

When do you cut a meadow?

The issue of when to cut a floodplain meadow is not a simple one. Some managers follow agricultural tradition and cut as soon as the hay has reached its optimal state in terms of feed value (typically last week of June, if the weather is conducive), many delay their cut into July in response to scheme agreements, whilst others choose to cut very late (August) for aesthetic reasons, to allow certain species to set seed or to encourage fauna. There are a number of factors to take into account when making your decision, and here we consider these different elements and discuss some of the work we are engaged in aimed at providing clarity on the issue.

Nutritional value of the hay crop and the nutrient cycle

The best time to cut a hay meadow to achieve the best feed quality for stock is as soon as the grass has started to set seed but before the seed has dropped. Historically this is what farmers have always aimed for; in a poem of 1926 ('The Land' by Vita Sackville-West) it was expressed as "You shall cut your hay, when grasses stand, in flower, but running not to seed." In the English lowlands, when the spring has been warm and dry this may be as early as mid June, if the weather has been cold and wet it may not be until early July. If the hay is left to stand past being "ready" then its nutritive value will fall quite quickly, partly as a result of seed shedding and partly as a result of mobile nutrients, such as nitrogen being taken back into the base of the plant, where it is stored for the following year. Late cut hay will be of little value for productive stock (dairy, beef and sheep enterprises) but may be favoured by horse owners, who simply want roughage to satisfy appetite rather than nutrition as such. One consequence of leaving hay to stand after it is ready and then cutting it late, is that there will be much reduced nutrient removal from the site. Consistent late cutting will therefore result in increased fertility of the soil, which usually results in the loss of species richness over time. Even without the nutrient factor, persistent late cutting can reduce species richness by allowing dominance of some coarser species that bulk up later in the summer (e.g. *Filipendula ulmaria*), shading out other species and gaining a strong competitive advantage.

Nutrients enter floodplain meadows from numerous sources; flood-deposited silts, farm-yard manure, and atmospheric deposition for example. Removal of the annual hay crop balances these inputs by exporting nutrients in the form of biomass. If the amount removed as hay is reduced through leaving the hay to stand beyond its optimal cutting date, then the nutrient status of the meadow soil will rise and the vegetation will respond accordingly with coarser species excluding the smaller herbs. The Partnership has a number of trials in place to try to quantify these effects. It follows that early hay cuts can also be used as a way to reduce the fertility of a meadow by removing the standing crop when it is at its most nutritious, and therefore can be a useful management tool to have up your sleeve.

Maintaining the quality of the hay crop for stock (as was the traditional practice of farmers over the generations) is perhaps the best way of ensuring the conservation of a diverse plant community. The requirement for a timely cut is a particular feature of floodplain meadows because they rely so heavily on hay removal for maintenance of their nutrient balance. Cutting dates in dry meadows are more flexible, because those systems do not receive regular influx of nutrients from floods.

Setting Seed

Occasionally, meadow managers choose to leave the hay cut as late as August to allow the plants to set seed. However, it should be borne in mind that of the eighty plant species regularly



Photo: Alan Markham

encountered in floodplain meadows, only a handful are annuals or biennials. The vast majority, including all the keystone species are perennial and most of them are very long-lived (some scientists estimate forbs can live to 500 years and some grass clones to 1000!). Annual seed rain therefore has a very minor role in maintaining the plant community. The perennial species do need to set seed occasionally, and this will happen under normal agricultural practice whenever there is a wet summer (e.g. 2007, 2008). There may also be some seed rain from uncut margins so it is generally unnecessary to deliberately leave the hay itself to stand for this purpose.



Photo: Mike Dodd

Ground nesting birds

Ground nesting birds may not have fledged chicks until early or even mid July and some advice says not to cut meadows until mid July to ensure that ground nesting birds have had time to fledge. HLS agreements are set at a hay cut date of 1st July (or even 15th July) for this purpose, but if you know you have ground nesting birds on your site in any one year, then you may want to think about the timing of the cut and also the way in which the hay is cut. Perhaps cutting in blocks or strips, leaving the nesting areas until later or even uncut that year. It should not be necessary to delay the cut of the whole site however. Cutting from the inside out to allow time for small animals and birds to get out of the way is another method occasionally used. Of course the use of such techniques may be dependent on the person responsible for cutting the hay and is probably only an option where financial support for conservation management is available. In some fields, it may be too fiddly to be viable even then!

A pattern cut like this over time could be beneficial to meadow plants by providing diversity in the cutting times across the meadow such that different areas are cut at different times in different years. It is not advisable to leave the cutting of meadows until mid July consistently 'just in case' there are ground nesting birds, as this could upset the balance of nutrient cycling as described above and lose some of the special plant interest of the site. The increased productivity of a nutrient rich system would also not favour the birds as many are not suited to rapid early grass growth in spring.

Invertebrates

There is a perception amongst some conservationists that meadows are a less interesting habitat for invertebrates than pastures, because the habitat is devastated when the hay is cut. Therefore, there are arguments from entomologists that later cuts can improve invertebrate populations by providing refuges for longer. However, meadows are uniquely rich nectar sources during the flowering period, and many species (particularly hoverflies and weevils) rely on such sources of food. Many are specialised to feed on particular species, so as a general rule, the more diverse the plant community, the more diverse the invertebrate community. Many species of Lepidoptera use meadows at all stages of their life cycle (e.g. chimney sweeper moth, burnet moth, orange tip butterfly and



Photo: Mike Dodd

small copper). Invertebrates benefit overall from plant diversity within a grassland and from a diversity of grassland types in the wider landscape i.e. a mosaic of meadows, pastures, road verges and hedge banks. Therefore, where there is a dearth of nectar and pollen sources in the near vicinity of a meadow, then the focus should be on re-establishing these, rather than risking late cuts in the meadow itself, which will result in a decline in the value of the meadow plant community to invertebrate populations. In terms of meadow management, the maintenance of plant diversity is key.

The weather

In recent years (2007-2009,) weather conditions for hay making have been good in June, but then spectacularly bad in July. Therefore sticking rigidly to pre-defined dates can be counterproductive. If hay is not cut during the summer and left as a wet crop that cannot be removed due to poor ground conditions even in the autumn, then the impacts on species diversity can be disastrous. Detailed monitoring data from North Meadow, collected over the past 12 years, shows us that areas not cut for just a single year suffer a significant decline in species richness, losses are greatest amongst the smaller herbs and less competitive grasses. This is due to both the effects of shading and changes in nutrient status. If this pattern is repeated, then long term declines can be observed. However, species diversity can be recovered by ensuring a prompt, or even early, hay cut the following year to remove the build up of nutrients and thatch. Of course you can have wet Junes too and in those years it is better to leave the hay standing till July when hopefully it will get a chance to dry. It is not a good idea to cut early when the soil is damp; firstly because it is difficult to make decent hay in such conditions, but more importantly, you would risk damaging the soil structure by compacting it with heavy vehicles (particularly hay trailers); this can take decades to reverse.

Control of aggressive species

Cutting can be used to help control some species. For example, cutting thistles before they flower controls their spread. We are currently investigating the role that early and late cutting play in the susceptibility of the meadow to invasion by large competitive sedges (*Carex acuta/acutiformis/riparia*). Early cutting may also be used to control the abundance of tall species, such as false oat grass (*Arrhenatherum elatius*) which can make a sward coarser and less species rich especially when cutting is regularly delayed.

What do other people do?

We collect management data annually from the five Floodplain Meadow SAC sites in the UK, and also from a number of the other sites we regularly survey. Most sites were cut in early July this year (as a result of HLS restrictions), but at least this was better than the previous three years when several were not cut until August, or were not cut at all, due to the persistently poor weather! There seems to be quite a bit of evidence to show that historically meadows were cut in June more consistently than they are now (see articles here).

The answer?

So what is the best solution? Well, as ever it really depends on your site objectives. If the overriding concern is a functioning meadow management unit with a farmer who is happy with his/her crop and the maximum plant species diversity, then the hay should be cut as soon as it is ready (before seed drop). This will result in a diversity of cutting dates over a number of years which will benefit the plant species diversity. It should be borne in mind that such meadows were



Hay cutting on the Shannon Callows, Ireland: Richard Jefferson

historically prized in the traditional agricultural system because of their naturally high productivity, which gave good yields of high quality hay and this cultural heritage should be an important consideration in the management of meadows today. It is the very reason we have such species rich systems and we ignore past management practises at our peril!

Please don't forget that if the farmer isn't happy with the quality of the crop and your management infrastructure is lost, then the whole habitat could be lost in just a few years, because floodplain meadows are absolutely reliant on the annual cycle of cutting to sustain their plant biodiversity. We often go to sites and advise managers to consider varying the time of the hay cut to enhance diversity. Some years, cutting early is good, and gives early maturing species, such as meadow foxtail (*Alopecurus pratensis*), a competitive advantage, whilst in other years, weather-delayed cutting benefits some of the later-developing species, such as the common bent (*Agrostis capillaris*). Variation of cutting date is probably beneficial to the diversity of the sward, though it is a challenge to demonstrate this scientifically. The Floodplain Meadows Partnership is trying to gather evidence from across the country so that we may be in a position to tackle this issue. To do this, we rely on the good will of site owners/managers in passing the information on. Please keep us posted.

The best current advice is probably to be guided by the weather. If the hay is ready and the weather good, then go for it as soon as you can, accepting that once every few years, the weather will be adverse and that you should wait till it improves. A late cut once in a while is not a bad thing and indeed may have positive results, but in floodplain meadows should probably never be the norm.

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