Massachusetts Butterflies

Fall 2012, No. 39

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A Native Butterfly Confronts Exotic Plants and Parasitoids

Frances S. Chew[1], Roy G. Van Driesche[2], and Richard A. Casagrande[3]

In the 1850s, the native Mustard White (*Pieris oleracea*) flew in Harvard Yard, according to Scudder, a Harvard lepidopterist. Since then, its range has retreated to western Massachusetts, and it has declined in numbers, likely due to some mix of habitat loss and invasions of several species including exotic plants such as garlic mustard and an exotic parasitoid (*Cotesia glomerata*) introduced as a biological control agent for the related Cabbage White (*Pieris rapae*). Despite *P. oleracea'*s current state-listed status, the unintended and unexpected interactions of these and other exotic species have set the ecological stage for population recovery of this native butterfly.

The Mustard White is one of several *Pieris* species descended from a single ancestral group that was established in North America when Pleistocene glaciation fragmented the ancestral geographic range of northern hemisphere *Pieris napi*. In spring, its habitat was beech-maple-hemlock woods where its principal host was two-

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leaved toothwort (*Cardamine diphylla*); in summer it flew in wet meadows with native crucifer hosts such as *Barbarea orthoceras*. By the mid-1800s, agricultural introduction of *Brassica* crops enabled Mustard White populations to expand and the species was a minor pest in some areas.

Beginning near the turn of the twentieth century, a series of exotic species spread into the habitats of this butterfly: (a) *Cotesia glomerata*, a parasitoid wasp introduced in the 1880s for biological control of *P. rapae*, which had invaded North America in the 1860s; (b) garlic mustard (*Alliaria petiolata*), which became common in western Massachusetts by the 1970s; (c) *Cotesia rubecula*, a second, more specialized parasitoid of *P. rapae* introduced to Massachusetts in 1988; and (d) cuckoo flower (*Cardamine pratensis*), which became common in parts of western Massachusetts by the early 2000s.

The first two introductions (*C. glomerata* and garlic mustard) were probably responsible, together with habitat destruction, for the decline of *P. oleracea* and the state's subsequent listing of it as a Threatened Species. *Cotesia glomerata* attacked its intended target pest species (*P. rapae*), but later research showed that it apparently prefers to attack the native *P. oleracea*, if given the choice. The second damaging invader, garlic mustard, is highly attractive to *P. oleracea* females for egg-laying, but until recently, their caterpillars had slow development and poor survival . Garlic mustard leaves contain high levels of allyl glucosinolate—one member of the class of compounds responsible for the "hot spicy" flavor in mustard, horseradish, and wasabi, as well as salad greens such as arugula. These are the compounds that stimulate oviposition by *P. oleracea*. However, the plant also contains at least two compounds that deter caterpillar feeding, causing *P. oleracea* larvae to starve to death. Garlic mustard is thus an

'evolutionary trap' and a population sink because normal butterfly responses to garlic mustard's stimulatory compounds doom the offspring of butterflies choosing garlic mustard compared to those of females that oviposit on more suitable crucifers.

However, if a female *P. oleracea* prefers to oviposit on flowering garlic mustard, her larval offspring, due to past selection, tend to perform better—they eat this plant more readily and develop more normally. This positive preference-performance correlation promotes natural selection for improved adaptation to garlic mustard. Very recently, we've even found some butterflies whose offspring develop as fast on flowering garlic mustard leaves as on the native host, but none—so far—can complete larval development on rosettes of garlic mustard. We believe this improved adaptation was aided by reduced parasitism on P. oleracea caterpillars and is a result of the third introduction, the exotic parasitoid *Cotesia rubecula*, which was introduced in 1988 by Roy Van Driesche as a better biological control parasitoid for the pest butterfly, *P. rapae*. Females of this wasp parasitoid attack only *P. rapae*, and when both *Cotesia* wasps lay their eggs in a caterpillar, *C. rubecula* kills larvae of *C. glomerata*. Competition between these two species has greatly lowered the prevalence of *C. glomerata* in Massachusetts, dropping from 20-80% parasitism in *P. rapae* in 1985-86 to only about 1-10% parasitism in 2007. Reduced density of *C. glomerata* may have reduced mortality of slow-growing *P. oleracea* caterpillars on garlic mustard, giving them a chance to complete their development.

The fourth exotic species playing a key role in the evolution of these relationships is a highly suitable host, the invasive form of cuckoo flower (*C. pratensis*). It is now well established in some wet meadows in western Massachusetts, where it attracts ovipositing *P. oleracea*. Because it is perennial and remains

suitable for the butterfly for an extended period (April to November), it now supports as many as four *P. oleracea* generations per year at some sites. Data from the Massachusetts Natural Heritage and Endangered Species Program and the Massachusetts Butterfly Club's seasonal summaries show that at one site in Lenox, Massachusetts, large numbers (100+ flying on a single date) began to be recorded beginning in 2004. Further, some newer invasive plant species such as *Cardamine impatiens* are now spreading into western Massachusetts, and we have determined that *C. impatiens* is also an excellent larval host for *P. oleracea*. As garlic mustard and cuckoo flower both spread in western Massachusetts, we predict that *P. oleracea* will not only expand its populations on cuckoo flower and perhaps C. impatiens but may also eventually incorporate garlic mustard into its diet, and this is possible because *C. rubecula* has greatly reduced (to near zero) parasitoid pressure on *P. oleracea*.

For further reading:

Benson, J. R. G. Van Driesche, A. Pasquale, and J. Elkinton. 2003. Introduced braconid parasitoids and range reduction of a native butterfly in New England. *Biological Control* 28: 197-213.

Keeler, M.S. and F.S. Chew. 2008. Escaping an evolutionary trap: preference and performance of a native insect on an exotic invasive host. *Oecologia* 156: 559-568.

Van Driesche. 2008. Biological control of *Pieris rapae* in New England: host suppression and displacement of *Cotesia glomerata* by *Cotesia rubecula* (Hymenoptera: Braconidae). *Florida Entomologist* 91: 22-25.

Acknowledgements:
We thank Michael W. Nelson and Bryan A. Connolly of the NHESP (MA Div. of Fisheries & Wildlife) respectively for checking population records for *P. oleracea* at Lenox, MA and helping us test the suitability of *Cardamine impatiens* for *P. oleracea.*

Both Cuckoo Flower and Garlic Mustard abound at the Lenox site, 5-2-2012

Wilson hunts for eggs among the masses of Cuckoo Flower, 5-2-2012

2012 NABA Butterfly Counts

Tom Gagnon

The number of individual butterflies was 14,720, up 3,947 for 2012. That is a dramatic increase over 2011 and the highest in several years. We added two NEW butterflies to the count list: American Snout (Central Berkshire) and Sachem (Brewster Count). South Berkshire count lead the way with the most species tallied at 52, the highest ever for that count. Their previous high was 48. There were 10 species seen on only ONE count. They were: Giant Swallowtail, Mustard White, Variegated Fritillary, Gray Comma, Hackberry Emperor, Hoary Edge, Northern Cloudywing, Sachem, American Snout and Harris' Checkerspot. Two species we have seen in the past on the counts, but did not see this year, were Compton Tortoiseshell and Milbert's Tortoiseshell.

Some participants felt that this year's counts had good weather though some butterflies were down in numbers due to the early spring and drought conditions leading up to the count period. Some species appeared earlier than usual this year. An example is the Acadian Hairstreak. I checked on the Pittsfield colony on June 30th and found 10 very fresh individuals but, by the time the Central Berkshire count was held on July 21st I could only find ONE. The Giant Swallowtail found on the South Berkshire Count was quite fresh and the start of a HUGE second flight that made history here in the Bay State.

Some of the count circles struggled to get enough counters in the field. This was true last year as well: the total number of participants in all the counts was about the same this year as last year. Some of us "Old Timers" are starting to fade and we need to

start doing some recruiting of younger members to keep this wonderful hobby of ours going and helping to add to our "citizen science data base".

A big THANK YOU to all those who helped collect all this data. And also THANK YOU to the count compilers --- like Alison Robb who compiles three counts each year and helps out on a fourth, and Tom Tyning and Mark Fairbrother who juggle two counts into their busy summer schedule, and all of the rest of the compilers. Thank you again, a job well done.

Tom Gagnon, Florence, Massachusetts

Editor's Note: The Butterfly Count Program is administered by the North American Butterfly Association, 4 Delaware Rd, Morristown, NJ 07960. Official reports for all counts held in the U.S., Canada and Mexico are available from NABA for $10.00. The unofficial tallies for Massachusetts counts are reported here.

Table 1: 2012 NABA Counts in Massachusetts:
Numbers Observed by Species

		Pipevine Swallowtail	Black Swallowtail	Giant Swallowtail	Eastern Tiger Swallowtail	CanadianTiger Swallowtail	Spicebush Swallowtail	Mustard White	Cabbage White	Clouded Sulphur	Orange Sulphur	Cloudless Sulphur	Harvester	American Copper	Bog Copper	Coral Hairstreak	Acadian Hairstreak	Edwards' Hairstreak	Banded Hairstreak	Hickory Hairstreak	Striped Hairstreak
Total		**152**	**1**	**147**	**14**	**76**	**56**	**1703**	**713**	**722**		**4**	**747**	**237**	**62**	**2**	**60**	**141**	**3**	**17**
Northern Berkshire		32			12			70	89	66			12		25	1		17		4
Central Berkshire		22			2	1	56	121	42	123		1	4		10	1				
Southern Berkshire		27	1	12		2		128	79	75		2	31					10	2	
Central Franklin		4		5		2		59	57	30			126	221	4			61		1
Northampton		19		14		7		262	126	71			6					3		
Northern Worcester		4		60		7		510	247	140			322					13		2
Concord		1		6				78	6	7			28					1		
Northern Essex		2		6		2		15	12	16			8					3		
Blackstone Corridor		1		13		6		24	10	39		1	22		1			2	1	
Bristol				2		12		31	2	9			1							
Falmouth		1				4		6	11	20			9		1		1	20		
Brewster				9		9		172		15			38		9			2		3
Barnstable				2		1		13	3	4										
Truro				13		11		16	17	31			129	16	5			2		7
Martha's Vineyard		39		5		12		119	12	76			11		7		59	7		

	Juniper Hairstreak	Gray Hairstreak	Eastern Tailed-Blue	"Summer' Spring Azure	American Snout	Variegated Fritillary	Great Spangled Fritillary	Aphrodite Fritillary	Atlantis Fritillary	Silver-bordered Fritillary	Meadow Fritillary	Harris' Checkerspot	Pearl Crescent	Baltimore Checkerspot	Question Mark	Eastern Comma	Gray Comma	Mourning Cloak	American Lady	Painted Lady
Total	**8**	**30**	**104**	**64**	**1**	**1**	**268**	**17**	**8**	**39**	**9**	**2**	**1311**	**127**	**149**	**36**	**3**	**15**	**146**	**45**
Northern Berkshire		1	5	29			47	7	5	2	2		85	56	23	6	3	2	9	4
Central Berkshire			2	5	1		13	1	3				247	18	13	9		1	4	
Southern Berkshire			15	1			35	2			7		124	18	20	11		4	2	5
Central Franklin			10	8			7	1		8			48	5	9	2		2	2	1
Northampton			10	4		1	6			12			184	2	11	2			9	11
Northern Worcester			14	9			114	6				2	2		34	3		4	9	2
Concord		3	4	2			3						80		7	1		1	1	
Northern Essex		1	5	2			26			14			6	28	2			1	4	2
Blackstone Corridor		6	13	4			13			2			97		5	1			8	1
Bristol		1	13				4			1			51		6				6	
Falmouth		6	1										12		1				22	1
Brewster	7	4	1										119		4				16	6
Barnstable			6										62							2
Truro		5	3										142		10				30	6
Martha's Vineyard	1	3	2										52		4	1			24	4

	Red Admiral	Common Buckeye	Red-spotted Admiral	White Admiral	Red-spotted Purple	Viceroy	Hackberry Emperor	Tawny Emperor	Northern Pearly Eye	Eyed Brown	Appalachian Brown	Little Wood-Satyr	Common Ringlet	Common Wood Nymph	Monarch	Silver-spotted Skipper	Hoary Edge	Southern Cloudywing	Northern Cloudywing	Dreamy Duskywing
Total	**145**	**19**	**31**	**6**	**19**	**78**	**1**	**6**	**36**	**27**	**72**	**197**	**646**	**2062**	**1025**	**302**	**2**	**6**	**1**	
Northern Berkshire	7			4	10	3			10			1	2	689	91	33				
Central Berkshire	4	1	6	1		11			5	1	14		190	105	42	9				
Southern Berkshire	6	2		1	9	6	1	3	10	1	17	9	3	594	102	20				
Central Franklin	3	4	1			4			2	6	11	8	4	21	61	81	2	1	1	
Northampton	4		3			17		3	1		2	6	219	144	112	29				
Northern Worcester	34	1	1			1			8	1	2	91	3	1	141	40		4		
Concord	8		10			9					2	15	4	16	42	18				
Northern Essex	5	1				1				11	1	12		30	40	4				
Blackstone Corridor	4	3				18				7	7	39	5	268	36	14		1		
Bristol		2				8					1	4		28	26	9				
Falmouth	6										2			50	16					
Brewster	16										3	2		17	26	8				
Barnstable													215	21	19	1				
Truro	44	1	1								2	8		22	87	22				
Martha's Vineyard	4	4	9								8	2	1	56	184	14				

Total	**28**	**73**	**47**	**78**	**127**	**407**	**54**	**61**	**9**	**360**	**70**	**1**	**101**	**78**	**9**	**3**	**88**	**7**	**28**	**1107**
Northern Berkshire				1	12	50	12	2	1	55	12		18		2		1			353
Central Berkshire		4				193	1	1		5	1		4				7	4		237
Southern Berkshire				2	4	55	1	12	1	20	2		8	21	1		47	3	3	151
Central Franklin			2			1	1	2	1	63	6		14	1					4	65
Northampton	1	8	26	51		56	8	1		10						1	2		1	19
Northern Worcester				1	99		2	9	5	8	30		9		6					9
Concord	6	6	9			6		1		10			3	8			10		1	17
Northern Essex	1			6	3			1		3	11		3	25			1		12	30
Blackstone Corridor		20	10		4	7	4	16		36	5		21	23			3		7	62
Bristol	19	15		1		11				13						2	5			4
Falmouth	2	6					1	1		34			10							3
Brewster	1					3		4		21	3	1	1				9			40
Barnstable		10		5		11	1			4										1
Truro				3	5			9		51			10				1			40
Martha's Vineyard		4		8		14	23	2	1	17							2			76
	Horace's Duskywing	Wild Indigo Duskywing	Common Sootywing	Least Skipper	European Skipper	Peck's Skipper	Tawny-edged Skipper	Crossline Skipper	Long Dash	Northern Broken Dash	Little Glassywing	Sachem	Delaware Skippeer	Mulberry Wing	Hobomok Skipper	Zabulon Skipper	Broad-winged Skipper	Dion Skipper	Black Dash	Dun Skipper

Table 2: 2012 NABA Counts in Massachusetts: Summary

Count Circle	No. of Individuals	No. of Species	No. of Participants	Party Hours	Date	Compiler
Northern Berkshire	1,983	47	8	NA	7-14	Tom Tyning
Central Berkshire	1,545	44	3*	15.5*	7-21	Tom Tyning
Southern Berkshire	1,728	52	14	39.5	7-13	Rene Laubach
Central Franklin	1,069	49	6	33.5	7-7	Mark Fairbrother
Northampton	1484	42	7	43.25	7-22	Mark Fairbrother
Northern Worcester	2,147	43	17	62.5	6-30	Carl Kamp
Concord	430	36	14	15.0	7-14	Dick Walton
Northern Essex	356	39	9	12.0	7-7	Sharon Stichter
Blackstone Corridor	890	45	7	44.25	7-14	Tom Dodd
Bristol	292	28	3	5.5	7-22	Mark Mello
Falmouth	237	27	4	7.0	7-14	Alison Robb
Brewster	560	30	14	9.0	7-21	Alison Robb
Barnstable	381	18	5	5	7-28	Ian Ives
Truro	749	31	4	11.0	7-7	Alison Robb
Martha's Vineyard	869	36	6	21.75	7-21	Matt Pelikan
Total	**14,720**	**73**	**121**			

Highlights from the 2012 Season

Sharon Stichter

This has been an amazing year for butterflies, with the numbers seen way up compared to last year, many new early records set, more southern migrants than usual, an outbreak of Painted Ladies, and other surprising phenomena. This report focuses on the early part of the season, through the beginning of August. A fuller report on the 2012 season, with numbers, analysis and more photographs, will appear in the Spring 2013 issue of Massachusetts Butterflies.

Juniper Hairstreak and Hessel's Hairstreak

Our eastern 'Olive' Juniper Hairstreak is recognized as a distinct sub-species, *Callophrys gryneus gryneus*. It is unusual among hairstreaks in having two separate flight periods, and both flights were beautifully photographed this year. Howard Hoople got the earliest photos of the first flight, while Greg Dysart captured the second flight (see photo on front cover). Juniper Hairstreak was also reported from Wellfleet Bay WS and Hingham World's End TTOR this year, and had a relatively good year in eastern Massachusetts after declines in 2010 and 2011.

Hessel's Hairstreak was also photographed in Massachusetts this year by Mark Rainey. It has been photographed in the state only a few times before, and only at the Ponkapoag site. Hessel's Hairstreak is state-listed as a species of Special Concern.

Juniper Hairstreak , Woburn, April 19, 2012. *Photo: H. Hoople*

Hessel's Hairstreak Ponkapoag Bog, May 20, 2012. *M. Rainey*

The two photos on page 18 show three ventral field mark differences between the closely related Juniper and Hessel's Hairstreaks. First, Hessel's has a white subcostal mark on the inner FW, which Juniper does not have. Second, in Hessels, the white postmedian line has brown on both sides, whereas Juniper has brown only on the inward side (not very visible in these photos). Third, the white line near the HW trailing edge is convex to the body in Hessel's, concave in Juniper. (There are also other differences; see Cech and Tudor 2005).

New Early Records for Elfins and Hairstreaks

Many new early flight records were set in 2012; the full list is forthcoming in the Season Summary in the Spring issue. Only the hairstreaks and elfins are reported here.

WHITE M HAIRSTREAK: A new early record for this species was set this year with the sighting by Tom Gagnon and others on 4/7/2012 on Mt. Tom in Easthampton. The photograph from Montague Plains on the next page documents the second earliest sighting date ever for White M in this state. The presence of fresh individuals in April at these two locations and at Middlesex Fells in eastern Massachusetts (M. Arey 4/21/2012) almost certainly indicates successful over-wintering. White M is probably established in the state; it has been seen every year since 2000.

BROWN ELFIN also set a new early record this year. The lovely photo on the next page shows the second earliest report this year. The earliest report was 3/23/12 Woburn, M. Arey.

White M Hairstreak, Montague Plains WMA, April 13, 2012. *S. Cloutier*

Brown Elfin, Montague Plains WMA, April 4, 2012. *Photo: S. Cloutier*

OAK HAIRSTREAK: The second earliest state record ever for this species was set this year on June 7, 2012, in Betsy Higgins' yard in Florence. The earliest record is 6/4/2011, Woburn, M. Arey. Our 'Northern' Oak Hairstreak is subspecies *Satyrium favonius ontario*, and is quite different from the 'Southern" Oak Hairstreak *S. f. favonius.*

Oak Hairsteak Northampton, Florence, June 7, 2012. *Photo: B. Higgins*

Other new early hairstreak and elfin records this year are

JUNIPER HAIRSTREAK: The new early record is 4/13/2012, when H. Hoople saw 3 in Woburn. Photos from that date are available.
FROSTED ELFIN: The new early record is 4/6/2012, 5 seen at Barnes Airport, Westfield, T. Gagnon.
HENRY'S ELFIN: The new early record is 3/23/2012, 1 seen at Georgetown/Boxford power line, M. Arey.

HOARY ELFIN: The new early record is 4/4/2012, at Martha's Vineyard, Wasque Reservation, R. Hopping.

Coral, Edwards', Banded and Acadian Hairstreaks set new early records in 2010, and these were not exceeded in 2012.

Eyed Brown Retreating Northward?

Eyed Brown appears to be declining in Massachusetts, according to MBC records, while Appalachian Brown is increasing (see data at www.butterfliesofmassachusetts.net/eyed-brown.htm). There are very few recent reports of Eyed Brown from the southeastern part of the state, and the species may be retreating northward. One example comes from Evans Field in Provincetown, where Eyed Brown was definitively present in the late 1970's, according to specimens in the collection of Mark Mello, and probably present in the 1990's, according to a few sight reports. This year the Truro NABA Count participants searched diligently for browns at Evans Field, and found only two – both Appalachian Browns. Eyed Brown now appears to be gone from this site.

On the very same day, the North Essex NABA Count participants did find Eyed Brown at Appleton Farms. The two photos shown here from these two counts nicely illustrate the field marks differentiating the two species.

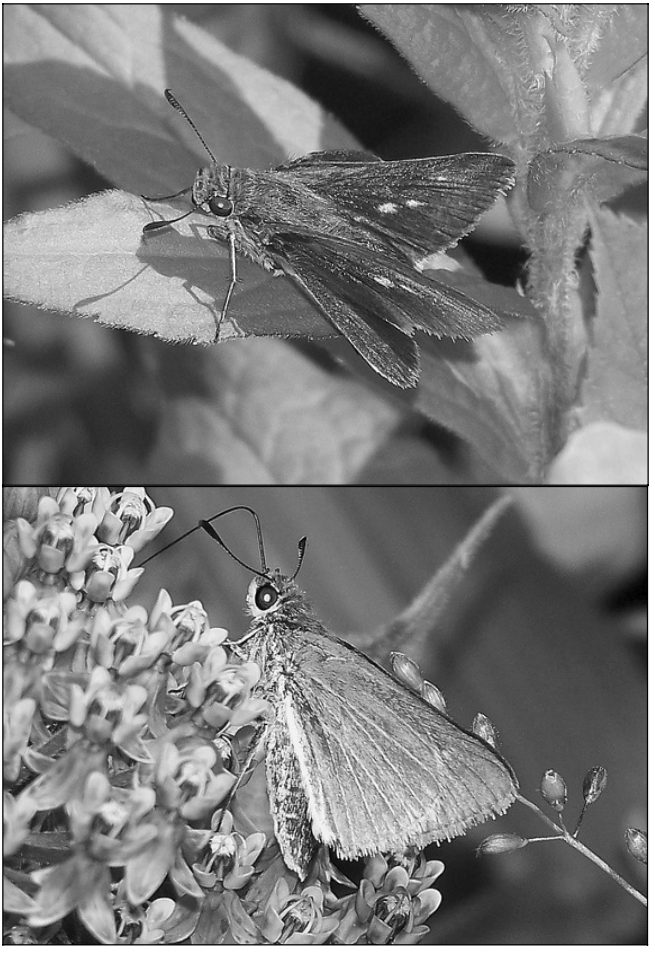
Again this year, as in most years, there were more Appalachian Browns found on Massachusetts NABA counts than Eyed Browns. But in addition to North Essex, Eyed Brown was also found on the Blackstone Corridor, Northern Worcester, Central Franklin, and Central and Southern Berkshire NABA Counts (see Count report in this issue).

Appalachian Brown, Evans Field Provincetown, 7-7-2012. *Joe Dwelly*

Eyed Brown, Appleton Farms Ipswich, 7-7-2012. *Photo: H. Hoople*

Two-spotted Skipper Relocated

This rare skipper was not found in the state in 2010 or 2011, but extensive searches this year by Frank Model reconfirmed its presence. Great work Frank!

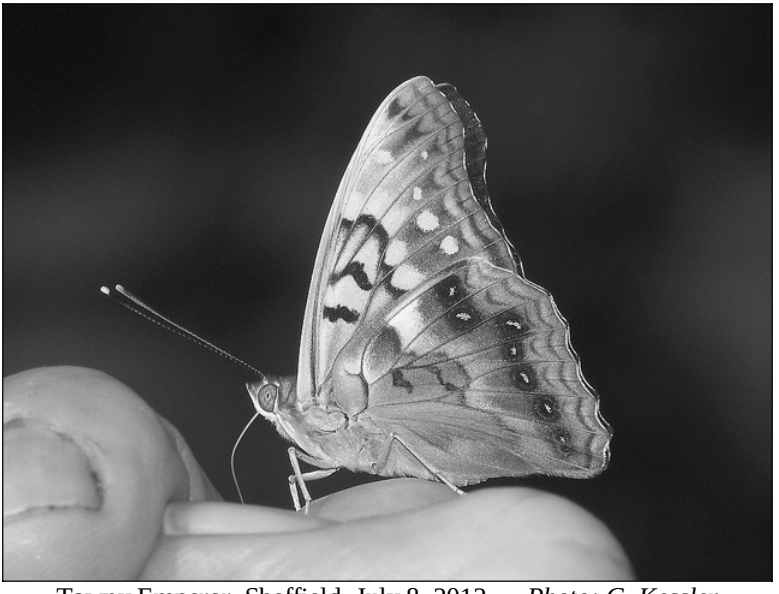


Two-spotted Skipper, dorsal and ventral, New Salem 6-28-2012. *F. Model*

Species which are Increasing or Decreasing

A new study by G. Breed, S. Stichter, and E. Crone was published this year in the journal *Nature: Climate Change*. Based on 19 years of MBC records, it describes the impact of climate change on Massachusetts butterflies, detailing the increase in sightings of southern-based species and the decline of some of our northern-based species.

One of the species which is increasing, according to this study, is Tawny Emperor. Garry Kessler photographed this very obliging individual sitting on his finger at Bartholomew's Cobble, TTOR. Tawny Emperors were seen at this location and at Northampton Community Gardens this year.



Tawny Emperor, Sheffield, July 8, 2012 *Photo: G. Kessler*

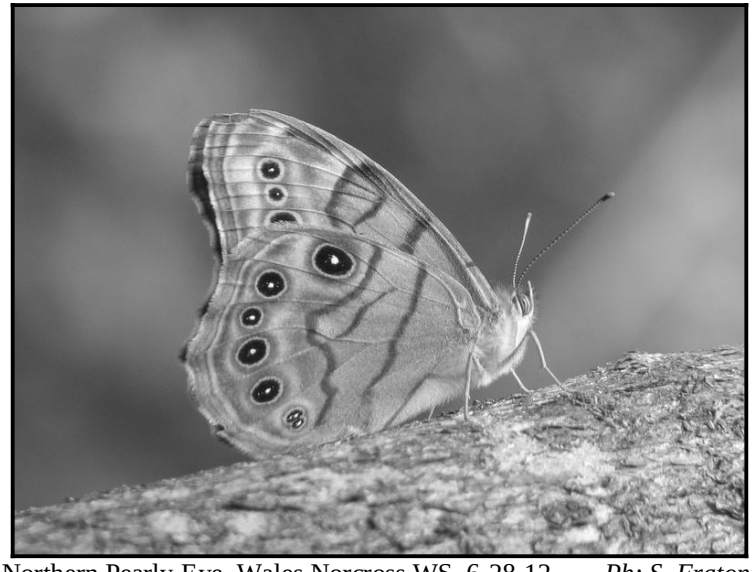
The climate change study finds that Aphrodite Fritillary, Acadian Hairstreak, and Atlantis Fritillary are the species which have declined the most in our state over the past 20 years. Leonard's Skipper and Northern Cloudywing are also declining.

Russ Hopping slogged through a wet meadow at Appleton Farms on August 4, 2012, and documented this Aphrodite Fritillary with a photograph from his smart phone. This is a first for this North Shore TTOR property and the first report from Essex County since 2008. Aphrodite remains very scarce in Essex County.

A species which is still doing quite well in Massachusetts is the Northern Pearly-Eye. There is a lot of good forest habitat in our state, and despite a slight decline in sightings over the past 20 years, probably due to climate warming, the outlook for this species here is still good.

The 2008 Pelham catalog, which is the basis of the Butterflies of America website, places Northern Pearly-Eye in its former genus *Lethe*, rather than in *Enodia*. We'll probably have to get used to this new classification. In any case, this beautiful woodland butterfly is apparently not found in Plymouth County, or on Cape Cod or the islands, and is very rare in Bristol County.

Northern Pearly-Eye actually has a wide North American range, but at higher elevations, not along the southeastern coastal plain. It has multiple broods further south, and uses a great variety of woodland grasses as host plants, including at least one introduced, non-native grass, Japanese stilt grass. All these factors argue for its general adaptability.



Northern Pearly-Eye, Wales Norcross WS, 6-28-12 *Ph: S. Fratoni*

At the Norcross Wildlife Sanctuary survey in June, led by Elise Barry and naturalist Jen Ohop, Steve Fratoni from Springfield took

this great shot of a Northern Pearly-Eye. Steve posted a gallery of photos from the walk on his Facebook page.

Little Yellows Return!

Little Yellow, Mattapoisett August 14, 2012. *Photo: F. Model*

Not seen in Massachusetts since 1999! A colony of Little Yellows (*Eurema lisa*) was discovered in August at Nasketucket Bay State Reservation at Mattapoisett by Gail Howe Trenholm. They were seen and photographed by many Club members, and were photographed laying eggs on their host plant at this site, Partridge Pea (*Cassia fasciculata*) by Garry Kessler. Kessler also photographed an egg. Then in September, more Little Yellows were discovered in two places in western Massachusetts: along a rail trail in Westfield/Southwick by Frank Model, and Sunderland by Mark Fairbrother! A total of 8 were counted at the Sunderland site by Sue and Ron Cloutier. The arrival of this species was truly a

surprise, since there had been no reports in Massachusetts since 1999, when there was a sizeable colony in Holyoke.

The Southern Invasion

FIERY SKIPPER was seen in especially large numbers this year, in Ware and Northampton in the west, from the north shore to Plymouth along the east coast, and in several locations in the heart of urban Boston, including Hyde Park, in Brian Faherty's yard! Brian's brother, Mark Faherty, identified it. Full details of all the Fiery Skipper and other southern migrant sightings are forthcoming in the Season Summary.

Fiery Skipper male, Boston Hyde Park, Aug. 12, 2012 *Photo: Brian Faherty*

OCOLA SKIPPER was photographed at a number of places, including Sylvan Nurseries in Westport and Erik Nielsen's yard in Westwood. Mark Faherty photographed one in his beachfront yard

in Plymouth, and another at Tidmarsh Farms, the site of a large restoration project visited by club members on a trip in June.

Ocola Skipper, Tidmarsh Farms Plymouth, 8-14-2012. *M. Faherty.*

SACHEMS were seen all up and down the east coast, from Oak Bluffs on the Vineyard, where they were quite numerous, to Plum Island in Newburyport. Sachem was photographed at Wellfleet Bay WS for the Brewster Fourth of July Count, and Mark Faherty also got a great series of photos from his Plymouth yard, including male/female courtship behavior.

RED-BANDED HAIRSTREAK, first found in Mass in 2011, was seen again at two locations in 2012. All sightings have been in August and September, suggesting dispersal from further south.

Sachem female, Plymouth, 8-25-2012 *Photo: Mark Faherty*

Cloudless Sulphur, Mattapoisett, 8-25-2012. *Photo: Tony Woodall*

CLOUDLESS SULPHUR is usually seen as a fly-by in the distance, rarely stopping to have its photo taken. This one at Mattapoisett Nasketucket Reservation was an exception – it looks right at home perched on its host plant Partridge Pea. The photo was taken by Tony Woodall. A full list of Cloudless Sulphur sightings will be found in the Season Summary.

And finally, it's not very often that a LONG-TAILED SKIPPER finds its way north into the heartland of Massachusetts, but this photo taken in Wendy Howe's backyard in Hubbardston proves that it does happen! Long-tailed Skipper was also seen in Winthrop (R. Mosco), Truro (T. Hansen), Gloucester (R. Heil), Northampton (T. Gagnon *et al.*), Westwood (E. Nielsen), and Plymouth (B. Faherty), Newbury (D. Saffarewich), and Maynard (L. Nachtrab).

Long-tailed Skipper, Hubbardston, August 30, 2012. *Ph.: Wendy Howes*

Review

Schweitzer, D. F., M. C. Minno, and D. L. Wagner. September 2011. **Rare, Declining, and Poorly Known Butterflies and Moths (Lepidoptera) of Forests and Woodlands in the Eastern United States.** Reviewed by Bo Zaremba.

This handsome, free 517-page, full-color work was published by the U.S. Forest Service in a hardback edition limited to 1,000 copies, which quickly were scooped up. It is now available only as a CD. Ordering information can be found at the end of this review.

Early chapters provide a general discussion of the life history and ecology of Lepidoptera, the process of identification of rare species, and the controversial roles of collections, collecting and specimens in research. And, it should be noted, the editors come down on the side of permitting responsible collecting by both professionals and dedicated amateurs in order to supplement the body of records, some of it now more than 20 years old, for continued research. Two appendices address the status of butterflies and macromoths of the eastern United States whose caterpillars feed on forest understory plants; and an additional list of poorly known species for whom a complete account could not be provided. An extensive bibliography completes the back matter.

The core of the book assesses the status and threats to 116 imperiled and/or rarely collected species or subspecies of butterflies and moths from the United States east of the Mississippi River, with habitats ranging from forests to sparsely wooded areas. Most accounts are illustrated with an upper and lower side image of an adult. Larval images are provided for most species. Species

Garlic Mustard invading the understory, Lenox, May 2012. *Ph. F. Chew*

Garlic Mustard is toxic to West Virginia White, yet females still oviposit on it. Invasion of the forest understory by Garlic Mustard is probably the most serious threat to this butterfly species, according to Schweizer, Minno and Wagner, but forest fragmentation, pesticide spraying and climate warming are also threats.

West Virginia White does not at present enjoy any legal protection in Massachusetts.

accounts include identification, taxonomic notes, a detailed accounting of historic and current range, habitat, rarity, life history, threats and management issues. These species were identified as "rare or declining" based heavily on data from NatureServe, a nonprofit conservation organization, representing an international network of biological inventories in all 50 states, Canada, Latin America and the Caribbean, which supplies rankings in a range from Secure through Vulnerable, Imperiled, Globally Historic (i.e., no verified occurrences in the last 20 years) and Extinct. Most species rankings were updated between 2006 and 2008.

For this reader, the extensive introductory section at the front of the book contains some of the most informative and original material I have found on topics such as causes of declines in rare species, and the discussion of special habitats.

The chapter on the causes of decline and imperilment covers many threats, some obvious, some much less so. Included are discussions on the impacts of non-native plants (i.e., the invasive garlic mustard, which is lethal to the West Virginia White larvae but females will readily oviposit on it), biocontrol agents, exotic insects, herbicides and insecticides, fire, right-of-way management, collecting, and the legal and illegal harvesting of wild plants important to rare butterflies and moths.

Issues relating to the spraying of insecticides are timely now with West Nile virus and Eastern Equine Encephalitis receiving much coverage in the press. The section on mosquito and gypsy moth control provides useful scientific data and studies on the toxicity of various agents to butterflies and other non-target insects.

One of the most serious threats to Lepidoptera which is sometimes overlooked is the excessive herbivory caused by overpopulation of

White-tailed deer. These deer eat the food plants, consume eggs and larvae on the plants, consume nectar flowers and eliminate forest understory. Leps that depend on spring growth or the flowers of lupine, wild indigo or on New Jersey tea foliage are among the most impacted.

In the chapter on special habitats, the author makes the observation that "forest understory" lep species are in decline in the east. The butterfly examples given are West Virginia White, Common Roadside-Skipper, and Silvery Checkerspot and once again one of the main culprits is deer overpopulation and herbivory.

Atlantic white cedar swamps and Hessel's hairstreak are forever linked, since the caterpillar feeds only on white cedar. However, Atlantic white cedar stands cannot regenerate after fires or logging where deer are excessively abundant, because the seedlings are a favored winter food for deer.

Foreign plant pathogens have and can cause profound changes in eastern forests. The results of Dutch elm disease and Chestnut blight are well known. The lesser known Beech canker fungus, which can catastrophically impact the Early Hairstreak, and the fungus causing sudden oak death which has been found in nursery stock on the east coast, are future threats.

The section on rarity includes a discussion of "false rarity". For butterflies, this would include several species that probably spend most of their time inaccessible and unobserved in the tree canopy, which complicates assessment. Forest canopy species include White-M Hairstreak and Oak Hairstreak. Local hairstreaks of conservation concern with an affinity for the tree canopy include Hessel's Hairstreak, Early Hairstreak and Bog Elfin.

Butterfly species included in the species accounts are West Virginia White, Hessel's Hairstreak, Persius Duskywing, Early Hairstreak, Frosted Elfin, and Northern Metalmark; all are well known to New England butterfly enthusiasts.

The extensive (nearly 200 pages) moth section of the book will be of particular interest and value to the growing number of moth enthusiasts, since there is currently such a paucity of readily available information on moths outside of specialized journals.

The authors remind the reader that protecting and managing habitats for rare butterflies will also help other declining species, including plants, birds and mammals. In the face of climate change, loss of habitat to development and other issues that affect our local lep populations, this book provides much food for thought as well as useful information.

The most recent information I have on availability is that copies of the CD were still available from:

Richard Reardon,
USDA Forest Service,
Forest Health Enterprise Team,
180 Canfield Street,
Morgantown, WV 26505;
(304)-285-1563; rreardon@fs.fed.us

Submission of Articles, Illustrations, and Season Records

We encourage all members to contribute to *Massachusetts Butterflies.* Articles, illustrations, butterfly field trip reports, garden reports, and book reviews are all welcome, and should be sent to the Editor by September 15 for the Fall issue, and January 15 for the Spring issue.

Send NABA Fourth of July count results to Tom Gagnon tombwhawk@aol.com by **August 15** for inclusion in the Fall issue. Send your season sightings and records to Mark Fairbrother by **December 31** for inclusion in the Spring issue. Records may now be submitted via the online checklist and reporting form, which is available for download from our website http://www.massbutterflies.org/club-publications.asp

Contributions

As a chapter of the North American Butterfly Association, the Massachusetts Butterfly Club is a non-profit, tax-exempt organization under section 501(c)(3) of the Internal Revenue Code. Gifts (in excess of dues) to the Massachusetts Butterfly Club are gifts to NABA, and are fully tax deductible.

Massachusetts Butterflies Advisory Board

Massachusetts Butterflies has been published continuously since 1993. Previous issues are viewable at www.massbutterflies.org/club-publications.asp after a three-year time lag. Print copies may be ordered for $6 each. Send a check made out to Massachusetts Butterfly Club to Sharon Stichter at the address on the inside front cover.

Harvesters mating, Sheffield, July 30, 2012

Photo: Garry Kessler