 81 pairs and redshank *Tringa totanus* increased from 11 to 29 pairs.

**BACKGROUND**

Ynys-hir RSPB reserve, situated in west Wales, comprises a mix of oak *Quercus* woodland with wet grassland and estuarine salt marshes. In 2000 the RSPB, partly through the Heritage Lottery Fund's Wetlands for Wales project, acquired 160 ha of improved grassland at Ynys-hir, with the aim of managing it to benefit breeding waders, especially lapwings *Vanellus vanellus*. The site was previously intensively managed for sheep and cattle production, this included fertiliser application, high stocking densities, supplementary feeding and lowering of water levels. The grass was previously managed to produce a dense perennial rye-grass *Lolium perenne* sward that was unsuitable as breeding habitat to most bird species, particularly breeding waders. Many of the former sheep-grazed fields purchased had a tight, uniform sward. Any lapwings nesting on these fields would have been very visible and vulnerable to predators.

**Figure 1.** Chisel ploughing grassland at Ynys-Hir. (Photo: Ross Willis)

**ACTION**

**Chisel ploughing:** At Penrhyn-gerwyn, where the newly acquired improved grassland was located, a chisel-plough towed by a tractor (Fig. 1) was used to break up the surface of the sward to create small hummocks and divots amongst which lapwings could nest. Chisel ploughs are designed to break up compacted soil below the depth reached by conventional plough cultivation, in order to improve drainage and aeration in the top 30 cm of the soil.

Initially, approximately 8 ha (20 acres) was chisel ploughed in February 2002. The area chosen was flat, improved, heavily grazed and well drained grassland with a deep perimeter ditch. It had been ploughed in the 1980s when the rye-grass dominant sward was seeded, but since then, there had been no arable management. Sections of each field were ploughed to create a suitable mosaic of tight and broken sward. Since then, chisel ploughing has been deployed to break up the surface of about 10 ha field area each year. Fields are chisel-ploughed on a 2-year rotation.

**Other management to help improve conditions for lapwings:** Water levels are raised in the spring to provide the high soil water levels that lapwing prefer. Levels are held high from the beginning of March onwards and are controlled by the use of sluices and pipe dams.

Smaller side ditches have been created to increase the water/grass ratio that breeding lapwings thrive on. Brambles *Rubus fruticosus*, willow *Salix* scrub and wire fencing were removed from the edges of all ditches on the site, and the ditches were widened (now up to 5 m wide) and water levels then held high to act as stock proof 'wet fences'. The waste material was spread alongside the ditches to create bare areas of ground that were also utilised by nesting lapwings. Ditch sides are gently sloping to provide invertebrate-rich feeding areas for lapwing chicks.

New grazing regimes were implemented, with cattle grazing from the end of April until mid-December (depending on soil conditions) and sheep from mid-June through the winter until March). The sheep are removed in March and from then until mid-June cattle only are used to create and manage the sward in a suitable condition for breeding lapwing. No specific stocking densities have been used on the site as livestock management is aimed at creating a certain sward structure and is therefore reactive to the seasonal and yearly conditions, such as annual variation in grass growth. Normally, though, stock density is held at approximately 0.4 livestock units/ha during April to May, and then increased to 1 livestock unit/ha from June onwards.

## CONSEQUENCES

The chisel ploughing of the heavily grazed improved *Lolium*-dominated fields was not the only management implemented so any response by lapwings may not be directly attributable to the ploughing. However, lapwings responded to the changes in the sward surface and used ploughed areas for nesting, which afforded both a suitable substrate for nesting and concealment for eggs. Overall, the various management actions dramatically increased numbers of breeding waders. Between 2000 and 2005, lapwings have increased from 10 to 81 pairs and redshank *Tringa totanus* from 11 to 29 pairs.

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