

Creating biodiverse grassland or flower-rich meadows

Introduction

The UK had lost more than 98% of its flower rich grasslands in the last 100 years. If you go back to 1900 then if grassland was sown it was sown with hay seeds and not with modern hybrid seeds mixtures originally developed in Aberystwyth by George Stapledon. These selected grass and clover varieties have dramatically increased yields and the grasses are bred to respond to artificial fertiliser. They not only respond to fertile soils but also create their own fertility. The clovers fix nitrogen to create a protein rich fodder which when grazed puts nitrate back in the soil. It is the basis of organic farming. You might need a bit of rock phosphate and lime to get the pH right but you don't really need artificial nitrate fertilisers if you use leys with plenty of clover and return the manure composted with straw. Modern improved grassland with short term or long-term leys, usually based on perennial ryegrass *Lolium perenne*, regularly ploughed and reseeded, are not very good for wildlife. The yield can be increased by the use of fertilizer, which is why farmers use so much, but clover is a better feed despite a lower bulk. The fertilizer brings the grass on quicker and promotes quick regrowth after cutting for silage. The grass is often sprayed with roundup before ploughing. Even the organic leys don't give much scope for diverse plant life. They will have nettles and docks and a few thistles but not much else. They use the same improved grass and clover seeds. Combine this with heavy grazing, or several cuts a year starting in May, and wildlife interest is very limited. One of the main reasons for the massive decline of the Curlew *Numenius arqua* and the Brown Hare *Lepus europaeus* is the early cutting of grass. They need late cut hay or very late grazing to survive. Hares that hide their leverets in long grass are particularly vulnerable to early mowing.

The Basic Requirements

Flower rich grassland needs much lower fertility otherwise the grasses smother out the flowers. Only when fertility is low will finer grasses like Yorkshire-fog *Holcus lanatus* replace Perennial Ryegrass *Lolium perenne*. If subsoil is exposed it soon grows flowers. Oxeye daisy *Leucanthemum vulgare*, Poppies *Papaver rhoeas* and Ribwort Plantain *Plantago lanceolata* colonise bare ground quickly often from seeds buried years ago. Bird's foot trefoil *Lotus corniculatus*, an important plant for butterflies, is another legume that, like clovers, fixes nitrogen and produces its own supply of nitrate and does well where the soil is poor. It is the larval foodplant of the Common Blue butterfly *Polyommatus icarus* and the Dingy Skipper *Erynnis tages*. Often the best way of starting a wildflower meadow in a garden is to remove the topsoil and sow wild flower seeds in the autumn. One of the easiest ways of speeding up the process of creating a species rich meadow is to introduce Yellow Hay Rattle *Rhinanthus minor*. This plant is a parasite on grasses and weakens them quickly. It seeds and spreads rapidly but is an annual and is soon lost with heavy grazing.



Yellow Hay Rattle

Cutting Meadows for Hay

Semi improved meadows or pasture, with a reasonable number of wild flowers, can have its fertility reduced and become better for wild flowers by regularly removing a crop of late hay. This not only takes away nutrients but, because the hay is not cut until late summer, allows the plant to set seed. Productivity and soil fertility is reduced and floral diversity increases. Some fields are very difficult to mow as they have rocks, or are too steep or too wet. If it is not possible to cut hay, then late summer grazing by cattle is an alternative but removes less nutrient. Very late hay cutting in September is particularly beneficial as the flowers can provide a succession of nectar sources through the summer for adult insects like bees and butterflies. One of the huge benefits



Common Blue On Knapweed

of species rich grassland is providing a nectar source for bees and other insects. Where possible the cut material is best removed if not baled for hay. Many smallholders have considerable difficulty getting contractors to cut small acreages of hay; the machines are often too big for the gates, the small bale bailers have nearly all disappeared. The contractors are used to big silage bales, massive mowers, big acreages and often go all night. They cannot be bothered with a few acres of poor grass to be cut late in the season. There is equipment available for this sort of thing but it is expensive: two wheeled finger mowers, even hay tedders and micro bailers. The Swiss still use this sort of kit and I have seen people in Switzerland, one of the richest countries in the world, using hay rakes. A fit and competent person with an old fashioned scythe can actually cut an acre in a day. Turning the hay with a pitch fork and hay rake is very hard work but not impossible. I have tried carrying it loose in a pickup but bales are so much easier in the winter. Getting a prolonged spell of dry weather is usually the main problem in the UK and wet hay goes mouldy and is very bad for the lungs. It can also heat up and catch fire. Silage has made a big improvement in farmer's health.

Grazing Regimes that Work

Winter grazing with sheep can help reduce bramble and scrub but tends to remove flowers like Cuckoo Flower *Cardamine pratensis* which is the foodplant of the Orange Tip butterfly *Anthracaris cardamines*. Devil's-bit Scabious *Succisa pratensis*, the foodplant of the Marsh Fritillary *Euphydryas aurinia*, is also lost with heavy sheep grazing. Very old pasture that has been grazed but not cut for many years often develops ant hills and a tussocky surface. There is a complexity of physical structure that opens up opportunities for wildlife. The Large Blue butterfly *Phengaris arion* is parasitic on ants and Green Woodpeckers *Picus viridis* mainly eat ants. Many Lycaenid (Blue) butterflies have a relationship with ants. Old pasture often has a complex fungal flora and Wales is particularly important for waxcap grasslands. A diverse flora with a long-established stable ecosystem can host a variety of insects utilising various components like seeds and dung, as well as specific host plants. This complexity is not reproduced by scattering a few seeds on bare ground. It takes years and a stable grazing/mowing regime to develop.

Cattle grazing is much better for species rich grassland than sheep grazing. By late summer butterflies like Meadow Brown *Maniola jurtina* and Ringlet *Aphantopus hyperantus* have completed their life cycle and scattered eggs in flight and flowers have set seed. Grazing with cattle in August and September works, whereas sheep don't cope with the long grass of land

ungrazed all summer. Following the cattle with sheep in autumn is acceptable if the grazing is light. This regime works where hay making is not possible where the land is too steep or too wet or has rocks. There are major constraints on moving cattle due to bovine TB. Very few farmers want to risk taking stock to a new area for a short period of grazing because they may bring home TB. For this reason, we needed our own Dexter cattle to manage our species rich grassland when I had a smallholding. In some parts of the country conservation grazing, often promoted by a Wildlife Trust or other conservation organisation, enables stock to be moved between holdings. NoFence GPS collars are a game changer in conservation grazing. These are powered by solar cells and need 4G connection to the internet. The boundaries where stock are allowed is defined by a smart phone and as the cattle approach the boundary they hear a noise that gets louder and at the boundary is followed by a harmless electric shock. The farmer can observe his stock remotely which is very useful. It is hoped that a conservation grazing project using cattle can be set up in the Oswestry Hills taking over from Shropshire Wildlife Trust who don't feel ideally suited to doing it themselves. This would enable many wildlife sites to be managed appropriately.

Keeping your own livestock, particularly cattle, is a 365 days a year responsibility and unless you have been brought up with it, has a steep and long learning curve. TB testing, regular if not daily checking, winter housing and feeding, calving, artificial Insemination, de-horning, and foot trimming are not exactly on the GCSE syllabus for most people. Cattle need TB testing and this is compulsory at least annually. For smallholders, a few sheep is a lot less trouble but not nearly so good for wildlife. They need regular checking, compliance with bureaucracy like movement forms. Sheep need feeding in winter and lambing might look fun on television but is a 24 hour a day responsibility. Sheep often need worming, preventive sprays for maggots and shearing every summer, producing wool with very little value. We used to put our black wool round the blackcurrants to help manage the weeds. The economics are not brilliant but a freezer full of lamb is quite an achievement.



Typical Meadow Flowers in Bloom

The timing of grazing is very important. Sometimes you are trying to avoid damaging rare species, particularly orchids; sometimes you are trying to get on top of scrub or scrub re-growth especially after scrub has been cut and cleared. In this case grazing in mid summer may be appropriate but otherwise spring, or early summer grazing is best avoided. Restricting stock to relatively small areas makes them graze intensively; they can then be moved to better grazing when they have eaten the scrub re-growth. Having sacrifice fields that are not so valuable as biodiverse grasslands often makes the whole issue of grazing much easier and helps keep stock away from important wildlife habitat when it should be left ungrazed.

There are a few alternatives. I have known fields managed fairly successfully with donkeys. They need hay in winter and appreciate shelter. Donkey sanctuaries and seaside donkey operators often want to farm out animals for the winter. Some conservation organisations use ponies. These don't match the ability of cattle to get their tongue round long grass and tear it off and tend to keep the grass too short, but they are a lot less trouble than cattle. The National Trust uses semi wild goats very effectively.

Preventing Invasion by Scrub

Often the biggest threat to old grasslands is invasion by scrub. Ash *Fraxinus excelsior* and Sycamore *Acer pseudoplatanus* once established can quickly take over and Hawthorn *Crataegus monogyna* seeds dropped by birds can mean the young trees appear anywhere. Blackthorn *Prunus spinosa* often spreads from hedgerows out into the field. Bramble *Rubus sp.* is similar and any loss of grazing, such as commons that lost their sheep in foot and mouth, quickly became overrun with bramble. Land abandonment is a big threat to existing species rich pasture all over Europe except perhaps in Switzerland where farmers are even more subsidized than in the EU and need to adhere to a strict regime that, for example, restricts their bought in feed, and maintains the diversity of the Alpine landscape. Alpine hay meadows are famous for their floral diversity and their butterflies. Land abandonment is often as big a threat to these as 'improvement' in Italy and France. Keeping farmers on unproductive, difficult land is essential.



A Well-managed Species Rich Meadow

Many nature reserves, set up for species rich grassland, are often under grazed, and can become infested with scrub very quickly. Cutting the scrub and not treating the stumps often makes matters worse. Heavy grazing of the scrub re-growth when it is most palatable in June is probably the best way to restore the grassland. Treating stumps of cut trees with herbicide is banned on organic land but is quite effective in preventing re-growth. Sheep, like goats, will browse hedges and scrub if the leaves are young. There are always difficulties with sheep grazing on popular sites for

dog walkers as loose dogs make the sheep nervous and some dogs will attack sheep.

Removing signs saying 'dogs on a lead please' when the sheep come off, and putting them up again when there are sheep there, is a really useful discipline in reducing problems with sheep grazing. One advantage of organic livestock is that they are not routinely treated with wormers and antihelminthics which mean that insects that depend on dung, like dung flies, are not poisoned. The lack of insects in dung reduces the food available to birds. As always these relationships are complex.

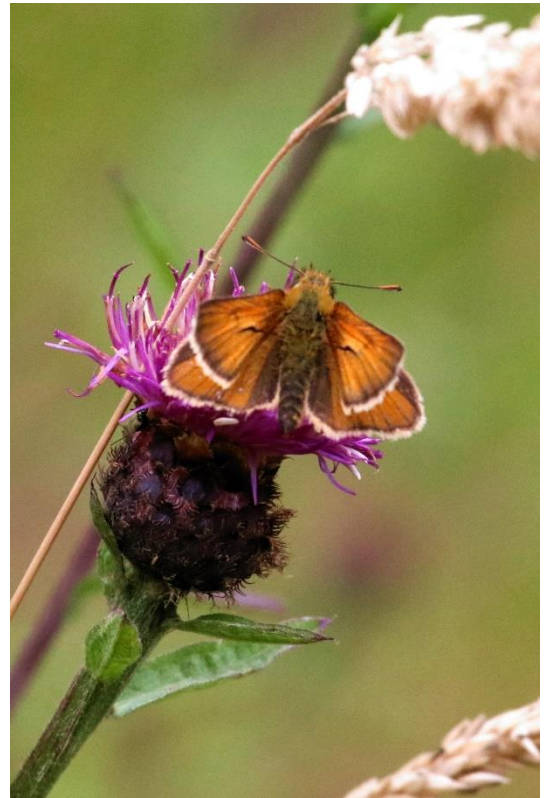
It is important not to overestimate the productivity of species-rich, nutrient poor, grassland. It needs grazing but it does not support many animals. Ancient breeds of cattle like Longhorn, Highland, Belted Galloways, Dexters and Welsh Blacks will do much better on poor land than Limousin and Charolais or Friesians. The commercial breeds need quality forage and lots of it. Often good areas for wildlife can only be properly managed by having other land which will support the livestock the rest of the year. Cattle housed in winter produce manure and this has to go somewhere and preferably not on habitat land. Agri-environment schemes often forget this. Much of the remaining lowland semi natural grassland is not on commercial farms. It is on abandoned quarries, smallholdings that are not farmed commercially, roadside verges and commons. Many of these are excluded from agri environment schemes where there is a minimum size. Though these schemes like Glastir, Higher Level Stewardship, the proposed Environmental Land Management Scheme in England and the Sustainable Farming Scheme in Wales are useful for large acreages, the hassle and bureaucracy involved for the remuneration offered, are in the author's experience, not worthwhile for small acreages. This is a pity.

Bracken

Bracken is a great destroyer of species rich grassland and in almost all circumstances bracken should be controlled to prevent it from dominating the grassland. The exception is where there is Pearl-bordered Fritillary (*Boloria euphrosyne*) that feeds on violets (*Viola* sp) growing under bracken. It is best controlled by cutting twice in summer in early June and again in early July. This can be done on a small scale with a brush cutter but a tractor mounted 'topper' is the best tool. It is poisonous to livestock but they will rarely eat it.

Land is a Responsibility

For new smallholders acquiring property with land with a view to increasing biodiversity you must work out how you are going to manage it from the very beginning of the process. Too often the years go by and the abandoned pasture looks great to start with. You begin to notice a few trees and patches of bramble but quite soon it is an impenetrable thorny thicket. Your best hope is to get to know your neighbours and see what they suggest. Also seek advice from people who have been on that journey.



Small Skipper on Knapweed

Dr Simon Spencer

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