The Habitat, Ecology, Distribution and Conservation of *Truncatellina cylindrica* (Ferussac) The Cylindrical Whorl Snail

With particular emphasis on the Bedfordshire population

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2002

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Abstract

The Cylindrical Whorl Snail (*Truncatellina cylindrica*) was searched for using a number of techniques at its only known Bedfordshire location; both living and dead specimens were found.

A review was carried out of existing literature and other information relating to the snail at its other known British and some Continental locations.

At all but the Bedfordshire site in Britain the snail appears to be restricted to the base of grass clumps in calcareous habitats. At the Bedfordshire site any association with a particular plant species is not clear but the habitat is neutral grassland, and the snail only occurs in the soil within a few cm of the base of a sandstone wall, or on the wall its self.

Further research is needed into the ecology of this species, but it is clear that the Bedfordshire site should be managed as grassland and that great care should be taken not to damage the existing habitat at the base of the wall.

Contents

1. Introduction

Truncatellina cylindrica, (Ferussac) the Cylindrical Whorl Snail (formerly known as *Vertigo cylindrica* (Ferussac) and *Vertigo minutissma* (Rimmer, 1907)) is a tiny snail, of the family Vertiginidae. It is currently thought to be extant at only three locations in Britain and very little is known about its habitat, ecology, status or conservation. It is on the UK Biodiversity Action Plan Long List, and is identified in the British Red Data Book, 3, Invertebrates other than Insects (Bratton, 1991) as "Vulnerable". The species has a Local Species Action Plan written for it in Bedfordshire (Edwards, 2001) and Edinburgh (Anon, undated, a).

2. Aims

The aim of this study was to investigate the habitat, ecology and current status of *Truncatellina cylindrica,* The Cylindrical Whorl Snail in order to establish recommendations for its conservation with particular reference to the Bedfordshire site.

3. Description of the species

The Cylindrical Whorl Snail is a minute snail not more than 2mm in length and less than 1mm in diameter. It is roughly cylindrical in shape with the top one or two whorls smaller than the rest giving a domed tip. There are 5.5 to 6 whorls, which are fairly rounded with many fine striations giving the species a very distinctive appearance. There are no teeth in the mouth, which has a slightly thickened edge and is longer than wide. The snail is pale golden brown in colour and is somewhere between matt and glossy in appearance.

4. Distribution

The Cylindrical Whorl Snail, is widely distributed throughout Europe "always very local, north to coastal areas of S. Scandinavia (near Oslo, Danish Islands, Bornholm, S. Sweden, Oland, Gotland" (Kerney & Cameron, 1979). It was more widespread in Britain in the past than it is now, especially in the Neolithic and Bronze ages. It is recorded from a total of 43 grid squares in the Atlas (Kerney 1999). Of these 3 are said to be from after 1965 (although one of these is the 1950 Thetford record), 17 prior to 1965 (mostly 1880-1914) and 23 fossil occurrences (Late- and Postglacial). This illustrates a steady decline from prehistory through to the present day. The most modern records (including the three currently known extant populations) are:

- Two Mile Bottom, Thetford, Norfolk. Last reported here in July 1950 by A. G. Davis when 157 specimens were taken by Davis, R. Goodman and T. Goodman, from dried and sieved leaf litter. Only 20 of the specimens they found were alive, but these died after about a month in captivity (Davis, 1952). The Norfolk site no longer appears to contain a population (Bratton, 1991).

- A Magnesian Limestone Quarry in Went Vale, Yorkshire in the Brockdale Nature Reserve. Dr. Lloyd-Evans discovered this population in September 1975, when he found a single dead specimen. After a subsequent search, several dead and one live specimen were discovered (Norris, 1976). The population was found to be extant in 1991 (Simon Hunt, pers. com.) but no more than 2 living specimens have been found at any one time (Norris, pers. Com.)

- Potton Road Verge Nature Reserve, Potton, Bedfordshire. Discovered here by Dr and Mrs Lloyd-Evans (probably in 1967). The species has since been reported by R Dowsett who found an unspecified number of specimens in 1982 (Dowsett, pers. com.) and Dr B. Nau and R. Brind who found 3 living specimens in 1998 (Nau pers. com.). I have since found a single dead specimen on 7th June 2001 and a single live specimen with J. Comont on 18th June 2001. All specimens have so far been found in the same part of the verge. The second part of this report details the finds of the snail in 2002.

- Dumbarnie Links Reserve in Fife, Scotland. A search of sand from within rabbit burrows by Dr Gordon Corbet in November 1999 revealed fresh empty shells in the Dunbarnie Links Reserve (Corbet, 2000). Subsequent searches revealed shells throughout the reserve and on 05/01/2001 3 live shells were found (Corbet pers. com.). These were in grass divots growing against a south facing concrete and brick wall of a W.W.II pill-box.

Searches at a number of other old locations have not succeeded in turning up any specimens (Bratton, 1991).

5. Ecology

The habitat of this species is described in the literature (e.g. Kerney 1999, Bratton, 1991, Kerney & Cameron, 1979) as very dry, short calcareous grassland in sandy or stony ground, screes, rocks and at the base of stone walls, typically among *Sedum, Thymus or Artemisia.* It has also been found in sand dunes. Ellis (1926) describes it as "an inhabitant of dry exposed places on hill-sides and arid ground".

Davis (1952) describes the habitat where he found the species as "grassy undergrowth beneath the shelter of a high old hawthorn hedge." He adds that there are some "quite large trees".

The Went Vale population is restricted to the base of small clumps of grass growing out of bare limestone at the top of an old limestone quarry (Norris pers. com.). This site is very different from the Potton site and it is difficult to find any continuity between the two locations.

In Poland the species is found in pastures, railway embankments and baulks among plant debris and at the base of grass blades. (ASP, undated)

The Dunbarnie Links population is found in a "stable calcareous dune habitat" (Corbet, 2000) consisting of sparse Marram (*Ammophila arenaria*) mixed with Red Fescue (*Festuca rubra*) and Sand Sedge (*Carex arenaria*). There is also White Clover (*Trifolium repens*), Ribwort Plantain (*Plantago lanceolata*) and Lady's Bedstraw (*Galium verum*). The vegetation in the area of dead and fresh shells is a mixture of Marram and False Oat-grass (*Arhenatherum elatius*) with, in addition to the above species, Cowslip (*Primula veris*), Thyme (*Thymus sp.*) and Purple Milk-vetch (*Astragalus danicus*) (Corbet, pers. com.). There appears to be little similarity between this and the Potton site.

The Potton population is found in the soil at the base of an old sandstone wall, between the wall and the highway in a strip of vegetation between 1 and 3 metres wide. (A plant species list for the site can be found in Appendix 3 and description of the vegetation in section 6.2.2). The soil is very sandy, but with a pH of 7 (neutral). The snail seems to be restricted to within a few cm of the base of the wall at, or just below, the soil surface. It has been found on the open face of the wall approximately

30cm from the ground. It does not appear to be associated with any particular plant species at Potton (see below).

6. An investigation into the Potton Site

6.1 Methods

Samples of approximately 50ml of soil were taken at 2m intervals from within 10cm of the base of the wall, in the middle of the verge and at the roadside edge of the verge. These were sieved using 2mm and 0.71mm wire mesh sieves. The particles held back by the 0.71mm sieve were tipped onto an aluminium tray and examined by eye and using x10 magnification for invertebrates (particularly *Truncatellina cylindrica*). All soil was immediately returned to the location of origin after examination. Soil samples were also examined from 4 points under the Elm scrub in the central section.

At 2m intervals starting from the de-restriction sign for a distance of approximately 10m to the east the surface of the wall was examined visually and at x10 magnification. A number of cracks and crevices on the wall were investigated using an aurascope.

At a number of points along the wall within the above 10m section the surface of the wall was brushed onto an aluminium tray using a soft bristle brush. The result was examined by eye and at x10 magnification.

A number of gravestones in the adjacent churchyard were brushed onto an aluminium tray and the result examined by eye and at x10 magnification.

A small number of soil samples from the graveyard (taken from molehills) were tipped onto an aluminium tray and examined by eye and at x10 magnification.

Any live specimens were returned to their place of origin following identification.

Notes were kept on the weather conditions at the time of survey.

A list of all invertebrates encountered was compiled (see Appendix 2).

6.2. Results

6.2.1 Invertebrates

Surveys using the above methods were carried out on the site on the 29th and 31st May 2002.

Only soil sieving surveys were carried out on the site on the 19th June

Map 1 shows the extent of the distribution of *T. cylindrica* shells found using all methods and a summary of the vegetation types.

No specimens were found by visual searching or anywhere within the cracks in the wall.

No specimens were found by brushing onto trays.

No specimens were found within the churchyard by any method.

No specimens were found under the Elm scrub in the central section.

Nine specimens of *T. cylindrica* were found by soil sieving, only one of which was alive. Appendix 1 shows the results of the soil sieving. The results show a concentration of specimens from within 10cm of the foot of the wall. The population is centred around the de-restriction sign and appears to extend approximately 12m east and 4m west of the de-restriction sign.

A total of 53 species of invertebrate were identified from the site, including 2 additional notable snails, *Helicella italia,* Heath snail (old shells only), LRDB A (Declining in Britain) and *Helicodiscus singleyanus,* LRDB F (No action required). A single specimen of *Badister unipustulatus,* a Nationally notable (B) ground beetle that does not appear to have been recorded from Bedfordshire since 1970 was found on the site.

6.2.2 Vegetation

Vegetation Surveys were undertaken on the site on 14th May and 19th June

A list of the plants recorded from the site during this survey can be seen in Appendix 3.

The site contains good examples of MG1 *Arrhenatherum elatius* (False Oat-grass) species-rich grassland that does not easily fall into any sub community.

On the western section there are good populations of Wild Clary (*Salvia verbenaca*), Garlic Mustard (*Alliaria petiolata*), Yellow Oat-grass (*Trisetum flavescens*), Rough and Bur Chervil (*Chaerophyllum temulum* and *Anthriscus caucalis*) and Ivy (*Hedera helix*), with patches of Black Horehound (*Ballota nigra*), Cleavers (*Galium aparine*) and Wild Onion (*Allium vineale*). There are large numbers of English Elm (*Ulmus procera*) and Ash (*Fraxinus excelsior*) saplings as well as the occasional Sycamore (*Acer pseudoplatanus*) sapling. The wall that backs onto the western section has abundant Ivy, Ivy-leaved Toadflax (*Cymbalaria muralis*), Pellitory-of-the-wall (*Parietaria judacia*), Biting Stonecrop (*Sedum acris*) and Mouse-ear-hawkweed (*Pilosella officinarum*) as well as at least two different species of Lichen covering any open parts. Some bare patches have recently been created on the western section of the verge during works to set the kerb back slightly; there are also some small patches of dumped building material on the western section above the recent works. There is a large oak tree (*Quercus robur*) overshadowing part of the site resulting in a reduction in elm saplings, but the tree is not within the study area.

The central section is dominated by Elm scrub with an Ivy ground flora that is encroaching on the western species-rich parts, there is only a narrow strip of False Oat-grass, Garlic Mustard and Black Horehound dominated vegetation between the road and Elm scrub. There is a steep bank at the back of the central section that leads onto the graveyard.

The eastern section has a more False Oat-grass dominated flora but with similar other species to the western section in less abundance including Wild Clary, Cleavers, Black Horehound etc with Mugwort (*Artemisia vulgaris*) in addition. There are very few saplings growing in this part of the site. The eastern section is separated from the rest of the site by a gateway with little in the way of vegetation. There is a steep bank and hedge dominated by Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruiticosus agg.*), Wild Privet (*Ligustrum vulgare*) and Dog Rose (*Rosa canina agg.*) at the back of the eastern section.

6.2.3 Weather

Date (2002)	Conditions
May 29th	warm with sunny spells and occasional heavy rain.
May 31st	warm and dry, slightly overcast with some sun
June 19th	Hot, dry and sunny

7. Discussion

7.1 The Cylindrical Whorl Snail

The Potton site appears to continue to support a breeding population of the Cylindrical Whorl Snail, *Truncatellina cylindrica*, demonstrated by the discovery of one living juvenile and several recently dead snails, which included juveniles, during the course of this survey. The population is apparently restricted to the western section of the site within a few (>10) cm of the base of the sandstone wall. The population appears to be very small, considering the small number of specimens found compared to the numbers of specimens of other mollusc species present (e.g. *Vallonia costata* several present in every sample).

It is not possible to draw any associations with particular plant species from these results as so few specimens were found. However the habitat of the western section is different from that of the central and eastern sections, with a greater variety of species, less grass and more saplings than the eastern and fewer trees and more grass than the central sections. A sandstone wall backs the western section and it appears that the species is associated with the soil at the base of this wall. In the past a number of specimens have been found on the wall about 30cm above the ground but again these were not associated with any plants (Nau, pers. comm.). Thorough searching during this survey did not find any specimens on the wall.

It is possible that the mortar in the wall is lime based and is thus producing very localised conditions that are suitable for the snail. pH readings were taken at the base of the wall (where snails were found), in the middle of the verge and at the verge edge but in all cases the value was 7 (neutral).

Although there is Biting Stonecrop on the site and this is one of the plants mentioned in the literature as being associated with the snail (e.g. Kerney, 1999, Kerney & Cameron, 1979) it is restricted to the top of the wall. Despite examining a number of these plants no specimens of the snail were found associated with them. There is also Mugwort on the site but this appears to be on the eastern section only and none was present in the areas populated by the snail. The other species reputedly associated with the snail (*Thymus*) has not been found on the site.

The Dunbarnie Links site is a “stable calcareous dune habitat” (Corbet, 2000) and the Went Vale site consists of a steep magnesian limestone cliff with wooded vegetation at the base and sparsely distributed clumps of grass growing out of the otherwise bare limestone (Norris, pers. com.). Both these sites are very different from the Potton site, which is more of a neutral grassland (MG1) site with developing scrub. There appears to be more similarities between the Dunbarnie and Went Vale sites as both are calcareous and in both cases the snails have been found at the base of grass clumps. The species also appears to have been associated with grass in Norfolk and Poland.

The species has been found alive in May and June in Bedfordshire and January in Scotland, Juvenile specimens were encountered in Bedfordshire in May. Corbet (2000) suggested the species might be a summer annual because he had, up until that time, only found dead specimens between November and January, however due to his subsequent discovery of living adult specimens in January this seems less likely. The presence of juveniles in May indicates spring breeding, but the number of recently dead shells suggests a high mortality rate (at the Potton site at least).

7.2 Protection of the site

The site does not contain the required National Vegetation Community type (as MG1) or sufficient indicators (6 present, 8 needed) or strong indicators (2 present, 3 needed) for Neutral Grassland County Wildlife Site (CWS) recognition. The site does contain more than 50 species, although 11 of the 58 species are woodland indicators, making only 47 grassland species.

The site supports a population of an RDB2 (vulnerable) invertebrate species (*Truncatellina cylindrica)* and as such qualifies for recognition as a CWS on invertebrate grounds (particularly as this is only one of three populations of this species currently known in Great Britain).

The following supplementary factors also apply for consideration as a CWS:

- Areas currently under sympathetic and appropriate management by cutting.
- In a suitable surrounding environment to prevent long-term loss of grassland species through outside factors e.g. spray drift.
- A range of sub-habitats including steep slopes, bare ground, hedgerows.
- Good ecotone along the site margin with scrub.
- Important grassland invertebrate communities.

Negative factors are:

- Areas of young invasive scrub which is adversely affecting the grassland and may be difficult to control in the future.
- Small sites isolated from other habitats.

8. Recommendations

The site should be considered for recognition as a County Wildlife Site on the basis of the important population of Invertebrates.

The snail appears to be restricted to the central part of the western section of Potton Road Verge Nature Reserve. It seems to be closely associated with the sandstone churchyard retaining wall and was only found during this survey at the base of the wall. At the other sites were there are known populations the snail is associated with clumps of calcareous grass.

It is therefore important that the habitat at the base of the wall is maintained as grassland. Occasional disturbance to the site resulting in patches of bare soil is

probably not detrimental to the species, but there should be as much grassland retained on the site as possible. The site should not be allowed to scrub over.

As a road verge the County Council Highways Department has an obligation to mow the vegetation on the verge for safety reasons. The mowing of the vegetation in spring and autumn should help to prevent the site from scrubbing over, but the resultant covering of the site in a mat of chopped vegetation is likely to be detrimental. Ideally the cut vegetation should be collected and removed from the site. This may result in removal of specimens of the snail but as the species appears to be associated with the base of grass plants (particularly at other sites) if cut vegetation is collected as it is produced this should not present a serious problem. Vacuum collection techniques should be avoided.

It would probably be beneficial to the site to attempt to control the encroaching ivy in order to maximise the amount of grassland, this should probably also be removed from the wall to allow *sedum* and lichens to flourish.

If any maintenance of the wall is proposed care must be taken not to disturb the areas of grassland at the base of the wall in the area of the de-restriction sign (see map 1) as this appears to be the stronghold for the species.

9. Need for further work

The site needs to be monitored at least annually (but see below) to ensure that freshly dead or living specimens of the snail are still present.

It would be beneficial to survey any similar appearing sites in the surrounding area, particularly concentrating on clumps of grass at the base of walls or cliffs. There is a sandstone cliff approximately 40m to the south of the road verge, which probably warrants investigation. There is a W.W.II pill-box marked on the OS map on top of this cliff that should also be searched. The eastern section (separated from the main population by the elm scrub) should be examined for specimens.

More surveys of the known site need to be carried out at different times of year to establish seasonal patterns (if any) in this species in order to find out the best time to monitor this and survey other sites.

Future surveys should include searching the wall and sieving small soil samples.

Acknowledgements

The author would like to thank Brian Eversham, Bernard Nau and Sheila Brooke for help with the surveys. John Comont for his help and advice throughout this investigation, for providing funding through Bedfordshire County Council, and his and Amanda Prouds comments on the draft report. The Wildlife Trust for Bedfordshire allowed access to old records from the site for which the author is grateful.

The author would also like to thank Dr Gordon Corbet for the information relating to the recently discovered Dunbarnie Links population and Dr Adrian Norris for the information about the Went Vale population.

The author also wishes to acknowledge the financial support of English Nature.

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MAP 1

Appendix 1

Number and location of specimens of *T. cylindrica* found by sieving.

Dead shells	Living specimens	Location	
-	-	Within 10cm, Sign + 4m west	
-	-	Mid verge, Sign + 4m west	
-	-	Edge of verge, Sign + 4m west	
2(1 recent juv.)	-	Within 10cm, Sign + 2m west	
-	-	Mid verge, Sign + 2m west	
-	-	Edge of verge, Sign + 2m west	
1	-	Within 10cm, At sign	
-	-	Mid verge, At sign	
-	-	Edge of verge, At sign	
1	-	Within 10cm, Sign + 2m east	
-	-	Mid verge, Sign + 2m east	
-	-	Edge of verge, Sign + 2m east	
1(recent)	-	Within 10cm, Sign + 4m east	
-	-	Mid verge, Sign + 4m east	
-	-	Edge of verge, Sign +4m east	
1	1(juv.)	Within 10cm, Sign +6m east	
-	-	Mid verge, Sign +6m east	
-	-	Edge of verge, Sign +6m east	
1(recent)	-	Within 10cm, Sign +8m east	
-	-	Mid verge, Sign +8m east	
-	-	Edge of verge, Sign +8m east	
1	-	Within 10cm, Sign +10m east	
-	-	Mid verge, Sign +10m east	
-	-	Edge of verge, Sign +10m east	
-	-	Within 10cm, Sign +12m east	
-	-	Mid verge, Sign +12m east	
-	-	Edge of verge, Sign +12m east	
-	-	Within 10cm, Sign +14m east	
-	-	Mid verge, Sign +14m east	
-	-	Edge of verge, Sign +14m east	
-	-	Elm scrub	
-	-	Elm scrub	
-	-	Elm scrub	
-	-	Elm scrub	
8(3 recent)	**1**	**Total**	**9**

Appendix 2

Invertebrate species list for Potton Road Verge (ISR no.: 86/42) Grid ref: TL229495

Mollusca		**Status**
1. Aegopinella nitidula	1. Smooth glass snail	
2. Arion Intermedius	2. Hedgehog slug	
3. Candidula intersecta	3. Wrinkled snail	
4. Cecilioides acicula	4. Blind snail	
5. Cepaea hortensis	5. White Lipped snail	
6. Cepaea nemoralis	6. Brown Lipped snail	
7. Cochlicopa lubrica	7. Slippery moss snail	
8. Deroceras reticulatum	8. Field (or Milk) slug	
9. Ena obscura	9. Lesser bulin snail	
10. Helicella italia	10. Heath snail (old shells only)	LRDB A (Declining in Britain)
11. Helicodiscus singleyanus	11. A snail	LRDB F (No action required)
12. Helix aspersa	12. Garden (or common) Snail	
13. Lauria cylindracea	13. Common chrysalis snail	
14. Monacha cantiana	14. Kentish snail	
15. Trichia plebeia	15. A snail	
16. Truncatellina cylindrica	16. Cylindrical whorl snail	RDB 2 (Vulnerable) & LRDB A (Declining in Britain)
17. Vallonia costata	17. Ribbed grass snail	
18. Vertigo pygmaea	18. A snail	
19. Vitrina pallucida	19. Pellucid glass snail	

Myriopoda		
1. Blaniulus guttulatus	20. A millipede	
2. Cylindroiulus sp	21. A millipede	
3. Nanogona polydesmoides	22. A millipede	
4. Polyxenus lagurus	23. Bristly millipede	
5. Tachypodoiulus niger	24. A millipede	
6. Lithobius sp.	25. A centipede	

Isopoda		
1. Armadilidium vulgare	26. A woodlouse	
2. Oniscus asellus	27. A woodlouse	
3. Philoscia muscorum	28. A woodlouse	

Insects		
1. Chorthippus brunneus	29. Common Field Grasshopper	
2. Leptophyes punctatissima	30. Speckled Bush-cricket	
3. Coreus sp.	31. Squash Bug	
4. Formica fusca	32. Black ant	
5. Myrmica scabrinodus	33. Red ant	
6. Bombus lucorum	34. A Bumble bee	
7. Artogeia napi	35. Green veined white	

8. Pieris brassicae	36. Large white	
9. Pyronia tithonus	37. Gatekeeper	
10. Meadow Brown	38. Meadow brown	
11. Ochlodes venatus	39. Large skipper	
12. Panorpa germanica	40. A scorpion fly	
13. Sphaerophora rueppellii	41. A hoverfly	
14. Platycheirus albimanus	42. A hoverfly	
15. Sarcophaga sp.	43. Flesh-fly	
16. Adalia bipunctata	44. 2-spot ladybird	
17. Adalia 10-punctata	45. 10-spot ladybird	
18. Propylea 14-punctata	46. 14-spot ladybird	
19. Adonia variegata	47. A ladybird	
20. Coccinella 7-punctata	48. 7-spot ladybird	
21. Metabletus foeveatus	49. A ground beetle	
22. Pterosticus madidus	50. A ground beetle	
23. Harpalus tardus	51. A ground beetle	
24. Badister unipustulatus	52. A ground beetle	Nationally Notable b
25. Serica brunnea	53. A chafer	

LRDB= Bedfordshire and Luton Wildlife Working Group (2001) *Bedfordshire and Luton Biodiversity Action Plan "The Red Data Book"*
RDB= JNCC (1991) *British red Data Books: 3. Invertebrates other than Insects*.

Appendix 3

Flora species list for Potton Road Verge (BRMC no.: 531/1) Grid ref: TL229 495

Flora		Indicator
1. Acer pseudoplatanus	Sycamore	
2. Achillea millefolium	Yarrow	
3. Alliaria petiolata	Garlic Mustard	
4. Allium vineale	Wild Onion	
5. Anisantha sterilis	Barren Brome	
6. Anthriscus caucalis	Bur Chervil	Acid Grassland
7. Anthriscus sylvestris	Cow Parsley	
8. Arhenatherum elatius	False Oat-grass	
9. Artemisia vulgaris	Mugwort	
10. Asparagus officinalis ssp. officinalis	Garden Asparagus	
11. Ballota nigra	Black Horehound	
12. Bromus hordeaceus	Soft Brome	
13. Bryonia dioica	White Bryony	
14. Centaurea nigra	Common Knapweed	Neutral and Calcareous grass
15. Chaerophyllum temulum	Rough Chervil	
16. Chenopodium bonus-henricus	Good-King-Henry	
17. Cirsium vulgare	Spear Thistle	
18. Clematis vitalba	Traveller's Joy	
19. Convolvulus arvensis	Field Bindweed	
20. Crataegus monogyna	Hazel	
21. Crataegus monogyna	Hawthorn	
22. Cymbalaria muralis	Ivy-leaved Toadflax	
23. Dactylis glomerata	Cock's –foot	
24. Elytrigia repens	Common Couch	
25. Fraxinus excelsior	Ash	
26. Galium aparine	Cleavers	
27. Galium verum	Lady's Bedstraw	Neutral and Calcareous grass
28. Geranium robertianum	Herb-Robert	
29. Hedera helix	Ivy	
30. Heracleum sphondylium	Hogweed	
31. Hordeum murinum	Wall Barley	
32. Humulus lupulus	Hop	
33. Lapsana communis	Nipplewort	
34. Ligustrum vulgare	Wild Privet	
35. Malva sylvestris	Common Mallow	
36. Medicago lupulina	Black Medic	
37. Melilotus officinalis	Ribbed Melilot	
38. Papaver rhoeas	Common Poppy	
39. Parietaria judaica	Pellitory-of-the-wall	
40. Pilosella officinarum	Mouse-ear-hawkweed	Strong Neutral and Strong Calcareous grass
41. Plantago lanceolata	Ribwort plantain	
42. Poa pratensis	Smooth Meadow Grass	
43. Poa trivialis	Rough Meadow Grass	

44. Ranunculus repens	Creeping Buttercup	
45. Rosa canina agg.	Dog Rose	
46. Rubus fruiticosus agg.	Bramble	
47. Rumex acetosa	Common Sorrel	Neutral grass
48. Salvia verbenaca	Wild Clary	Strong Neutral grass
49. Sambucus nigra	Elder	
50. Sedum acre	Biting Stonecrop	
51. Senecio Jacobaea	Common Ragwort	
52. Silene latifolia	White Campion	
53. Solanum dulcamara	Bittersweet	
54. Sonchus oleraceus	Smooth Sow-thistle	
55. Trisetum flavescens	Yellow Oat-grass	Neutral grass
56. Ulmus procera	English Elm	
57. Urtica dioica	Common Nettle	
58. Vicia sativa	Common Vetch	
Total 58		1A, 6N (2SN), 3C(1SC)

Indicators from: Bedfordshire and Luton Wildlife Working Group (1998) *Bedfordshire and Luton County Wildlife Sites (Prime sites of Nature Conservation Importance) Selection Guidelines* (and subsequent amendments and additions).