

Associations of 16-year population dynamics in range-expanding moths with temperature and years since establishment

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SUPPLEMENTARY INFORMATION

Table S1. The 107 range-expanding moths arranged in taxonomic order of their family, subfamily and yearly abundance sorted taxonomically.

Family	Subfamily	Species/Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Pyralidae	Phycitinae	<i>Oncocera semirubella</i>		2	2	2	3		1	3	7	11	4	5	2	5	6	6	59
Pyralidae	Phycitinae	<i>Sciota fumella</i>							1			1		3		4		3	12
Pyralidae	Phycitinae	<i>Sciota adelphella</i>	1		2	3		12	11	2		4	1		1	4	3		44
Pyralidae	Phycitinae	<i>Nephoterix angustella</i>			3	1					3	1		2	2	50	8	1	71
Pyralidae	Pyralinae	<i>Pyralis regalis</i>													2	3	13	8	26
Crambidae	Pyraustinae	<i>Loxostege turbidalis</i>								2			1						3
Crambidae	Pyraustinae	<i>Loxostege sticticalis</i>		8	7	5	8	4	10	3	1	1		1		1	22	8	79
Crambidae	Pyraustinae	<i>Nascia ciliatilis</i>							3					2	2	2	1	3	13
Crambidae	Pyraustinae	<i>Ostrinia palustralis</i>	2	4	1		1								1	1	1		11
Crambidae	Pyraustinae	<i>Anania verbascalis</i>	1		8	3	4	2	15	4	15	11	4	1	2	5	11	22	108
Crambidae	Spilomelinae	<i>Udea ferrugalis</i>		1													12	5	18
Crambidae	Spilomelinae	<i>Udea accolalis</i>														19			19
Crambidae	Spilomelinae	<i>Diseamia reticularis</i>							1			1	2	1		15	5		25
Crambidae	Spilomelinae	<i>Nomophila noctuella</i>	1	38	95	1	1	105	3	12	20	87	34	5	1	50	236	8	697
Crambidae	Spilomelinae	<i>Antigastra catalaunalis</i>		1															1

Crambidae	Spilomelinae	<i>Palpita vitrealis</i>									2		2		1	2	5	12	
Crambidae	Glaphyriinae	<i>Evergestis frumentalis</i>						1										1	
Crambidae	Crambinae	<i>Euchromius ocella</i>			2						1			1		3	8	15	
Drepanidae	Drepaninae	<i>Watsonalla binaria</i>		1		1	5	8	45	15	49	102	45	89	46	296	51	49	802
Drepanidae	Drepaninae	<i>Watsonalla cultraria</i>											4					4	
Drepanidae	Drepaninae	<i>Drepana curvatula</i>		1	2			1	1			1	1		1	3	1	12	
Geometridae	Sterrhinae	<i>Cyclophora annularia</i>											1					1	
Geometridae	Sterrhinae	<i>Cyclophora porata</i>				1								3	2			6	
Geometridae	Sterrhinae	<i>Cyclophora linearia</i>	1	5			5	1	3		2		1	2		5	5	30	
Geometridae	Sterrhinae	<i>Idaea ochrata</i>		1			2	2	1				1	1	2	6	9	29	
Geometridae	Larentiinae	<i>Orthonama obstipata</i>	1					1						1			1	4	
Geometridae	Larentiinae	<i>Xanthorhoe biriviata</i>											1	1				2	
Geometridae	Larentiinae	<i>Catarhoe rubidata</i>				1					1		1		3	1		7	
Geometridae	Larentiinae	<i>Costaconvexa polygrammata</i>		1						1							1	3	
Geometridae	Larentiinae	<i>Horisme corticata</i>												1				1	
Geometridae	Larentiinae	<i>Chloroclystis v-ata</i>	2		3	3	2	4	6		10	3	7	15	27	45	15	13	155
Geometridae	Larentiinae	<i>Eupithecia pulchellata</i>															1	1	
Geometridae	Larentiinae	<i>Chesias legatella</i>	1			1						1	1	1	5	1	3	14	
Geometridae	Ennominae	<i>Fagivorina arenaria</i>		1														1	
Geometridae	Geometrinae	<i>Thetidia smaragdaria</i>	1							2		1	1	2	1	5		1	14
Sphingidae	Sphinginae	<i>Agrius convolvuli</i>	17	6	5	1	2	7	7	1	8		1		2	3	3		63
Sphingidae	Macroglossinae	<i>Hyles euphorbiae</i>							2										2
Sphingidae	Macroglossinae	<i>Hyles gallii</i>		11	93	16	26	70	108	30	120	56	56	34	60	22	50	32	784
Notodontidae	Thaumetopoeinae	<i>Thaumetopoea pinivora</i>			7														7
Notodontidae	Notodontinae	<i>Notodonta tritophus</i>	2	3	4		4	1	7	5	5	5	8	4	7	5	5	6	71
Notodontidae	Pygaerinae	<i>Clostera anachoreta</i>	1															1	2
Erebidae	Hypeninae	<i>Colobochyla salicalis</i>		1				1	4	4	1	1	4	6	5	1	2	2	32
Erebidae	Nygmiini	<i>Euproctis chrysorrhoea</i>		31					1	2		1		2	1			1	39
Erebidae	Lithosiini	<i>Pelosia muscerda</i>	2	5	1		6	8	8	2	4	8	32	44	22	32	18	38	230

Erebidae	Lithosiini	<i>Pelosa obtusa</i>	2	5		6		1	2	2	4	3			1	3	3	2	34
Erebidae	Lithosiini	<i>Lithosia quadra</i>		1	1	8	4	3	16	12	5	20	13	3	16	15	9	4	130
Erebidae	Lithosiini	<i>Eilema griseola</i>					1		1				4	1	1	4		3	15
Erebidae	Arctiini	<i>Callimorpha dominula</i>			1														1
Erebidae	Boletobiinae	<i>Eublemma purpurina</i>															1		1
Erebidae	Erebinae	<i>Minucia lunaris</i>		1															1
Erebidae	Erebinae	<i>Grammodes stolidia</i>															1		1
Erebidae	Erebinae	<i>Catocala fulminea</i>							1	2						1			4
Erebidae	Erebinae	<i>Catocala fraxini</i>	11	35	9	3	9		30	7	8	5	8	9	8	4	11	10	167
Erebidae	Erebinae	<i>Catocala nupta</i>	3	15	18	5	5	8	47	4	13	4	9	12	15	10	12	10	190
Noctuidae	Acontiinae	<i>Acontia trabalis</i>	2	2	11	2		6	54	43	8	3	1	5		15	2	13	167
Noctuidae	Plusiinae	<i>Abrostola triplasia</i>	59	24	93	87	72	80	170	89	67	127	75	73	202	106	70	85	1479
Noctuidae	Plusiinae	<i>Trichoplusia ni</i>			1														1
Noctuidae	Plusiinae	<i>Macdunnoughia confusa</i>	4	21	35	7	12	6	15	4	13	11	6	2	10	14	17	16	193
Noctuidae	Plusiinae	<i>Autographa mandarina</i>	7	15	9		4	3	61	7		1							107
Noctuidae	Plusiinae	<i>Syngrapha interrogationis</i>	2	8		2		1	4	6	7	7	1			2		1	41
Noctuidae	Cuculliinae	<i>Cucullia fraudatrix</i>							2	1				4		1		2	10
Noctuidae	Cuculliinae	<i>Cucullia artemisiae</i>		1							1			1					3
Noctuidae	Cuculliinae	<i>Cucullia scrophulariae</i>															1	2	3
Noctuidae	Eustrotiinae	<i>Deltote deceptor</i>		1					7	5	1								14
Noctuidae	Acronictinae	<i>Acronicta albovenosa</i>	6	12	5	23	15	9	14	7	28	48	7	8	2	98	44	41	367
Noctuidae	Condicinae	<i>Eucarta virgo</i>	4	14	26	9	9	136	138	31	25	91	24	27	18	83	17	10	662
Noctuidae	Heliothinae	<i>Heliothis peltigera</i>			1								1						2
Noctuidae	Heliothinae	<i>Heliothis virescens</i>		5	5	3	1	10	3			6	3			3	24	23	86
Noctuidae	Heliothinae	<i>Helicoverpa armigera</i>		3								7	7		8		4	1	30
Noctuidae	Bryophilinae	<i>Cryphia algae</i>							1			1	2	1	3	4	64	114	190
Noctuidae	Pseudeustrotiini	<i>Pseudeustrotia candidula</i>	2	7	16	7	5	11	138	14	44	87	9	11	35	35	337	92	850
Noctuidae	Prodeniini	<i>Spodoptera exigua</i>											6			4	1	1	12
Noctuidae	Caradrinini	<i>Hoplodrina ambigua</i>	2	1	3	19	94	10	16	37	33	91	587	1186	632	513	3284	1575	8083
Noctuidae	Caradrinini	<i>Proxenus lepigone</i>			1									12	3	2	18	7	43

Noctuidae	Phlogophorini	<i>Phlogophora meticulosa</i>	54	61	199	115	53	3	13	43	23	73	366	155	49	81	109	243	1640
Noctuidae	Apameini	<i>Hydraecia ultima</i>		7	5		1	3	49	4	2	12	3		1	1			88
Noctuidae	Apameini	<i>Sedina buettneri</i>							2		1	2	2	2		1		2	12
Noctuidae	Apameini	<i>Archanara neurica</i>						1											1
Noctuidae	Apameini	<i>Coenobia rufa</i>												1	1	13	16	43	74
Noctuidae	Apameini	<i>Photodes extrema</i>				1		1											2
Noctuidae	Apameini	<i>Globia sparganii</i>			1	2		3	1		4	3	7	1	1	4	8	8	43
Noctuidae	Apameini	<i>Globia algae</i>			1		1	1		1	2	7	4	2	1	6	11	4	41
Noctuidae	Xylenini	<i>Cirrhia gilvago</i>	4	11	2		1	1	2	1	10	6	1	9	2	15	4		69
Noctuidae	Xylenini	<i>Agrochola lychnidis</i>					1		1	2			1	1			1		7
Noctuidae	Xylenini	<i>Xylena exsoleta</i>												1					1
Noctuidae	Xylenini	<i>Cosmia affinis</i>								1			1				1	1	4
Noctuidae	Xylenini	<i>Atethmia centrugo</i>															1	2	3
Noctuidae	Xylenini	<i>Blepharita amica</i>							1						1		1		3
Noctuidae	Hadenini	<i>Lacanobia splendens</i>							1					1		1			3
Noctuidae	Hadenini	<i>Conisania leineri</i>							1										1
Noctuidae	Leucaniini	<i>Mythimna turca</i>	9	11	2	5	4	7	12	13	24	20	19	23	35	29	6	4	223
Noctuidae	Leucaniini	<i>Mythimna vitellina</i>		4											2			1	7
Noctuidae	Leucaniini	<i>Mythimna albipuncta</i>	4	9	4	15	31	15	12		1	29	102	184	88	30	137	227	888
Noctuidae	Leucaniini	<i>Mythimna l-album</i>									2	8	2			1	4	2	19
Noctuidae	Noctuini	<i>Peridroma saucia</i>	2	1															3
Noctuidae	Noctuini	<i>Actebia praecox</i>	3	4	2	2	12	13	22	24	67	26	51	42	27	28	36	30	389
Noctuidae	Noctuini	<i>Agrotis bigramma</i>										1	1						2
Noctuidae	Noctuini	<i>Agrotis ripae</i>		3	1	1	6	6	8	2	5	7	5	5	3	37	7	16	112
Noctuidae	Noctuini	<i>Agrotis puta</i>														1	2	2	5
Noctuidae	Noctuini	<i>Agrotis ipsilon</i>	3	87	79	8	5	17	25	18	10	28	26	35	14	208	11	10	584
Noctuidae	Noctuini	<i>Chersotis cuprea</i>		1	1	1	1			2									6
Noctuidae	Noctuini	<i>Noctua interposita</i>			2		2	1	2				3	3	5	17	9	10	54
Noctuidae	Noctuini	<i>Noctua janthina</i>	103	35	17	37	71	34	62	60	136	244	58	102	62	69	24	30	1144
Noctuidae	Noctuini	<i>Noctua interjecta</i>	51	2	19	54	136	127	64	35	62	273	212	713	481	543	281	215	3268
Noctuidae	Noctuini	<i>Xestia alpicola</i>							2										2
Noctuidae	Noctuini	<i>Xestia ditrapezium</i>							1				1	1	3	6	1	1	14
Nolidae	Chloephorinae	<i>Nycteola asiatica</i>		2	1	1							3	1	1				9

Figure S1. Average ambient air temperature during May - July at the WMO meteorological station Ölands södra udde during the study period 2005 - 2020.

