

## **Chimney Meadows Nature Reserve: Restoring species rich lowland meadows in the Upper Thames CTA**

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BBOWT's Chimney Meadows nature reserve was already home to some wonderful species-rich lowland meadows before an arable reversion project began to create 70 ha of additional meadow on 11 arable fields. The project makes a significant contribution to Oxfordshire Biodiversity Action Plan's habitat targets for lowland meadow creation.

The arable reversion research project has to date recorded the successional progress of these meadows towards the target communities of the National Nature Reserve (NNR), part of Chimney Meadows, from where the green hay seed source originated in 2004.

Within the first 12 months (July 2004 – July 2005) all the key species of a dry neutral grassland community (MG5 in the National Vegetation Classification) had been established. By the third year in 2007 (before the severe floods of July 2007) the botanical community had developed the key species of the floodplain meadow community of the NNR (MG4).

One of the requirements prior to gaining funding support for arable reversion is to test the phosphorous levels of the soil. DEFRA use this as an indicator of the "health" of the soil and suitability for reversion to neutral grassland and currently specify a level of 1 or less is required (scale of 1-5). At Chimney all but 3 of the 11 fields were in the range of 1-2, yet one field had a level 3 and two others had a level 4.

BBOWT went ahead and sowed these high phosphorous level fields, along with the 8 "suitable" fields, which from a research perspective has been extremely interesting to monitor. The phosphorous level 3 field developed the key species of an MG5 lowland meadow within the first 12 months. This field is one of our most diverse and successful and last year a pyramid orchid was recorded for the first time. The phosphorous level 4 fields were overcome by thistles, dock and competitive grasses for the first 3 years of the project. In 2008, one of the fields finally started to show signs of progressing with the emergence of Quaking Grass (*Briza media*) and Pepper Saxifrage (*Silaum silaus*). The other level 4 field showed no signs until 2009! However, when this field did progress it went straight into presenting the more specialised species instead of the gradual succession observed in the majority of the reversion fields! One theory is the slurry spread across these 2 fields by the previous owner damaged the health of the mycorrhizal fungal communities. Research has demonstrated these fungi enhance the growth of the less competitive herbaceous plants by supplying additional nutrients via hyphal links. It is likely these fungal communities have now had time to start recovering, hence the abrupt emergence of the less competitive plants in these fields. The Institute of Grassland and Environmental Research is now researching the possibility of using a test of the "health" of the mycorrhizal community to replace the phosphorous level test. Many variables will play a role in dictating how a sward develops but the latter test would seem the most reliable given the intricate role these fungi play in grassland development and given the success of our higher nutrient level fields!

The next interesting step will be to look at the botanical and invertebrate data to analyse the impact of the 2007 summer floods on the community structure and start looking at the process of recovery and re-colonisation across the reserve.

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