

# Cattle exclosure plots to enhance breeding whinchat *Saxicola rubetra* numbers on sub-alpine pasture at Bever, Graubünden Canton, Switzerland

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## SUMMARY

A project undertaken from 2003 to 2009 evaluated the efficacy of cattle exclosures to enhance breeding whinchat *Saxicola rubetra* numbers in a 65 ha study area comprising sub-alpine cattle-grazed pasture (42 ha) and hay meadows in the Southern Alps of Switzerland. Potentially suitable nesting sites were created in the pasture by erecting fences to exclude cattle, and this made available additional perches (providing hunting and song posts in territories) where previously mostly lacking. One 0.9 ha plot was excluded from grazing cattle with a wooden fence, and five smaller 0.1 ha plots with electric fences. Whinchats used the plots as parts of their territories and the fence posts as song posts and perches. The 0.9 ha plot secured whinchat territories until 2009. For the five 0.1 ha plots there was no clear effect on whinchat territory occupancy. Over the study period the whinchat population declined (following a general regional trend) from a high of 27 pairs in 1990 to a low of six pairs in 2009.

## BACKGROUND

The whinchat *Saxicola rubetra* is an insectivorous passerine that breeds in Europe and western Asia, and winters in tropical Africa. Whinchat populations are decreasing in Switzerland and adjacent central European countries (Horch *et al.* 2008). They typically nest in traditionally managed flower-rich hay meadows and low-intensity grazed pastures. Formerly widespread throughout Switzerland, they are now restricted as a breeding species to montane and subalpine grasslands (Müller *et al.* 2005). The main factor attributed to their decline as a breeding species is intensified grassland management (including application of artificial fertilizers, herbicides and insecticides, and irrigation) over recent decades. Whinchats are ground-nesters requiring at least a few vertical structures within their territories, such as isolated bushes and/or other prominent tall plants or fence posts that provide hunting perches and song posts.

Swiss Ornithological Institute (SOI) projects aimed at whinchat habitat enhancement

indicate that whinchats build their nest within dense herbaceous vegetation patches of at least 1-2 m<sup>2</sup> in area. SOI has evidence that late mowing of hay meadows benefits whinchats by allowing tall vegetation to develop, with cutting undertaken post-breeding. Thus, promoting availability of such nesting habitat was identified as a way of providing potential suitable nesting areas.

This present study reports a whinchat habitat enhancement programme in sub-alpine pastures in Bever (southeast Switzerland) initiated in 2002. SOI wanted to test measures in a cattle-grazed area aimed at halting the whinchat breeding population decline and to enhance whinchat reproductive success through exclusion of cattle grazing in several plots. Primary objectives were: 1) to allow development of taller vegetation and to retain old grass stands as potential breeding sites; and 2) to improve the availability of vertical structural elements (tall plants, fence posts) in the grazed parts of the study area where these were lacking.

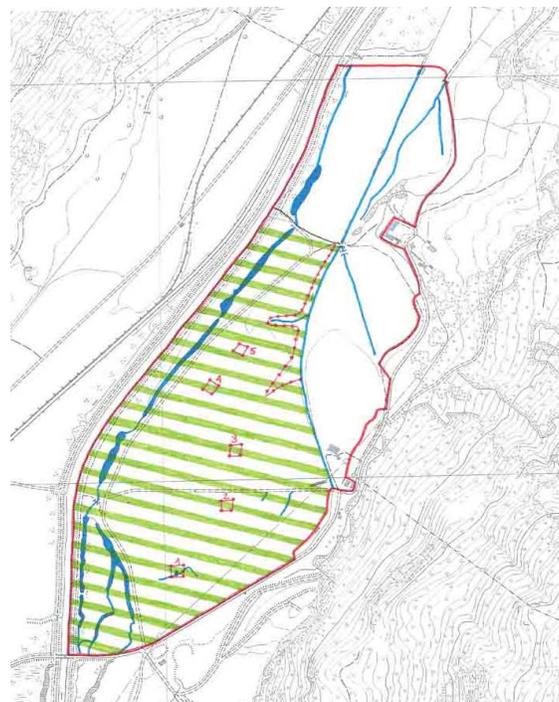
## ACTION

**Study area and initial monitoring:** The municipality of Bever (46°33'N, 9°55'E, 1,700 m a.s.l.) is located in the southern part of the Engadine Valley, Graubünden Canton, Switzerland. A small breeding whinchat population has been monitored in Bever since 1989 by SOI. In the 1980s, breeding whinchats were dispersed throughout the 65 ha sub-alpine study area comprising about one third flower-rich meadows (23 ha) mown for hay in late summer, and two thirds pasture (42 ha; cooperatively farmed land) subject to low intensity cattle grazing in spring and autumn. The pasture is a mosaic of three vegetation types: subalpine pastures *Poion alpinae*, calcareous fen *Caricion davallianae* and mat-grass pastures *Nardion strictae* (Delarze & Gonseth 2008). In 1989, 23 whinchat territories were recorded in the 65 ha area. In subsequent years prior to initiation of the cattle-exclusion project, monitoring showed that the population was declining. It was noted however, that the distribution of whinchat territories was associated with pasture margins with slightly taller vegetation and presence of fence posts (used as hunting perches and song posts); these observations helped to formulate the idea of using cattle enclosures as a conservation measure.

**Treatments:** The measures tested were designed to be simple, cost-effective and applicable to other grazed areas supporting breeding whinchats. The project was a collaboration of the farming co-operative, community of Bever and the SOI, conducted from 2003 to 2009. The following three measures were agreed upon by all partners in November 2002 for the 42 ha cattle grazed area (Fig. 1):

1) A permanent wooden fence (built in a traditional manner of the region) was erected enclosing a 0.9 ha of grassland abutting a small stream, with grazing undertaken in autumn only (Fig. 2). Those farmers affected were remunerated (Swiss Francs CHF 300/ha) by the SOI for loss of spring/summer grazing.

2) In the core area of the pasture, five 'whinchat plots' (each of 0.1 ha) were fenced with electric fences (Fig. 3), all in wet and rather unproductive patches with little vegetation growth and hence low value for livestock grazing. Through summer and winter these fences were removed to allow autumn cattle grazing. The farmers wished that the electric fences were erected in the same places each year, so the four corners of each plot were marked with a wooden post. Again grazing loss was compensated with CHF 300/ha.



**Figure 1.** The 65 ha study area at Bever (delineated by the continuous red line), showing the 42 ha pasture (green-stripes) and meadows (white within perimeter), streams and ponds (blue), and the fenced plots. Small numbered rectangles in red are whinchat plots; the dotted red line indicates the wooden fenced plot.

3) The farmers feared that the grazing exclusion measures would augment the amount of unproductive pasture land by promoting growth of plants of low palatability to cattle. Therefore it was agreed to take measures to control such plants (especially woody shrubs of all species, unless of low numbers of isolated individuals) if undesired vegetation encroachment was observed.



**Figure 2.** The wooden fence around the 0.9 ha plot, built in a traditional manner typical of the region.



**Figure 3.** A 0.1 ha 'whinchat plot' excluded from cattle grazing by an electric fence.

**Monitoring:** Throughout the 65 ha study area, whinchat territories were mapped during six visits during the breeding season (May-July) from 1989 to 2002 (prior to fencing) and from 2003 to 2009 (following the method of Bibby *et al.* 1992). It was hoped to ascertain whether

the fenced areas encouraged whinchats to establish territories in the vicinity.

SOI planned to monitor vegetation change in the whinchat plots annually to assess if any undesired vegetation changes were occurring and to thus take counteractive measures as required, to appease farmers. Vegetation was also monitored to gauge if restriction of cattle grazing in these patches was sufficient to promote natural establishment of tall herbaceous plants, isolated bushes etc. in this sub-alpine region, or if planting might in fact be necessary to provide whinchat perch features.

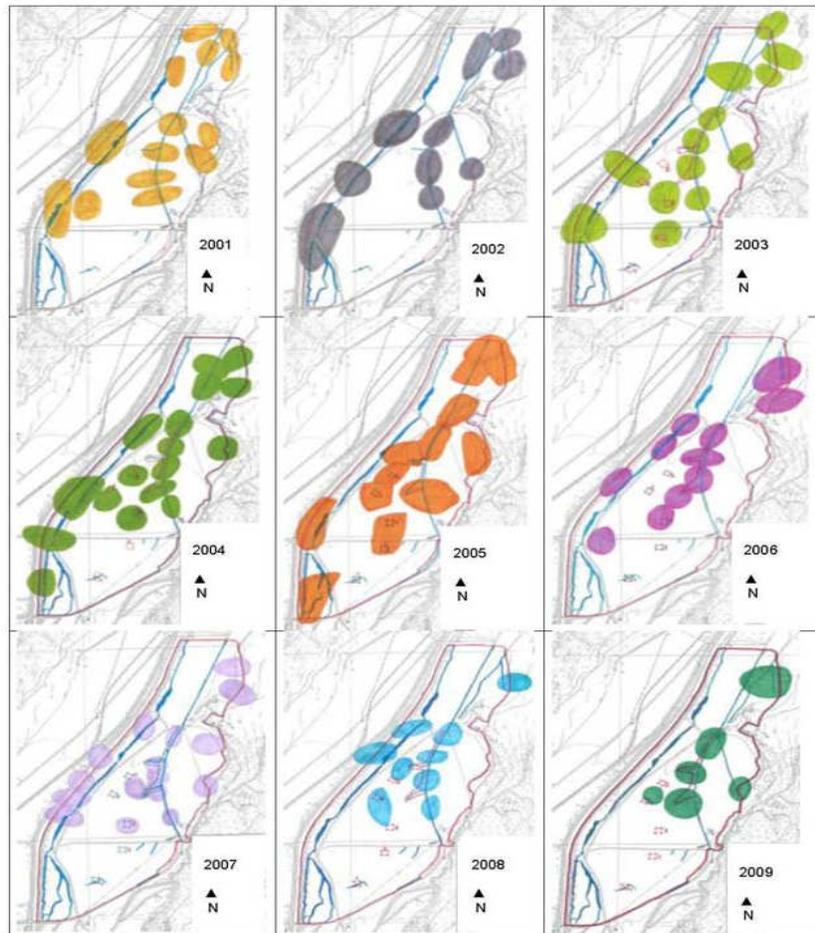
## CONSEQUENCES

**Whinchat territory occupation:** In total 1.4 ha (3.3%) of the previously spring-autumn cattle grazed area was excluded from grazing during each breeding season (2003-2009). Most territories were established in the same parts of the study site each year (Fig. 4). In the first years of the project, we found several new whinchat territories (Table 1: 2003: 2 territories; 2004: 3 territories; 2005: 4 territories; 2006, 2007 and 2008: 2 territories; 2009: 1 territory) in the middle of the pasture, with four whinchat plots used as parts of these territories. The 0.9 ha ungrazed area within the wooden fence formed part of several territories (2003: 4 territories; 2004: 4 territories; 2005: 2 territories; 2006-2009: 3 territories).

Although systematic nest searches were not conducted, in the first three years nests were located inside at least two of the enclosures: in 2003 and 2004 in whinchat plot 3; and 2003, 2004 and 2005 inside the wooden fenced plot. Observations indicated that the fences provided whinchat song posts and vantage points from which to hunt for invertebrates.

**Table 1.** Location and numbers of whinchat territories in Bever from 2001 to 2009.

Year	Territories in pasture			Territories in hay meadows	Total
	River Inn embankment	Whinchat plots (0.1 ha plots)	Wooden fenced plot (0.9 ha)		
2001	3	0	4	7	14
2002	3	0	3	4	10
2003	2	2	4	5	13
2004	4	3	5	5	17
2005	2	4	2	5	13
2006	4	2	3	2	11
2007	5	2	4	4	15
2008	2	2	4	1	9
2009	0	1	3	2	6



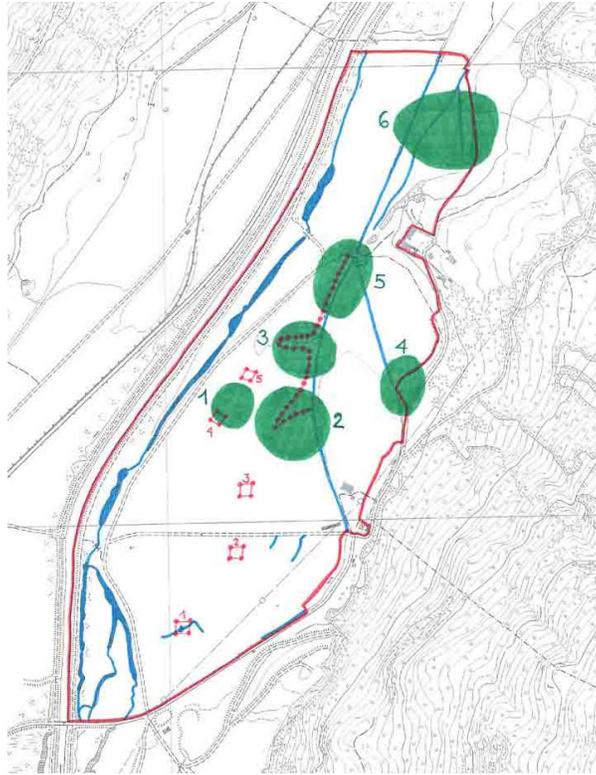
**Figure 4.** Whinchat territory distribution in 2001-2009; fences to restrict cattle grazing were erected in 2003.

**Effects on population size:** A total of 23 whinchat territories were counted within the 65 ha study site in 1989. Territory numbers then steadily declined up to 2002, when 10 territories were mapped (Fig. 5). Although in 2004 (17 territories) and 2007 (15 territories), numbers seemed to recover a little, the overall trend was a continued decline over the 7-year study period when the exclosures were present (Table 1, Fig. 4), falling to an all time low of six pairs in 2009 (Fig. 6).

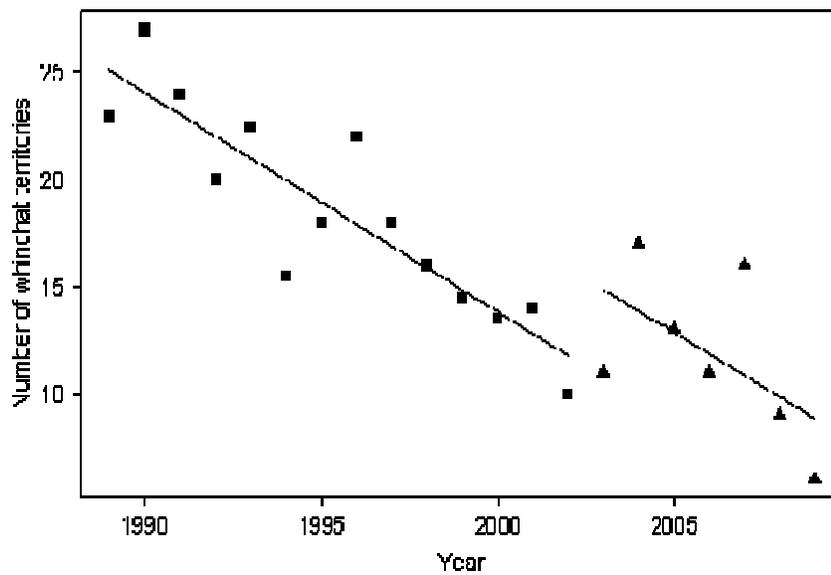
**Vegetation change:** The vegetation in the fenced plots changed little over the seven years. The cattle did not graze the whinchat plots in autumn despite the plots being opened to allow grazing, attributed to the grass being old and dry. Due to the lack of vegetation response to seasonal cattle exclusion, only one concerted vegetation survey was conducted, in 2007. This indicated that the vegetation species composition had not changed. The only noticeable change was that taller grass stands had established (5-20 cm prior to fencing and

5-40 cm in 2007). A few single small willow *Salix* bushes (50-120 cm tall) had colonised the wettest parts of four plots. These vegetation features are considered valuable structures for whinchats but are undesired by the farmers.

**Conclusions and discussion:** The breeding population of whinchats declined in the study site over the study period, mirroring the regional trend. The installation of fenced plots preventing cattle grazing in some areas during the whinchat breeding season did not halt this decline. However, looking at the results of the last year of study (2009), when only four males established territories in the pasture (thus little territory competition existed), one territory included parts of whinchat plots 4 and 5 (Fig. 5) and the three others were along the stream including parts of the larger (0.9 ha) wooden fenced area. Therefore, fencing out areas of pasture may have promoted whinchat occupancy, at least offering undisturbed nest sites and perches.



**Figure 5.** Whinchat territories at Bever in 2009. Four territories (1, 2, 3 and 5) were established in the pasture: The wooden fenced area (0.9 ha) appeared an important falling within three territories (2, 3 and 5); the two whinchat plots (numbers 1 and 5) in the north partly fell within territory 1. Two territories (4 and 6) were established in the parts of the study area under hay-meadow management (see Fig. 1).



**Figure 6.** Whinchat population trend at Bever from 1989 to 2009, showing the trend before commencement of the whinchat project (1989-2002, rectangles) and subsequently (2002-2009, triangles).

By contrast, the 0.1 ha plots had only a discernable effect on territory distribution when competition on territory occupation in the marginal areas of the pasture existed. The larger (0.9 ha) fenced area, on the other hand, held up to four whinchat territories and thereby appeared to provide features attractive to territory establishment.

A study in the nearby Lower Engadine (northern Engadine valley) by Schuler (2003) revealed that a mosaic of uncut plots of about 0.1 ha (randomly distributed over the study site) had no effect on territory occupation of whinchats when the proportion of uncut grass was between 4 and 10% of the total grassland area (3.3% in our study). The experiences made in our study in Bever were repeated in another region in Switzerland (Les Ponts-de-Martel Neuchâtel Canton, 2004-2010), where whinchats also breed in pasture (Groupe Tarier Neuchâtel, 2010). Three plots (in total 1.38 ha, 6 %) of the pasture were fenced with electric fences. This helped to support whinchat numbers in the short term but could not prevent a population decline.

Given this and the findings of our study, we suggest that uncut or ungrazed plots during the breeding season must be at least 1 ha in area, representing a minimal proportion of 10% of favourable grassland to have any effect on whinchat territory establishment. If such initiatives are repeated elsewhere, given site faithfulness, we recommend that fences should be erected in places where whinchats are known to have bred previously in an attempt to enhance their breeding habitat, if appropriate. In our project we used both a fixed wooden fence and easily movable electric fences. A fixed wooden fence has higher initial costs, but electric fences need organising (incurring additional cost) as they are re-erected each year. From our experience, we recommend fixed wooden fences (preferably of a traditional design) if farmers agree to compensation of loss of grazing land.

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