

Do road verges hold the key to diversity in rural areas?

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Summary

In order to test the theory that there is more species diversity in the road verges of housing estates than there is in those of farmland, a small pilot survey was undertaken.

Introduction

Using a local example of the area around Faringdon in the Vale of the White Horse Oxfordshire, I have been comparing the verges in housing estates and farmland. The idea that verges may reflect the present, or past diversity, of the surrounding area was sparked off by an article on garden weeds in the newsletter of the Botanical Society of Britain and Ireland (BSBI), (Braithwaite 2017) and has grown from there. This idea is also the result of my observations when monitoring 10km squares for the 2002 and 2020 Atlases for the BSBI (Preston et al 2002). This is not a scientific document but I hope will give some indications for future investigation.

Verges are the immediate refuge for species displaced from the two branches of farmland, arable and pasture fields. Arable flowers are amongst the most threatened species in Oxfordshire (Erskine et al 2018). They are mainly annuals and depend on ground disturbance for germination. Meadows are a threatened habitat and 'improved pasture' is not always compatible with traditional species. In housing estates verges and gardens are also a refuge. Gardens are not subject to so much herbicide/pesticide treatment, but gardeners vary in their tolerance of 'weeds'. Builders are supposed to replace the topsoil removed during building operations and with it the seedbank may be restored to something approximate to its origins, although this may depend to some extent on how the soil has been stored and for how long.

I am writing primarily as a botanist, but as plants ultimately provide the food for insects, birds and other animal species, this is a good starting point.

Method

To test this possibility, I chose to use the examples of three road verges in housing estates and three through farmland and I will attempt to show there is sufficient evidence to back up my theory.

I made a search along six 100m stretches of road verge (both sides of road) in 20 minutes, in October 2018. Keeping to the time and distance constraints was a necessary discipline to achieve comparability between the different habitats. The actual sites chosen were influenced by where I could park the car safely rather than 'cherry pick' the places which looked interesting. By chance all the road verges through farmland were backed by hedges, dominated by Hawthorn (*Crataegus monogyna*), with grass verges of varying width.

A complete list of species is to be found in Appendices 1 and 2.

Table 1. Number of species found in 100m verge strips. (The Corallian ridge underlies all these verges.)

Faringdon Housing Estates

			No. of species
Westland Road	WR	Built 1990s	51
Tuckers Road	TR	Built 2000s	56
Gilligans Way (This had a culvert, feeding into a small pond.)	GW	Built 2010s	64

Rural Verges

			No. of species
Fernham Road	FR	Arable E. side, Pasture W. side	30
A420, Little Coxwell	LC	Pasture both sides	34
A420, E. of Snooty Mehmaan	SM	Arable both sides	30

These results indicate that more species diversity was seen within the verges of housing estates, relative to verges adjacent to farmland. Note that no attempt has been made to see if these results are statistically significant.

In the housing estates the front gardens tended not to have walls or hedges, but lawns fronting onto the pavement. A pleasing aspect was that within the housing estates, areas were left as green spaces, one a ‘village green’ type area, one an area with mature shrubs and grassy rides and one a steep hollow with a culvert and pond area. It is a policy of the local planning department that 15% of the area in a housing estate should be left as open space, which can be used as a general amenity, children’s play area or for allotments (Planning Dept, Vale of the White Horse pers. comm.) They provide a welcome break for nature. In all three areas the ubiquitous daisies, dandelions and buttercups were found, and also remnants of original vegetation e.g. Cat’s-ear (*Hypochaeris radicata*), see figure 1, Stork’s bill (*Erodium cicutarium*), see figure 2, Dove’s-foot Crane’s-bill (*Geranium molle*), with little evidence of soil enrichment by nitrogen. In the third area the housing density was higher than the previous two areas and there were no or minimal front gardens and on driving in, the first impression was that the pavement and gutter had very little vegetation, but once parked and on foot, there was the usual significant number of species, including Pearlworts (*Sagina* sp.), Annual Meadow-grass (*Poa annua*), Spotted Medick (*Medicago arabica*) and in the wetland space Bulrush (*Typha latifolia*), Fleabane (*Pulicaria dysenterica*) and Mint (*Mentha aquatic*), amongst the specialities.



Figure 1. Common Stork's bill (*Erodium cicutarium*). Photo by Peter Creed



Figure 2. Cat's-ear (*Hypochaeris radicata*) Photo by Peter Creed

On the farmland road verges, nitrogen loving species dominated, Cow Parsley (*Anthriscus sylvestris*), Nettles (*Urtica dioica*) and coarse grasses e.g. Cock's-foot (*Dactylis glomerata*), False Oat-grass (*Arrhenatherum elatius*), Meadow Fescue (*Schedonorus pratensis*) and Perennial Rye-grass (*Lolium perenne*). The high fertility of these verges is assumed to be due to a combination of drift of fertilizer from the adjoining fields and the arisings from verge cuttings being left on site. This means that there is little chance of annuals being able to gain a foothold and small species are crowded out. Along the A420 one species, Lesser Sea Spurrey (*Spergularia marina*) is a coloniser due to salting of the roads; see figure 3.



Figure 3. Lesser Sea-spurrey (*Spergularia marina*), in natural habitat. Photo by Peter Creed

If the species found in the 'public' areas of housing developments are replicated to some extent in gardens, then these areas are reservoirs for many of the commoner species which are rarely found on farmland, not even in the headlands.

Discussion

The research I have done is minimal, but I think it bears out the gut feeling I had that intensive farming poses a bigger threat to biodiversity than building new houses.

Garden weeds can be grouped as:

Hated (by most gardeners): eg Bindweed (*Calystegia* sp., *Convolvulus arvensis*), Couch grass (*Elytrigia repens*), Dandelions (*Taraxacum* agg.);

Tolerated: Lesser Celandine, (*Ficaria verna*), Cuckooflower (*Cardamine pratensis*), Upright Yellow-sorrel (*Oxalis stricta*) and

Cherished: Cowslips (*Primula veris*), Bluebells (*Hyacinthoides non-scripta*), Broomrape (*Orobanche minor*).

These reflect my own preferences, but I think most people can identify with this kind of grouping. The first group will contain those plants we wish we could get rid of from the garden. The other two provide a reservoir of seed, which may or may not enrich the natural habitat. These along with the species found in the verges of the housing estates and roads are the remnants of the wild flora and these we would hope to preserve. To avoid a decreasing gene pool, corridors of continuous ‘natural habitats’ are required. This has been perceived as very important by Plantlife, the wild plant charity (www.plantlife.org.uk). To this end their Verge Project was launched (Plantlife 2019) and it has made a promising start.

The vast majority of species found in gardens, villages, housing estate verges and general country-side verges are designated of Least Concern (LC) (Stroh et al 2019), when being assessed for ‘risk of extinction’, but this does not mean that their loss to the environment is immaterial. A wide variety of species, means a wider variety of insects and birds, which are important in making a healthy ecological network. It is also noteworthy that very few species chronicled in the ‘Oxfordshire’s Threatened Plants’ (Erskine et al 2018) are to be found within the town’s environs. When the development of Fernham Gate (not one of the developments surveyed) took place, the habitat was no longer suitable for at least one, or possibly two, species from the scarce list. Arable species are those which have suffered the greatest loss and allotments are now the most likely places to find them. Species such as Field Penny-cress (*Thlaspi arvense*) and Corn Buttercup (*Ranunculus arvensis*) are unlikely to survive the dense sward of a verge.

Conclusion

In conclusion, most of the species rich grassland has gone from our farmland and the intensive improved pasture and arable land, which has replaced it, is species poor. The land around small towns and villages, which is most likely to be built on, may still have a seedbank, which is more botanically diverse. The land around small towns was often left unimproved, perhaps because of a ‘green belt’ mentality, where fields would be left for ponies or horses. When large gardens or estates were sold off in part for building, pockets of land were left undeveloped which were too distant from the farm, or where there was public demand for an open space, such as happened in Faringdon when Humpty Hill was threatened. From a species diversity point of view new housing estates are ‘richer’ than the farmland which they displaced. They also provide opportunities for the more unusual species to survive.

The human population is increasing. More houses are required. Britain needs to grow more food. These pressures on our land use are not going to go away, or even

decrease. So, It is more important than ever that the pockets of ‘unimproved’ pasture grassland, woodland, small ponds, lakes, which remain, are earmarked for conservation. These are the real areas where the seedbank remains diverse and must be cherished. The evidence of this investigation of diversity in the housing estates is encouraging, but it is very uncertain as a seedbank for the future.

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Appendix 1 – Housing Estate Verges

WR: Westland Road, TR: Tuckers Road, GW: Gilligans Way

<i>Acer campestre</i>	Field Maple				
<i>Acer platanoides</i>	Norway Maple		TR		
<i>Acer pseudoplatanus</i>	Sycamore	WR			
<i>Achillea millefolium</i>	Yarrow	WR	TR		
<i>Aegopodium podagraria</i>	Ground Elder		TR		
<i>Agrostis stolonifera</i>	Creeping Bent	WR	TR		
<i>Alliaria petiolata</i>	Garlic Mustard	WR			
<i>Anagallis arvensis</i>	Scarlet Pimpernel		TR		
<i>Anthriscus sylvestris</i>	Cow Parsley	WR	TR		
<i>Aquilegia vulgaris</i>	Columbine	WR			
<i>Arrhenatherum elatius</i>	False Oat-grass				GW
<i>Artemisia vulgaris</i>	Mugwort		TR		
<i>Aubretia deltoidea</i>	Aubretia	WR			
<i>Bellis perennis</i>	Daisy	WR	TR		GW
<i>Buddleja davidii</i>	Butterfly-bush	WR			GW
<i>Calystegia silvatica</i>	Large Bindweed		TR		GW
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	WR	TR		
<i>Cardamine hirsuta</i>	Hairy Bitter-cress		TR		
<i>Carex pendula</i>	Pendulous Sedge				GW
<i>Centaurea nigra</i>	Common Knapweed				GW

<i>Cerastium fontanum</i>	Mouse-ear		TR	
<i>Cirsium arvense</i>	Creeping Thistle	WR	TR	GW
<i>Conyza canadensis</i>	Canadian Fleabane	WR	TR	
<i>Corylus avellana</i>	Hazel		TR	
<i>Cotoneaster horizontalis</i>	Cotoneaster	WR		
<i>Cotoneaster sp.</i>	Cotoneaster	WR		
<i>Crataegus monogyna</i>	Hawthorn			GW
<i>Crepis capillaris</i>	Small Hawk's-beard	WR		GW
<i>Dactylis glomerata</i>	Cock's-foot	WR	TR	GW
<i>Dipsacus fullonum</i>	Teasel			GW
<i>Dryopteris filix-mas</i>	Male Fern	WR		
<i>Epilobium hirsutum</i>	Great Willowherb			GW
<i>Epilobium sp.</i>	Willowherb	WR		
<i>Equisetum telmateia</i>	Great Horsetail			GW
<i>Erodium cicutarium</i>	Common Stork's-bill	WR		
<i>Euphorbia peplus</i>	Petty Spurge	WR	TR	GW
<i>Fagus sylvatica</i>	Beech		TR	
<i>Festuca rubra</i>	Red Fescue	WR	TR	GW
<i>Fraxinus excelsior</i>	Ash		TR	
<i>Galinsoga quadriradiata</i>	Shaggy-soldier	WR		
<i>Galium aparine</i>	Cleavers	WR	TR	
<i>Galium verum</i>	Lady's Bedstraw		TR	
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill		TR	GW
<i>Geranium molle</i>	Dove's-foot Crane's-bill	WR		
<i>Geranium pusillum</i>	Small-flowered Crane's-bill	TR		
<i>Geranium robertianum</i>	Herb Robert	WR	TR	
<i>Geum urbanum</i>	Wood Avens	WR	TR	GW
<i>Hedera helix</i>	Ivy		TR	
<i>Helminthotheca echioides</i>	Bristly Ox-tongue			GW
<i>Hypochaeris radicata</i>	Common Cat's-ear	WR	TR	
<i>Hypericum tetrapterum</i>	Square-stemmed St. John's-wort		TR	
<i>Iris foetidissima</i>	Stinking Iris		TR	
<i>Lapsana communis</i>	Nipplewort	WR		
<i>Lamiastrum galeobdolon ssp argentatum</i>	Yellow Archangel		TR	
<i>Lolium perenne</i>	Perennial Rye-grass	WR	TR	
<i>Lotus corniculatus</i>	Bird's-foot Trefoil			GW
<i>Mahonia aquifolium</i>	Mahonia		TR	
<i>Malva sylvestris</i>	Common Mallow			GW
<i>Matricaria discoidea</i>	Pineapple Weed	WR		
<i>Medicago arabica</i>	Spotted Medick			GW
<i>Medicago lupulina</i>	Black Medick	WR		
<i>Myosotis arvensis</i>	Field Forget-me-not		TR	
<i>Oxalis stricta</i>	Upright Yellow-sorrel		TR	
<i>Plantago lanceolata</i>	Ribwort Plantain	WR	TR	GW
<i>Plantago major</i>	Greater Plantain	WR	TR	GW
<i>Poa annua</i>	Annual Meadow-grass	WR	TR	GW
<i>Polygonum aviculare</i>	Knotgrass	WR	TR	
<i>Polygonum arenastrum</i>	Equal-leaved Knotgrass	WR		
<i>Potentilla reptans</i>	Creeping Cinquefoil		TR	GW
<i>Poterium sanguisorba</i>	Salad Burnet			GW
<i>Prunella vulgaris</i>	Selfheal	WR	TR	
<i>Prunus avium</i>	Wild Cherry		TR	

<i>Pulicaria dysenterica</i>	Common Fleabane			GW
<i>Ranunculus repens</i>	Creeping Buttercup		TR	
<i>Rosa canina</i> ss	Wild Rose		TR	GW
<i>Rubus caesius</i>	Dewberry			GW
<i>Rubus fruticosus</i> agg	Bramble		TR	GW
<i>Rumex obtusifolius</i>	Broad-leaved Dock		TR	GW
<i>Sagina apetala</i>	Annual Pearlwort	WR		
<i>Sagina procumbens</i>	Procumbent Pearlwort	WR.		GW
<i>Salix cinerea</i>	Grey Willow			GW
<i>Salix x rubens</i>	Hybrid Crack-willow			GW
<i>Schedonorus arundinaceus</i>	Tall Fescue			GW
<i>Scorzonerioides autumnalis</i>	Autumn Hawkbit	WR		
<i>Senecio erucifolius</i>	Hoary Ragwort		TR	GW
<i>Senecio jacobea</i>	Common Ragwort			GW
<i>Senecio vulgaris</i>	Groundsel	WR		GW
<i>Sonchus asper</i>	Prickly Sowthistle	WR.	TR	GW
<i>Sonchus oleraceus</i>	Smooth Sowthistle		TR	
<i>Symphoricarpos albus</i>	Snowberry		TR	
<i>Taraxacum officinale</i>	Dandelion	WR	TR	GW
<i>Taxus baccata</i>	Yew		TR	
<i>Trifolium repens</i>	White Clover	WR	TR	GW
<i>Tussilago farfara</i>	Coltsfoot			GW
<i>Typha latifolia</i>	Bulrush			GW
<i>Veronica persica</i>	Common Field-speedwell		TR	GW
<i>Vicia tetrasperma</i>	Smooth Tare		TR	GW

Appendix 2 – Farmland Verges

FR: Faringdon Road, LC: A420 Little Coxwell, SM: A420, E of Snooty Mehman

<i>Achillea millefolium</i>	Yarrow	FR	LC	SM
<i>Agrostis stolonifera</i>	Creeping Bent	FR	LC	SM
<i>Anthriscus sylvestris</i>	Cow Parsley	FR	LC	
<i>Arrhenatherum elatius</i>	False Oat-grass	FR	LC	SM
<i>Artemisia vulgaris</i>	Mugwort		LC	SM
<i>Atriplex prostrata</i>	Spear-leaved Orache	FR	LC	SM
<i>Ballota nigra</i>	Black Horehound			SM
<i>Brassica rapa</i>	Wild turnip		LC	SM
<i>Centaurea nigra</i>	Common Knapweed	FR		
<i>Chenopodium album</i>	Fat Hen	FR	LC	
<i>Cichorium intybus</i>	Chicory			SM
<i>Cirsium arvense</i>	Creeping Thistle	FR		
<i>Cirsium vulgare</i>	Spear Thistle		LC	
<i>Conium maculatum</i>	Hemlock			SM
<i>Crataegus monogyna</i>	Hawthorn	FR	LC	SM
<i>Dactylis glomerata</i>	Cock's-foot	FR	LC	SM
<i>Daucus carota</i>	Wild Carrot		LC	
<i>Epilobium hirsutum</i>	Great Willowherb	FR	LC	
<i>Fraxinus excelsior</i>	Ash	FR		
<i>Galium aparine</i>	Cleavers	FR		
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill		LC	SM
<i>Hedera helix</i>	Ivy	FR		
<i>Helminthotheca echioides</i>	Bristly Ox-tongue		LC	SM
<i>Heracleum sphondylium</i>	Hogweed	FR	LC	SM

<i>Hypochaeris radicata</i>	Common Cat's-ear	FR	LC	SM
<i>Lamium album</i>	White Dead Nettle	FR		
<i>Leucanthemum vulgare</i>	Ox-eye Daisy		LC	
<i>Malva sylvestris</i>	Common Mallow			SM
<i>Medicago arabica</i>	Spotted Medick		LC	
<i>Plantago lanceolata</i>	Ribwort Plantain	FR	LC	SM
<i>Plantago major</i>	Greater Plantain	FR		
<i>Poa annua</i>	Annual Meadow-grass	FR		
<i>Polygonum aviculare</i>	Knotgrass	FR	LC	SM
<i>Potentilla reptans</i>	Creeping Cinquefoil	FR	LC	
<i>Rosa canina</i> agg.	Wild Rose		LC	
<i>Rubus fruticosus</i> agg.	Bramble	FR	LC	SM
<i>Salix</i> sp.	Willow		LC	
<i>Sambucus nigra</i>	Elder	FR		
<i>Schedonorus arundinacea</i>	Tall Fescue	FR	LC	SM
<i>Schedonorus pratensis</i>	Meadow Fescue	FR	LC	SM
<i>Sedum acre</i>	Biting Stonecrop			SM
<i>Senecio erucifolius</i>	Hoary Ragwort		LC	
<i>Senecio jacobea</i>	Ragwort	FR	LC	
<i>Senecio vulgare</i>	Groundsel	FR	LC	SM
<i>Sinapis arvensis</i>	Charlock		LC	
<i>Silene latifolia</i>	White Campion			SM
<i>Sonchus oleraceus</i>	Smooth Sowthistle		LC	
<i>Spergularia marina</i>	Sea Spurrey			SM
<i>Stellaria media</i>	Chickweed			SM
<i>Taraxacum</i> agg.	Dandelion			SM
<i>Trifolium repens</i>	White Clover	FR		
<i>Tussilago farfara</i>	Coltsfoot		LC	SM
<i>Urtica dioica</i>	Stinging Nettle	FR		SM