The Biodiversity and Conservation of Hedgerows

Position Paper No. 3 by The Dublin Naturalists' Field Club

Summary

Hedgerows are an integral part of the modern, enclosed Irish landscape. Their varied functions include delineating ancient boundaries, dividing land holdings, forming stock-proof barriers and providing climate mitigation functions, as well as acting as refuges and reservoirs of ancient biological diversity.

From an ecological perspective, not all hedgerows can be considered of equal value. Some of the older hedgerows, which are often found on townland boundaries, may represent the limits of forest clearance for farming purposes and may thus contain fragments of our original native woodlands. They usually exhibit a more complex habitat structure and a wider species mix. In contrast, hedgerows that were inserted into the landscape during the 18th and 19th centuries, to divide up larger land holdings and create individual fields, tend to be more linear, have a simpler structure, with fewer species and with the basal herbaceous layer often heavily grazed.

Roadside hedgerows may also be quite ancient in origin, having persisted along early travel routes that evolved to become our modern roads. But the nutrient runoff from intensively farmed land, coupled with introduced pathogens and insensitive mowing and trimming, means that many have become structurally degraded and their herb layer has become impoverished as common and nutrient-demanding plants have replaced a diverse range of smaller, less competitive species.

Hedgerows are often considered nature's highways, enabling wildlife to move from one location to another. This may be true for mobile, generalist species, such as small mammals, birds and winged insects, but it is very unlikely that they can provide a viable corridor for species of greatest conservation concern that require specific environmental or microclimatic conditions which differ from those provided within the hedgerow.



Fig. 1. Hedgerows are a distinctive and integral feature of the Irish landscape, of immense value for wildlife. Sensitive management enables the component trees, shrubs and woody species to mature, providing an ample food source of flowers, fruits and leaves for insects and other fauna. Photo: Pat Lenihan

The Dublin Naturalists' Field Club (DNFC) is concerned at the ongoing process of hedgerow destruction, whereby ancient hedgerows continue to be removed without due consideration to their ecological value and irreplaceability. We consider that the present management of many of our hedgerows is detrimental from a wildlife point of view. Hedgerows are often severely trimmed or flailed on an annual basis. This prevents the woody species from flowering and fruiting, and from providing food for wildlife or producing the propagules that would enable the hedge to replenish itself. While regular cutting of certain hedgerows is necessary for road safety, much of the harsh trimming of hedgerows in the countryside is not justified on such grounds, for example when applied to those within fields or bordering roads where sightlines are not compromised.

The efficacy of planting hedgerows to 'enhance' biodiversity or to mitigate the destruction of ancient hedgerows is highly questionable, particularly regarding risks associated with the spread of pests and diseases, as well as misconceptions regarding the use of 'native' species. The removal of an indigenous hedgerow that has developed a complex array of plant, animal, insect, fungal and microbial interdependencies over hundreds or perhaps thousands of years, and its replacement by a mixed row of 'native' shrub species, cannot in any way be considered as replacing like with like.

The DNFC's recommendations for the management and conservation of existing hedgerows include:

- The recognition and documentation of hedgerows that survive from ancient times and incorporate elements of our native woodlands. These provide the centres from which areas of truly native woodland could be re-established by natural means;
- The preservation of ancient hedgerows, especially those on townland boundaries, that include these wildwood elements and support the greatest diversity of habitats and species;
- A more sympathetic approach to the management of hedgerows, and a reduction in the frequency and severity of cutting, whereby — taking account of road safety requirements — woody plants are allowed to flower and fruit;
- The restriction of animal grazing in spring and early summer along the base of field hedgerows, enabling the herbaceous plants to flower and set seed;
- The recognition by the Department of Agriculture, Food and the Marine (DAFM), local authorities and other relevant bodies of hedgerows as important habitats, and irreplaceable repositories of our aboriginal flora and fauna, when considering the impact of proposed developments on the natural environment, along with the recognition that an existing hedgerow of ecological significance cannot be relocated and continue to retain its ecological integrity and attendant species; and
- The cessation of the importation (and growing abroad) of allegedly 'native' plant species for various grant-aided hedgerow, tree planting and 'biodiversity net gain' planting schemes.



Fig. 2. Where cutting is minimal and grazing is excluded, flowering shrubs and herbaceous vegetation at the base of the hedgerow flourish (above left). Contrastingly, severely cut hedgerows (above right) have a damaged structure, preventing flowering and fruiting, and cutting off the food supply to insects, birds and mammals. Photos: M. Lyons

1. Origins and function of hedgerows

Hedgerows stand out as refuges for the scattered remnants of our natural flora and fauna, in the intensely farmed and increasingly environmentally impoverished countryside of lowland Ireland. Fields defined by hedgerows are distinctive features of the landscape of Ireland, Britain and NW France and have come about as a result of traditional livestock management interacting with soils, climatic factors and changing patterns of land ownership. It is often assumed that these hedgerows have been planted, as many were — especially in the 18th and 19th centuries — but others are much older, **preserving living evidence of a flora and fauna now extinguished from most of our countryside.**

The conversion from aboriginal native woodland to pasture and tillage has been proceeding since Neolithic times. Early pastoral farmers appreciated that our moist, temperate climate enabled grass to grow throughout much of the year, providing a food source for grazing animals, supplemented by hay in areas not favourable to winter grazing. Livestock (predominantly cattle) were prevented from straying by various types of enclosures, for example, by stone walls constructed over 5,000 years ago in the Céide Fields in Co. Mayo. Much later, with the establishment and expansion of tillage, commencing in Anglo-Norman times, it became necessary to segregate livestock from crops. Over time, large areas corresponding loosely to modern townlands evolved as individual farm units. These areas were often bounded by various forms of fencing and earthworks, as well as by natural features, such as rivers, and trees and scrub retained from earlier woodland prior to clearance. The townland is still a well-established territorial unit and features prominently in addresses and property deeds.

Later, it became evident that in pastoral areas greater productivity could be achieved by dividing farms into smaller field units, where enclosed areas could be grazed on a rotational system. Clusters of smaller fields were demarcated within the larger pre-existing townlands. Where there was an abundant supply of post-glacial rubble, unmortared (dry) stones were used to form field walls. However, in areas where there was a deep covering of well-worked glacial till, suitable stones were not easily available, and hedge planting proved to be a viable alternative form of boundary demarcation. Inspection of large-scale maps and aerial photographs often discloses that these infill hedgerows, inserted into the pre-existing townland matrix two to three hundred years ago, are usually linear structures, their layout and disposition clearly pre-planned and contrasting strongly with the more irregular outline of older townland boundaries.

The predominant hedge-forming species in these infill hedgerows, Hawthorn (Maybush, Whitethorn, *Crataegus monogyna*), was widely planted for its utilitarian value — it grows rapidly, and its thorns and robust growth form serve as a suitable stock-proof barrier. This inhibited cattle from escaping into other land holdings, onto roadsides or into crops. In early May, if not subjected to intensive cutting, planted hedges of this sort — dominated by this single species — can be clearly recognised by their abundance of white flowers. Within the present-day landscape, **townland boundary hedgerows are consistently more species-rich than these recently planted infill hedges.**

Most land on lowland mineral soils in Ireland is now assigned to food production — pasture for cattle and sheep, silage and hay production, and cereal and other crops. Traditionally, stocking levels were related to the natural carrying capacity of the land, with better soils able to support more livestock. Stock rotation was conducted, with cattle being transferred from one field to the next allowing the grass in the first field to re-grow. Movement of stock within the farm still operates, now at even higher stocking densities, with the use of artificial fertilisers and supplementary concentrate feeds. Increasingly, hedgerows have been removed to facilitate larger machinery, with stock rotation facilitated by electric fencing.

In addition to the complete removal and harsh, inappropriate trimming of hedgerows, modern intensive farming practices have resulted in overgrazing and nutrient enrichment which has altered the floral

composition of hedgerows. Cattle breeds are much heavier nowadays, and their impact on hedgerows much greater. Their collective weight has the effect of compacting the soil and, in wet areas, cutting up the sward and the herbaceous layer at the base of the hedgerow where they congregate for shelter. Despite such far-reaching changes, fragments of original hedgerows and their included species may still be encountered.



Fig. 3. In early summer, the planted character of the Hawthorn-dominated hedges contrasts strongly with the remnants of the now mostly removed original scrub at Corcomroe Abbey and Bell Harbour. Photo: Pat Lenihan

2. Hedgerow form and species composition

Hedgerows consist of lines of woody trees and shrubs (the 'hedge') — sometimes set into an earthen bank — as well as the herbaceous strip along the base. Not included here are rows of recently planted shrubs, native or otherwise, intended to create new hedgerow features or to mimic the authentic species composition of the local area.

Hedgerow species and ecological gradients

The number and variety of indigenous trees, shrubs and woody climbers available to inhabit or form hedgerows naturally in an area varies throughout Ireland. These variations are largely due to soil and climatic conditions, modified by ancient and recent historical landscape management. Some plant species have wide ecological tolerances and can grow and maintain populations in a variety of habitat conditions. As a result, they have spread by their own devices throughout Ireland. Other species have narrow ecological tolerances and are very susceptible, for example, to local climatic conditions — hence the difficulties encountered by most trees attempting to grow on high moorland or the windy, western Atlantic seaboard.

Two broad ecological gradients define the character and species composition of the original or long-established vegetation types which form hedgerows (Doogue & Kelly, 2006):

1. base-rich (lime-rich, calcareous) to base-poor (acidic), and
2. dry to wet.

Some species grow very well on the base-poor margins of peat bogs: Birches (especially Downy Birch, *Betula pubescens*), Eared Willow (*Salix aurita*), Mountain Ash (Rowan, *Sorbus aucuparia*) and Alder (*Alnus glutinosa*) thrive in such places, but they seldom manage well on dry, lime-rich soils. Other species show a strong preference for the calcareous ridges in the midlands. Hence, species such as Spindle (*Euonymus europaeus*), on dry lime-rich ground, and Guelder Rose (*Viburnum opulus*), on similar but less well drained ground, have a conspicuous autumnal presence by virtue of their colourful fruits, especially in roadside hedges. Some undoubted native species have had their natural distributions expanded because of their utilitarian value. Furze (Gorse or Whin, *Ulex europaeus*) grows on a variety of soil types, particularly those subject to desiccation. Because of its thorny prickles it was also widely planted in dry, shallow, upland acid soils on ground where other species cannot grow well. Additionally, it has been widely planted in lowland situations as a reinforcement of hedges where gaps have appeared.

It is possible when travelling along a transect through undulating lowland landscape to detect patterns of alternating bands of wet, base-poor and dry, base-rich soils by reference to the contrasting botanical composition of the roadside hedges. Willows and Birches in the dips in the road give way to Spindle, Guelder Rose, a variety of different rose species and above all, Hazel (*Corylus avellana*), on drier ground. Hazel was widely adopted as a living fence, especially on lime-rich soils, because it could be easily coppiced. It therefore gave a certain amount of brushwood but also sprouted anew, producing even more dense stems. Hedges dominated by Hazel usually have a number of additional associated uncommon shrub species (such as Rose species, Spindle and Guelder Rose). This contrasts strongly with later infill hedges where Hawthorn is the main species. Because most trees and shrubs either live longer or can produce sucker growth, they constitute a more durable body of living evidence as to long-term ecological conditions in any area than the myriads of short-lived, ephemeral, transitory herbaceous colonists, garden ejects and commercially produced 'wildflower' seed mixtures that are now becoming such a feature of our roadside verges.

For a fuller account of the species of hedgerows, see Doogue & Krieger (2010).



Fig. 4. Low levels of trimming and cutting, coupled with reduced grazing, enable species such as Blackthorn (*Prunus spinosa*), to flourish and bloom abundantly in Spring. Where Hawthorn is not dominant, many other woody and herbaceous species thrive, protected to some extent from grazing, by the fringing suckers and strong thorns of Blackthorn. Photo: Charles Shier

Surviving fragments of wildwood and potential for recolonisation

Where substantial fragments of native woodland have survived, they have often done so because parts of the original scrub have been allowed to grow and form hedgerows, even in areas where most of the surrounding countryside has been assigned to livestock and silage production. This is particularly evident in central Ireland, especially on lime-rich ground close to lakeshores, in circumstances where protruding bedrock has prevented deep ploughing. These scrubby formations include many of our native species and provide evidence as to why and where they can survive nowadays. Some of the rarer species, including Small-leaved Sweet-briar (*Rosa agrestis*), Crab Apple (*Malus sylvestris*), and Buckthorn (*Rhamnus cathartica*), are well represented in these situations. It is sometimes possible to trace the former extent of semi-natural scrub communities by examining the botanical content of hedgerows immediately adjacent to these features. **Here, flora of the original wildwood margins can survive and testify to its former extent in the locality.** In these circumstances, **it becomes possible to identify suitable areas where former woodland can become re-established through natural means,** by allowing locally available species to re-populate suitable lost ground with their own seeds.

Similarly, hedgerows that have been derived from the original wildwood or scrub growing on esker ridges have often retained combinations of uncommon species, usually poorly represented or absent in adjoining modern field hedges. Hazel was a predominant shrub or small tree in these esker woodlands, along with several rare rose species such as Harsh Downy-rose (*Rosa tomentosa*), Small-leaved Sweet-briar (*R. agrestis*) and the commoner Field-rose (*R. arvensis*). On drier ground, Goat Willow (*Salix caprea*) is often present, sometimes indicating the former presence of base-rich woodland. On slightly more acid soils, different species of rose occur, most obviously Sherard's Downy-rose (*Rosa sherardii*, below). In contrast, hedges with associated watercourses — drains, streamlets, even small rivers — will have the widespread native Grey Willow (*Salix cinerea*) and, on more acid soils, Eared Willow (*S. aurita*), as well as hybrids between these two.



Rosa canina agg.
Various forms of Dog-rose



Rosa sherardii
Sherard's Downy-rose



Rosa stylosa
Short-styled Field-rose

Fig. 5. Hedgerows are suitable habitats for many species of Irish roses. When allowed to flower and fruit, they form a significant proportion of the indigenous biodiversity of our hedgerows. On lowland, lime-rich soils, roses of the *Rosa canina* agg. group are widespread and common. These roses have hips with flat discs and shed their sepals quite early in the autumn. On more acid soils, *R. sherardii* is particularly prominent in early autumn with its large strongly coloured fruits, persistent sepals, downy leaves and glandular pedicels which smell of resin or turpentine. In the south of Ireland, *R. stylosa* is a much more frequent element characterised by its raised conical discs, persistent styles and long pedicels. Many forms of the *Rosa canina* aggregate are successful in old and new hedgerows, but both *R. sherardii* and *R. stylosa* are more strongly associated with long established hedgerows. Photos: Melinda Lyons

In summary, the ecological preferences of individual species, and their capacity to form a presence in hedgerows with various historical origins, combine to determine the species composition and species richness. If a given species has not had a recent known biogeographical presence in a particular area, it will then be very unlikely to appear by natural means in the hedgerows of the locality.

Townland boundary versus inserted hedges

It is usually the case, particularly in lowland Ireland, that the evident physical and environmental contrast between the hedgerows of the townland boundary and the nearby inserted hedges is reflected in the differing species-mix which either type supports. The physical characteristics of older boundary hedgerow features, often incorporating earthen banks, are more suitable for a wider range of species. **Usually, these more ancient boundaries have a stronger and more complex habitat structure.** There may be a drain or streamlet defining the property line, which supports a range of wetland plants and invertebrates very different from the species present in drier but otherwise similar circumstances. The main difference however is in the ancient character of the boundary features themselves. **Because many of the townland boundary hedgerows contain species that are seldom present in inserted hedges, and may be survivors from much earlier times, they require particular conservation-oriented management.**

In contrast, many inserted hedges, especially those planted on flat ground, have limited species content and are composed mainly of ecologically unfastidious species. Where cattle and sheep, in intensive systems, have had access to these planted hedges, most of the understorey vegetation will have been heavily grazed. Newly colonising plant species (usually arriving as seeds, either wind-borne or in the digestive system of birds) seldom get the opportunity to mature, set seed and initiate stable durable colonies. However, over time, some thorn-bearing species — Roses (*Rosa* species) and Brambles (*Rubus* species) — may become established. These prickly species discourage grazing and can facilitate the spread and establishment of a small number of widespread and common herbaceous species.

The inserted hedges, though originally intended to restrict livestock movement, are no longer maintained as stock proof barriers with the advent of wire fencing and, in areas where tillage and especially cereal production now predominate, hedgerows are frequently removed to facilitate the operation of large crop-harvesting machinery. In contrast, the sturdier townland boundary hedgerows often still serve as property boundaries. As a result, they have been spared from removal and retained as landscape features to define ownership limits; as long as adjoining farms remain under separate ownership or management, their boundary hedges and associated wildlife are more likely to survive. However, increasingly, farm consolidation and inadequate legal protection for hedgerows means that even these highly important ancient hedgerows continue to be under threat.

Pests and diseases

Pests and diseases pose a serious risk to the health and integrity of native hedgerow habitats, and their profound and long-lasting effects have already been clearly demonstrated. The arrival in Ireland of Dutch Elm Disease (caused by *Ophiostoma* fungi) eliminated most of the island's mature Elm trees in the latter half of the twentieth century. The devastating effects of Ash Dieback Disease, due to the introduction of another fungal pathogen (*Hymenoscyphus fraxineus*) on forestry planting stock, can now be seen throughout the country, as indigenous Ash trees as well as forestry plantations are dying. Fireblight — a bacterial disease caused by *Erwinia amylovora* — is on the increase at present. It affects a number of species in the Rose family, including Hawthorn, Blackthorn, Pyracantha, Apple, Pear and Plum.

The presence of non-native pests and pathogens can be very difficult to detect and thus it is difficult to control their spread. The threat posed by their introduction is assessed by O'Hanlon *et al.* (2021) as being the greatest risk to trees and tree habitats in Ireland. The implications are especially relevant in the context of policies and schemes aimed at promoting the planting of hedgerows, and trees in general. The scale of

demand for hedging plants, the requirement to import nursery stock to meet this demand, as well as the practice of sending Irish propagules abroad for growing on before being brought back to Ireland[1], all serve to increase opportunities for pests and diseases to be translocated and introduced to places where they did not previously occur. Once introduced, they are difficult or impossible to eradicate.

3. Roadside hedges

Roadside hedgerows are particularly significant in terms of their potential as natural reserves for native flora and fauna mainly because of their antiquity. They often provide the best indication of the surviving or potential vegetation and species-mix of an area. As the road network evolved, its routes were constrained by factors such as steep slopes, where the road had to follow the contours of the landscape and therefore wound its way cross-country. Sometimes the developing trackways and roads had to circumvent obstacles such as private estate land, bogs or graveyards to connect with other road systems. They also often skirted (then) existing woodland, long since disappeared, and this accounts for the occasional occurrence and survival of some woodland species in what appears nowadays to be unlikely situations. Wood Anemone (*Anemone nemorosa*) and Goldilocks (*Ranunculus auricomus*) thus appear in roadside hedgerows and it is only by a careful examination of the associated flora and old maps that their woodland origins can be adduced. Where townland boundaries coincide with roadsides, the flora of these surviving hedgerows is often particularly rich, preserving elements otherwise vanished from the vicinity.

When deep drains are incorporated into the stretch between the hedge and the road, moisture-demanding and shade tolerant species can also grow. An interesting example of such is Bittersweet (Woody Nightshade, *Solanum dulcamara*). In its truly wild habitats it can grow on wetland margins, and its flexible stems can spread over emergent lakeside vegetation where it can cope with rising and falling water levels. In these roadside drains, its deep roots can access transitory water often not visible in dry periods, but its stems can climb to flower and fruit in high summer. In shadier situations a small undershrub, Tutsan (*Hypericum androsaemum*) can grow in limited quantity. Regrettably, many roadside hedges have deep open drains which seldom now carry water at any time of year. This is partly due to the falling water table, but also because many drains have been culverted or filled with gravel thus making the water supply less accessible and reducing the associated flora and fauna.

In recent years the inherent value and species diversity of these hedged roadsides has been reduced by the effects of nutrient run-off into land and roadside drainage systems and by air pollution. Fertilisers applied to fields to stimulate extra growth of tillage crops and grass for silage also promote the growth of robust herbaceous plants with high levels of nutrient requirement. These larger species thrive at the expense of smaller species by crowding or shading them out. Many roadside drains and verges are now becoming choked with heavy nutrient-demanding vegetation, most notably with species such as Cow Parsley (*Anthriscus sylvestris*) and Hogweed (*Heracleum sphondylium*), which then suppress the smaller species that would otherwise thrive in these situations.

In the past, cows being walked to the milking parlour would have browsed the roadside vegetation, thus keeping the larger species in check and allowing smaller and lower-growing species to benefit. Today, many species of the roadside margin (between the hedge proper and the edge of the road) are highly challenged by the manner of roadside management which indicates a lack of understanding of their local and general geographical significance.

Roadside hedges are often severely trimmed or flailed, and recent storms have led to increased calls for the removal of roadside trees. Where lines of sight are restricted by excessive growth, or where disease-

[1] See, for example https://www.irishtimes.com/ireland/2023/08/21/native-trees-facing-danger-from-disease-and-threats-to-gene-pool/

compromised trees necessitate removal, then public safety clearly becomes a major issue of concern. **However, in many instances, hedges are trimmed far more severely than is needed, which makes for neatness but at a substantial ecological cost.** Severe and repeated cutting destroys the capacity to replenish the hedge line with local seed, and it cuts off the food supply of blackberries, sloes, haws, raspberries and rose hips, essential for birds and small mammals, as winter approaches. (See also Hedgerow Management below.)

4. Hedges as highways for nature?

The value of hedgerows as highways for wildlife is well flagged. Conspicuous mobile species, such as small mammals and birds, use the shelter of the hedgerow as well as its included food supply of leaves and fruits. Bats are usually found feeding on the significant supply of airborne insects flying in the lee of hedges and use older decaying trees as summer roosts. Larger mammals, such as badgers, rabbits and foxes, utilise the earth banks or cuttings at the base of many hedges as dens. Certain insects are attracted to the flowers of trees, shrubs, woody climbers and herbaceous margins for pollen and nectar. True plant bugs such as shield bugs and many species of beetle — especially weevils — eat their leaves or imbibe sap from plant tissue, and many insects depend at some stage of their lives for shelter as well as sustenance on hedgerows. This food supply is particularly important in situations where grazing by cattle and sheep is appropriately managed by restricting access to the fringe of herbaceous vegetation that can flourish at the bottom of hedgerows.

Willows are a valuable source of nectar and/or pollen for insects in the early season and may sometimes also be a larval food plant. Many moth larvae find sustenance in the vegetation of the hedgerow; and (leaf) miners, including micromoths, may be detected by their characteristic patterns of dead leaf tissue and frass between the dermal plant layers, e.g. in Brambles. These insects, in turn, provide food for birds. Perhaps surprisingly, hedgerows are not of primary importance for many butterfly species. However, some of the Whites and Vanessids, if there are nearby suitable food plants to sustain them, will avail of nectar sources in the upper and ground layers. False Brome (*Brachypodium sylvaticum*), Yorkshire Fog (*Holcus lanatus*) or Cock's-foot (*Dactylis glomerata*) are essential larval food plants for the Speckled Wood. Its primary adult food source is honeydew, but if there is a scarcity of productive aphids (greenfly) or other hemipterans (bugs) it will of necessity seek nectar sources. Blackthorn (*Prunus spinosa*) is the sole larval foodplant for the Brown Hairstreak butterfly. Blackthorn is common and widespread throughout Ireland, yet this butterfly is essentially restricted to some limestone areas west of the Shannon. The Holly Blue, now a common urban butterfly, utilises Furze, Brambles and Spindle, in addition to Holly (*Ilex aquifolium*) and Ivy (*Hedera* species), as its larval food plants.

The concept of creating 'corridors' along which species can move has gained much popular credence. While there may be benefits for highly mobile species, it is another matter entirely as to whether they are of any relevance to the many small and slow-moving creatures which depend on the complex ecological conditions found in certain sections of long-established hedgerows. Small soil and ground-dwelling wingless sedentary invertebrates, such as millipedes (Diplopoda), woodlice (Isopoda) and centipedes (Chilopoda) — less affected by browsing livestock than hedgerow flora — provide evidence of habitat survival from former times. Studies in Britain (Cameron *et al*., 1980) have shown that small snail species in the ground and leaf-litter layer of ancient hedgerows **do not migrate to recently formed adjacent hedges.** The reasons for this are evident — the essential ground conditions such as soil porosity, capillary action to ensure continuance of moisture supply, the formation of a humid soil/leaf litter interface all combine to create a stable matrix appropriate to the requirements of these small invertebrates. **Where small colonies of ecologically sensitive and usually rare species are found to be present, it is most often because they occur in conditions that have taken hundreds or thousands of years to develop, and which have distinct physical and edaphic characteristics. Current recommendations on planting as a replacement for removed hedgerows fail to**

recognise this; newly planted hedges cannot become authentic ecological replacements for grubbed-out ancient hedges.

Additionally, there are recent instances where substantial lengths of hedgerow have been excavated and repositioned in the belief that these actions constitute appropriate conservation measures or result in no net loss of biodiversity. It may be possible to physically transplant some hedge shrubs, and certain mobile animals (small mammals and birds) may be able to escape and relocate. However, a landscape feature of ecological (and historical) significance which has evolved over hundreds or even thousands of years of natural soil formation, together with its included microbes, mycorrhizal fungi and soil invertebrates, cannot be similarly transposed and continue to retain its ecological integrity.

A number of plant species, such as Primrose (*Primula vulgaris*), originally from woodland margins, can colonise some hedgerows and particularly their shaded earthen banks, where they encounter living conditions sufficiently similar to those of their original habitat. However, many plant and animal species never lived in hedgerows and therefore cannot use them as a conduit. Many wetland species, for example, have very specific and restricted habitat requirements. **They will not forsake their ecological and genetic lineage and establish themselves in an environmentally unsuitable hedgerow network which lacks their fundamental edaphic and other environmental requirements.**

5. Planting hedgerows

Hedgerow planting is widely promoted and, indeed, sometimes formally required under certain farm payment schemes and planning permissions. However, the conservation rationale for planting hedgerows needs to be examined, especially where it is promoted as a 'biodiversity enhancement' or as a means to offset the loss of biodiversity if existing hedgerows are to be removed. Similarly, the long-term effectiveness of well-intentioned efforts to address biodiversity loss by planting 'native' species needs to be examined. Whether hedge planting is an effective measure for carbon sequestration also requires close scrutiny.

Planting 'native' species

The planting of so-called 'native' mixed-species hedges has been promoted by both publicly funded bodies (e.g. National Biodiversity Data Centre) and commercial enterprises, allegedly as a contribution to the protection or 'enhancement' of biodiversity or to achieve so-called 'Biodiversity Net Gain'. This stems from the increasingly promoted erroneous idea that 'biodiversity' is simply the diversity (or number) of species. Landowners are encouraged to purchase these mixtures of 'native' hedge-forming species and plant them on their farms and development sites to encourage bird and insect visitors (assuming that the relevant potential target species actually occur in the hinterland). These planting schemes often result in the introduction of species mixtures into rural areas where they never occurred naturally. A species may be a genuine surviving native in one narrow part of the landscape, such as on a long-established townland boundary or in native scrub on esker ridges, but completely out of place and biogeographically incongruous if planted into another hedge. **The ecological validity of these planting schemes, and the thinking and funding streams which propel them, require considerable scrutiny, to ascertain what is their precise intent, value and impact on stemming biodiversity loss.** The benefit of these schemes needs to be evaluated within the established body of secure historical, geographical and empirical knowledge and understanding that underpins the informed interpretation of the known distribution of species and the associated ecological processes that have brought this about. Rows of planted trees and shrubs may appear attractive to some and may in some ways emulate the natural woodland margin species, but **they are not in any way authentic and do not offset habitat destruction and consequent species loss.**

What is native?

Increasingly, so-called 'native' species of trees and shrubs can be readily purchased for planting into areas in the belief that they are 'native' to that area. All species are native somewhere on this planet. Sitka Spruce (*Picea sitchensis*), the species that is one of the mainstays of conifer planting in Ireland, is indeed native — in Sitka, Alaska. At a local level, the Devon Whitebeam (*Sorbus devoniensis*) is considered to be native in SE Ireland. Inserting such a species into the landscape of Donegal, for example, allegedly in the name of biodiversity, **would be to negate its historical, biogeographical and ecological significance and to undermine the basis for incisive research** (e.g. Praeger, 1901; Stroh *et al*., 2023), which is concerned with the study and interpretation of the natural distribution of Irish plants — their natural non-contrived arrival, establishment and ecological significance. Furthermore, actions of this type are in direct conflict with maintaining the genetic integrity and health of locally adapted populations and with the fundamental concept of biological diversity[2] — or 'biodiversity' — in the context of biological conservation and the intrinsic value of natural habitats (Soulé, 1985).

This raises the issue of what exactly is native in Ireland. Detailed studies, especially those predicated on pollen analysis (e.g. Jessen, 1948; Mitchell, 1954; Mitchell & Maldonado-Ruiz, 2018; O'Connell & Overland, 2024), have shown the presence of many tree-forming species thousands of years ago and have been instrumental in chronicling the fluctuations in the tree cover at various stages over time. Scots Pine (*Pinus sylvestris*), Hazel (*Corylus avellana*) and Elms (*Ulmus* species), all at different historical periods were widespread and then fell into decline for various reasons. Others are not as evident in the pollen record. However, it is certain in much more recent times that ornamental tree species have been deliberately introduced into the hedgerow landscape. Today, many of these are included in hedge planting schemes and marketed as so-called 'native' species. It is now not unusual to see hedges of Spindle (*Euonymus europaeus*) and a variety of other small shrubs inserted incongruously into certain areas, apparently in the belief that they are native (as they are, elsewhere) **but are certainly not native to their place of planting.**

By now, irrespective of the manner in which hedgerows are currently managed, most are prevented from acquiring new species by natural means, because so many of the potential contributor species have been completely obliterated from the broader landscape. Occasionally, small pockets of surviving plants testify to what was formerly present in the hinterland. These small clusters, composed of species indigenous to the locality, have the potential to act as authentic seed reservoirs, with the capacity to recolonise certain suitable nearby stretches of hedges, if protected from harmful mismanagement. **It is now imperative that such naturally occurring fragments are identified and protected from further destruction,** to allow species whose genetic makeup and natural habitat requirements have evolved to match the site history and the characteristics of the area in question, to reassert or expand their presence in a natural manner.

This conservative approach is very different from the widely supported commercially driven and state-encouraged 'biodiversity enhancement' practices of sowing and planting species into areas where they do not naturally belong, in the mistaken belief that these actions are furthering biodiversity and nature conservation. These actions — sometimes symbolic or cosmetic, and often well-funded — distort the fundamental patterns of plant geography and falsify the authentic plant/habitat connectivity relationship evidenced by the substantial body of scholarly studies in Ireland conducted during three centuries of species/site recording. **Similarly, they deflect knowledgeable analysis and scrutiny from the real factors**

[2] Convention on Biological Diversity, Article 2: 'Biological diversity' means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (https://www.cbd.int/convention)

determining habitat loss and degradation, by inculcating a belief that overt interventions of this type are relevant to nature conservation.

Decorative planting

At various stages in recent history, attempts have been made to enhance the beauty of roadside hedges by the introduction of ornamental tree species which are not indigenous or of ecological significance. The most obvious of these is Wild Cherry (*Prunus avium*), a small to medium-sized tree, which was widely promoted for its spectacular pink flowers in late spring. It is now very difficult to clarify what its natural distribution in Ireland might once have been. Occasionally, landowners augmented their roadside hedges with species such as Yew (*Taxus baccata*), most familiar in old graveyards, and Lilac (*Syringa vulgaris*), and these are still to be found locally in parts of Ireland. More difficult to unravel is the true status of a wide range of species (e.g. Wild Privet, *Ligustrum vulgare*) promoted by the (Royal) Dublin Society (e.g. Rawson, 1807) as part of their efforts to organise and improve the state of agricultural productivity in Ireland from the end of the 18th century. More informally, other species were incorporated into hedges (roadside or field) for their fruit by individual landowners. Various forms of Wild Plum (*Prunus domestica*) have been planted into particular stretches of roadside hedges. Apple trees (*Malus* species), including some varieties resembling Crab Apple, were often planted into hedges as a supplementary food source although many trees have come about as a result of discarded apple-butts. Sycamore (*Acer pseudoplatanus*), widely utilised as a rapidly growing durable windbreak has been planted throughout the island and, though introduced, also spreads easily into pre-existing roadside hedges, as well as on urban waste ground. Horse-chestnut (*Aesculus hippocastanum*) and Beech (*Fagus sylvatica*) have similar histories and many young trees can be found self-seeded from parent trees in adjacent estate parkland. A number of species used as game cover or originating from smaller gardens have become established in some roadside hedges, most notably Snowberry (*Symphoricarpos albus*), with its attractive white berries, which often now forms dense thickets to the exclusion of other species. In more recent years, entire hedgerows have been removed and replanted with the invasive Cherry Laurel (*Prunus laurocerasus*).

Climate mitigation and carbon sequestration

As trees grow, they take carbon from the atmosphere and incorporate it into their physical structure and also into the underlying soil as their foliage is broken down and their roots die off. Planting for carbon sequestration is often viewed as making a positive contribution both in the context of the climate crisis and for addressing biodiversity loss. However, **actions to sequester carbon through tree planting are often at odds with nature conservation,** especially if they impinge on habitats of high nature value such as semi-natural grasslands and wetlands, or if the trees are of a mal-adapted exotic genetic makeup or harbour imported pathogens which may compromise indigenous plant populations (e.g. the fungus responsible for Ash Dieback). Furthermore, the results of the Hedgerow Carbon Project point out that current hedgerow management practices may be resulting in net emissions from the biomass pool, whereas alternative, less intensive, hedgerow management can result in significant removals of carbon dioxide within the Land Use, Land Use Change and Forestry (LULUCF) sector (O'Sullivan *et al*., 2024).

The optimum approach is to retain existing woody vegetation in its natural setting and allow it (where appropriate) to expand naturally through suckering and self-seeding; this is to the benefit of both biodiversity and carbon storage.

6. Hedgerow management

Hedgerows, whether planted or naturally derived from retained woodland vegetation, originally had stock-proofing functionality. They are now known to have other significances — botanical, zoological, environmental, archaeological and cultural. **The importance of hedgerows in an ecologically depleted landscape calls for effective and sympathetic conservation action, primarily to prevent their removal, avoid severe mechanical cutting and ensure that the herbaceous vegetation at their base is not damaged.**

Legal protection for hedgerows is, at present, entirely inadequate. Current thresholds for screening under the European Communities Environmental Impact Assessment (Agriculture) Regulations 2011 (and amendments in 2013 and 2017) allow substantial lengths of hedgerows to be removed without any requirement for Environmental Impact Assessment (see Appendix: Summary of Hedgerow Legislation). Furthermore, even where the thresholds are exceeded and screening is required, a study by Foulkes (2018) found a very high approval rate for proposed removals, up to 100% in some counties, with an apparent lack of appreciation and recognition of what was being lost.

The Protection of Hedgerows Bill, introduced to Dáil Éireann in May 2024 (see Appendix), offers an alternative legal mechanism to halt the destruction of 'significant hedgerows', except in very limited circumstances. 'Significant hedgerows' are defined as those which make a contribution in terms of, for example, the local ecosystem, heritage or biodiversity. The Bill prohibits their removal without permission from the relevant authority, and it sets out offences and penalties for breaches of the provisions.

The damaging effects of harsh, annual cutting of hedgerows can be seen throughout many parts of the country. Advice to farmers regarding hedgerow cutting often specifies minimum heights, preferred shapes or allowing individual trees or clumps to 'escape' a topped hedge (e.g. Teagasc 2022; Nitrates Derogation Terms and Conditions, Government of Ireland 2025, see Appendix). From the point of view of nature conservation, however, hedgerows require a site-specific, long-term management cycle to prevent the hedge as a whole from becoming senescent, allowing for rejuvenation and for woody species to flower and fruit freely.

The ecological value of surviving hedgerows can be improved by relevant and proper management in other ways. One such measure is to temporarily fence off hedgerows and their herbaceous fringes during the main growing season and to allow some of the existing vegetation to flourish in the absence of intense grazing. The structure of the vegetation margins, protected in this manner, allows for increased insect occupancy. This measure has the additional advantage of allowing rarer plant species, locally present but normally undetectable, to grow properly, to flower, fruit and ensure generational continuity. At the end of the growing season, light grazing or topping should be permitted. Similarly, in arable settings, it is important to leave a margin unploughed at the base of the hedgerow to avoid damaging the herbaceous vegetation.

Hedgerows are often used by livestock for shelter with resultant damage due to trampling and dunging. A number of widespread species such as Docks (*Rumex* species) and Nettles (*Urtica dioica*) with broad nutrient-demanding profiles are favoured by this, but most species, particularly the rarer ones, are deeply challenged.

An increasing proportion of agricultural funding, whether derived from the Common Agricultural Policy or from other EU or national sources, is being directed towards ostensible environmental or landscape protection measures. In designing the various agricultural funding schemes, it is necessary to ensure that the intrinsic scientific importance of landscape features such as townland boundary hedgerows is not lost sight of and displaced by expensive displays of 'environmentally friendly' optics. Instead, **farmers and landowners must be rewarded for retaining ecologically valuable habitats and managing them appropriately.**




Fig. 6. Changing land use (from pasture to arable) means that the hedgerows in these landscapes became redundant as their stock-proofing function was no longer required. In intensively-farmed arable landscapes, hedges are also heavily trimmed, reducing biodiversity and leaving little opportunity or living space for common, uncommon or rare species to recolonise, grow and mature. Newly-planted hedges have very little potential to offset the damage to biodiversity caused by such severe cutting. Photos: Charles Shier

7. Studying hedges

With the ready accessibility of satellite imagery it has now become possible to examine and understand at close quarters the hedged landscape and local patterns of field/hedgerow formation. With some digital applications it is possible to switch from the aerial photographs of an area to images of the original six inch to one mile field survey of the Ordnance Survey (1833–1846) of the same space. In this way it becomes possible to analyse and interpret the changes which have taken place in the intervening two centuries. Most of the preliminary field work leading to the production of the printed maps took place between the initiation and progression of the formal enclosure movement and the onset of the great famine, and thus the surviving hedge flora of these features can be examined and interpreted in that light.

It is now a priority to identify hedges with the greatest ecological and historical value and to manage them in a manner that respects their local characteristics and significance. **The current one-size-fits-all approach, though administratively convenient, does not do justice to the nuances of national and local plant geography and ecology.** A species may be widespread in one part of the country, where suitable conditions prevail and may be of very rare occurrence elsewhere, disclosing the presence of unusual ecological conditions combined with historical landscape management. This is where local hedgerow studies by competent ecologists can make an important contribution in understanding our surviving hedgerow flora and in establishing priorities for its protection. A case in point is Holly (*Ilex aquifolium*). On slightly upland, mildly acid ground, Holly is often a widespread and common species especially in and on the fringes of existing woodland and roadside hedges. However, in parts of the lowlands, especially on lime-rich soils, it is apparently associated with more ancient boundaries. Research of this kind is now timely, in order to catalogue the sites of occurrence of certain key species and to interpret their occurrence in the light of historical records. In this way, **the primacy and authenticity of ancient hedgerows and their living complement of species** can be chronicled at local level, while the living evidence is still present in the landscape.

Above all, the results of studies of this quality must be set down and placed in situations where the contained knowledge and generated understanding of the field researchers can be put to good purpose. This can be achieved by combinations of GIS mapping, printed material and digital imagery, set against the body of cartographic evidence and historical and cultural records. In this way, the impact of various landscape alterations can be assessed, quantified and where necessary, forestalled. The creation of habitat inventories of this sort goes some way to ensure, whenever a planning issue arises, that — as a minimum —

the matters raised can be addressed in an open way and given due consideration. Local conservationists often know far more than they realise and their historical perspectives, coupled with good quality field survey work and good presentation, can go some way towards preserving what remains of the natural landscape. Too many habitats have been lost because one party assumes that some other party is taking responsibility for the issue, or that local people feel that there is nothing they can do to prevent such losses. By addressing the issues, especially at Department of Agriculture, Food and the Marine (DAFM) or local authority planning level, it may be possible to avoid needless destruction due to lack of foreknowledge or understanding by the relevant statutory parties.

Conclusion

Long established hedgerows are an irreplaceable part of our natural and cultural heritage. They are essential refuges for native flora and fauna, including certain ecologically sensitive species which are in decline due to habitat loss, and their conservation is an urgent priority in order to halt biodiversity loss at the habitat level.

Hedgerows vary in terms of their ecological significance. Older hedgerows — especially those along townland boundaries — are, in general, of greater merit than more recent infill hedges planted during the past two or three hundred years. Many older hedgerows still contain authentic fragments of aboriginal woodland; their structure is more complex, and their species composition and historical lineage are much richer. These ancient hedgerow habitats must now be properly documented. They must be afforded the highest effective protection in recognition of their unique ecological value, and their destruction and insensitive management must cease.

Incentivisation of planting initiatives for climate mitigation, including the use of so-called 'native' species, as well as the promotion of highly dubious "biodiversity enhancement" or "biodiversity net gain" policies, need to be adequately scrutinised for the increasing risk these actions pose to existing ecologically important habitats and species, and to the genetic integrity of indigenous populations.



Fig. 7. The well-hedged lowlands define the most productive farming land, and contrast with the more open, less fertile upland terrain. Photo: Charles Shier

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Appendix: Summary of Relevant Legislation

Hedgerow Cutting

Legal provisions under the Wildlife Acts 1976 to 2023[3] provide for a ban on cutting from 1st March to 31st August inclusive, each year.

Hedgerow Removal

Hedgerow removal is treated under the European Communities Environmental Impact Assessment (Agriculture) Regulations 2011 (and amendments in 2013 and 2017)[4], as follows:

Restructuring of rural land holdings	**EIA Screening Required**	**Mandatory EIA**
Length of field boundary to be removed	Above 500 m	Above 4 km
Area of lands to be restructured by removal of field boundaries	Above 5 hectares.	Above 50 hectares

The Protection of Hedgerows Bill

The Protection of Hedgerows Bill[5], prepared by a working Group of Comhshaol – The Climate Bar Association[6], in response to a request from Hedgerows Ireland (Tipperary)[7] seeks to safeguard native Irish hedgerows.

Nitrates Derogation

'Biodiversity Measures' under the Nitrates Derogation Terms and Conditions (2025)[8] require all derogation farmers to adopt at least one of the following two actions from the All-Ireland Pollinator Plan:

1. When hedge cutting, retain at least one Whitethorn/Blackthorn tree within each hedgerow to allow it mature.
2. Hedgerows shall be maintained on a minimum 3-year cycle. i.e. cut in rotation rather than all at once as this will ensure some areas of hedgerows on the farm will always flower.

[3] https://www.npws.ie/legislation
[4] https://www.irishstatutebook.ie/eli/2011/si/456/made/en/print
[5] https://data.oireachtas.ie/ie/oireachtas/bill/2024/39/eng/initiated/b3924d.pdf
[6] https://www.lawlibrary.ie/the-climate-bar-association-welcomes-the-introduction-of-the-protection-of-hedgerows-bill-2024-in-dail-eireann-today/
[7] https://hedgerowsireland.org/
[8] https://assets.gov.ie/245560/12c3e4e9-b530-41f6-a785-17d5ae1059f9.pdf

The Dublin Naturalists' Field Club

Promoting nature in Ireland since 1886

The Dublin Naturalists' Field Club promotes the study and conservation of the natural environment, its species, habitats, underlying geology and landscape. It provides opportunities to learn about and share information on all aspects of natural history and it encourages and seeks to assist in the conservation and protection of sites of ecological interest.

Activities

Outdoor field meetings and indoor workshops and presentations are held throughout the year, mostly in the greater Dublin region. Many of our events are conducted by leading Irish and visiting naturalists. They cover natural history topics from the wild plants, birds and insects, to the geology and ecology that make their lives possible.

Principal aims

The principal aims of the Field Club are:

- to provide opportunities for people to share their interests in all aspects of natural history
- to offer activities that raise awareness of and promote interest in our natural heritage
- to train and educate naturalists of all ages and experience
- to protect rare and endangered plants, animals and habitats
- to promote the conservation of sites of natural history interest
- to carry out specialist surveys of flora and fauna
- to provide input to local and national authorities on nature conservation matters

History and publications

The Dublin Naturalists' Field Club was founded in 1886. Early members included Nathaniel Colgan (1851–1919), author of *A Flora of County Dublin*, and Robert Lloyd Praeger (1865–1953) whose publications included *Irish Topographical Botany* and *The Way that I Went*. Other significant publications include the *Flora of the County Wicklow* by J.P. Brunker (1950), *Flora of County Dublin* by DNFC members (1998), *The Flora of County Cavan* by P.A. Reilly (2001), *A Catalogue of Alien Plants in Ireland* by Sylvia Reynolds (2002), *Irelands' Butterflies: A Review* by David Nash, Trevor Boyd and Deirdre Hardiman (2012) and the *Flora of County Limerick* by Sylvia Reynolds (2013).

Conservation

In view of the continuing loss of natural habitats, the Board of the DNFC felt obliged to form a Conservation Sub-committee in 2018 to review, prepare and disseminate evidence-based commentaries on the current conservation status of species, sites and habitats; to consider the content and effectiveness of various local and national biodiversity plans; and to convey its opinions, through discussion and written submission, to parties concerned with the implementation of these plans.

Position Paper 1, *The Case Against Wildflower Seed Mixtures*, was produced by the DNFC in 2021; Position Paper 2, *Protecting the Threatened Flora of Old Walls*, was produced in 2024.

For further details, see dnfc.net