The use of exclosures to produce a favourable grazing regime for the orchid, Spiranthes romanzoffiana, on the dune/hill intergrade - part of the machair complex, on Colonsay, Inner Hebrides, Scotland

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Nine plants of the Biodiversity Action Plan orchid, Irish Lady's-tresses - *Spiranthes romanzoffiana* were discovered in bloom in 1997 on a single visit at one site - KA - at the back of dunes on Colonsay; and 24 at a second nearby site - KB - in 1999. At each site the number of plants in bloom have been monitored in each subsequent year (2000 - 2008). This includes the number found at positions where flowering plants have never previously been recorded.

The substrate at KA and KB is wind blown sand. KA is on sloping ground with some water movement down from the surrounding hill in wet weather, possibly supplemented by a weak underground spring(s). KB is in a shallow hollow between large craggy outcrops. It is very gently sloping with a small amount of water movement through the soil. Exclosures were erected in 2001 to provide a Summer Grazing Break (SGB). A grazing break had previously occurred between 1996 and 2000 under the terms of an Environmentally Sensitive Area grazing regime.
The capsules of *Spiranthes romanzoffiana* do not develop as they do in Autumn Lady's-tresses orchid - *Spiranthes spiralis*; nevertheless the withered structures are now known to contain small numbers of seed. The grazing break allows seed development and hence the possibility of population maintenance via sexual reproduction.

The number of plants in bloom has varied greatly from year to year. In 2008 numbers were the lowest ever recorded since 1998 in KA and there were no plants flowering in KB.

There are a number of factors which could be responsible for this decline. These may be acting in combination. They include a) drought in May and June; b) increases in rabbit grazing; c) the presence of a decline phase in the population (known from other *Spiranthes romanzoffiana* populations); and d) changes in above-ground sward structure, with changes in root and rhizome density. Sward structure changes could in turn be due to more than one cause, e.g. cumulative effect of SGBs 2002 - 2007 or presence of a dune-wide grazing break between early May and late July in 2008.

Stock (sheep and cattle) movement through and into the exclosures is facilitated by two gates. *Spiranthes romanzoffiana* often occurs in disturbed habitats. One challenge at KA and KB is to ensure adequate levels of sward disturbance and heavy winter grazing within the exclosures when the basic grazing regime is set at the whole-dune level.

At other sites in Scotland it may be possible to negotiate SGBs by management agreements rather than exclosures. Some new sites are found in the west of Scotland in most years, these quite often contain one or two plants. Conversely the species has become locally extinct at many of its former sites. Several aspects of the biology of the species and its interactions with a) competitors and b) habitat structure, are still unknown. A full understanding of the behaviour of the species above and below ground requires detailed research. Attempts to secure relevant funding for studies on both conservation biology and conservation management are ongoing.