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Micro moths on Great Cumbrae Island (vc100)

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ABSTRACT

Few previous records exist for micro-moths from vc100. Data are presented from the first year-round moth-trapping exercise accomplished on Great Cumbrae Island; one of the least studied of the Clyde Isles (vc100). Data from a Skinner-type light-trap, supplemented by collection of leaf mines from local trees, revealed the presence of 71 species of micro moths, representing 20 new records for the vice-county.

INTRODUCTION

The extensive nineteenth-century list of Lepidoptera in the 1901 handbook on the natural history of Glasgow and the West of Scotland issued for the Glasgow meeting of the British Association for the Advancement of Science (Elliot *et al*., 1901) included few Cumbrae records. What records exist relate to macro moths recorded during brief visits by undergraduate classes at the Marine Station (now Field Studies Centre, Millport) or by visiting naturalists, perhaps participating in a group excursion to Cumbrae, as the Glasgow Natural History Society has done in the past. The moth fauna of Cumbrae has never received year-round attention; indeed the 'Clyde Isles' (vc100) section of Smith & Smith (1983) lacked coverage of Cumbrae. Leverton (2001, Appendix 1) was able to estimate only the macro moth species diversity of the Clyde Isles (at 275 species) and it was not until 2008 that the first moth list for the adjacent islands of Bute and Inchmarnock was published by Collis & Collis (2008), including some micro moth records. Micro moths in vc100 have certainly been under-recorded locally, a not unusual circumstance (Kinnear & Kirkland, 2000; Knowler, 2016).

SITES AND METHODS

A Skinner-type light trap ('Portable Suitcase Moth Trap (MT01): Wildforms, Stranraer) using two 20W fluorescent bulbs issuing 100W+ per bulb was deployed under the canopy of my garden office verandah at "Redcliff" (NS171547), looking west over a sheltered lawn in a coastal situation (elevation *ca*. 8m). The light source was situated *ca*. 125cm above ground level. The following mature flower clumps and shrubs were present within a 7m radius: red-hot poker (*Kniphofia uvaria*), honeysuckle (*Lonicera* sp.), *Magnolia* sp. and *Forsythia* sp. Behind the office is a large mature black mulberry tree (*Morus nigra*) and to one side is a tall privet hedge (*Ligustrum ovalifolium*). To the rear of my property is a wooded escarpment with old-growth ash (*Fraxinus excelsior*) frequently ivy-covered (*Hedera helix*), sycamore (*Acer pseudoplatanus*) and rowan (*Sorbus aucuparia*), with an undergrowth of hawthorn (*Crataegus monogyna*), wild garlic (*Allium ursinum*), nettle (*Urtica dioica*), bracken (*Pteridium aquilinum*) and bramble (*Rubus fructicosus*). Rhind (1988) detailed the vascular plants found on Great Cumbrae Island between 1985 and 1987 and delineated the history of the island's botanical investigations. Leaves of brambles in my garden, beech trees (*Fagus sylvatica*) and hazel (*Corylus avellana*) at other locations on the island (respectively Craiglea Wood (NS175566; referenced herein as CW), the eastern margin of the island's perimeter road (NS182553; referenced as EM) and the roadside, Farland Point (NS175544; referenced as FP)), were sampled for leaf-mining stigmellids

After some preliminary deployments in September and October 2015 (which yielded no micro moths), the light trap was employed extensively from 24 March 2016 to 23 March 2017 on as many occasions as proved feasible and personal circumstances allowed, which amounted to 148 nights sampled. Nights when heavy rain or gales were forecast were avoided, given the vulnerability of the light trap. A few later records are included. Micro moth determinations have been greatly facilitated by Sterling & Parsons' field guide (2012). Most helpful for checking distribution are the maps compiled by the East Scotland Branch of Butterfly Conservation (www.eastscotland-butterflies.org.uk/scottishmicros.html; accessed 19 October 2016 *et seq*.). Other relevant websites proved useful for checking identities and distribution data (notably ukmoths.org.uk, www.ukleps.org and lepiforum.de).

Micro moths of uncertain identity were either retained frozen as voucher specimens or photographed (or both). Confirmation of micro moth identifications was obtained from Nigel G. J. Richards (a member of the Scottish Micro Moth Verification Panel) either photographically via the

Scottish Moths Group e-mail facility, directly by e-mailing photographs to an expert or by submission of voucher material and genitalia dissection. Mark Young kindly confirmed the identity of certain stigmellid leaf miners. I am grateful to all, but especially to Nigel Richards, for patience and forbearance of this tyro lepidopterist's efforts, both at photography and identification, and latterly for his helpful comments on the first draft of this paper. I should like also to acknowledge the helpful assistance received from Glyn Collis (county moth recorder for vc100). Inspiration has been derived from the publications of Leverton (2001) and Plant (2008).

Night-time minimum temperatures and weather conditions were recorded after each trap deployment, beginning 13 April 2016. Data on the erebid macro moth, Pinion-streaked Snout (*Schrankia costaestrigalis*), are also included here since it is often mistaken for a micro (Sterling & Parsons, 2012: 28).

RESULTS

Data on occurrences and seasonality of 71 micro moth (together with data on one macro) species are presented in Appendix 1. For the most part micros occurred as singletons in my trap, the few exceptions (on occasions) being the Diamond-back Moth (*Plutella xylostella*), *Blastobasis adustella*, *B. lacticolella*, the Twenty-Plume Moth (*Alucita hexadactyla)*, the Barred Fruit-tree Tortrix (*Pandemis cerasana*), *Clepsis consimilana*, *Epiblema scutulana*, Small Magpie (*Anania hortulata*), *Eudonia angustea*, *E. mercurella*, *Chrysoteuchia culmella*, *Agriphila tristella* and *A. straminella*.

The proportion of micro to macro moths in the light trap varied seasonally with maximum occurrences of micros in the summer months (May to September, with a few in early October). Mean overnight minimum temperatures are given in Table 1.

Date	Min temperatures
13–30/04/2016	4.5
01–31/05/2016	9.6
01–30/06/2016	13.3
05–31/07/2016	14
01–31/08/2016	13.4
01–30/09/2016	13.5
01–31/10/2016	9.2
01–30/11/2016	4.9
01–31/12/2016	7.6
01–31/01/2017	4.7
01–28/02/2017	4.8
01–23/03/2017	5.8

Table 1. Mean monthly overnight minimum temperatures (ºC) at monitoring site.

DISCUSSION

It is not unusual to find that micro moths are under-recorded in any area (Knowler, 2016), so the paucity of data on Great Cumbrae Island is not unexpected. Collis & Collis (2008) recorded 31 micro moth species in their contribution on moths from Bute and it is interesting to compare their list with mine. Of the species recorded by Collis & Collis, only 19 are shared in my list. Doubtless this will relate to habitat differences in the vicinity of the trap sites between these adjacent islands. The very large catches of *Scoparia ambigualis* reported from Mugdock Country Park (Stirlingshire) by Knowler (2016) are unmatched in my data, and none of the highly distinctive *Yponomeuta evonymella* (Bird-Cherry Ermine), similarly prominent in Knowler's data, was recorded by me, although Collis & Collis (2008) did record it from Bute (suggestive of an absence here of its host tree, *Prunus padus*).

My investigation has established 20 new records for micro moths in vc100: *viz. Stigmella microtheriella*, *S. floslactella*, *S. tityrella*, *S. hemargyrella*, *Caloptilia rufipennella*, *Borkhausenia fuscescens*, *Diurnea fagella*, *Agonopterix nervosa*, *A. yeatiana*, *Blastobasis adustella*, *Pterophorus pentadactyla*, *Emmelina monodactyla*, *Clepsis consimilana*, *Epiphyas postvittana*, *Eana penziana*, *Apotomis betuletana*, *Notocelia cynosbatella*, *Cydia splendana*, *Scoparia subfusca* and *Catoptria pinella*.

All these are common species and widespread in Britain, so the previous absence of records locally reflects an absence of recorders. It remains important, though, that as much information as possible be forthcoming from neglected sites, even for common species. *Caloptilia rufipennella* is interesting in that it was discovered in Britain only in 1970 and has been gradually expanding its range ever since. *Epiphyas postvittana*, by contrast, came over here from Australia in the 1930s (www.ukmoths.org.uk; accessed 18 October 2016). Problematic infestation of brassicas by the migratory *Plutella xylostella* was reported in June 2016 from several monitoring sites in S. England; a two-mile-long cloud of these moths being reported near Leominster, Herefordshire, the high numbers so reported being unmatched for the past 20 years, with reports even reaching the national press (Knapton, 2016). Only two specimens were recorded by Knowler (2016) in 2006 from Mugdock Country Park (Stirlingshire). Numbers can fluctuate markedly from year to year. The leaf-mining moth *Cameraria ohridella*, first recorded in Britain in 2002 and now rapidly spreading north and west (Sterling & Parsons, 2012), currently threatens horse-chestnut trees (*Aesculus hippocastanum*) in England. There has been one confirmed sighting in Scotland (Forestry Commission website, as updated 27 September 2016; see www.forestry.gov.uk/horsechestnutleafminer, accessed 24 October 2016). It is another micro

moth that has made the national newspapers (Eleftheriou-Smith, 2016; Fox-Leonard, 2016). But, having examined the leaves of local horse-chestnut trees, I can affirm it has not reached Cumbrae (yet). The potential role of herbaria and archival DNA in tracking the origins of this invasive herbivore has been highlighted by Lees *et al*. (2011).

Note added in press:
A Small Magpie moth trapped 26 May 2017, has been confirmed as correctly identified by Nigel Richards, substantiating my earlier record (see above).

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Appendix 1. Micro moths of Great Cumbrae Island: abundance and seasonal occurrence

As per convention (Leverton, 2001), dates here recorded relate to dates of overnight trap deployment not dates of dismantling (which my notebooks record). Dates predominately reflect 2016 results. Any 2017 data are in parentheses. A single asterisk for *Gracillaria syringella* records that leaf mines were present on my privet hedge in addition to adults trapped. Any of my records not available for Nigel Richards' scrutiny of voucher material are marked with a double asterisk. Marked with a treble asterisk is the White-Plume moth (*Pterophorus pentadactyla*), which was found on the lawn in front of my garden office during the day, near to a bindweed plant (*Calystegia sepium*). †Signifies confirmed by Roy Leverton from photograph; §found inside and outside house; !!found outside house. Species numbering follows the latest check-list of Agassiz *et al*. (2013). In parentheses is the species number relating to Bradley's earlier check-list (2000).

	Numbers	Earliest date	Latest date
Family Nepticulidae			
4.010 (111) *Stigmella microtheriella* (EM, leaf mines in hazel)			
4.024 (104) *Stigmella magdalenae* (CW, leaf mines in rowan)			
4.032 (75) *Stigmella floslactella* (EM, leaf mines in hazel)			
4.034 (77) *Stigmella tityrella* (CW, leaf mines in beech)			
4.035 (68) *Stigmella salicis* (FP, leaf mines in sallow)			
4.045 (50) *Stigmella aurella* (leaf mines in bramble)			
4.055 (81) *Stigmella hemargyrella* (CW, leaf mines in beech)			
Family Gracillariidae			
15.004 (282) *Caloptilia elongella*	1	24/09	
15.006 (284) *Caloptilia rufipennella*	1	13/09	
15.014 (293) *Gracillaria syringella**	1	09/08	
Family Ypsolophidae			
17.011 (461) *Ypsolopha ustella*	1	30/10	
Family Plutellidae			
18.001 (464) *Plutella xylostella*	16	09/06	18/07
Family Glyphipterigidae			
19.002 (397) *Glyphipterix thrasonella*	1	06/06	
Family Oecophoridae			
28.009 (648) *Endrosis sarcitrella*	1	14/08	
28.010 (647) *Hofmannophila pseudospretella*	3	22/06	11/07
28.012 (644) *Borkhausenia fuscescens*	1	21/07	
Family Chimabachidae			
29.001 (663) *Diurnea fagella*!!	1	(06/04)	
Family Depressariidae			
32.007 (701) *Agonopterix ocellana* **	1	05/ 05	
32.017 (697) *Agonopterix arenella*	3	14/08 (06/04)	29/08
32.029 (705) *Agonopterix umbellana*	1	18/09	
32.030 (706) *Agonopterix nervosa*	2	21/07	20/08
32.035 (714) *Agonopterix yeatiana*	1	(08/04)	
32.039 (670) *Depressaria daucella*§	(3)	(17/01)	(06/04)
Family Gelechiidae			
35.038 (789) *Bryotropha domestica*	1	04/08	
35.040 (787) *Bryotropha terrella*	1	23/07	
Family Elachistidae			
38.026 (598) *Elachista kilmunella*	1	04/06	
Family Blastobasidae			

41.002 (873) *Blastobasis adustella*	17	18/07	30/10
41.003 (874) *Blastobasis lacticolella*	38	30/05	29/10
Family Alucitidae			
44.001 (1288) *Alucita hexadactyla***	10	05/05	13/09
Family Pterophoridae			
45.010 (1497) *Amblyptilia acanthadactyla*	1	23/07	
45.030 (1513) *Pterophorus pentadactyla****	1	11/07	
45.044 (1524) *Emmelina monodactyla*	3	05/09 (08/04) (10/04)	
Family Tortricidae			
49.025 (970) *Pandemis cerasana*	9	16/06	14/08
49.029 (1002) *Lozotaenia forsterana*	2	15/07	26/07
49.031 (989) *Aphelia paleana*	1	31/07	
49.038 (994) *Clepsis consimilana*	5	05/06	16/08
49.039 (998) *Epiphyas postvittana*	3	13/09	05/10
49.048 (1013) *Eana penziana*	1	26/07	
49.066 (1038) *Acleris laterana*	2	23/08	27/09
49.069 (1041) *Acleris sparsana*	1	13/09	
49.077 (1048) *Acleris variegana*	4	15/09	05/10
49.091 (1011) *Pseudargyrotoza conwagana*	1	15/07	
49.111 (954) *Eupoecilia angustana*	1	05/06	
49.127 (945) *Aethes cnicana*	1	18/07	
49.150 (1093) *Apotomis betuletana*	2	09/06	16/06
49.156 (1083) *Hedya nubiferana*	2	15/06	20/06
49.166 (1076) *Celypha lacunana*	2	09/06	18/07
49.194 (1111) *Bactra lancealana*	1	20/06	
49.195 (1110) *Bactra furfurana*	1	06/06	
49.214 (1126) *Ancylis badiana*	6	12/05	29/08
49.248 (1139) *Epinotia tenerana*	1	14/08	
49.285 (1184) *Epiblema scutulana*	2	12/06	
49.292 (1174) *Notocelia cynosbatella*	7	05/06	08/07
49.294 (1175) *Notocelia uddmanniana*	2	18/07	23/07
49.298 (1176) *Notocelia trimaculana*	1	17/06	
49.341 (1260) *Cydia splendana*	1	23/07	
Family Pyralidae			
62.001 (1428) *Aphomia sociella*	3	06/06	18/07
Family Crambidae			
63.025 (1376) *Anania hortulata* (Small Magpie)**	7	06/06	23/06
63.038 (1405) *Pleuroptya ruralis* (Mother of Pearl)** †	1	23/07	
63.057 (1356) *Evergestis forficalis* (Garden Pebble)	2	23/07	31/07
63.062 (1332) *Scoparia subfusca*	5	16/06	06/08
63.064 (1334) *Scoparia ambigualis*	7	05/06	06/08
63.069 (1342) *Eudonia angustea*	4	29/08	01/10
63.074 (1344) *Eudonia mercurella*	14	11/07	23/08
63.080 (1293) *Chrysoteuchia culmella*	39	04/06	23/08
63.081 (1294) *Crambus pascuella*	1	29/07	
63.088 (1302) *Crambus perlella*	1	23/07	
63.089 (1305) *Agriphila tristella*	44	03/06	29/08
63.093 (1304) *Agriphila straminella*	21	14/06	12/08
63.099 (1313) *Catoptria pinella*	1	11/07	
63.100 (1314) *Catoptria margaritella*	1	23/07	
Family Erebidae (Macro moth)			
72.061 (2484) *Schrankia costaestrigalis* (Pinion-streaked Snout)	2	29/07	31/07