

# *Avena strigosa* (Schreb.) in north-western Europe: a historical landrace without crop wild relatives?

Crop wild relative case study by W. Podyma<sup>1</sup>, M. Scholten<sup>2</sup> and E. Bettencourt<sup>3</sup>

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Photography M. Scholten Map adapted from Preston *et al.* (2002) *New Atlas of the British and Irish Flora*

## *Avena strigosa* (Schreb.): crop and crop wild relative

*Avena strigosa*, an annual cereal, is both a minor, neglected crop and a crop wild relative. It is a diploid oat. As a crop, it was domesticated in southern Europe, probably Spain and spread from there over Europe where it was cultivated before the more productive hexaploid oat (*Avena sativa*) made its entry. Historical geographical distribution includes Austria, Byelorussia, Belgium, Corsica, Denmark, France, Finland, Germany, Hungary, Lithuania, Luxemburg, Norway, Portugal, Russia, Slovakia, Spain, Sweden, Switzerland, and the United Kingdom.

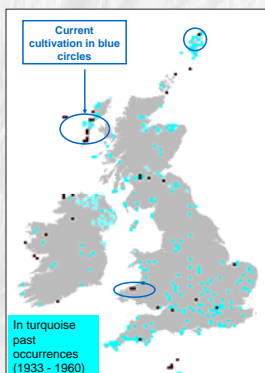
In Portugal its cultivation nowadays is restricted to small areas with light sandy soils. Current cultivation in Lithuania comprises four locations of small scale cultivation. *A. strigosa* does not form a seedbank, it requires continuous reintroduction. Hence, without the crop, there will be no crop wild relatives. This is currently the case in many European countries where cultivation has ceased, for example in Poland where it only occurs nowadays as a seed contaminant (Kiec, 2003). In Denmark, former stronghold of the crop, not one plant was discovered in a wide survey (Weibull, 2001).

## The role of *Avena strigosa* in agriculture

- Its introduction as a crop of the European Union Common Catalogue is being discussed at present.
- *Avena strigosa* has breeding qualities such as a very high oil content (Podyma, 1994) and a very long rooting system which makes it an excellent fodder with soil erosion prevention qualities.
- It is also grown as a fodder crop outside of Europe in South America.
- It is still a major feed on the Outer Hebrides where it survived as a crop in marginal agricultural circumstances due to its capability to stand up to high winds, tolerate manganese deficiency and very light soils.

## The fate of not-native crop wild relatives: the example of the UK

Plants associated with arable and horticultural habitats have undergone the strongest decline compared with plants in other habitats in the UK. Many crop wild relatives associated with former crops only occur as rare casuals nowadays. The plight of these plants, many of which not native to the UK, has recently been recognised by UK conservation authorities in the latest national Red Listing. Archaeophytes, introduced plants that have arrived in the UK before 1500, have been included in the National Red List 2005 and as a consequence will be candidates for Biodiversity Action Plans.



Distribution of *Avena strigosa* in the UK in the wild

In turquoise: past occurrences, before 1960; in black: occurrences between 1989–1999. Present occurrences on mainland Great Britain are rare casuals from bird-feed spills. In blue circles: present areas of cultivation. In 2004 as a crop it was only present on the Outer Hebrides, the Fair Isles, Shetlands Islands and in two locations in Wales.



*A. strigosa* has been used in the past in Scotland both for human consumption, as fodder for horses and cattle, and the straw for furniture and thatching. The photograph (upper left) shows one current use on the Outer Hebrides as feed for Highland cattle. It is usually grown with rye as a mixed stand to safeguard a harvest even in dry years. The proportion of the mixture varies with the soil and may be different on different parts of the Islands. Traditionally the harvest was stored outside the farm in stacks (right below). The lower left photograph shows the sandy soils of the Machair on North Uist (Outer Hebrides). In the background silaged fodder (hay and *A. strigosa* mixed with rye). Most, but not all, crofters have abandoned the traditional stacking in favour of silage.



## Current distribution of *Avena strigosa*, cultivated and in the wild

In the UK the remaining area of cultivation is mainly on the Outer Hebrides. Several hundreds of hectares on Machair soils are rented by small-scale farmers or "crofters". Here crofters grow "little or small oat" - *A. strigosa* - rather than the hexaploid modern cultivars. The main reason why this crop is still in use here is because it can stand up to high winds and give a yield on the very light, manganese deficient soils. The tradition of growing small oats is also a reason for some crofters to adhere to this landrace. The oat has been seed saved on farm for many generations. As can be seen on the map, occurrence of *Avena strigosa* in the wild coincides with areas of actual cultivation.

## Threat

On the short term crop cultivation is plagued by geese eating the grain and spoiling the feed. There have been some disease problems, such as smut. On the longer term the biggest threat for *A. strigosa* on the Scottish Islands is cessation of cultivation because of depopulation, an ageing crofters population and increased sheep instead of cattle farming.

## Conservation

The Machair is one of the priority habitats for conservation in the UK. However, at present, *Avena strigosa* is not listed as a typical species of the Habitat Action Plan for the Machair nor is it part of the agro-environmental schemes on the Islands.

Several accessions of *A. strigosa* are conserved in national and international gene banks.

### Literature cited

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Conserving Euro-Mediterranean plant genetic resources for use now and in the future

