



*Ladybird Survey
Northern Ireland 2005*



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Abstract

The appearance of the alien incursive *Harmonia axyridis* (harlequin ladybird) in southern and central England in recent years has led to concern about potential impacts on native ladybird populations. This species has devastated naturally-occurring ladybird populations in N. America and parts of Europe, having been originally introduced as a biological control for crop aphids. Baseline surveys to measure future impact are therefore highly desirable. The Harlequin is not yet in Ireland but is likely to appear within the next few years.

The survey* comprised visits to a selection of sites suspected to be important for native ladybirds and which have in the main some form of conservation designation or stability in management to allow repeat surveys and comparison of results. Geographic spread was also important and sites were selected from across Northern Ireland. Surveying consisted of 45 minute collection periods in suitable habitat types within sites. In conifer or birch woods on raised mires, for instance, 45 minutes was spent sweeping the mire surface and 45 minutes beating conifer or birch trees in the vicinity. Transects were random and a total of 34 sites were visited.

Fourteen species of larger coccinellid were recorded in the survey out of a total of 16 for this area. Absentees were *Hippodamia tredecimguttata* (13-spot) and *Subcoccinella 24-punctata* (24-spot). Conclusive evidence that the latter occurs in Ireland is lacking, and the former has declined strongly in the last century, now known in the British Isles only from All Saints Bog in Co. Offaly. Of the remaining species, most are widespread and common in their habitats but the south-western *Chilocorus bipustulatus* (Heather) was found only at Ballynahone More and Derryhowlaght bogs. The other 'heather' ladybird *Coccinella hieroglyphica* (hieroglyphic) is widespread on raised mires throughout, but apparently not on blanket peat. Two conifer species are rare and only on Scots or black pine: *Myzia oblongoguttata* (oblong spot) found only at the Batt Estate, Mournes, and *Myrrha 18-guttata* (18-spot) only on dunes at Umbra and Murlough NNR. The other conifer species *Aphidecta oblitterata* (larch) and *Anatis ocellata* (eyed) are widespread on Sitka spruce infested with spruce aphid although the eyed is very local.

Failure to find the 13-spot is not surprising as the ecology is poorly known. Nine raised or cutaway bogs and four transition mires were visited as the most likely areas to look. These yielded other important records, notably of the heath shield bug *Rhavcognathus punctatus* (formerly a doubtful Irish species) at three sites including Ballynahone More and the Murrins, the blue shield bug *Zicrona caerulea* (recently confirmed as Irish) at Deroran Bog, and the birch leaf beetle *Cryptocephalus pusillus*, otherwise known from early 20th century records in Kerry/Cork, at five sites in north Tyrone, south Derry.



* *The survey was financed by NBN through CEDaR with the rationale of providing a baseline estimate of the natural occurrence of larger coccinellids in Northern Ireland.*

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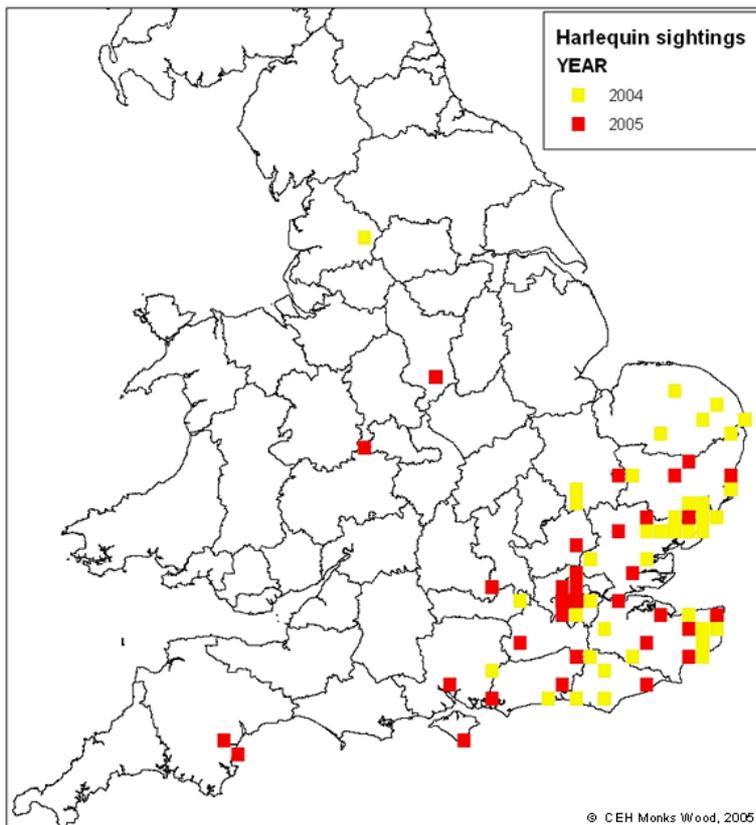
The Harlequin Problem

The harlequin ladybird *Harmonia axyridis* Pallas is an arboreal ladybird native to northern and eastern Asia which was imported to the SE United States about twenty-five years ago. It established successfully, extending north into Canada and then through-USA. It is now the most abundant ladybird in N. America to the detriment of many native species (Coderre *et al.* 1995). Deperience, the animal was released into Italy and elsewhere in Europe. It has now established in land (2002) and Belgium (2002) and The Netherlands and Belgium increased greatly in June-July 2004 (despite it being a 'bad' year for aphids and ladybirds) (Mabbott 2005).



It was imported to the twenty-five years ago. extending north into out the rest of the abundant ladybird in of many native species spite the American ex-also released into Italy has now established Germany (2000), Hol- (2002). Numbers in The Netherlands and Belgium increased greatly in June-July 2004 (despite it being a 'bad' year for aphids and ladybirds) (Mabbott 2005).

Not unexpectedly, it reached Britain in September 2004 and had spread by June 2005 to most of the southern counties with reports from as far north as Lancashire (Majerus *et al.* 2005).



It is expected to continue pushing northwards and may reach Ireland within the next two to three years.

So, what is the problem?

The reason for the original and all subsequent introductions is a perception that it is a very efficient biological control organism, particularly with respect to aphid infestations of food crops. However, highly invasive behaviour and a very wide dietary and ecological range allow it to potentially eat all the aphids in an area, out-competing native ladybirds whose populations decline by starvation. Some formerly common species in Canada are now rare. When the aphid supply fails, it will predate other invertebrates - hoverflies, lacewings, butterflies thrips etc..

Many of these are beneficial to agriculture, but are put at risk. This scenario has been experienced in N. America and is under way in Europe (Coderre *et al.* 1995). The already serious problems caused by harlequin naturalisation on a continental scale could be magnified on small islands such as Britain and Ireland.

The first British record was that of Ian Wright who found a single specimen in the grounds of the *White Lion* at Sible Hedingham, north Essex on 19th September 2004. It

then was then reported from other parts of greater London and the south-east and, despite a flood of mistaken claims and mis-identifications, a substantial number of verified records are now available for the whole of south-east England with a scatter of outliers as far west as Devon and as far north as Lancashire.

Life Cycle

It is believed that females overwinter in protected sites unmated, with the majority of the population mating later in the spring. Eggs generally hatch in 3 to 5 days. The larval stage lasts 12 to 14 days, and the pupal stage, which takes place on leaves, lasts 5 to 6 days. In cool spring weather, development from egg to adult can take 36 days or longer. After emergence, adults can live as long as 2 to 3 years under optimal conditions.



Ecology

In Japan, *Harmonia axyridis* is considered primarily an arboreal species and is common on various aphid-infested trees and bushes such as maple, walnut, willow, and rose; it is also an important predator of various destructive scales in Japan and mainland China. An adult is capable of consuming 90 to 270 aphids per day, and each larva can consume 600 to 1,200 aphids during its development (Weeden *et al.* 2005).

Periodic large, and even explosive, population increases are probably caused by the availability and abundance of prey (predominantly aphids and scales), inability of native ladybirds to compete, and lack of natural enemies. It has been postulated that in affected areas the population will eventually fall back to lower, more balanced, levels as prey decreases and natural enemies increase. This should not be relied upon, however, and some assistance in the form of artificially introduced parasitoids or predators may be necessary to stem the tide of damage to native species of ladybird.

A particular problem in continental areas appears to be mass hibernation of the adults in and around houses where they may constitute a considerable nuisance. In North America it is recommended that ladybirds be prevented access to buildings by judicious sealing of cracks and openings around windows, doors, siding, and utility pipes with silicone rubber or similar sealant (Knodel *et al.* 1996). Interior temperatures in houses often promote continuous activity and since up to 20,000 may occur in any one locality, the problems are obvious. When alarmed, ladybirds can discharge a yellow fluid due to reflex bleeding from the leg joints that will stain walls, paint, and fabrics, and that has an unpleasant odour. Rough handling, including vacuuming, are therefore not recommended for disposal and prevention seems to be much better than attempting to remove an infestation (Knodel *et al.* 1996).



Study Objectives

A primary objective of the work was to determine whether the harlequin *Harmonia axyridis* occurs in Northern Ireland and to begin a monitoring process which might be used to determine and follow its status in future years.

More generally, the status and distribution of native coccinellids in Ireland is poorly understood. Johnson & Halbert's (1902) list of the beetles of Ireland remains the most detailed single source of information and clearly needs to be updated. As it appears that the harlequin can negatively impact native or old established ladybird species it was considered important to determine the status of the Irish taxa.

This would be achieved partly by surveying, partly by inviting contributions of data from interested members of the public and partly by reviewing the available literature on the larger coccinellids. All data would be input to the RECORDER relational database to provide a baseline mapping array on which to promote further and future work. The results of this would be combined in a visual format at www.habitas.org.uk to provide a public interface for the work and an online key for members of the public willing to engage and to contribute records.

Literature records

These were extracted from Johnson & Halbert (1902) in cases where the locality data allowed sites to be determined to at least 10-km square accuracy. Records since Johnson & Halbert (1902) were extracted from relevant journals including *Entomologist's monthly Magazine*, *Entomological Record* and *Journal of Variation*, *Coleopterist*, *Irish Naturalist* and *Irish Naturalist's Journal*. A number of faunal lists in the authors possession, collated by visiting specialists in Ireland, were also used as were pre-existing records on the CEDaR database at the Ulster Museum. Putting all these together generated baseline maps for Northern Ireland distribution of the commoner species but left both all-Ireland maps for these and Northern Ireland maps for rarer species still looking spare and difficult to interpret. It was not possible, in view of time constraints to visit the major collections and collect records relating to voucher specimens. This is a task which may be undertaken at a future date.

Coverage of Ireland is still clearly much poorer overall, and much more patchy, than for Britain as a recording scheme has been in operation there for some time. Preliminary results for this scheme were published by Majerus *et al.* (1997). In Ireland, therefore, comments on species distributions are based only partly on recording data and partly on the comments of Johnson & Halbert (1902), who had the benefit of many unpublished records to go on. Any obvious differences between the historical accounts of distribution and what is known today are drawn attention to.

Donated records

A public appeal for records from the CEDaR Record Centre generated only a small response in terms of usable records. However, the collection and records of Dr. D. Cotton were kindly made available and proved invaluable in assessing the status of larger coccinellids in the north-west of Ireland—here mainly Sligo-Leitrim, an area virtually unrecorded

even in the 19th-century.

Survey

A survey of larger Coccinellidae was conducted in Northern Ireland in spring/summer 2005. The primary objective was to target habitat types regarded as important for the more restricted or stenotopic Irish coccinellids which might be impacted by harlequin colonisation. A secondary objective was to provide better overall coverage than that obtained by other methods, notably literature review, and update Johnson & Halbert (1902) in respect of any putative or real changes in status of species since the 19th century.

Of necessity the scope of the survey was restricted to what could be achieved by one surveyor in one season. A broad range of habitat types were selected but emphasis was placed on raised and transition mires because of the fauna historically associated with these i.e. heather and hieroglyphic ladybirds in the raised mires and 13-spot ladybird in the transition mires. Opportunity was also taken to look at stream gravel beds for the 5-spot ladybird and a wood ant colony for the scarce 7-spot ladybird.



Materials & Methods

A total of 35 sites were visited between April and August 2005. These fell into the following broad habitat categories:

- ◆ Raised mire (with conifers on lagg)
- ◆ Transition mire
- ◆ Dune heath/grassland (with conifers)
- ◆ Semi-natural broadleaf woods
- ◆ Coniferous plantations
- ◆ Floriferous margins/pasture

Within sites each distinct habitat was surveyed by sweep-netting. Where the habitat comprised low shrub or herb vegetation, a random transect of duration 45 minutes was walked so as to cover a cross-section of visible features and sample as much structural diversity as possible. With habitats comprising larger shrubs and trees, vegetation was beaten into the sweep net, again for a duration of 45 minutes, with an attempt made to sample as much of the canopy variation that was accessible at any given site. In wooded sites path margins and any open floriferous areas were sampled by sweeping and classified as a distinct habitats. These methods were considered to be relatively fast and efficient and appeared to deliver reasonable numbers and variety of species at the sites visited. Collected material was identified using Majerus & Kearns (1989) and all larvae were determined to species.

Sites were selected to deliver

- ◆ Good geographic spread
- ◆ Representative examples of habitat types chosen

- ◆ Consistent management and protection to allow future re-survey e.g. NNRs, ASSIs where possible.

Table 1. Survey sites

<i>Site</i>	<i>Grid</i>	<i>VC</i>	<i>Habitats</i>
Ballynahone More Bog	H8697	H40	Raised mire; lagg broadleaf woods
Brackaghreilly Bog	H8398	H40	Raised mire; lagg broadleaf woods
Deroran Bog	H5171	H36	Raised mire; lagg broadleaf woods
Derryadd, Peatlands	H9160	H37	Cutover raised mire
Derryhowlaght West	H1937	H33	Cutover raised mire; birch bog
Lisnagunoge Bog, Araboy	C9940	H29	Cutover raised mire; birch bog
Murrins, Mweela Beg	H6378	H36	Raised mire
Murrins, Loughnamaddy	H5679	H36	Raised mire
Wolf Island Bog	C9208	H40	Raised mire; lagg broadleaf woods
Brackagh Moss	J0151/0251	H37	Transition mire; birch woods
Drumnamether Fen	H9943	H37	Transition mire; floriferous meadow
Drummanmore Lake	H8947	H37	Transition mire; SIP pasture
Kiltubbrid Lough 'A'	H7639	H37	Transition mire; SIP pasture
Killard NNR	H6043/6042	H38	Dune grassland; slumping sediments
Murlough NNR	J4035/4135	H38	Dune grassland; conifer/mixed woods
Umbra	H7235	H40	Dune grassland; conifer wood
Moyola Waterfoot	H9790	H40	Lakeshore, sandy
Annagarriff NNR	H9061/9062	H37	Conifer/mixed woods; cutover raised mire
Banagher Glen NNR	C6704	H40	Broadleaf woods
Breen Oakwood NNR	D1233	H39	Broadleaf woods
Colin Glen	J2672	H39	Broadleaf woods; floriferous pasture
Culliaghs Wood, Crom	H3624	H33	Broadleaf woods' SIP pasture
Loughgall Country Park	H9051/9052/9152	H37	Broadleaf woods; floriferous pasture
Murlough Bay NNR	D2041	H39	Broadleaf woods; floriferous pasture
Rostrevor Oakwd NNR	J1817	H38	Broadleaf/mixed woods
Altnaheglish Forest	C6904/7201	H40	Conifer woods
Batt Estate, Altataggart	J2223	H38	Conifer woods
Creggan, Carrickmore	H6278	H36	Conifer woods
Drum Manor Forest	H7577	H36	Mixed woods
Florencecourt	H1834	H33	Mixed woods
Goles Forest	H6893	H36	Conifer woods
Braade, Lough Navar	H0454	H33	Conifer woods
Moydamlaght Forest	H7399	H40	Conifer woods; floriferous margins
Pomeroy Forest	H7072	H36	Broadleaf woods; wood margins
Termon Glen	H6271	H36	Broadleaf woods; wood margins

Results

Harmonia axyridis

A report of a capture was received, from H. Fox, Glasnevin, Dublin, of a melanic ladybird purporting to be this species. An accompanying digital photograph indicated that the specimen was a typical example of the heather ladybird *Chilocorus bipustulatus*. Its origin in an inner city botanical garden is unknown.

Species recorded

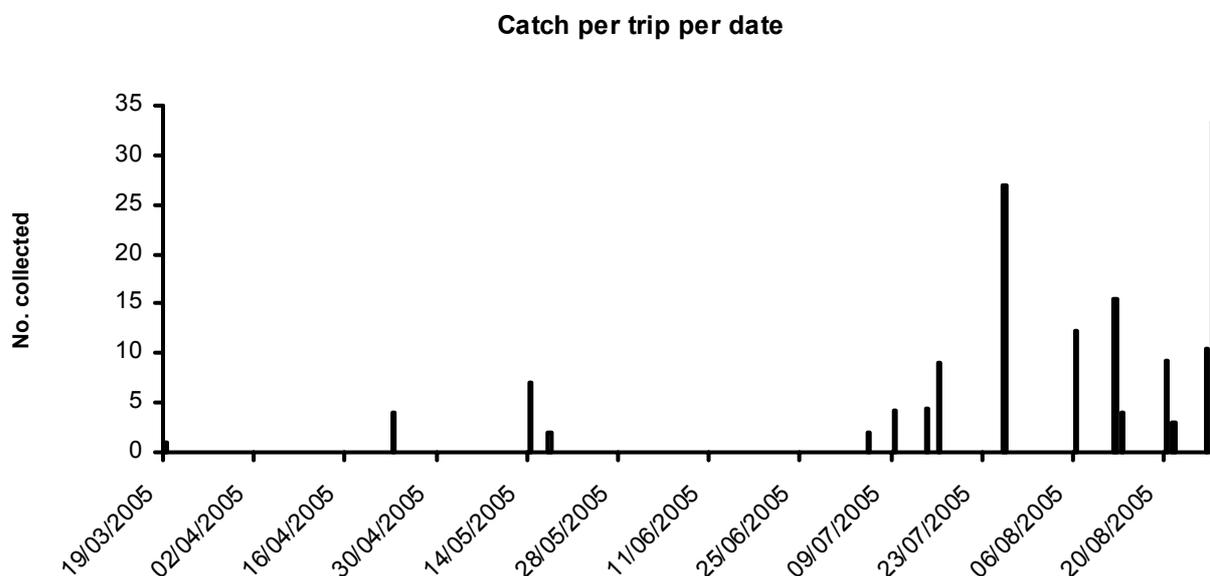
A total of 14 species of larger coccinellid were recorded during the Survey. These are listed with sites and totals.

Species		Sites	Total catch
<i>Adalia bipunctata</i>	2-spot	1	1
<i>Adalia 10-punctata</i>	10-spot	15	36
<i>Anatis ocellata</i>	Eyed	2	3
<i>Aphidecta obliterated</i>	Larch	7	48
<i>Calvia 14-punctata</i>	Cream-spot	7	11
<i>Chilocorus bipustulatus</i>	Heather	2	8
<i>Coccinella hieroglyphica</i>	Hieroglyphic	8	51
<i>Coccinella 7-punctata</i>	7-spot	16	56
<i>Coccinella undecimpunctata</i>	11-spot	1	1
<i>Halysia sedecimguttata</i>	Orange	1	1
<i>Myrrha 18-guttata</i>	18-spot	2	8
<i>Myzia oblongoguttata</i>	Striped	1	5
<i>Propylea 14-punctata</i>	14-spot	18	133
<i>Psyllobora 22-punctata</i>	22-spot	3	17
		14	379

There appear to be only three common generalist species: *Adalia 10-punctata*, *Coccinella 7-punctata* and *Propylea 14-punctata*. *Calvia 14-punctata* appears equally widespread but less common. *Aphidecta obliterated* and *Coccinella hieroglyphica* are also widespread but in a restricted habitat range. The remaining species were rare in the sites visited, and may be elusive or difficult to collect, or else have a localised distribution which the survey simply under-sampled.

Seasonality in 2005

The graph shows catch by date in the survey. Early on the season was a cold one but with sizeable temperature fluctuations. This is likely to have had a negative effect upon ladybird survival. Before July catches were small and of the generalist species only occasional 10-spots and 14-spots were seen. Seven-spots were recorded for the first time only



on 9 July. By late July/early August numbers had recovered and August was the most productive month.

Habitat preferences

The table (next page) summarises species by habitat records. The greatest number of specimens was taken in floriferous grassland, a category now rare or in rapid decline to judge by the decline in *Bombus* spp., which are very dependent upon legume-rich swards. This habitat is not particularly diverse in terms of ladybird species and yields mostly 7-spots, 14-spots and 22-spots.

It was expected at the commencement of the survey that broadleaf woods, and particularly ancient woodland, would be productive. This was not the case. Of the 8 mature broadleaf woods visited, only 4 produced any ladybirds at all and these comprised small numbers of very common species. Only four native species appear to utilise this habitat routinely: 10-spot (frequent); 14-spot (locally abundant); cream-spot (occasional); orange (in other years occasional but in 2005 uncharacteristically rare). Birch/willow woods on the periphery of mires or in wetlands are more productive and may yield hieroglyphic ladybirds in numbers (usually with *Lochmaea suturalis*) and, in the eastern part of the Lough Neagh basin 2-spot ladybirds (see species accounts).

Conifer woodland, although all of relatively recent anthropogenic origin, was at least as diverse and had a greater number of stenotopic species. Conifer specialists in N. Ireland are: eyed ladybird (scarce); larch ladybird (abundant); 18-spot (local, ?coastal); striped (rare). Ten-spot ladybird is common on conifers and cream-spot occurs occasionally (pupae were collected at one site). It seems likely that 18-spot at least was under-

Species	BRL*	CON	RM	TM	FM	SH
<i>Adalia bipunctata</i>					1	
<i>Adalia 10-punctata</i>	19	13			4	
<i>Anatis ocellata</i>	1	2				
<i>Aphidecta oblitterata</i>		47	1			
<i>Calvia 14-punctata</i>	8	2			1	
<i>Chilocorus bipustulatus</i>			8			
<i>Coccinella hieroglyphica</i>	15		36			
<i>Coccinella 7-punctata</i>	1	3	1		50	1
<i>Coccinella undecimpunctata</i>						1
<i>Halyzia sedecimguttata</i>	1					
<i>Myrrha 18-guttata</i>		8				
<i>Myzia oblongoguttata</i>		5				
<i>Propylea 14-punctata</i>	35				98	
<i>Psyllobora 22-punctata</i>					17	
	65 (5)	95 (7)	46 (4)	0	171 (6)	2 (2)

*BRL—broadleaved woods, all categories; CON—conifer woods; RM—raised mire; TM—transition mire; FM—floriferous meadow/SIP; SH—sandy heath/soils

recorded because of a predilection for the crowns of mature trees and the striped and eyed may have been missed for similar reasons.

Sweeping wetland vegetation in transition mires and lakeshores was entirely unproductive. Technically ladybirds collected on wetland trees such as willow in these situations should be included here, but waterside vegetation in this part of Ireland lacks specialist wetland species such as the water ladybird (*Anisosticta 19-punctata*) and attempts to re-find the 13-spot (*Hippodamia 13-punctata*) were unsuccessful.

Riverine gravel banks were searched at two sites in the central Sperrins for 5-spot ladybirds (*Coccinella 5-punctata*) but without result and the only extant wood ant site in N. Ireland, at Peatlands Park, Co. Armagh, was investigated for *Coccinella magnifica* but similarly drew a blank.

The sandy coastal habitats preferred by 11-spot ladybirds proved unproductive in 2005 although 1 specimen was taken on a sandy lakeshore on Lough Neagh. Coastal dune vegetation otherwise yielded only a single 7-spot.



Species Accounts

Adalia bipunctata (L.)

2-spot ladybird

Distribution

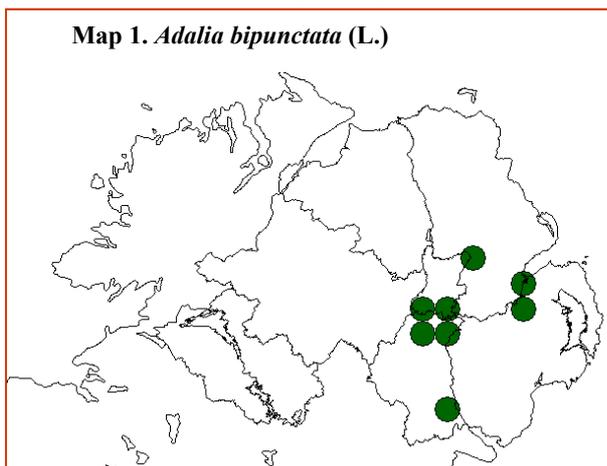
Britain: throughout, to the far north of Scotland (Majerus *et al.* (1997) but becoming less common northwards.

Ireland: historically only in the extreme south. J & H (1902) give a single record, for Waterford (coll. A. Neale). Bonaparte-Wyse took it sparingly in the Kilbarry marshes south of Waterford (Phillips 1924) and Phillips (1924) reported it in abundance from his garden near Middleton, East Cork, also from a garden in Mid Cork to the south of the River Lee.

Anderson (1990) summarised its recent appearance in northern counties from records for Greenmount Co. Antrim (Welch 1986) and Deramore in the Lagan Valley west of Belfast (1989). Colonisation of this new area appears to have occurred post-1980.

Survey: only one record. A singleton was swept in wet meadowland by Loughgall Lake, Co. Armagh, a new site.

Other: the CEDaR database holds records for Derrytrasna on the south shore of Lough Neagh, Portadown Co. Ar-



magh and Bessbrook, Co. Armagh. It is widespread if local in the Lagan Valley from Belfast west to Lough Neagh. There are records for river margins south from Lough Neagh to Loughgall and Bessbrook, and it also occurs north along the Lough Neagh shoreline to the Antrim area (Map 1).

Ecology

Mostly recorded inside houses (40% of records), in gardens, or on foliage in wet water margin pasture or scrub. Where trees are mentioned *Salix* is the most common (5 records), then *Betula* (2) and *Populus* (1). That riverine wetlands and gardens appear to be favoured may be simply a consequence of other



habitats having been less adequately researched. Aphidophagous.

Variation

The nominate form is dominant, melanic forms are rare. Form *quadrimaculata* occurs sparingly in Belfast gardens (Figure 1).

Adalia 10-punctata (L.)

10-spot ladybird

Distribution

Britain: similar in distribution to the 2-spot but, if anything, slightly less common across its range.

Ireland: regarded as common and widespread by J & H (1902).

Survey: recorded at 15 sites with a total of 36 specimens, making it the fifth most abundant species.

Ecology

Mainly in woodland edge habitats, including hedgerows. Arboreal on *Acer* (3), *Alnus* (1), *Betula* (1), *Picea* (3), *Pinus* (2), *Quercus* (2) and *Salix* (5). More rarely encountered in the herb layer (2), by sweeping. Apart from the



stenotopic conifer specialists this is the only species to be regularly encountered on *Pinus* and *Picea*. Aphidophagous. The diet on spruce has



not been examined but may include green spruce aphid *Elatobium*.

Variation

Can be variable. Commonly with faded brownish ground colours and a variable number (4-10) of large or small spots (Figure 1). Reddish-orange ground colours can occur, and fused- or chequered-spot forms such as *decempustulata* and *annulata* (Figure 3) are not uncommon. The melanic form, with two backwardly directed orange spots on a black ground, has been encountered once, on willow at Colin Glen near Belfast.

Anatis ocellata (L.)

Eyed ladybird

Distribution

Britain: common in south-east Britain and parts of Scotland, mainly on *Pinus*.

Ireland: local according to J & H (1902) though widespread and recorded from six counties.

Survey: encountered at two sites within the same 10-km square – Drum Manor Forest and Pomeroy Forest, Tyrone (grid square H77). Its apparent absence from a



number of seemingly suitable sites across N. Ireland was noted.

Ecology

Found on *Picea sitchensis* at Drum Manor and on

Acer pseudoplatanus at Pomeroy. Sitka spruce at the Drum Manor site was infested with green spruce aphid so this may have been the food source for the two late instar larvae collected. One was reared to adulthood on aphids from birch (pupa, Figure 4). This species has been collected on Sitka spruce infested with spruce aphid on other occasions but is not common enough to act as a useful control.

Variation

No significant variation recorded in Ireland (Figure 5).

[Anisoticta 19-punctata L. Water ladybird]

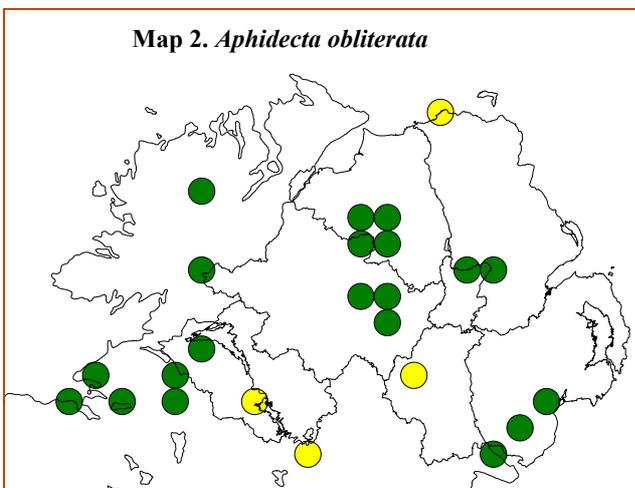
Distribution

Britain: widespread in southern Britain.

Ireland: recorded by H. G. Cuthbert (J & H 1902) from Kenmare Wood at Killarney, Co. Kerry but not reported from Ireland since. It should, on biogeographic grounds, be expected in southern counties and the lack of recent records is puzzling.

Survey: not seen]

Aphidecta oblitterata (L.) Larch ladybird



Distribution

Britain: widespread throughout.

Ireland: widespread on conifers and recorded historically

from eleven counties (J & H 1902). Probably introduced with planted conifers in the 17th century as native Irish pine became extinct in the middle ages (Mitchell 1976).

Survey: found in most sites with planted conifers, especially where Sitka spruce is present. Spruce showing defoliation and

needle browning was targeted with some success. Totals: 48 individuals recorded from 7 sites (Map 2).

Ecology

Exclusively on conifers with needle foliage. Commonest on Sitka spruce infested with the green spruce aphid where it probably exerts a degree of pest control.

Variation

The common form in N. Ireland lacks elytral markings (Figure 6) though it frequently has a darkened suture. Melanic forms have not so far been recorded.



Calvia 14-guttata (L.) Cream-spot ladybird

Distribution

Britain: widespread throughout Britain but less common northwards.

Ireland: widespread throughout (J & H 1902).

Survey: eleven specimens recorded at 7 sites.



Ecology

A predominantly arboreal species. Taken on *Acer* (2), *Betula* (1), *Crataegus* (1), *Picea sitchensis* (1), *Quercus* (1) and *Salix* (3). One specimen was swept in pasture. Aphidophagous.

Variation

None observed apart from variation in the ground colour which ranged from yellowish-brown to dark brown (Figure 7). This can be a function of the maturity of the chitin of the elytra and teneral specimens are paler.

Coccinella hieroglyphica L. Hieroglyphic ladybird

Distribution

Britain: scattered throughout in heathy districts.

Ireland: widespread in heathery places (J & H 1902).

Survey: recorded from all but one inland bog visited but not in drier places such as dune heath on the coast. Total: 8 sites, 51 specimens.

Ecology

Restricted to damp heather moors because of a dependance upon the heather beetle *Lochmaea suturalis* as prey. The latter is not found on coastal dune systems as a rule, since the larva requires wet conditions and shoot succulence to feed successfully. This in turn probably leads to the exclusion of heather beetle predators such as *Coccinella hieroglyphica* and *Chilocorus bipustulatus* from dune ecosystems.

Heather beetle is known to feed preferentially upon senescent or mature plants. This accords well with observations from the survey since larvae of the hieroglyphic ladybird were generally found in wet lagg areas, rather than bog domes or other



beetle and its predators thrive where heather growth is more luxuriant, then efficient moor management for game birds, with burning and flailing, probably has the opposite effect i.e. the move to



younger growth stages probably limits heather beetle and hieroglyphic ladybird numbers. Burning also serves to remove, as volatiles, much of the nitrogen which has accumulated in heath vegetation as a result of atmospheric deposition. This further cuts back the potential for eutrophic growth of heather which so often leads to heather beetle infestation.

Hieroglyphic ladybird was also found in numbers upon birch (adults & larvae) at Deroran Bog with *Lochmaea suturalis*.

Variation

The hieroglyphic ladybird is subject to considerable variation in the completeness and length of lateral markings on the elytra (which give it its trivial name) and in the intensity of ground colouration (Figure 8). Totally melanic individuals (Figure 9) occur relatively frequently in many populations.

Coccinella 7-punctata L.

7-spot ladybird

Distribution

Britain: the commonest ladybird across Britain.

Ireland: certainly less common than the 14-spot ladybird in Ireland but generally distributed and common except in upland areas or in other types of acidic terrain.



Figure 10

exposed areas i.e. where heather growth was coarser and large mature plants were common. The corollary also applies. If heather

Survey: fifty-five specimens were recorded from 14 sites.

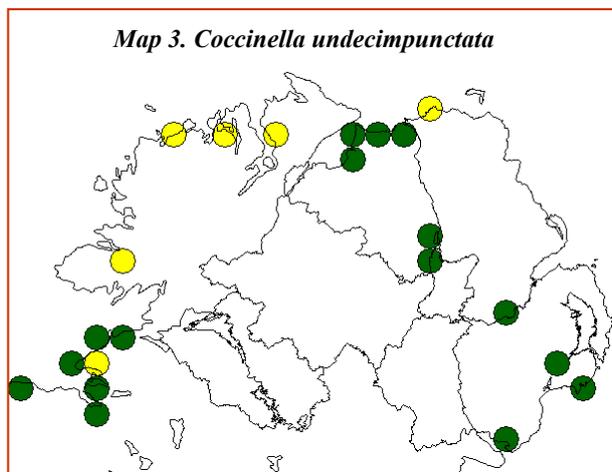
Ecology

It was recorded mainly from herbaceous swards (12 occasions), and to a much lesser extent on conifer (2) or broadleaf (1) foliage or in heather (1). Larvae were found by sweeping in overgrown, floriferous, mainly legume-dominated swards (2) or on *Cirsium arvense* (3) in semi-improved pasture.

Variation

The intensity of ground colour may vary and the relative size of spots, but otherwise variation is limited (Figure 10).

Coccinella undecimpunctata L. 11-spot ladybird



Distribution

Britain: common both in the coastal zone and inland in southern Britain but much rarer north of the midlands and then largely coastal.

Ireland: almost exclusively coastal but occurs inland along river valleys or lakeshores in one or two places such as the sandy shorelines of Lough Neagh.

Survey: seen only on a sandy shoreline of Lough Neagh, at Moyola Far Waterfoot, Co. Londonderry.

Ecology

Thermophilic and restricted to dry soils, mostly in coastal areas. Usually seen perambulating on the ground, among driftwood in estuaries, under *Ulva* on shorelines and similar places. Swept off gorse in the Quoile Pondage, Down, in May 1995.

Variation

Tomlin & Joy (1914) give records of var. *brevifasciata* Weise, for Cloghane, Kerry, Roundstone and Dog's Bay, Galway and Portballintrae and Ballycastle, Antrim. Otherwise not subject to much variation.

Halyzia sedecimguttata (L.)

Orange ladybird

Distribution

Britain: widespread, locally common.

Ireland: widespread but rarely in numbers. Recorded from 12 counties by J & H (1902).

Survey: only seen at one site during the survey but 2005 may have been an unusually poor year for the species.



Figure 11

Ecology

An arboreal species said to feed on sooty moulds (Majerus & Kearns 1989). Observations of two generations present on a birch tree in Belfast in 2005, suggest such assumptions about diet may be

too restrictive. No sooty moulds could be detected on the birch but larval development appeared normal. Larvae taken from the tree were fed separately on aphids present in abundance on the tree and appeared to feed and grow normally.

Variation

Subject to little variation in our area (Figure 11).

[*Hippodamia 13-punctata* 13-spot ladybird

Distribution

Britain: regarded as a vagrant or occasional visitor.

Ireland: formerly widespread (J & H 1902) but very local in wetlands. Currently known only from All Saints Bog Co. Offaly (Speight 1990). The reasons for this severe decline are unknown.

Survey: the sites in N. Ireland from which it was formerly known i.e. Drummamore Lough, Killinure and Churchill (Peatlands Park), Co. Armagh, were visited, but without result]

***Myrrha 18-guttata* L. 18-spot ladybird**

Distribution

Britain: widespread though local with concentrations of records in parts of southern England and highland Scotland.

Ireland: recorded from 12 counties by J & H (1902). Restricted to conifers and probably very local.



Figure 12

Survey: found at two sites: the Umbra dunes, Magilligan, Co. Londonderry and Murlough NNR, Co. Down. At both sites it was beaten from the lower branches of pine trees in coastal dune systems.

Ecology

Restricted to *Pinus* spp. and seemingly commonest on the crowns of mature trees (Majerus *et al.* 1997).

Variation

None noted (Figure 12).

***Myzia oblongoguttata* L. Striped ladybird**

Distribution

Britain: widespread but local with clusters of records in southern England and highland Scotland.

Survey: found at a single site, Batt Estate, Mourne Mountains, Co. Down. Two adults and three larvae were recovered by beating the lower branches of *Pinus sylvestris* in red bog.

Ecology

Associated with *Pinus* and probably restricted to mature trees in areas of older woodland. The larvae are distinctive because of the



Figure 13

Figure 14



very long pro legs (Figure 13).

Variation

None noted (Figure 14) but the number and length of the pale streaks is said to vary.

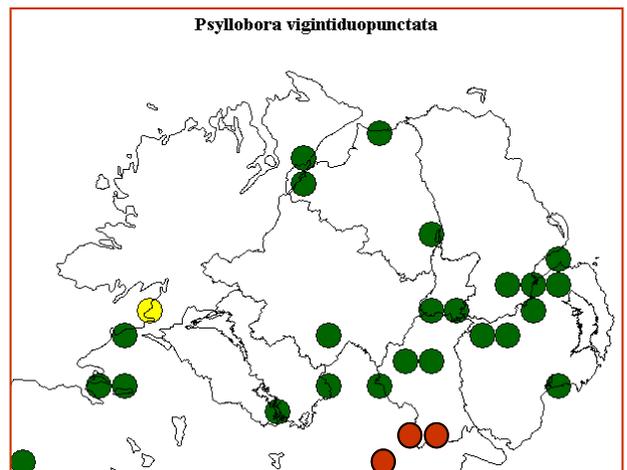
***Psyllobora 22-punctata* (L.) 22-spot ladybird**

Distribution

Britain: widespread and common in the southern half of Britain but rarer northwards and rare in Scotland.

Ireland: common in the east but rare in the west (J & H 1902). In Northern Ireland, widespread but localised to low-lying, richly vegetated sites.

Survey: found at only 3 sites, all in Co. Armagh, but relatively common where it occurred (Map 4, red circles).



Ecology

In two out of the three sites it was taken exclusively on *Cirsium arvense* in semi-improved pasture. At the third site it was taken by general sweeping in an ungrazed, legume-dominated, floriferous sward.

Variation

Subject to little or no variation.

***Propylea 14-punctata* (L.) 14-spot ladybird**

Britain: widespread and common.



Figure 15

Ireland: widely distributed and common.

Survey: the commonest species recorded. Totals: 124 specimens at 17 sites.

Ecology

Eurytopic but found almost equally on trees as in herbage: semi-improved grass (5); floriferous meadows (6); *Acer* (2); *Betula* (6); *Calluna/Erica* (2); *Fagus* (1); *Quercus* (1); *Salix* (3); *Sorbus* (1). Larvae were recorded from: semi-improved grass (3); floriferous meadows (1); *Betula* (3); *Calluna/Erica* (2).

Variation

Remarkably constant. The ground colour varies from white to deep yellow. Markings on the elytra form a checkerboard pattern in the common forms (Figure 15).

[*Subcoccinella 24-punctata* L. 24-spot ladybird

Distribution

Britain: widespread in southern Britain.

Ireland: recorded by Claude Buckle (J & H 1902) from cliffs between Whitehead and Black Head in Co. Antrim (det. J. N. Halbert) but not reported from Ireland since. As the species is predominantly brachypterous it is unclear how it could have reached this isolated location before (?) disappearing.

Survey: not seen]



Conclusions

The survey yielded important baseline data on the the larger coccinellids in Northern Ireland. In particular it has confirmed that 13 of the 15 species recorded in this area by Johnson & Halbert (1902) are extant and not noticeably in decline or threatened by recent environmental change.

An exception is the 13-spot ladybird which circumstantial evidence suggests has been widely but locally resident in Ireland in the past. It now seems much diminished and has probably disappeared from Northern Ireland. Drainage and loss of habitat may be invoked as the cause of this decline but the particular sites from which it was recorded are still in existence today and are not noticeably impacted adversely by agriculture or exploitation for peat. A second species recorded by Johnson & Halbert (1902) but now disappeared is the 24-spot ladybird. This was found by Claude Buckle on the north foreshore of Belfast Lough and may have been a vagrant as no trace of it has been found since.

In contrast, the 2-spot ladybird was unknown in Northern Ireland in 1902 but is now well established in the Lagan Valley west of Belfast and on the east shore of Lough Neagh (Anderson 1990). With global warming this species is likely to continue expanding its range in Ireland.

The most conservation-worthy species in the fauna are arguably those associated with heather moors i.e. the hieroglyphic and heather ladybirds. The hieroglyphic is well adapted to predate the heather beetle and must exert some control over numbers of this potential pest, being widespread and common. It is unclear whether invasive harlequins would be capable of exploiting the heather beetle food resource and competing with the harlequin and heather ladybirds. The heather ladybird is clearly on the edge of its range in N. Ireland and numbers probably fluctuate with the prevailing weather. However, it can be expected to consolidate its position in the south and west in an era of global warming.

It is notable that the 1997 survey in Britain (Majerus *et al.* 1997) revealed the orange ladybird to be far more widespread than previously thought. It is certainly widespread in Ireland though 2005 appeared to a 'poor' year and it was only seen once during the survey. Other species associated with broad-leaved woodland are of lesser conservation significance and the principle item of diet— sooty moulds – of the orange ladybird will probably protect it from any harlequin-induced food shortages.

Conifer woodland has a respectable variety of ladybird species most or all of which feed on the green spruce aphid which is known to be increasing with climate warming. Again, it is unclear if the harlequin can exploit the spruce aphid resource, but this seems likely on balance.

The conclusions arrived at here are at best preliminary. Only a small sample of habitats was visited and it is desirable that at least the status of the 13-spot ladybird be more thoroughly investigated because of its association with threatened habitats and importance to Ireland's biodiversity. It would also be useful to determine the between-season variability in occurrence of all the species found and to investigate the status of several ladybirds more closely, notably the conifer specialists and the heather ladybird *Chilocorus*.



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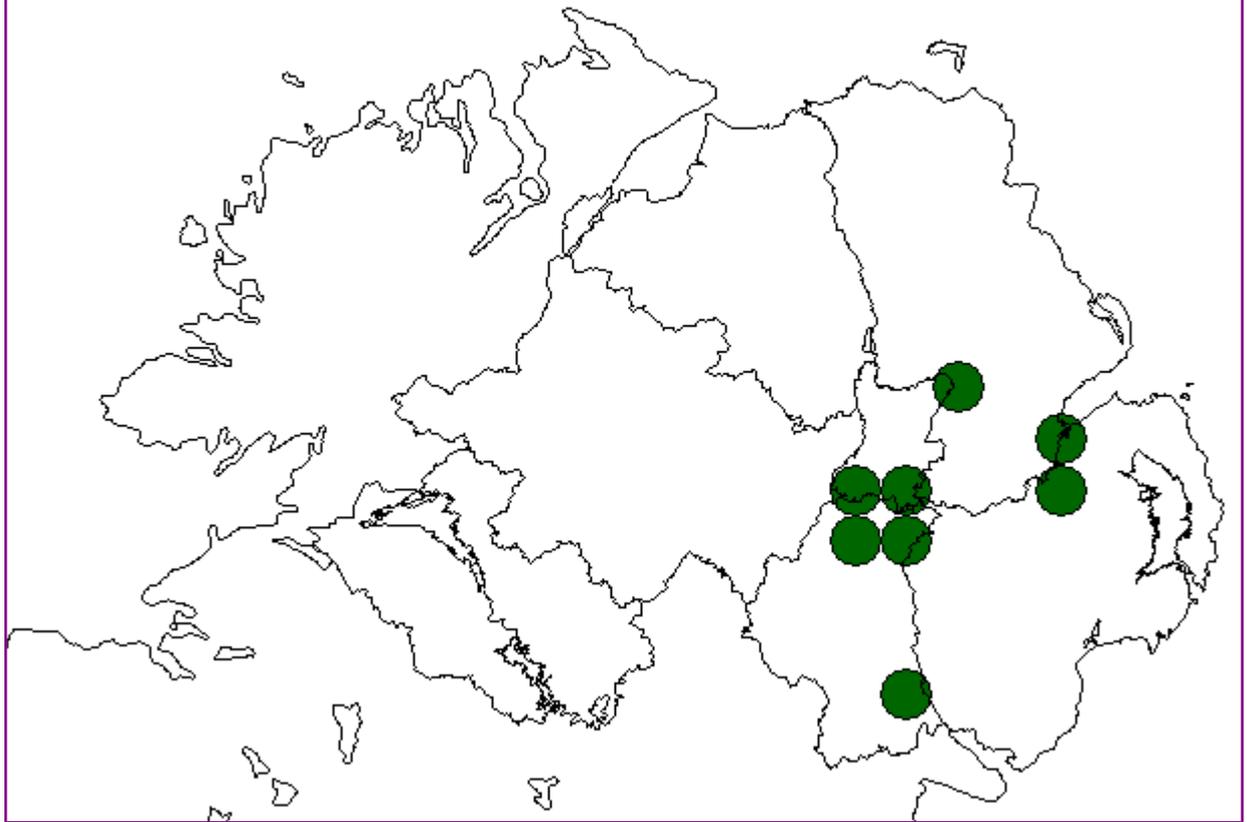


Appendix

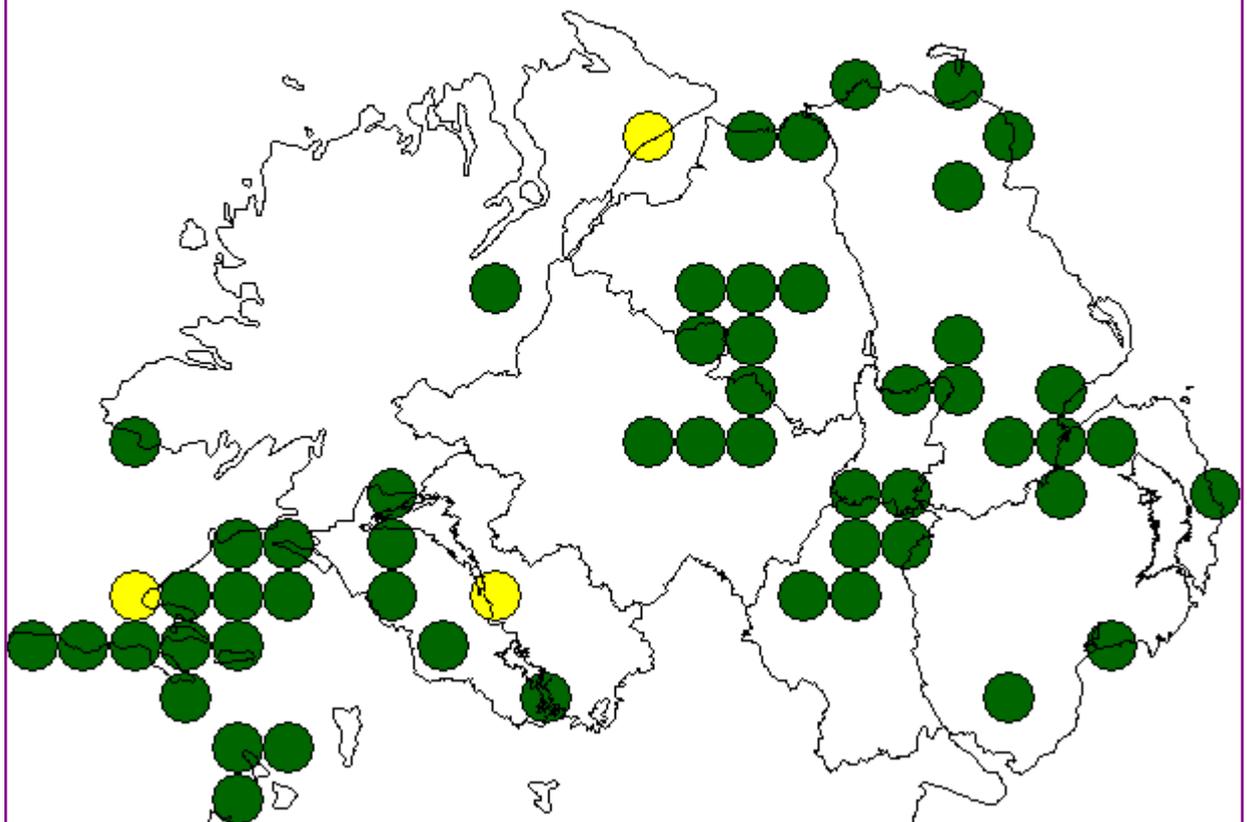
Species maps, Northern Ireland



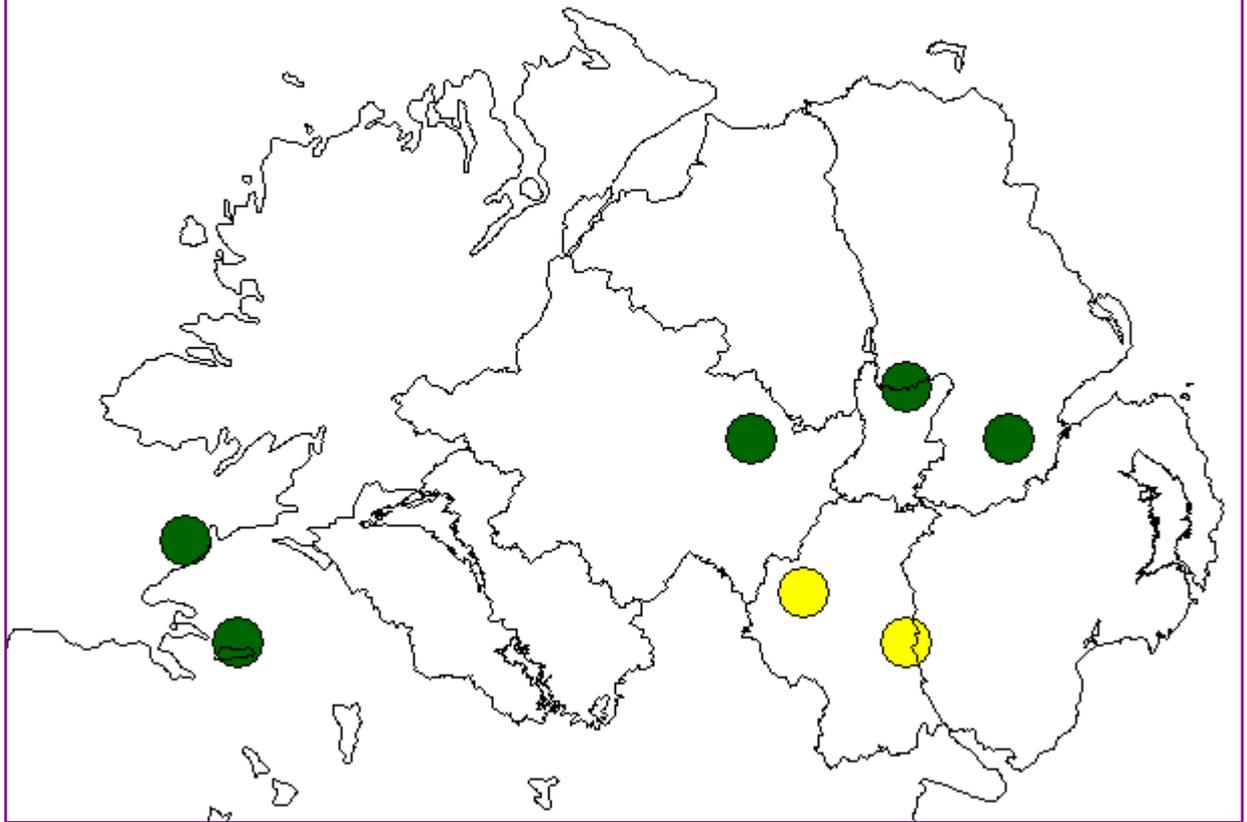
Adalia bipunctata



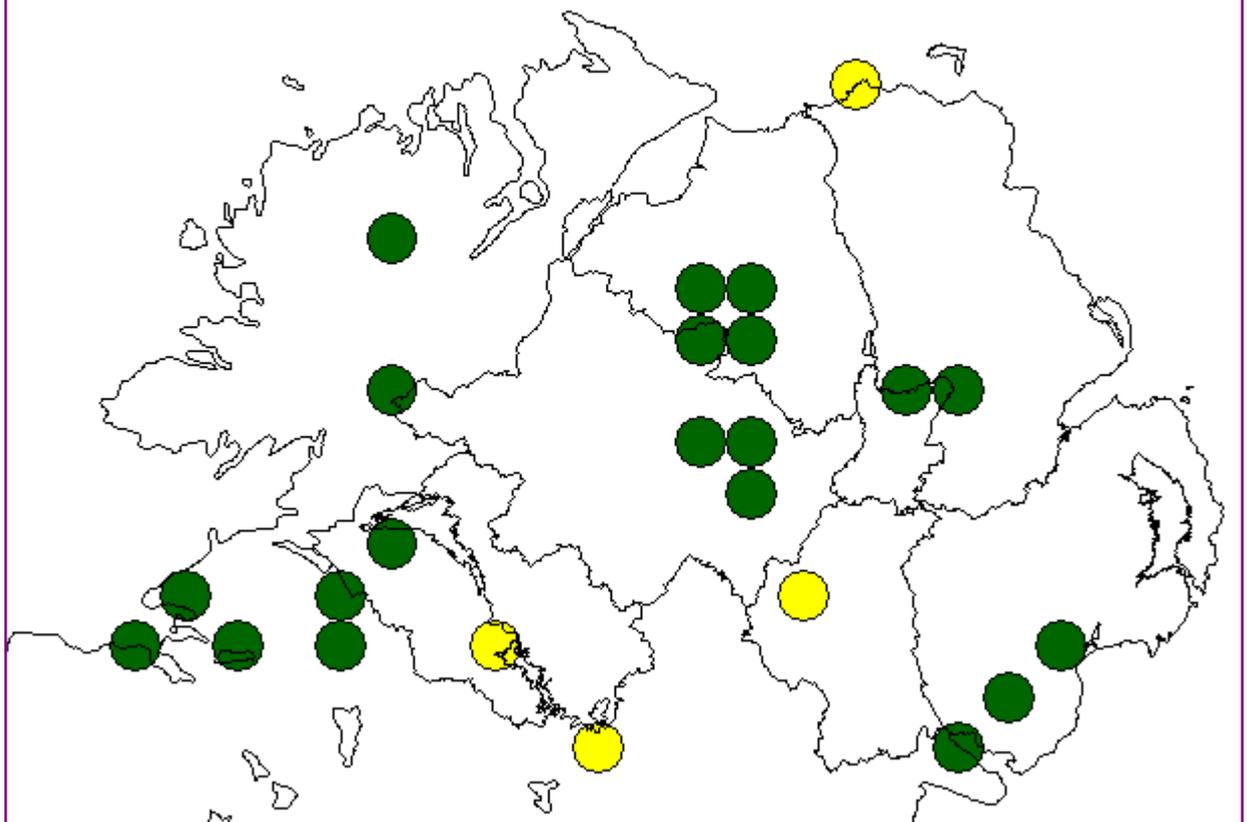
Adalia decempunctata



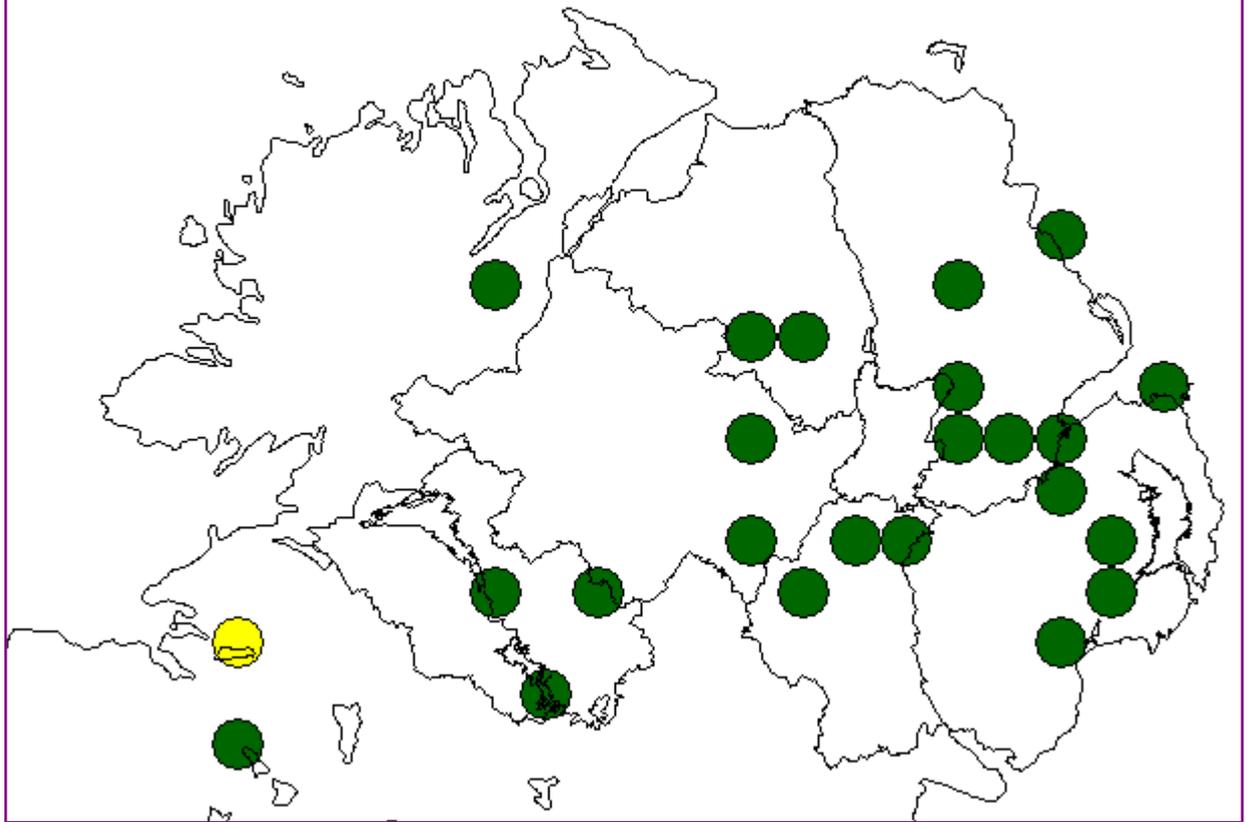
Anatis ocellata



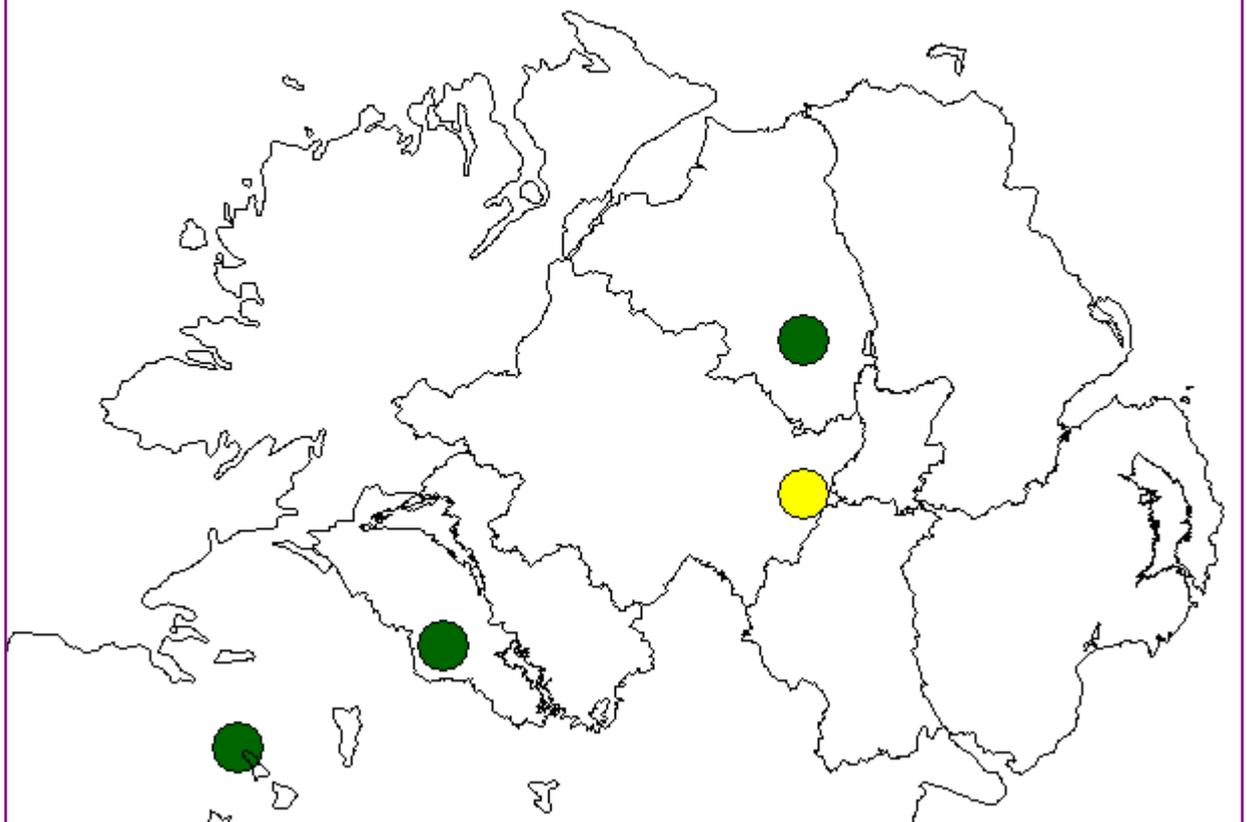
Aphidecta obliterata



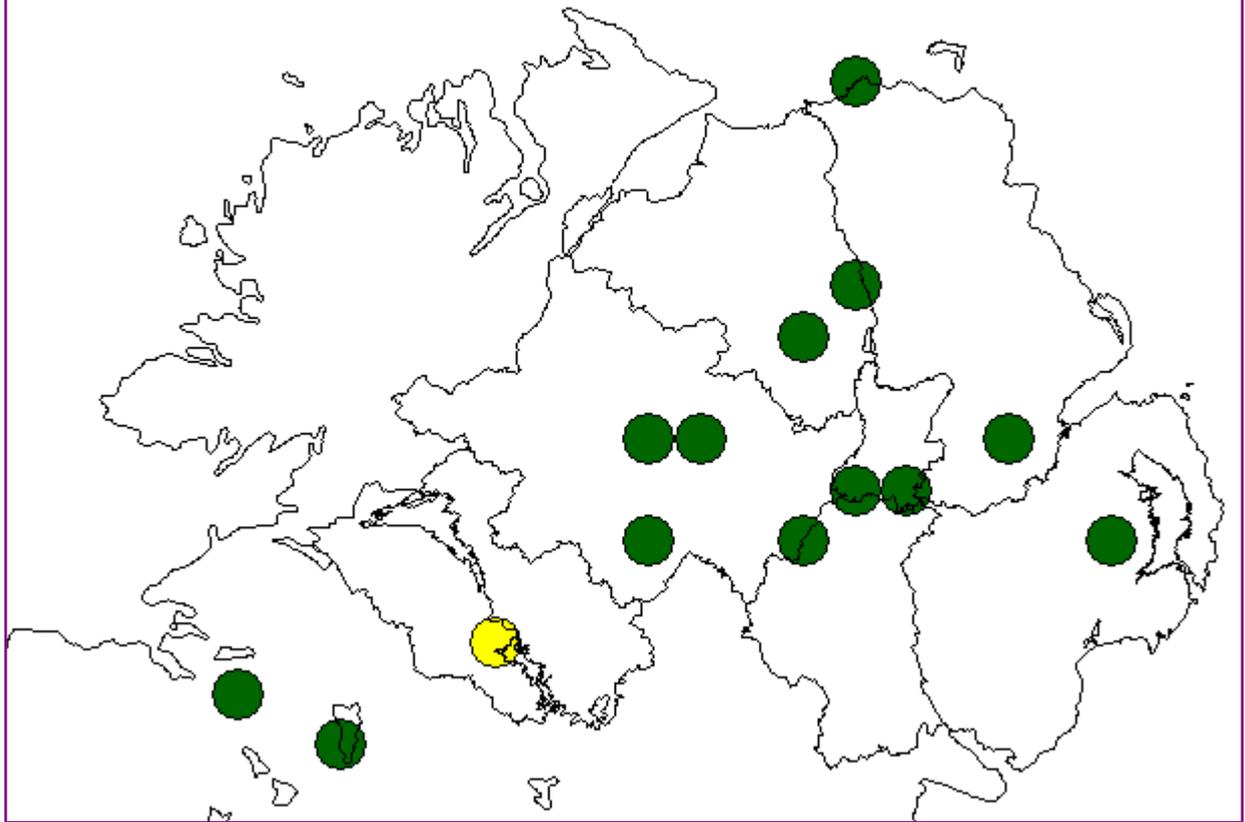
Calvia quattuordecimguttata



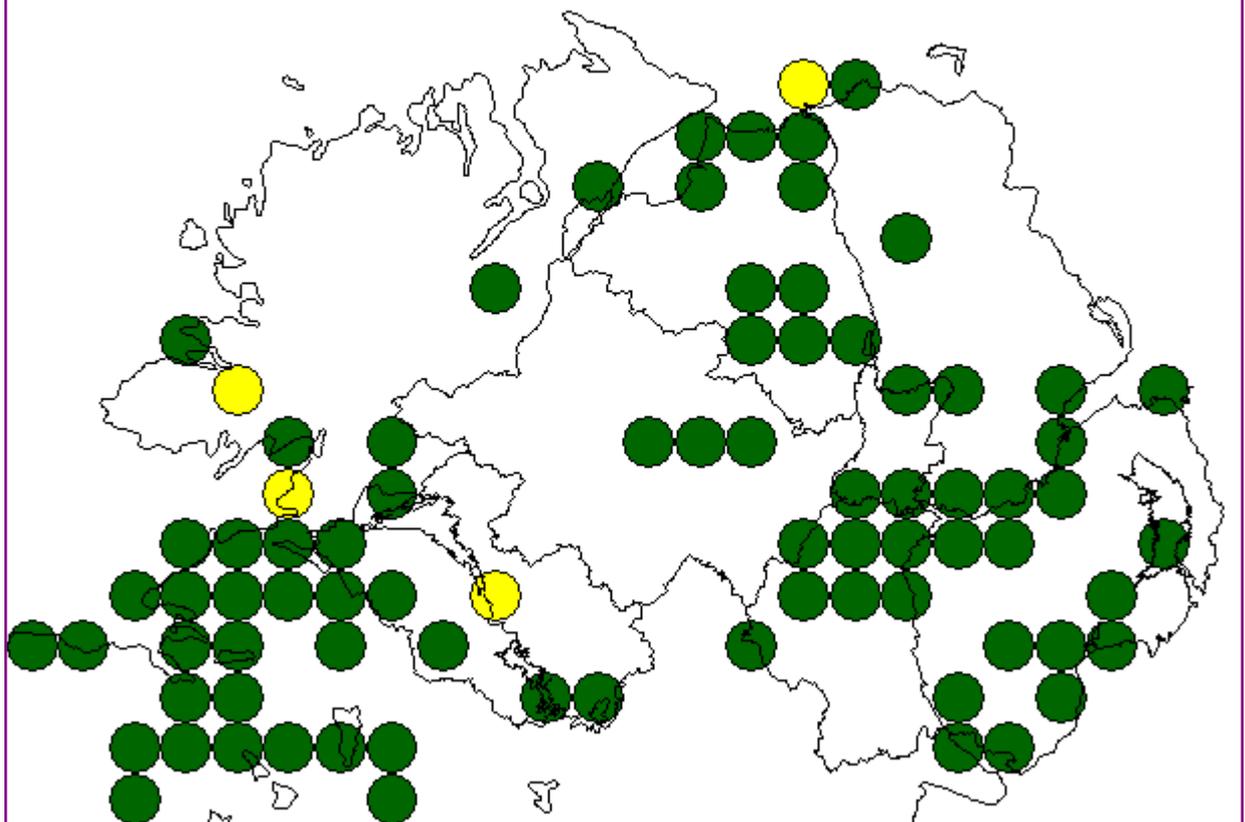
Chilocorus bipustulatus



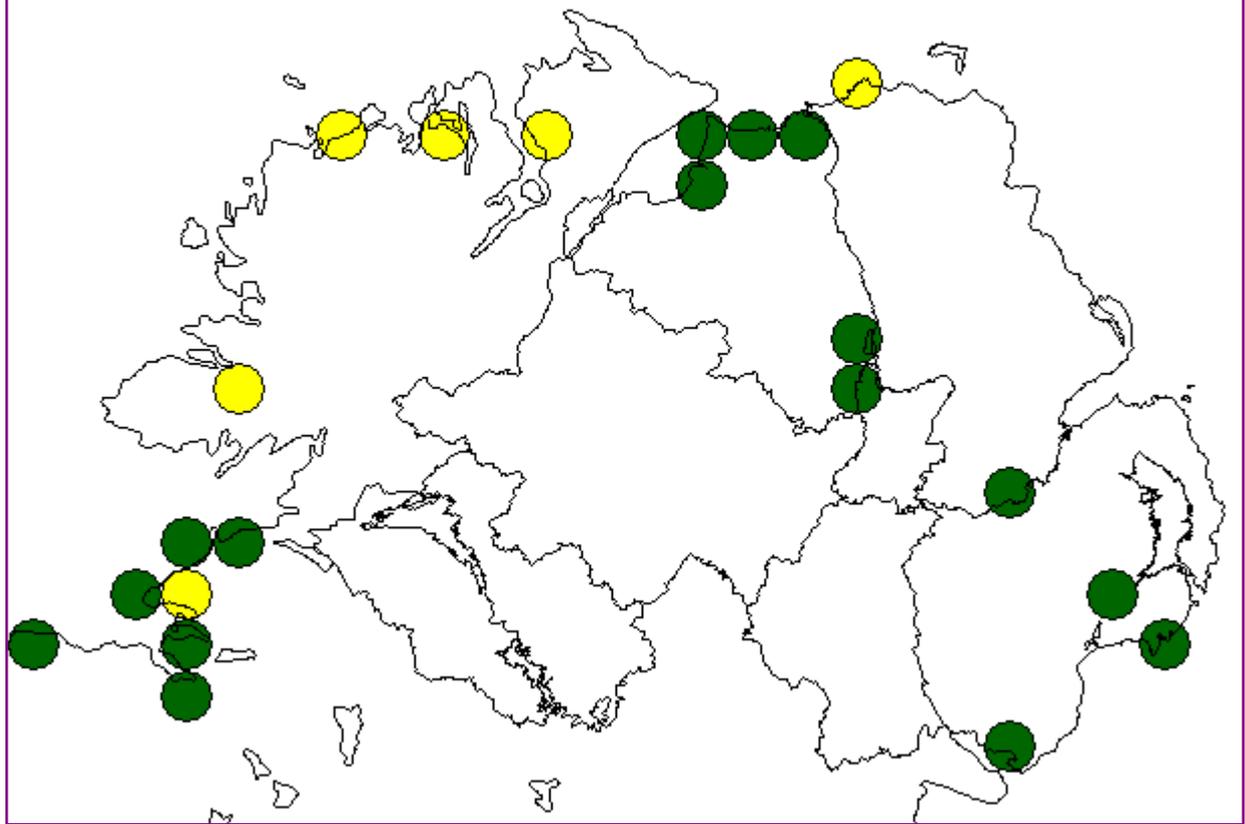
Coccinella hieroglyphica



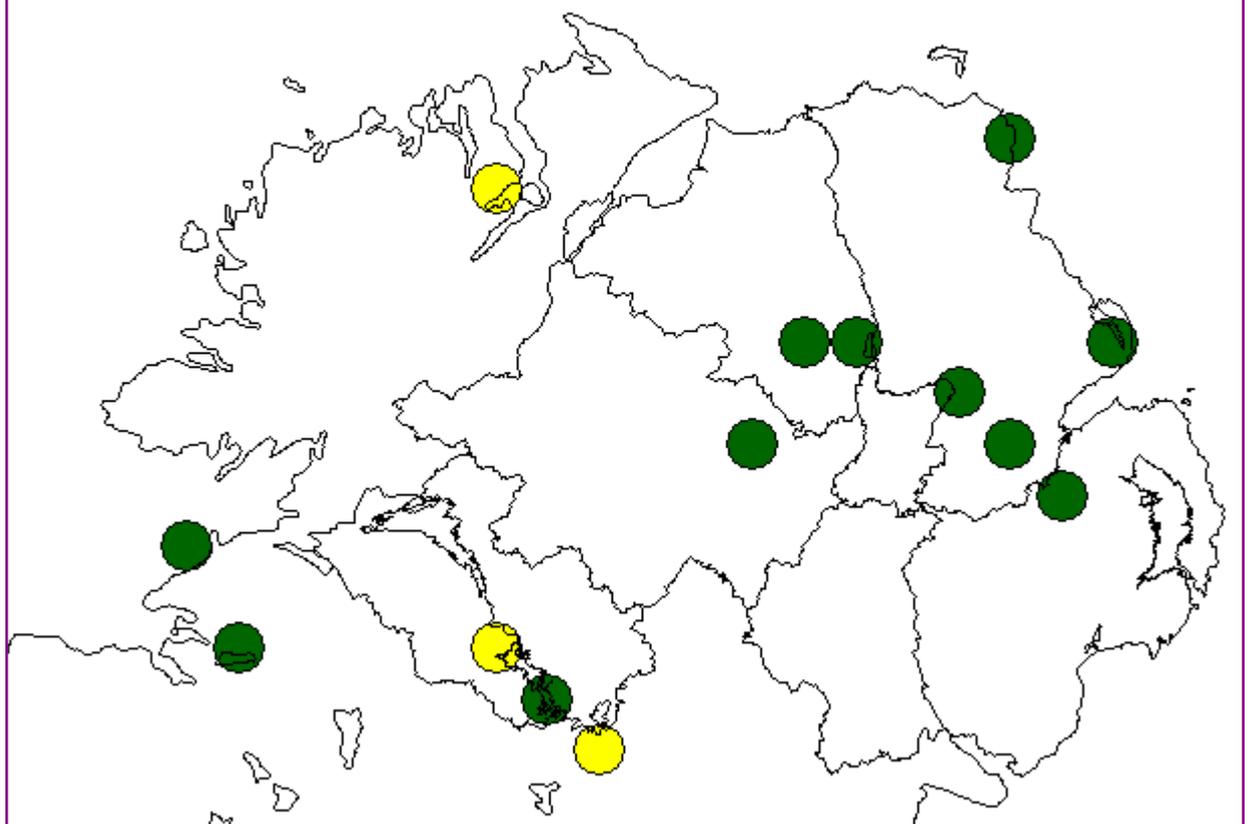
Coccinella septempunctata



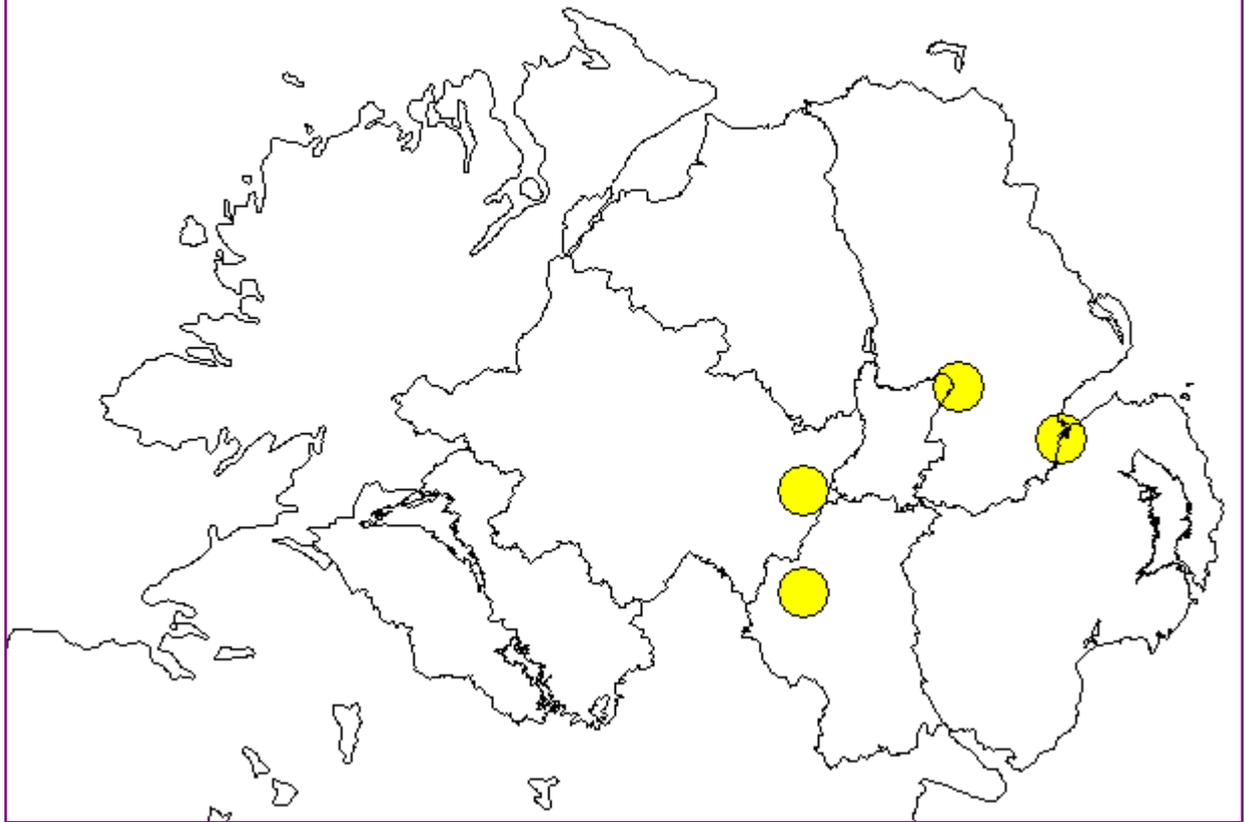
Coccinella undecimpunctata



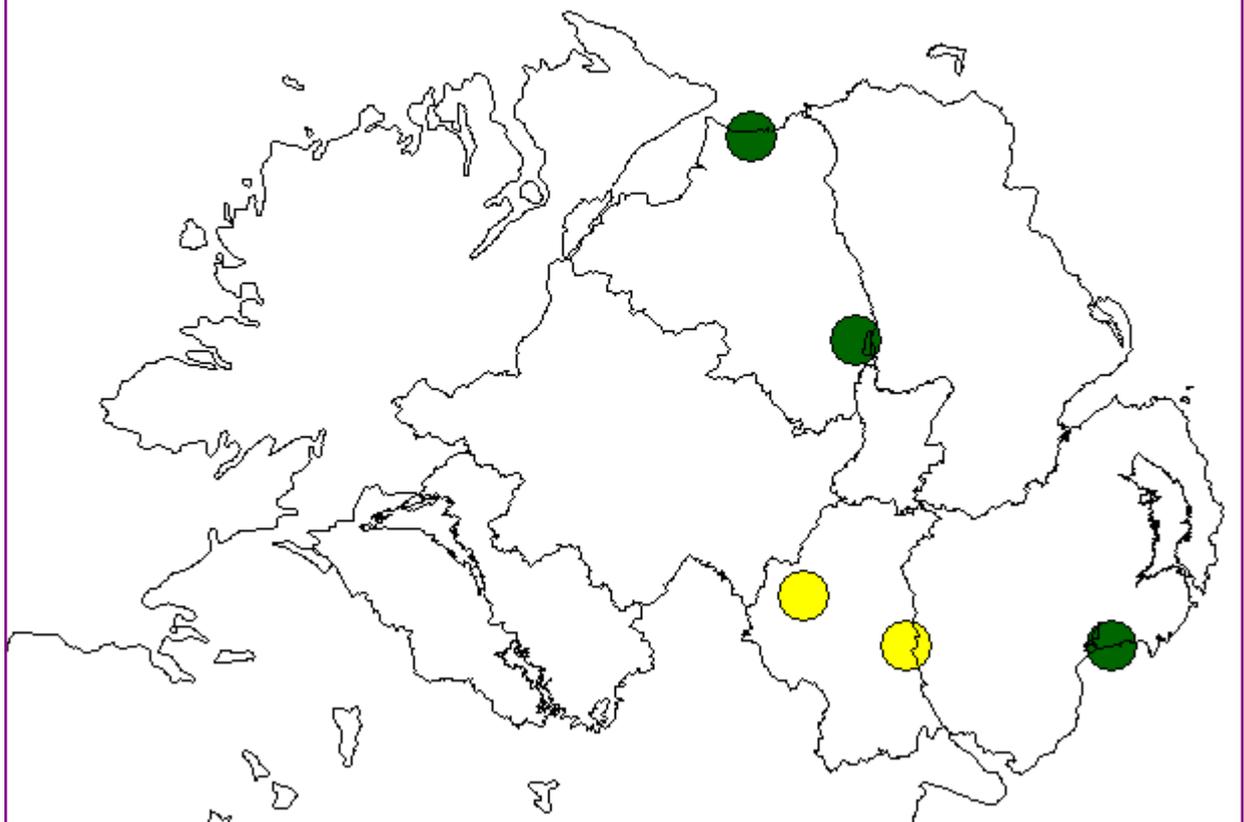
Halyzia sedecimguttata



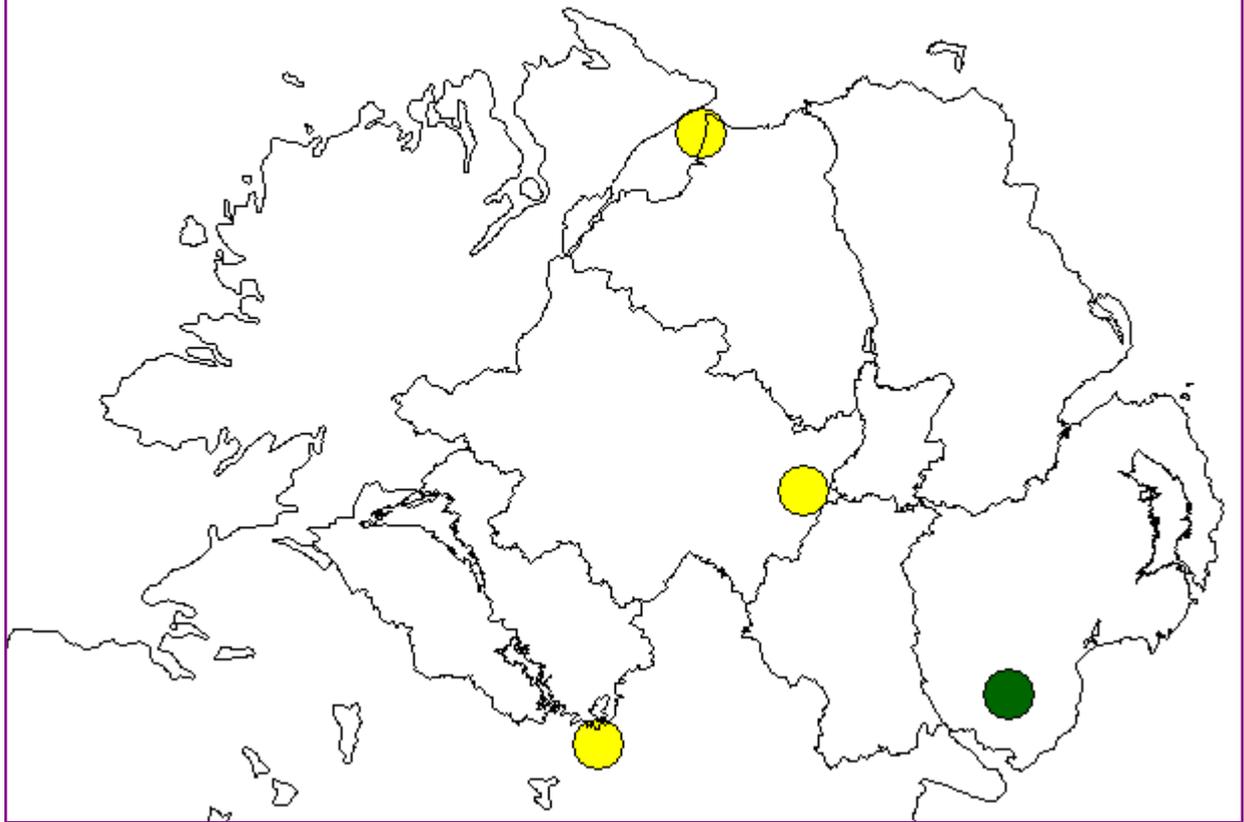
Hippodamia tredecimpunctata



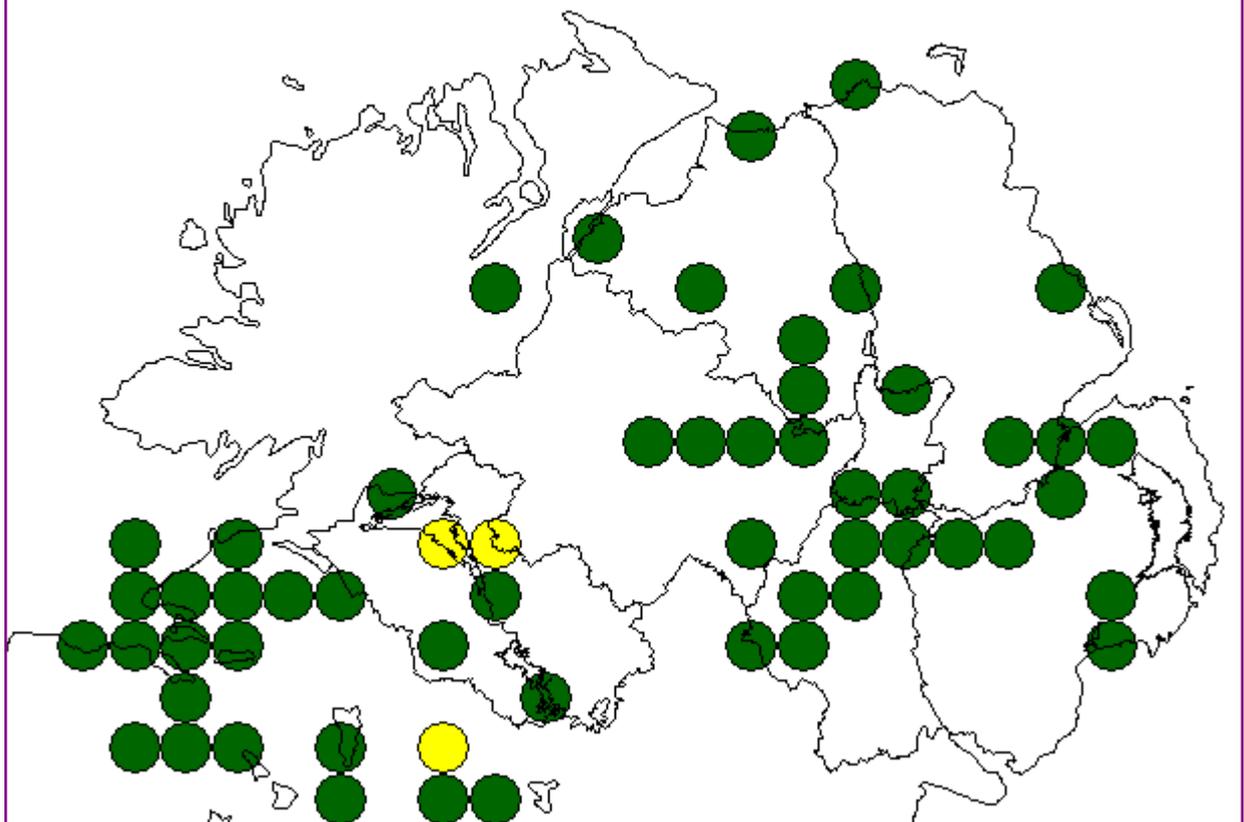
Myrrha octodecimguttata



Myzia oblongoguttata



Propylea quattuordecimpunctata



Psyllobora vigintiduopunctata

