

Using yellow rattle to restore wildflower grasslands

Yellow rattle is an annual grassland plant. It germinates between February and April, grows and flowers in May to July and sets seed in July to August, after which the plant dies. New seeds germinate the following year. The annual life-cycle of yellow rattle differs from other grassland plants, which are usually perennial growing from rosettes or tubers every year. This means that yellow rattle needs to have space to germinate within the grass sward, and the seeds need to touch bare soil. Yellow rattle is a hemi-parasite (meaning partially parasitic) on grasses and some legume herbs such as clovers, whilst also photosynthesising to produce its own nourishment.

It is a native species present in many different types of grassland but most strongly associated with neutral lowland and upland hay meadows, floodplain and water meadows. Although it does grow on wetter meadows, it tends to be



found in the areas that are drier. Indeed, it may not survive in areas pooled with water for long periods of time. Yellow rattle grows in a wide range of soils with acidity higher than pH 5. It struggles to grow in more acidic soils and is not usually found in acid grassland. However, it can also live in both nutrient poor sites, and those that are slightly more fertile (up to a phosphorous index of 2.5 to 3).

Yellow rattle seeds tend to have a short longevity in the soil seed bank. The plant can quickly die out if it is unable to germinate for a few years. For example, grass thatch, which is the build-up of dead leaves from the previous year's growth forming a mat, stop yellow rattle seeds touching the soil if it is not removed through suitable management. Equally, flooding at the wrong time of year may kill seedlings. Also, the large heavy seeds are not dispersed over long distances and tend to fall close to the parent plant. This limits the colonisation of new grasslands.

Historically, yellow rattle was spread in supplementary feed, which is hay baled in summer for use as fodder during the winter. The bales were spread across the field which allows seed to drop onto the soil. Sweepings of hay lofts were also used to re-seed grassland and would have included yellow rattle seeds.

The parasitic nature of yellow rattle reduces the vigour of grasses and legumes, opening up the grassland. Some grasses, such as fescues, are resistant to parasitism of yellow rattle, and in high nutrient soils grasses such as perennial rye-grass may grow very quickly shading out yellow rattle plants which are not tolerant of shady conditions. However, using yellow rattle in the right location increase the chances of establishing and maintaining flower-rich grassland.



Using yellow rattle in wildflower grassland restoration and recreation

Yellow rattle reduces the above ground grasses and legumes and is also thought to affect the rate of nutrient cycling and the composition of the soil microbial community. It can be used in two ways for wildflower grassland restoration and recreation:

- Two-stage process introducing yellow rattle in the first instance and wildflower seed a few years after yellow rattle has become established. This is particularly useful in grassland that is slightly more fertile, with a phosphorous index of over 1.5, or where there are tufted grasses present such as Yorkshire fog and cock's-foot. Yellow rattle may fail to establish in grasslands that have very competitive grasses including perennial rye grass that may swamp seedlings, out-competing them for light.
- One-stage process where yellow rattle is introduced with the seed source, either through natural generation of transported seed on livestock, green hay, brush-harvested seed or seed mixture. This process is recommended on land that has a phosphorous index of 0 or 1, and where large areas of tufted grasses are not present.

Yellow rattle can also be used to help create calcareous (chalk and limestone) pasture. This is usually undertaken in a one-stage process. Careful management is needed to make sure that young plants are not eaten by livestock, and yellow rattle is allowed to set seed each year until the wildflowers are established.

Using yellow rattle as part of a two-stage wildflower grassland restoration / recreation

Establishing yellow rattle seed in grassland is a similar process to that required for any wildflower seed transfer:

- Patches of bare ground need to be created in the summer by either livestock and/or machinery to create 50% bare ground.
- A seeding rate of 0.5-2.5kg per hectare of yellow rattle seed is recommended and should be scattered across a field.
- Seeds can be spread using a fertiliser spreader, seed drill with the coulters lifted up, or spread by hand. If hand scattering, bulk the material with sand or other inert material so that an even amount of material is spread in each throw. More seed is needed in grassland that has greater amounts of tufted and competitive grasses. The aim would be to establish 100-200 plants per square metre after a few years, once yellow rattle has been allowed to build-up.
- Seed should preferably be spread in late summer or early autumn. Although the seedlings germinate in early spring, they usually require vernalisation, a period of cold weather which breaks their dormancy. If yellow rattle seed is being spread in early spring and been kept in a warmer environment, it should be placed in a cold environment such as a fridge or freezer, for a couple of weeks to provide these conditions.

- Following seed broadcast, either livestock and/or machinery such as a roller mounted onto a tractor, should be used to push the seeds onto the soil. The seeds do not need to be buried as most wildflower seed germinates on the soil surface, but they do need to touch the soil. If neither livestock nor suitable machinery are available, some other form of trampling may be required to bring the seeds into contact with the soil.

Future management

Yellow rattle needs to be able to set seed each year to maintain the population levels. Hay cuts should be taken after it has set seed, and the grass should be turned in the field to dry the hay and allow yellow rattle seeds to fall out of the cuttings. If the land is being managed as pasture, the fields need to be 'shut-up' preventing access of livestock from early spring to late July, to allow yellow rattle to flower and set seed.

In the first few years of establishing yellow rattle, the numbers of plants can climb relatively high. This is part of the parasitic nature of the plant and could continue for a number of years until the grass vigour dies back, which will cause yellow rattle to decline as well. Once the number of plants reaches 100-200 plants per square metre, other wildflowers could be introduced, as there will be gaps in the grass sward. This could be done by using green hay or brush harvested seed that

has been taken from a field with yellow rattle, or a seed mixture containing yellow rattle seed.

Once established, the presence of yellow rattle can vary dramatically throughout a field with dense patches of the plant in some areas, and barely any in other areas. These patches may change on an annual basis and move around the grassland. It is nothing to be too concerned about. Occasionally, the amount of yellow rattle can become very high over a successive number of years. The little grass left may not be suitable for hay making. In this case, some of the field - up to half - could be cut in June before the plant sets seed, reducing the number of seeds in the soil seed bank. Cutting could take the form of a random pattern across the field to make the effect more natural. Cutting in blocks would reduce the yellow rattle in one part of the field but not across the whole of the field and would give a very blocky appearance of yellow rattle the following year.

After other wild flowers have established it may not be necessary to keep to the later hay cut or livestock exclusion dates under pasture management, as yellow rattle will have served its purpose. Generally, hay cutting and aftermath grazing management allows yellow rattle to persist as part of the grassland. Pasture management may remove yellow rattle, as livestock are usually allowed into pasture slightly earlier than a hay cut and may eat the plants before they set seed.



Adapted from Natural England's [TIN060 The use of yellow rattle to facilitate grassland diversification](#) and other sources of information.