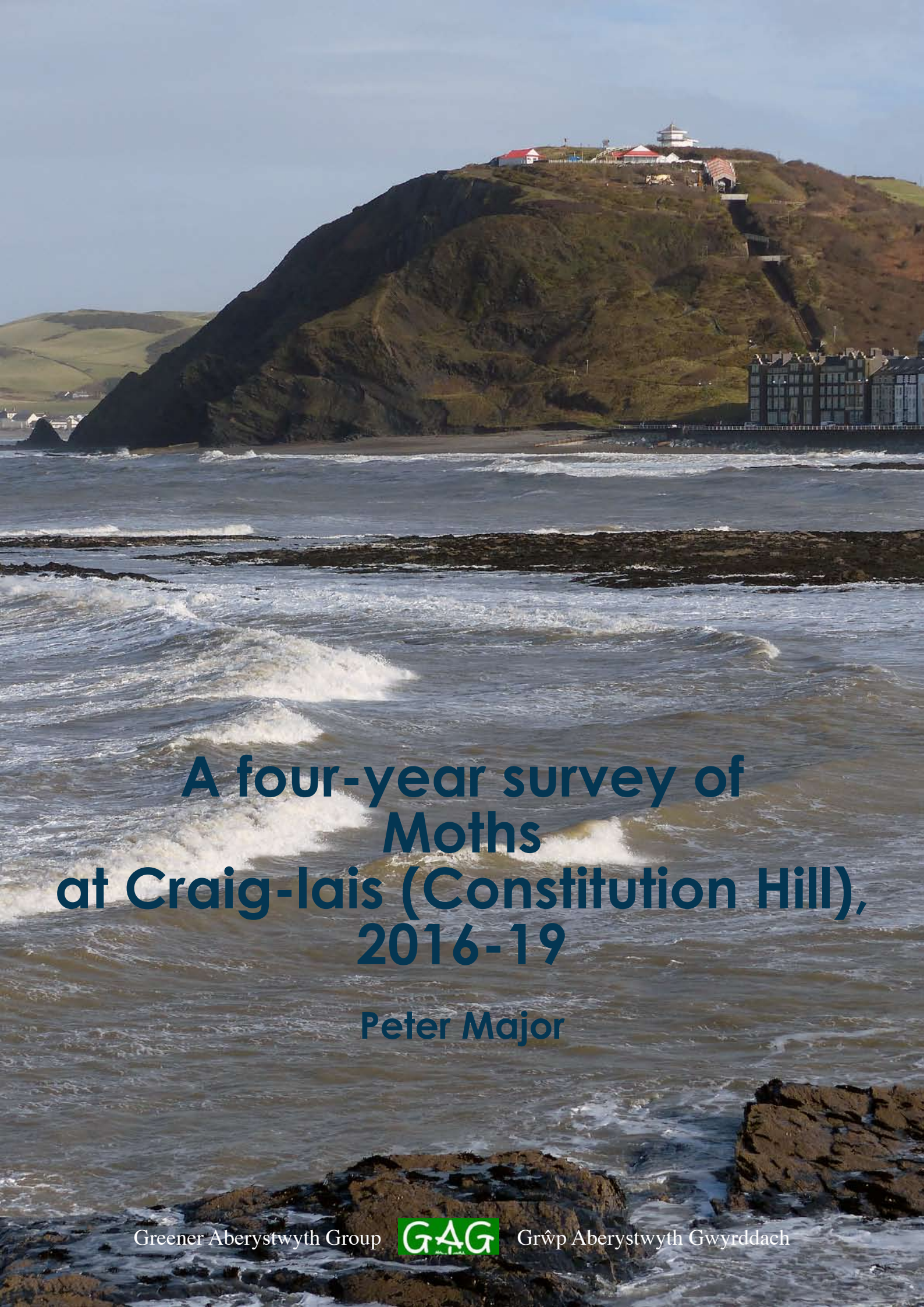

A four-year survey of Moths at Craig-lais (Constitution Hill), 2016-19

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A four-year survey of moths at Craig-lais (Constitution Hill), near Aberystwyth, 2016 – 2019

Peter Major[1]

Abstract

In a four year survey of night-flying moths at Craig-lais, immediately to the north of Aberystwyth, thirteen nationally scarce species of moth were recorded. Within Ceredigion, a similarly high number of notable species is extremely unlikely to be recorded other than in (or near) National Nature Reserves. The majority of the notable Craig-lais species exploit the grassland habitat of the unstable coastal scree found along the seaward slopes of Craig-lais. The findings of this survey in themselves justify the designation of the site as a Site of Special Scientific Interest (SSSI) on account of its invertebrate fauna.

Introduction

In 2016, I reported on a one-year survey of moths flying at Craig-lais (also known as Constitution Hill), which overlooks the town of Aberystwyth.[2] The seaward slopes of this site form a major part of the Craigyfulfran & Clarach SSSI (see Figure 1), designated on account of the readily visible geological features; the ecological importance of the site remains unrecognized.

Given the number of nationally scarce moths, and of immigrant moth species, recorded in the 2016 survey, it became of interest to conduct a more extensive study of the moths at the site.

Moths form an important part of most UK ecosystems. They are a large group, of over 2000 breeding species in the UK, compared with just 58 butterflies; they exploit a vast diversity of ecological niches. Both as larvae and adults, moths are an essential food source for many species of birds, small mammals, including bats, and invertebrates; in addition, adult moths pollinate many flowers.[3]

The diversity and ecological importance of moths make them a valuable indicator of the health of an ecosystem. Over the last 40 years, despite some species of moth increasing in their range and/or abundance, there has been an overall dramatic decline in moth numbers in Great Britain.[4,5] Similar declines in flying insects and in arthropods have been recorded in Germany and Puerto Rico respectively.[6,7] The causes of these declines are unknown but there is some evidence that climate change, habitat loss, light pollution and chemical pollution have each contributed.[4,8]

Method

During each of the years from 2016 to 2019, I periodically ran a light-trap at a single site on Craig-lais, just inside the southern boundary of the SSSI, approximately half-way up the hill where the cliff faces north-eastwards over the sea (Figure 2), at OS grid reference SN58308267 (Figure 1). Table 1 shows the total number of nights, along with the earliest and latest date, surveyed each year. I chose warm nights when the wind speed was relatively low (typically below 12 miles per hour), as more moths fly in such conditions and a light-trap samples only those moths that are flying. The trap used a 15W actinic blacklight, powered by a 12V battery. On each night, I activated the trap at approximately the end of civil twilight and then either attended the trap until after midnight, counting the moths as they arrived, or (more usually) left the trap and returned at dawn to count the moths in and near the trap.

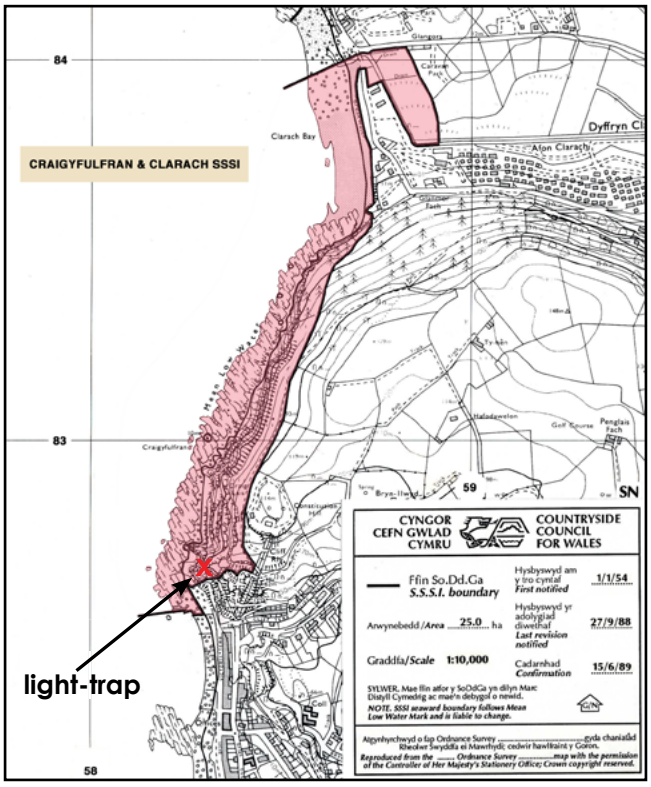


Figure 1. A 1:10000 map[9] of Craigyfulfran & Clarach SSSI (shaded), showing (a red x) the position of the light-trap.

Figure 2. The moth-trap in position.

	2016	2017	2018	2019
Nights trapped	8	15	13	12
Earliest (ddmm)	0905	2004	2104	2302
Latest (ddmm)	2610	2610	1511	1509

Table 1. The nights trapped in each year of the survey.

Findings

Table 2 presents a summary of moth numbers recorded during the survey.

For each of the 233 species of moth of which more than a single individual was recorded during the four-year survey, Table 3 (pages 8-11) presents the earliest and latest dates of the year (ddmmyy) on which the species was seen, the total number of moths recorded during each year of the survey, the usual larval foodplant(s) of each species, and the status of the species within Britain as a whole. Nationally scarce, local and immigrant species are highlighted. Table 4 (page 11) lists a further 109 species for which only a single individual was seen in four years, highlighting six notable species among them. In what follows, I will, unless I state otherwise, refer only to the species in Table 3.

185 of the moth species seen are described as Common, having been recorded in more than 300 10 km squares in Britain since 1960. 47 have a more restricted distribution; 31 are Local (recorded in 101-300 10 km squares), eight are Nationally Scarce B (nb – recorded in 31-100 10 km squares) and two are Nationally Scarce A (na – recorded in only 16-30 10 km squares). Six moth species are Immigrant; these species may breed and complete their life cycle within Britain, but each winter the entire population dies; within any one year, the occurrence of the species depends on the arrival of individuals from overseas. One species has an unknown distribution, due to a lack of records.[18]

It is useful to consider whether a moth is by diet a generalist, its caterpillars eating many species of plant, or a specialist, eating just one or a small number (although, for some species, what the caterpillars eat in the wild remains unknown). As the list of larval foodplants in Table 3 illustrates, there is a continuity of variation. Of the 233 species recorded, 162 have larvae that are commonly recorded feeding on more than four species of plants. Among the others, perhaps 31 are true specialists, feeding only on a particular single species of plant.

The data illustrate the value, particularly when data are collected episodically, of extending a survey beyond a single year. 50 of 233 species were seen in three years but not in a fourth. By the fourth year, however, only 9 new species were recorded.

	2016	2017	2018	2019
Total moths	506	888	1393	1627
Average moths per night	63.3	59.2	107.2	135.6
Number of species	145	179	242	189
Singletons (species seen only once in four years)	17	22	48	22
New species (excluding singletons)	128	56	40	9
Total species over all four years				342
Total species (excluding singletons)				233
Species seen every year				82

Table 2. The number of moths recorded in each year of the survey.

Notable species

The following photographs show the Nationally Scarce and Immigrant species recorded in the survey. *Cnephasia conspersana*, seen only once, is likely to be breeding on the coastal cliffs at the site. The bedstraw hawk-moth, seen only once, is the most notable immigrant species recorded in the survey, only the second individual to be seen in Ceredigion, the first since 1978. The length given for each species is that of the moth's forewing.

Nationally scarce species

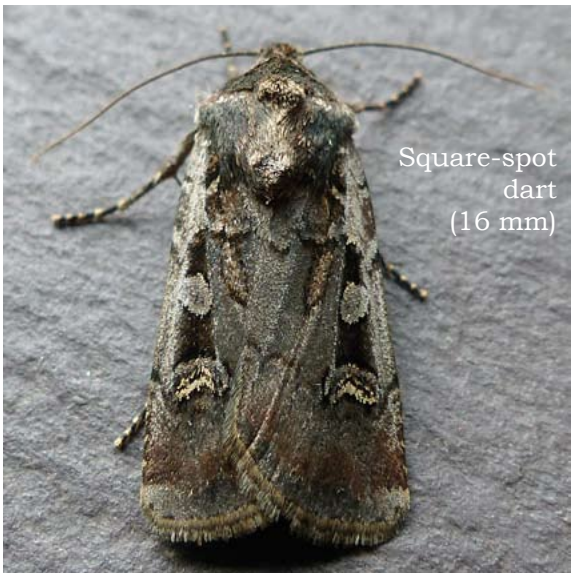
Epinotia nanana (5 mm)

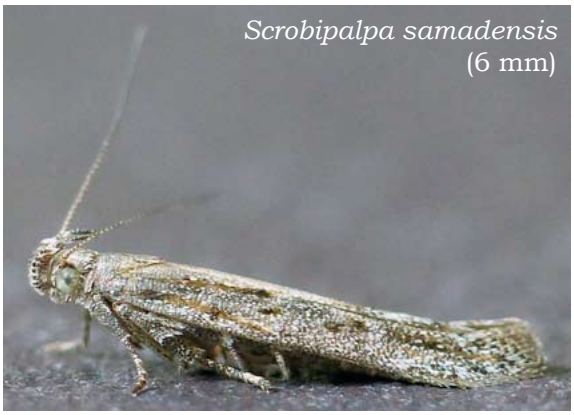
Caryocolum vicinella (6 mm)

Barrett's marbled coronet (17 mm)

Hoary footman (16 mm)

Thyme pug (9 mm)





Immigrant species

Rush veneer (13 mm)

Dark sword-grass (24 mm)

Bedstraw hawk-moth (36 mm)

Diamond-back moth (7 mm)

Pearly underwing (22 mm)

Silver y (21 mm)

Rusty-dot pearl (10 mm)

A brief discussion of some issues affecting the interpretation of the data.

In Lepidoptera life-cycles, feeding is concentrated in, or even entirely restricted to, the larval phase; at the same time the larvae, while able to move, do not have the same capacity to disperse across long distances that the adults display. Therefore, when considering the ecological value of a site, it would be preferable to know which species of moth feed there as caterpillars. This would require searching the appropriate plant(s) at the appropriate time of year (and typically at night) for feeding caterpillars. Given the relatively sedentary and well-concealed behaviour of most Lepidoptera larvae (for example, many spend this entire phase of their life-cycle below ground, and many spend it entirely within the plant on which they feed), it is impractical to obtain such data at the vast majority of sites. Light-traps, because they sample dispersing adults, provide only an approximate, and biased, indication of which larvae live at the site. Capturing a moth in a light-trap on Craig-lais does not indicate that the species completes its life cycle there, or even somewhere nearby. The adult may be exploiting flowers as a nectar source, or may be purely transitory; some of the adults seen have probably come from Ireland or mainland Europe.

Understanding the nature of this approximation and bias is an ongoing challenge to all who attempt to interpret moth-trap data. Bias arises from differences, not only in ecology but also in behaviour, between moth species. Species vary in their propensity to fly, in the circumstances under which they fly (some species are entirely day-flying), in their degree of attraction to various sources of light, and in their likelihood of being caught (and remaining caught) in any particular design of trap.

I have drawn a distinction between species recorded occasionally (in this case, one individual in four years) and those recorded more frequently (in this case, two or more individuals over the four years). Species seen less often are more likely to have dispersed to the site as adults; those seen more often are more likely to have flown to the trap from within the site. For the latter group it is a more reasonable assumption that, although some of them may have come from elsewhere, most of them will have come from Craig-lais. The dividing line is necessarily arbitrary; it depends on the length of the survey and frequency of trapping. In this case, my protocol has excluded ~2.5% (109/4414) of recorded moths.

No attempt has been made to analyse the data longitudinally; while it would seem unlikely, given recent national trends, that longitudinal effects are absent, they seem likely to be outweighed by variation, between years, in annual weather patterns (which affect, for each moth species, breeding strategy, overall breeding success, and likelihood of being recorded at a light-trap). To highlight two examples, large yellow underwing shows a spectacular increase over the period of the survey – this is probably due largely to the effects of the exceptional weather conditions in 2018 upon breeding success; feathered ranunculus appears to all-but disappear from the site over the period of the survey – this is probably due to the relatively poor weather conditions from mid-september to late october in 2018 and 2019 both curtailing the survey and reducing the dispersal of the species. Species with shorter flight periods are more likely to show sampling effects due to variation, between years, in weather conditions.

A 2013 report[5] highlighted several species of moth whose abundance in Britain declined drastically between 1968 and 2007; among them, anomalous, autumnal rustic, rosy minor, lackey and grass rivulet, all found on Craig-lais, had declined by more than 90%. While three of these species (see Table 3) are Common, it should be noted that the status of a moth species refers to its distribution within Britain, not its abundance. Common species may be found across Britain but at a low density, while Nationally Scarce species may occur at a small number of sites but have a large population at each. To highlight species of conservation concern, both types of data, distribution and abundance, are important, though abundance data allow declines to be noted sooner, before large-scale local extinctions have occurred. Such data are, however, more difficult to obtain.

The designation of a moth species as Nationally Scarce does not, in itself, indicate that the species is of particular conservation concern; some such species are, at present, increasing their range and abundance. However, with the exception of *Epinotia nanana*, which has spread with the planting of spruce trees, and possibly of marsh oblique-barred, largely a species of wet western habitats, the Nationally Scarce species recorded at Craig-lais are largely restricted to particular, specialised habitats, typically coastal, which Craig-lais provides.

Conclusions

From a conservation perspective, species that have a restricted distribution are generally more vulnerable to population declines than those that are common. Further, moths that have a limited number of foodplants are generally more vulnerable than those that eat a wide variety of plants. Craig-lais supports both a high number of Nationally Scarce species and a high number of species with specialised diets.

This, along with the large total number of moth species found on Craig-lais, indicates the desirability of maintaining habitats on and near the site. The foodplants of the various species indicate that, while some species are exploiting scrub habitat, the majority are exploiting the particular grassland habitat found on the unstable coastal scree. Due to the proximity of the sea and the unsheltered aspect of the coast along Craig-lais, these habitats are likely to remain self-sustaining; necessary management interventions can be largely restricted to those already listed for the SSSI on account of its geological importance.[10] In exception to this, the growing awareness of the impact of light pollution on all ecosystems[2,11,12,13] means that reducing light pollution, in terms of the number of lights installed, the number of nights on which they are used and the number of hours per night during which they are lit, requires action, at this site and on a larger scale.

While parts of Craig-lais have already been designated a SSSI on account of particular geological features, it should be recognised that those features do not share the same precise geographical location, and are not vulnerable to the same risks, as the site's invertebrate fauna. It is important that the notable invertebrate fauna be recognised in any consideration of operations at the site that require consultation. Therefore the site should be assigned SSSI status on account of its invertebrate fauna.

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1. Copyright © 2020 of all text and photographs belongs with the author.
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18. A new species, *Delplanqueia inscriptella*, formerly included within *D. dilutella*, was described in 2015; uncertainty remains concerning the distribution of the two species; while a single 2019 specimen from Craig-lais has been confirmed as *D. inscriptella*, both species may be present at the site (or nearby), in which case my other *Delplanqueia* records should be seen as an aggregate of the two species.

Acknowledgements

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Peter Hall and Norman Lowe for their considerable help with the identification of several species;
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The Greener Aberystwyth Group for their help in bringing the report to a wider audience.

Table 3. A list of the moths recorded (excluding singletons), local and notable species in red.

ABH[14]	Name	Common name	Earliest	Latest	2016	2017	2018	2019	Usual foodplant(s)[15,16,17]	Status
12.016	*Nemapogon cloacella*	cork moth	300518	090616	1	0	1	0	bracket fungi	common
15.015	*Aspilapteryx tringipennella*	–	110517	210817	1	3	15	4	ribwort plantain	common
15.033	*Parornix torquillella*	–	190818	190818	0	0	2	0	blackthorn	common
16.001	*Yponomeuta evonymella*	bird-cherry ermine	300618	020819	1	0	2	1	bird cherry	common
18.001	*Plutella xylostella*	diamond-back moth	300518	071016	2	0	2	10	many brassicaceae	immigrant
18.005	*Rhigognostis annulatella*	–	130816	210817	1	1	0	0	common scurvygrass, danish scurvygrass, hairy bitter-cress	nb
28.010	*Hofmannophila pseudospretella*	brown house-moth	240519	210817	0	2	1	3	dead animal and plant matter	common
28.017	*Batia lambdella*	–	090616	210817	1	1	1	4	gorse	local
32.018	*Agonopterix heracliana*	–	230219	200518	0	0	1	2	various apiaceae	common
32.030	*Agonopterix nervosa*	–	120718	070817	0	1	2	0	various leguminosae	common
35.010	*Aproaerema anthyllidella*	–	200518	140916	2	6	1	2	kidney vetch, other fabaceae	local
35.040	*Bryotropha terrella*	–	090616	150719	1	0	0	1	common bent, *Rhytidiadelphus squarrosus* (a moss)	common
35.046	*Bryotropha senectella*	–	300618	150719	0	0	1	1	mosses	local
35.093	*Mirificarma mulinella*	–	020819	040917	1	2	11	2	gorse, broom	common
35.119	*Scrobipalpa samadensis*	–	130617	060818	0	1	3	2	plantains	nb
35.130	*Caryocolum vicinella*	–	300618	260819	0	3	3	4	sea campion	na
35.146	*Teleiopsis diffinis*	–	070618	260918	3	7	3	9	sheep's sorrel	common
37.063	*Coleophora albicosta*	–	240517	300518	0	1	2	0	gorse	common
37.083	*Coleophora saxicolella*	–	020819	020819	0	0	0	2	various chenopodiaceae	local
38.004	*Elachista argentella*	–	110517	070618	0	2	2	2	grasses	common
38.025	*Elachista atricomella*	–	190818	260819	0	0	2	1	cock's-foot	common
41.002	*Blastobasis adustella*	–	300618	040917	2	3	13	3	various	common
41.003	*Blastobasis lacticolella*	–	240519	151118	1	3	4	2	various	common
44.001	*Alucita hexadactyla*	twenty-plume moth	150719	210817	0	1	0	1	honeysuckle	common
49.002	*Isotrias rectifasciana*	–	300618	120718	0	0	2	0	hawthorns?	local
49.015	*Archips xylosteana*	variegated golden tortrix	300618	300618	0	0	2	0	various deciduous plants	common
49.030	*Cacoecimorpha pronubana*	carnation tortrix	060818	040917	0	2	1	1	various	common
49.031	*Aphelia paleana*	timothy tortrix	130617	150719	0	2	0	2	various	common
49.039	*Epiphyas postvittana*	light brown apple moth	110517	151118	1	9	6	1	various	common
49.091	*Pseudargyrotoza conwagana*	–	250619	210716	1	0	0	2	ash, privet	common
49.097	*Cochylimorpha straminea*	–	300518	090616	1	0	1	0	common knapweed	common
49.110	*Agapeta zoegana*	–	120618	250619	0	1	1	1	common knapweed, small scabious	common
49.111	*Eupoecilia angustana*	–	070618	150719	2	4	2	4	various	common
49.166	*Celypha lacunana*	–	300518	190818	0	0	5	0	various herbaceous	common
49.194	*Bactra lancealana*	–	200518	070618	0	0	5	0	rushes	common
49.223	*Rhopobota naevana*	holly tortrix	150719	170717	0	1	0	1	various woody plants	common
49.242	*Epinotia nanana*	–	300618	300618	0	0	2	0	norway spruce, sitka spruce	nb
49.264	*Eucosma obumbratana*	–	300618	300618	0	0	3	0	perennial sowthistle	local
49.265	*Eucosma cana*	–	120718	170717	0	1	1	1	thistles, common knapweed	common
49.266	*Eucosma hohenwartiana*	–	120718	020819	0	0	1	3	common knapweed	common
49.294	*Notocelia uddmanniana*	bramble shoot moth	090616	250619	1	1	1	2	bramble, raspberry	common
49.298	*Notocelia trimaculana*	–	300518	130617	0	1	1	0	hawthorn	common
49.325	*Cydia ulicetana*	–	300518	260819	1	2	3	2	gorse, broom, bird's-foot trefoil, greenweed	common
49.341	*Cydia splendana*	–	300618	210817	0	1	7	0	oaks, sweet chestnut, walnut	common
62.001	*Aphomia sociella*	bee moth	200419	150719	1	1	3	5	nests of wasps and bumblebees	common
62.0151	*Delplanqueia inscriptella*[18]	–	070618	010918	7	8	11	7	wild thyme	unknown
62.029	*Phycita roborella*	–	300618	020819	0	0	1	1	oaks	common
62.037	*Acrobasis marmorea*	–	130617	150719	2	2	3	5	blackthorn	local
62.054	*Homoeosoma sinuella*	–	090616	190818	3	2	5	2	ribwort plantain, other plantains	common
62.065	*Ephestia unicolorella*	–	070618	150719	0	0	1	1	dead plant matter?	local
63.005	*Pyrausta despicata*	–	150719	010918	0	1	1	1	greater plantain, ribwort plantain	common
63.025	*Anania hortulata*	small magpie	180617	300618	0	1	2	0	nettle	common
63.031	*Udea ferrugalis*	rusty-dot pearl	260819	071016	2	1	0	1	various herbaceous	immigrant
63.034	*Udea prunalis*	–	120718	170717	0	1	1	0	various	common
63.038	*Pleuroptya ruralis*	mother of pearl	170717	210817	0	2	0	3	nettle	common
63.052	*Nomophila noctuella*	rush veneer	140916	071016	2	0	0	0	various herbaceous	immigrant
63.064	*Scoparia ambigualis*	–	180517	070618	0	1	5	1	mosses	common
63.066	*Scoparia pyralella*	–	240517	150719	5	12	14	10	ribwort plantain	common
63.067	*Eudonia lacustrata*	–	250619	210716	1	0	0	3	mosses	common
63.069	*Eudonia angustea*	–	180619	081017	11	4	3	9	mosses	common
63.074	*Eudonia mercurella*	–	070618	210716	5	3	3	4	mosses	common
63.080	*Chrysoteuchia culmella*	garden grass-veneer	090616	020819	2	8	3	43	grasses	common
63.081	*Crambus pascuella*	–	250619	250619	0	0	0	2	sheep's-fescue, deergrass	common
63.086	*Crambus lathoniellus*	–	070618	070618	0	0	2	0	grasses	common
63.089	*Agriphila tristella*	–	190818	210817	0	1	2	0	grasses	common
63.090	*Agriphila inquinatella*	–	300618	150919	6	14	19	4	grasses	common
63.093	*Agriphila straminella*	–	300618	070817	1	2	6	2	grasses	common
63.095	*Agriphila geniculea*	–	210817	150919	0	8	2	5	grasses	common
65.007	*Cilix glaucata*	chinese character	200419	170717	0	1	2	1	various	common
65.008	*Thyatira batis*	peach blossom	300518	190818	1	0	3	0	bramble	common
65.009	*Habrosyne pyritoides*	buff arches	070618	210716	1	0	1	1	bramble	common
66.003	*Malacasoma neustria*	lackey	300618	210716	2	1	4	0	various hardwoods	common
66.010	*Euthrix potatoria*	drinker	150719	210817	0	2	0	1	grasses	common

69.002	*Smerinthus ocellata*	eyed hawk-moth	070618	120618	0	0	2	0	willows, apple	common
69.003	*Laothoe populi*	poplar hawk-moth	120718	210817	0	1	1	1	poplars, willows	common
69.016	*Deilephila elpenor*	elephant hawkmoth	240519	150719	1	2	14	5	rosebay willowherb, other herbaceous	common
69.017	*Deilephila porcellus*	small elephant hawk-moth	300518	250619	0	0	1	1	various bedstraws	local
70.009	*Idaea subsericeata*	satin wave	240519	010918	1	1	9	10	various herbaceous?	common
70.011	*Idaea dimidiata*	single-dotted wave	060717	020819	2	3	0	1	cow parsley, burnet-saxifrage, hedge bed-straw	common
70.013	*Idaea biselata*	small fan-footed wave	120718	010918	0	1	2	1	various herbaceous?	common
70.016	*Idaea aversata*	riband wave	180619	020819	4	1	6	7	various herbaceous	common
70.023	*Scopula marginepunctata*	mullein wave	240519	010918	0	0	4	6	various herbaceous	local
70.024	*Scopula imitaria*	small blood-vein	180619	010918	2	1	3	2	honeysuckle, privet	common
70.049	*Xanthorhoe fluctuata*	garden carpet	200417	150919	5	4	3	5	many brassicaceae	common
70.051	*Xanthorhoe spadicearia*	red twin-spot carpet	200419	210716	1	1	5	3	various herbaceous	common
70.053	*Xanthorhoe designata*	flame carpet	240519	190818	0	0	2	2	various brassicaceae?	common
70.054	*Xanthorhoe montanata*	silver-ground carpet	120519	120618	0	0	2	1	various herbaceous	common
70.059	*Camptogramma bilineata*	yellow shell	090616	210817	2	1	0	1	various herbaceous	common
70.061	*Epirrhoe alternata*	common carpet	200518	210817	1	3	3	0	various rubiaceae	common
70.063	*Epirrhoe galiata*	galium carpet	240517	120718	0	2	4	0	lady's bedstraw, heath bedstraw, hedge bedstraw	local
70.066	*Earophila badiata*	shoulder-stripe	200417	200419	0	1	0	1	roses	common
70.067	*Anticlea derivata*	streamer	200419	210418	0	0	1	1	roses	common
70.079	*Thera britannica*	spruce carpet	200319	151118	1	1	4	1	many coniferous trees	common
70.087	*Cosmorhoe ocellata*	purple bar	210817	010918	0	1	1	0	various rubiaceae	common
70.091	*Eulithis populata*	northern spinach	300618	150719	0	0	1	1	bilberry	common
70.095	*Chloroclysta siterara*	red-green carpet	230219	081017	0	1	0	1	various hardwoods	common
70.097	*Dysstroma truncata*	common marbled carpet	090516	151118	2	6	2	1	various hardwoods	common
70.100	*Colostygia pectinataria*	green carpet	240517	260918	0	1	1	0	various rubiaceae	common
70.103	*Lampropteryx suffumata*	water carpet	200319	200518	0	3	4	4	various rubiaceae	common
70.107	*Epirrita dilutata*	november moth	151118	151118	0	0	3	0	many hardwoods	common
70.114	*Hydrelia flammeolaria*	small yellow wave	180617	300618	0	1	2	0	field maple, sycamore, alder	common
70.123	*Triphosa dubitata*	tissue	170717	010918	0	2	2	0	buckthorn, alder buckthorn	local
70.131	*Mesotype didymata*	twin-spot carpet	060818	150919	1	4	4	2	various	common
70.133	*Perizoma alchemillata*	small rivulet	210716	210716	2	0	0	0	common hemp-nettle	common
70.137	*Perizoma albulata*	grass rivulet	090616	090616	2	0	0	0	yellow-rattle	local
70.141	*Gymnoscelis rufifasciata*	double-striped pug	230219	040917	3	19	35	11	various	common
70.142	*Chloroclystis v-ata*	v-pug	210418	190818	1	3	8	1	various	common
70.151	*Eupithecia pulchellata*	foxglove pug	180517	210817	5	9	17	16	foxglove	common
70.155	*Eupithecia venosata*	netted pug	200417	070618	1	9	7	5	bladder campion, sea campion	local
70.156	*Eupithecia abbreviata*	brindled pug	200419	200518	0	5	14	7	oaks, hawthorn	common
70.157	*Eupithecia dodoneata*	oak-tree pug	200419	120519	0	1	0	3	hawthorn, pedunculate oak	common
70.161	*Eupithecia virgaureata*	golden-rod pug	060818	010918	0	0	2	0	hawthorn, ragworts, golden rod	local
70.168	*Eupithecia nanata*	narrow-winged pug	300518	030716	1	0	4	0	heathers	common
70.172	*Eupithecia distinctaria*	thyme pug	180619	300618	0	0	3	2	wild thyme	nb
70.173	*Eupithecia centaureata*	lime-speck pug	300518	190818	2	0	3	0	various herbaceous	common
70.179	*Eupithecia absinthiata*	wormwood pug	030716	020819	2	0	1	1	many asteraceae	common
70.183	*Eupithecia vulgata*	common pug	240519	120618	1	0	3	1	various	common
70.187	*Eupithecia icterata*	tawny speckled pug	190818	010918	0	1	2	0	yarrow, sneezewort	common
70.190	*Eupithecia subfuscata*	grey pug	090616	250619	1	3	1	2	various	common
70.200	*Acasis viretata*	yellow-barred brindle	190818	040917	0	1	1	0	various woody plants	local
70.222	*Petrophora chlorosata*	brown silver-line	060518	090616	1	0	3	0	bracken	common
70.226	*Opisthograptis luteolata*	brimstone moth	200417	260918	4	13	23	7	many hardwood rosaceae	common
70.237	*Selenia dentaria*	early thorn	200319	020819	5	1	2	2	various hardwoods	common
70.241	*Crocallis elinguaria*	scalloped oak	060818	060818	0	0	3	0	various hardwoods	common
70.243	*Ourapteryx sambucaria*	swallow-tailed moth	120718	210716	1	0	1	0	various	common
70.244	*Colotois pennaria*	feathered thorn	151118	151118	0	0	3	0	various hardwoods	common
70.248	*Lycia hirtaria*	brindled beauty	200419	200419	0	0	0	2	many hardwoods	common
70.252	*Biston betularia*	peppered moth	240519	210716	3	3	3	3	various	common
70.258	*Peribatodes rhomboidaria*	willow beauty	070618	260918	3	4	5	5	various woody plants	common
70.265	*Alcis repandata*	mottled beauty	250619	210716	3	0	1	1	various	common
70.280	*Lomographa temerata*	clouded silver	300518	170717	2	1	12	1	many hardwood rosaceae	common
70.282	*Theria primaria*	early moth	230219	200319	0	0	0	3	blackthorn, hawthorn	common
70.283	*Campaea margaritaria*	light emerald	300618	210716	1	0	1	0	various hardwoods	common
70.284	*Hylaea fasciaria*	barred red	180617	060818	0	1	1	1	various coniferous trees	common
70.287	*Charissa obscurata*	annulet	300618	040917	7	9	28	4	various herbaceous	local
71.003	*Cerura vinula*	puss moth	200419	240519	0	0	3	3	poplars, willows	common
71.013	*Notodonta ziczac*	pebble prominent	060518	190818	1	1	5	2	many salicaceae	common
71.017	*Pheosia tremula*	swallow prominent	120519	210817	0	1	0	1	poplars, willows	common
71.018	*Pheosia gnoma*	lesser swallow prominent	200518	190818	0	0	2	0	silver birch, downy birch	common
71.025	*Phalera bucephala*	buff-tip	120519	210716	2	0	3	4	various hardwoods	common
72.001	*Scoliopteryx libatrix*	herald	200319	130816	1	1	0	2	many salicaceae	common
72.013	*Euproctis similis*	yellow-tail	060717	020819	1	4	3	3	various hardwoods	common
72.015	*Calliteara pudibunda*	pale tussock	300518	070618	0	0	2	0	various hardwoods	common
72.019	*Spilosoma lutea*	buff ermine	070618	070618	0	0	2	0	various herbaceous	common
72.020	*Spilosoma lubricipeda*	white ermine	090516	240519	1	0	0	1	various herbaceous	common
72.022	*Diaphora mendica*	muslin moth	060518	120519	0	0	1	1	various herbaceous	common
72.024	*Phragmatobia fuliginosa*	ruby tiger	120718	040917	1	2	1	1	various herbaceous	common
72.031	*Tyria jacobaeae*	cinnabar	060518	120618	1	0	3	0	common ragwort	common
72.035	*Miltochrista miniata*	rosy footman	060717	010918	2	3	3	1	lichens	local

72.042	*Atolmis rubricollis*	red-necked footman	300618	300618	0	0	2	0	lichens, green algae	local
72.044	*Eilema griseola*	dingy footman	300618	210817	2	7	5	4	lichens	common
72.045	*Eilema lurideola*	common footman	180619	020819	2	2	6	8	lichens, hawthorn	common
72.046	*Eilema complana*	scarce footman	070618	260819	8	21	35	173	lichens	local
72.047	*Eilema caniola*	hoary footman	060717	260819	2	5	10	12	lichens	nb
72.060	*Hypenodes humidalis*	marsh oblique-barred	120718	150719	0	0	1	1	unknown	nb
72.061	*Schrankia costaestrigalis*	pinion-streaked snout	210817	210817	0	2	0	0	various?	local
73.001	*Abrostola tripartita*	spectacle	120718	150719	0	0	1	1	nettle	common
73.012	*Diachrysia chrysitis*	burnished brass	120718	020819	0	0	1	1	various herbaceous	common
73.015	*Autographa gamma*	silver y	090516	151118	25	53	139	42	various herbaceous	immigrant
73.022	*Plusia festucae*	gold spot	020819	040917	0	1	1	1	various sedges	common
73.036	*Acronicta alni*	alder moth	120519	120519	0	0	0	2	various hardwoods	local
73.045	*Acronicta rumicis*	knot grass	090516	060818	3	3	7	0	various	common
73.061	*Stilbia anomala*	anomalous	140916	081017	8	7	4	12	wavy hair-grass, tufted hair-grass	local
73.062	*Amphipyra pyramidea*	copper underwing	010918	010918	0	0	2	0	various hardwoods	common
73.069	*Xylocampa areola*	early grey	230219	200417	0	1	0	3	honeysuckle	common
73.084	*Bryophila domestica*	marbled beauty	300618	040917	4	3	10	7	lichens	common
73.095	*Caradrina clavipalpis*	pale mottled willow	300518	260918	1	1	3	0	grasses	common
73.096	*Hoplodrina octogenaria*	uncertain	180619	020819	2	4	3	9	various herbaceous	common
73.097	*Hoplodrina blanda*	rustic	250619	150719	0	0	8	17	various herbaceous	common
73.101	*Charanyca trigrammica*	treble lines	240519	120618	0	0	1	4	various herbaceous	common
73.113	*Phlogophora meticulosa*	angle shades	090516	261017	7	14	3	5	various	common
73.114	*Euplexia lucipara*	small angle shades	300518	040917	0	4	2	0	various	common
73.131	*Luperina testacea*	flounced rustic	190818	260918	2	0	17	24	grasses	common
73.156	*Apamea crenata*	clouded-bordered brindle	300518	020819	2	1	2	1	grasses	common
73.158	*Apamea sordens*	rustic shoulder-knot	200417	090616	1	1	5	0	grasses	common
73.162	*Apamea monoglypha*	dark arches	070618	151118	16	25	18	87	grasses	common
73.163	*Apamea lithoxylaea*	light arches	030716	210716	2	1	0	0	grasses	common
73.169	*Mesapamea secalis*	common rustic	170717	190818	0	2	2	2	grasses	common
73.171	*Litoligia literosa*	rosy minor	150719	210817	2	3	2	2	grasses	common
73.172	*Mesoligia furuncula*	cloaked minor	120718	130816	6	3	2	1	grasses	common
73.173	*Oligia strigilis*	marbled minor	110517	120618	0	3	4	6	grasses	common
73.176	*Oligia fasciuncula*	middle-barred minor	070618	250619	2	3	2	1	grasses	common
73.193	*Omphaloscelis lunosa*	lunar underwing	071016	261017	8	6	0	0	grasses	common
73.194	*Conistra vaccinii*	chestnut	230219	151118	0	0	3	3	various hardwoods, docks	common
73.209	*Xylena vetusta*	red sword-grass	200319	200319	0	0	0	2	various	local
73.216	*Cosmia trapezina*	dun-bar	150719	190818	0	1	2	5	many hardwoods, and carnivorous	common
73.233	*Aporophyla nigra*	black rustic	190917	151118	9	13	3	0	various	common
73.235	*Polymixis lichenea*	feathered ranunculus	140916	261017	44	59	12	1	various herbaceous	local
73.236	*Polymixis xanthomista*	black-banded	190818	150919	0	8	22	20	thrift	na
73.241	*Panolis flammea*	pine beauty	060518	180517	0	1	1	0	pines	common
73.242	*Orthosia incerta*	clouded drab	200319	090516	1	2	2	7	various hardwoods	common
73.244	*Orthosia cerasi*	common quaker	230219	200518	1	18	33	12	various hardwoods	common
73.245	*Orthosia cruda*	small quaker	230219	090516	1	0	10	4	various hardwoods	common
73.247	*Orthosia gracilis*	powdered quaker	200417	090516	1	1	1	0	various	common
73.249	*Orthosia gothica*	hebrew character	230219	300518	3	14	8	12	various	common
73.250	*Anorthoa munda*	twin-spotted quaker	230219	090516	1	0	1	4	various hardwoods	common
73.254	*Cerapteryx graminis*	antler moth	020819	260819	0	0	0	4	grasses	common
73.267	*Lacanobia oleracea*	bright-line brown-eye	030716	170717	1	2	3	0	various	common
73.273	*Hada plebeja*	shears	240517	030716	4	1	1	0	various herbaceous	common
73.274	*Mamestra brassicae*	cabbage moth	240517	210817	0	2	0	0	many herbaceous	common
73.278	*Conisania andalusica*	barrett's marbled coronet	180517	250619	4	4	17	13	sea campion, rock sea-spurrey, sand spurrey	nb
73.281	*Hadena bicruris*	lychnis	030716	010918	1	0	2	0	several campions	common
73.283	*Hadena confusa*	marbled coronet	200417	070817	5	15	33	38	several caryophyllaceae	local
73.286	*Hadena perplexa*	tawny shears	200417	010918	15	31	43	33	several caryophyllaceae	common
73.293	*Mythimna impura*	smoky wainscot	120718	070817	1	1	2	1	grasses	common
73.298	*Mythimna ferrago*	clay	090616	020819	2	5	3	6	grasses	common
73.307	*Peridroma saucia*	pearly underwing	081017	081017	0	2	0	0	various herbaceous	immigrant
73.312	*Euxoa obelisca*	square-spot dart	020819	040917	4	6	14	7	various herbaceous?	nb
73.317	*Agrotis exclamationis*	heart and dart	120519	010918	4	8	63	162	various herbaceous	common
73.319	*Agrotis segetum*	turnip moth	060717	071016	2	1	0	0	various herbaceous	common
73.324	*Agrotis trux*	crescent dart	120618	210817	9	12	17	31	thrift?	local
73.325	*Agrotis puta*	shuttle-shaped dart	200417	260918	2	2	17	17	various herbaceous	common
73.327	*Agrotis ipsilon*	dark sword-grass	200319	151118	1	8	5	4	various herbaceous	immigrant
73.328	*Axylia putris*	flame	250619	040917	0	3	0	1	various herbaceous	common
73.329	*Ochropleura plecta*	flame shoulder	200419	040917	5	9	18	4	various herbaceous	common
73.333	*Diarsia mendica*	ingrailed clay	120618	030716	2	1	1	0	various	common
73.334	*Diarsia rubi*	small square-spot	300518	070618	0	0	3	0	various herbaceous	common
73.336	*Cerastis rubricosa*	red chestnut	230219	210418	0	1	4	2	various	common
73.338	*Lycophotia porphyrea*	true lover's knot	070618	210716	3	1	6	2	heathers	common
73.341	*Standfussiana lucernea*	northern rustic	240517	260918	2	16	13	8	various herbaceous	local
73.342	*Noctua pronuba*	large yellow underwing	090616	081017	22	60	85	361	various herbaceous	common
73.343	*Noctua fimbriata*	broad-bordered yellow underwing	020819	020819	0	0	0	2	various herbaceous	common
73.345	*Noctua comes*	lesser yellow underwing	030716	071016	7	10	7	18	various	common
73.346	*Noctua interjecta*	least yellow underwing	120718	010918	0	2	4	6	various herbaceous, grasses	common
73.348	*Noctua janthe*	lesser broad-bordered yellow underwing	170717	040917	2	6	12	10	various	common
73.357	*Xestia xanthographa*	square-spot rustic	170717	261017	60	72	34	19	various herbaceous	common

73.359	*Xestia c-nigrum*	setaceous hebrew character	060818	150919	2	8	18	6	various herbaceous	common
73.360	*Xestia ditrapezium*	triple-spotted clay	150719	020819	0	0	0	2	various	local
73.361	*Xestia triangulum*	double square-spot	130617	210716	1	2	0	1	various	common
73.365	*Eugnorisma glareosa*	autumnal rustic	010918	260918	0	2	4	3	various	common
74.003	*Nola cucullatella*	short-cloaked moth	130617	210716	2	2	2	2	many hardwood rosaceae	common
74.004	*Nola confusalis*	least black arches	200419	300518	0	2	3	3	various hardwoods	local
74.009	*Nycteola revayana*	oak nycteoline	210418	070817	0	1	1	0	pedunculate oak	local

Table 4. Moth species of which only one individual was recorded, notable species in red.

2016	2017
Caloptilia rufipennella	*Endrosis sarcitrella*, white-shouldered house-moth
Bryotropha affinis	*Carcina quercana*
Lozotaenia forsterana	*Acleris variegana*, garden rose tortrix
Endotricha flammealis	*Notocelia roborana*
Rhodometra sacraria, vestal (immigrant)	*Grapholita funebrana*, plum fruit moth
Chesias legatella, streak	*Myelois circumvoluta*, thistle ermine
Odontopera bidentata, scalloped hazel	*Nycterosea obstipata*, gem (immigrant)
Ectropis crepuscularia, engrailed	*Euphyia biangulata*, cloaked carpet (nb)
Lithosia quadra, four-spotted footman (na)	*Hydriomena furcata*, july highflyer
Herminia tarsipennalis, fan-foot	*Ecliptopera silaceata*, small phoenix
Apamea furva, confused	*Aplocera plagiata*, treble-bar
Lithophane leautieri, blair's shoulder-knot	*Abraxas grossulariata*, magpie
Griposia aprilina, merveille du jour	*Bupalus piniaria*, bordered white
Lacanobia thalassina, pale-shouldered brocade	*Cabera pusaria*, common white wave
Leucania comma, shoulder-striped wainscot	*Hemithia aestivaria*, common emerald
Euxoa tritici, white-line dart	*Hypena proboscidalis*, snout
Pseudoips prasinana, green silver-lines	*Herminia grisealis*, small fan-foot
2018	*Acronicta tridens*, dark dagger
Bucculatrix ulmella	*Hydraecia micacea*, rosy rustic
Ocnerostoma friesei	*Lateroligia ophiogramma*, double lobed
Argyresthia retinella	*Oligia versicolor*, rufous minor
Argyresthia albistria	*Lithophane socia*, pale pinion
Oegoconia quadripuncta	2019
Coleophora paripennella	*Monopis laevigella*, skin moth
Pandemis cinnamomeana	*Monopis weaverella*
Pandemis heparana, dark fruit-tree tortrix	*Diurnea fagella*
Aleimma loeflingiana	*Depressaria daucella*
Acleris laterana	*Coleophora laricella*, larch case-bearer
Orthotaenia undulana	*Ditula angustiorana*, red-barred tortrix
Hedya pruniana, plum tortrix	*Cnephasia conspersana* (nb)
Lobesia littoralis	*Acleris literana*
Spilonota ocellana, bud moth	*Cochylis dubitana*
Epiblema costipunctana	*Epinotia tedella*
Cydia fagiglandana	*Hyles gallii*, bedstraw hawk-moth (immigrant)
Dioryctria abietella	*Scotopteryx luridata*, july belle
Acrobasis advenella	*Lomaspilis marginata*, clouded border
Phycitodes binaevella	*Ennomos fuscantaria*, dusky thorn
Phycitodes saxicola	*Phigalia pilosaria*, pale brindled beauty
Pyralis farinalis, meal moth	*Agriopis marginaria*, dotted border
Udea olivalis	*Colocasia coryli*, nut-tree tussock
Watsonalla binaria, oak hook-tip	*Amphipyra berbera*, svensson's copper underwing
Tethea ocularis, figure of eighty	*Coenobia rufa*, small rufous
Epirrhoe tristata, small argent & sable	*Denticucullus pygmina*, small wainscot
Euchoeca nebulata, dingy shell	*Mesapamea didyma*, lesser common rustic
Pasiphila rectangulata, green pug	*Eupsilia transversa*, satellite
Selenia tetralunaria, purple thorn	
Cleorodes lichenaria, brussels lace	
Pseudoterpna pruinata, grass emerald	
Furcula furcula, sallow kitten	
Stauropus fagi, lobster moth	
Drymonia dodonaea, marbled brown	
Notodonta dromedarius, iron prominent	
Lymantria monacha, black arches	
Eilema depressa, buff footman	
Eilema sororcula, orange footman	
Deltote pygarga, marbled white spot	
Acronicta leporina, miller	
Acronicta menyanthidis, light knot grass	
Cucullia umbratica, shark	
Cucullia verbasci, mullein	
Agrochola macilenta, yellow-line quaker	
Atethmia centrago, centre-barred sallow	
Melanchra persicariae, dot moth	
Ceramica pisi, broom moth	
Papestra biren, glaucous shears	
Xestia sexstrigata, six-striped rustic	