



THE PEARLY-EYE 2008

Field Reports of the NABA North Jersey Butterfly Club

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Pearly-Eye 2008

By Michael Gochfeld

Some of last year's predictions didn't quite work out. For example, the part about "*I expect it to go more smoothly in 2008*". It didn't. There is still a lot of detail and back and forth communication to try to assemble an accurate and representative data base of butterflies for central and northern NJ, not to mention the nights spent formatting a multicolumn report. I also looked "*forward to a fruitful 2008 with bountiful butterflies*" However, I felt 2008 was generally poor and several observers remarked on the dearth of some common butterflies, particularly skippers. Several people including J. Connor, V. Corsello, T. Halliwell, P. Murray, D. Schweitzer, J. Springer, W. & S. Wander, D. Wright, and C. & P. Williams helpfully responded to numerous email questions. Tom's summary of early/late dates was invaluable. I appreciate D. Burnside's and A. Koster's help in communicating with contributors, and J. Burger's patience.

I distinguish Central NJ (Monmouth, Mercer, Middlesex, and parts of Hunterdon and Somerset corresponding roughly to the coastal plain and the southern Piedmont) from Northern NJ. So far 2009 is shaping up to be a late spring as well. Climate change isn't about warmth. I appreciate any suggestions on content or format as well as any corrections to the 2008 record.

Overall 56 people submitted about 5900 records (some duplicates) compared to 64 people and 5200 records in 2007.

2008 Season

2008 began with a cool windy winter with very little snow cover, and with very few breaks that lasted for only a day at a time. Jan 7th and Feb 6th had temperatures in the 60's. Then it didn't reach the 50's again until early March, with a cool wet spring through May, followed by very dry summer. The first butterfly was an Eastern Comma 3/3 in Montclair [AB], then nothing until 3/24, but it was mid-April before there was a sequence of warm, sunny days. "Butterfly days" continued to be scarce until mid-May. And summer was very dry which reduced nectar sources. At the end of the year, butterflying essentially ended with a lovely warm Oct 26th (only 2 early Nov reports).

Some people generously sent in each day's complete list (five contributors accounted for 60% of the records) while others sparingly provided a few highlights. The day lists make it possible to fill in more of the geographic and seasonal patterns of occurrence for the common butterflies.

Last year I emphasized the dearth of records from Union (0), Hudson (1), and relative dearth from Hunterdon (37 records). How did it shape up in 2008?

COUNTY REPORTS FOR 2008

Bergen	148	Morris	601
Essex	73	Passaic	52
Hudson	5	Somerset	1101
Hunterdon	99	Sussex	2053
Mercer	343	SUS-WAR	333
Middlesex	108	Union	6
Monmouth	404	Warren	48

PS: The Hudson and Union records are all mine from Liberty SP and Newark Airport.

FINALLY Readers who have 2008 records that weren't sent before, it's not too late. They can be added to the online data base for future reference and corrected in future issues.

Table 1. Lists the butterflies recorded in 2008. There are about 110 species of butterflies that have been recorded in our region in recent years, of which about 95-105 are recorded in any year (101 in 2008). The columns include: The number of reports in 2008 and 2007, the earliest record with date and details, the date of the maximum count with the number and location, the date of the latest 2008 record with location, and the all-time earliest and latest records (from data tabulated by T. Halliwell, supplemented by 2007 and 2008 records). Record early & late dates are shaded. In some cases the Maximum number includes single party and full 4JC maximums separated by a slash '/'.
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SPECIES	# reports 2008	# reports 2007	Earliest Date	Earliest Record	Maximum Date	Maximum Count	Maximum Season Count	Latest Date	Latest Record	All Time early record	All Time late record			
Pipeline Swallowtail	33	26	6-May	BER: Palisades [VC]=3	14-Sep	55-60	BER: Palisades [VC]	20-Sep	MOR: Mendham [AK]	4/26/2005	11/9/2006			
Black Swallowtail	99	106	24-Apr	MON: Sandy Hook [VC]=1	5-Jul	50	MID: Helmetta [TJ]	18-Oct	SOM: NegriNepote [PM]=1	4/7/2000	10/19/2006			
Giant Swallowtail	22	4	3-Jul	SUS: Canal Rd [G&L]=1	4-Sep	27	SUS: Vernon AT [VC]	21-Sep	SUS: Muckshaw [TH,F]=1					
Eastern Tiger Swallowtail	254	220	16-Apr	ESS: W Orange [DB]=1	10-Aug	79	MOR: Willowood [JB]	24-Sep	WAR: White Lake [TH]=1	4/2/2006	10/11/2003			
Canadian Tiger Swallowtail			Only NJ record was a 2001 SUS road kill [SW]											
Spicebush Swallowtail	188	157	6-May	MOR: Willowood [JB]=1	1-Aug	60	MOR: Schooley Mtn [VC]	18-Sep	SUS: Vernon [TH]=1	4/17/2004	10/14/2000			
Zebra Swallowtail			NO RECORDS IN 2008											
Checkered White	2	1	8-Jun	UNI: Newark Airport [MG]=1	7-Aug	3	UNI: Newark Airport [MG]	7-Aug	UNI: Newark Airport [MG]=3	4/16/2003	11/3/2003			
Cabbage White	483	394	24-Mar	MER: Trenton Marsh [JG]=2	18-Jul	1844	SOM: MID: Raritan 4JC	1-Nov	ESS: DeKorte Pk [LG]=1	1/29/2002	11/30/2003			
Falcate Orange-tip	33	10	12-Apr	MER: Assunpink [JS,CW]=7	17-Apr	40	MOR: Mountainside [FP]	5-Jun	SUS: Whittingham [JB,M]=1	4/8/2000	6/17/2003			
Clouded Sulphur	170	140	16-Apr	MON: Big Brook [VC]=5	7-Sep	80	SUS: Vernon AT [MG]	26-Oct	SUS: Whittingham [TH]=1	2/25/2002	12/6/1994			
Orange Sulphur	254	209	16-Apr	MON: Big Brook [VC]=17	13-Jul	209	MER: Mercer 4JC	2-Nov	SUS: KVSP [TH]=2	3/7/2002	12/31/2004			
Cloudless Sulphur	15	23	3-Aug	MER: Assunpink [JS,CW]=1	14-Sep	15	MON: Sandy Hook [JS]	11-Oct	MON: Sandy Hook [EL]=1	5/15/2004	11/4/2005			
Little Yellow	1	0	11-Sep	MON: Sandy Hook [KK]=1	Only one record in 2008						6/17/2004	10/29/1992		
Harvester	33	18	14-May	MOR: Mendham [AK]=3	19-Jun	5	MOR: Brookside Pk [AK]	11-Oct	MOR: Brookside Pk [AK]=1	5/14/08	9/17/2006			
American Copper	82	67	16-Apr	MON: Big Brook [VC]=2	19-Jun	200+	MON: Big Brook [VC]	6-Oct	SUS: Fredon [WW]=1	6/9/1996	10/20/07			
Bronze Copper	3	2	12-Jul	SUS: Springdale 4JC [TH]=1	Only two singleton records in 2008						4/4/2001	11/2/2003		
Bog Copper	1	0	27-Jun	MID: Jamesburg [TJ]=9	Only one record in 2008						6/6/1986	9/4/1994		
Coral Hairstreak	7	13	19-Jun	MON: Big Brook [VC]=40	19-Jun	40	MON: Big Brook [VC]	16-Jul	SUS: Sunrise Mtn [TH]=1	6/22/2003	7/9/1994			
Acadian Hairstreak			NO RECORDS IN 2008. Last in 2005											
Edwards Hairstreak	4	9	9-Jul	SUS: Crater Lk Rd [JB]=2	16-Jul	3	SUS: Sunrise Mtn (TH)	21-Jul	SUS: Sunrise Mtn [TH]=3	6/15/06	8/2/2003			
Banded Hairstreak	41	42	11-Jun	MON: Earle [WW,SW]=4	12-Jul	196	SUS: Springdale 4JC	22-Jul	SUS: Frankford [FW]=1	6/6/2004	8/13/2003			
Hickory Hairstreak	7	10	1-Jul	SUS: Paulinskill [TH]=1	12-Jul	16	SUS: Springdale 4JC	13-Jul	SUS: Wall 4JC=1	6/18/2004	8/2/1996			
Striped Hairstreak	6	15	12-Jul	SUS: Springdale 4JC=3	12-Jul	3	SUS: Springdale 4JC	1-Aug	MOR: Schooley Mtn [VC]=1	6/16/2000	8/24/07			
Oak Hairstreak	1	3	8-Jul	SUS: Vernon AT [VC]=1	Only one record in 2008						6/17/2000	7/16/2005		
Brown Elfin	12	2	19-Apr	SUS: Crater Lk Rd	13-May	47	SUS: Crater Lk [TH]	1-Jun	SUS: Crater Lk Rd [JS]=5	4/11/1998	6/7/2001			
Frosted Elfin			NO RECORDS IN 2008. Last reported in 2005											
Henry's Elfin	6	5	18-Apr	MON: Allaire SP	24-Apr	80	MON: Sandy Hook [VC]	10-May	MON: Sandy Hook	4/28/1995	5/21/1992			
Eastern Pine Elfin	9	10	22-Apr	SUS: Crater Lk Rd (JB,MB)=3	4-May	7	SUS: Flatbrookville [JS]	6-Jun	SUS: Walpack [WWW,SW]=1	4/7/2000	5/16/1998			
Olive Juniper Hairstreak	54	31	10-Apr	SUS: Canal Rd [VC]=1	24-Apr	36	MON: Sandy Hook [VC]	17-Aug	WAR: Hardwick [JB,MB]=1	4/17/2005	6/8/1997			
White M Hairstreak	3	12	29-Jul	MON: Earle [WW,SW]=1	15-Aug	all single	PAS: Rifle Camp Pk [VC]=1	26-Aug	MOR: Brookside Pk [TH]=1	4/28/1989	10/9/2006			
Gray Hairstreak	68	49	17-Apr	MOR: Frelinghuysen Arb [AK]=1	13-Jul	19	MER: Mercer 4JC	16-Oct	MOR: Mountainside Pk [VC]=1	4/3/2002	11/2/2003			
Red-banded Hairstreak	52	59	15-May	MOR: Mountainside Pk [VC]=4	3-Sep	7	SOM: Somerset [MG]	15-Oct	SOM: Somerset [PM]=1	4/30/2002	11/9/2006			
Eastern Tailed Blue	220	154	16-Apr	MON: Big Brook [VC]=4	13-Jul	104/255	MER: Mercer 4JC	16-Oct	MOR: Mountainside Pk [VC]=2	4/1/2000	10/31/1999			
Spring Azure	68	35	8-Apr	HUN: Amwell [SM] & SUS: Vernon [VC]=5	5-May	53	MON: Allaire SP [JB]	20-Jun	BER: Celery Farm [FW]	3/15/2002	undetermined			
Summer Azure	109	81	1-Jun	SUS: Muckshaw Pond [TH]=1	13-Jul	21/26	MER 4JC	21-Sep	SUS: KVSP [TH]=1	undetermined	11/1/2003			
Appalachian Azure	4	3	5-May	MER: Baldpate Mtn [Cwy]=1	17-May	3	HUN: Tower Hill [JS]	11-Jun	SUS: Culvers Gap [FW]=2	5/5/08	6/30/2005			
Northern Metalmark	4	9	12-Jul	SUS: WAR: Spring 4JC=64	12-Jul	64	SUS: WAR: Spring 4JC	10-Jul	SUS: KVSP [TH]=25+	6/23/04x2	8/2/2003			
American Snout	9	10	8-Jun	SUS: Canal Rd [SW,WW]	12-Jul	2	SUS: WAR: Spring 4JC	5-Aug	MON: Thompson Pk [VC]=1	4/17/2006	10/21/2000			
Variegated Fritillary	31	32	9-Jun	SUS: Montague [JB,MB]=1	14-Sep	11	MON: Thompson Pk [JS]	15-Oct	SOM: NegriNepote [PM]=1	5/13/2004	11/15/2002			
Great Spangled Fritillary	149	125	6-Jun	WAR: White Lake [DA]=1	12-Jul	2007/17	SUS: WAR: Spring 4JC	9-Oct	MOR: Willowood [TH]=1	5/30/2006	10/14/2003			
Aphrodite Fritillary	2	3	12-Jul	SUS: WAR: Springdale 4JC	only 2 singleton records						22-Jul	SUS: Frankford Twp [FW]=1	6/19/2004	9/27/2003
Silver-bordered Fritillary	13	7	11-May	MID: Mounts Mills [JS]=16	11-May	16	MID: Mounts Mills [JS]	23-Aug	SUS: Blue Mtn Lk [JS,TH]=3	5/7/2006	9/27/2003			
Meadow Fritillary	47	32	24-Apr	WAR: White Lake [WW]=110	4-May	c200	SUS: Dingmans [TS]	7-Sep	SUS: Vernon AT [MG]=5	4/16/1995	10/17/1998			
Silvery Checkerspot			No records from NJ. A 2006 report was the first in a long time.											
Harris' Checkerspot			No NJ reports since 2003											
Pearl Crescent	266	184	23-Apr	MER: Mercer Co Pk [HK]	13-Jul	2826	MER: Mercer 4JC	26-Oct	some: NegriNepote [PM]=3	6/11/2003	6/23/1994			
Northern Crescent			No records since 1996.											
Baltimore Checkerspot	21	20	7-Jun	SUS: Wallkill [JB,MB]=1	12-Jul	132	SUS: WAR: Spring 4JC	16-Jul	SOM: Scherman-Hoffman [JG]=1	6/4/2004	8/2/2003			
Question Mark	54	75	14-Apr	SOM: D&R Canal [PM]=1	7-Aug	12	SUS: Canal Rd [EM]	14-Oct	SUS: Vernon AT [VC]=1	3/11/2001	1/6/2007			
Eastern Comma	101	90	3-Mar	ESS: Mills Res. (Montclair) [AB]=1	26-Jun	16	SUS: Vernon AT [VC]	26-Oct	SUS: Whittingham [TH]=1	2/21/2002	11/27/2003			
Gray Comma			No reports since 2004.											
Compton Tortoiseshell	13	19	23-Mar	SUS: KVSP [TH]=1	3-Apr	6	PAS: Weis Eco [EM]	15-Jul	SUS: Crater Lk Rd [TH]=1	2/26/2002	11/18/2001			
Mourning Cloak	68	69	24-Mar	PAS: Weis Eco [MJ]=1	25-May	9	SUS: Crater Lk [JB,MB]	11-Oct	SUS: AT above Mecca Lk [JS,TH,WW]=1	2/16/2002	12/16/2006			
Milbert's Tortoiseshell	2	3	4-Sep	SUS: Vernon AT [VC]=1	Only one record in 2008						4/10/2005	11/21/2003		
American Lady	136	153	12-Apr	MER: Assunpink [JS,CW]=1	12-Jul	40	SUS: WAR: Spring 4JC	15-Oct	SOM: Somerset [PM]=1	4/3/2002	11/21/2003			
Painted Lady	33	13	23-Apr	SOM: Duke Farms [PW]=1	5-Aug	5	MON: Thompson Pk [VC]	24-Sep	MON: Thompson Pk [VC]=1	4/5/05 x2	12/22/2001			
Red Admiral	83	192	24-Mar	MOR: Rockaway [SG]=1	8-Jul	6	SUS: Vernon AT [VC]	26-Oct	SUS: Stillwater [EM]=1	3/24/08	8/2/2003			
Common Buckeye	62	38	15-Jun	MOR: Troy Meadows [NABA]=2	13-Jul	12/24	MER: Mercer 4JC (1 party/total)	20-Oct	SOM: NegriNepote [PM]=1	3/12/1990	12/16/2006			
Red-spotted Purple (White Admiral)			2 NO RECORDS IN 2008											
Red-spotted Purple	53	70	27-May	SOM: D&R Canal [PM]=1	12-Jul	9/21	SUS: WAR: Spring 4JC	18-Sep	MON: Big Brook [VC]=1	5/6/1990	10/26/2003			
Viceroy	70	76	1-Jun	SUS: Blue Mtn Lk [JB,MB]	28-Jul	21	SUS: Vernon AT [VC]	14-Oct	SUS: Vernon AT [VC]=1	5/15/01	10/11/2001			
Hackberry Emperor	22	35	8-Jun	SUS: Canal Rd [SW,WW]=3	16-Jun	8	SUS: Vernon AT [TH]	18-Sep	MON: Big Brook [VC]=1	5/15/04x2	10/14/08			
Tawny Emperor	19	22	26-Jun	SUS: Vernon AT [VC]=1	12-Jul	7/10	SUS: WAR: Spring 4JC	10-Sep	MON: Sandy Hook [TH]=1	6/2/2004	10/10/1994			
Northern Pearly-Eye	29	27	27-Jun	SUS: Vernon AT [DA]=2	12-Jul	14/53	SUS: WAR: Spring 4JC	24-Aug	SUS: Stillwater [EM]=1	6/7/2004	9/27/2001			
Eyed Brown	9	6	16-Jun	SUS: Vernon AT [TH]=30+	26-Jun	47	SUS: Vernon AT [VC]	28-Jul	SUS: Vernon AT [VC]=1	6/13/2004	9/4/2000			
Appalachian Brown	45	40	6-Jun	SOM: Duke Farms [SL,PW]=1	12-Jul	23/56	SUS: WAR: Spring 4JC	7-Sep	SUS: KVSP [TH]=1	6/4/2004	7/31/2006			

SPECIES	# reports 2008	# reports 2007	Earliest Date	Earliest Record	Maximum Date	Count Number	Maximum Season Count	Latest Date	Latest Record	All Time early record	All Time late record
Little Wood-Satyr	117	103	21-May	MOR:Willowood [AK]=1	1-Jun	405	SUS:Green Twp [JB,MB]	18-Jul	WAR:White Lake [TH]=1	5/11/2001	9/6/07
Common Ringlet	56	45	14-May	WAR:White Lake [TH]=2	9-Aug	41	SUS:Montague[JB,MB]	7-Sep	SUS:Vernon [MG etal]=3	5/7/2006	9/18/2002
Common Wood-Nymph	92	88	17-Jun	MON:Thompson Pk [VC]=1	13-Jul	108	SUS:Walkill single party	3-Sep	WAR:White Lake [TH]=1	6/13/2005	0/27/97
Monarch	263	275	25-Apr	SOM:Somerset [PW]=1	16-Sep	175	WAR:Raccoon Ridge[BH]	18-Oct	WAR:Raccoon Ridge[BH]=6	4/15/2006	11/23/2003
Silver-spotted Skipper	187	141	26-Apr	SUS:Swartswood [RK et al]	12-Jul	134/433	SUS-WAR:Spring4JC	1-Oct	SUS:Fredon [WW]=1	4/28/1995	10/13/2003
Long-tailed Skipper	4		1-Sep	MON:Sandy Hook [AM]=1	Four singleton records in 2008			18-Oct	MON:Sandy Hook [KK]=1	8/24/2000	10/8/1994
Hoary Edge	6	19	20-Jun	SUS:KVSP [TH]=1	12-Jul	6/7	SUS-WAR:Spring4JC	16-Aug	SUS:Vernon[NABA]	5/22/2002	7/21/2001
Southern Cloudywing	9	16	11-Jun	MON:Earle [SW,WW]=6	11-Jun	6	MON:Earle [SW,WW]	3-Aug	MON:Assunpink[JS]=5	5/15/1993	10/10/06
Northern Cloudywing	33	30	7-May	SUS:Vernon AT [VC]=1	14-Jun	15+	SUS:Walpack[SW,WW] WAR:Yards	22-Jul	MOR:Mountainside [VC]=5	5/7/2001	7/26/07
Dreamy Duskywing	13	9	11-May	MON:Assunpink [JS]=2	29-May	8	Creek[WW,TH]	1-Jun	SUS:Flatbrookville [JS]=1	4/18/1998	6/26/2005
Sleepy Duskywing	2		19-Apr	HUN:Milford Bluffs [JS]=11	22-Apr	12	HUN:Milford Bluffs[TM]	22-Apr	HUN:Milford Bluffs[TM]=12	4/13/2006	6/12/2005
Juvinal's Duskywing	75	39	19-Apr	MOR:Mountainside Pk[VC]=3	14-May	70+	WAR:Deer Lake [TH]	14-Jun	DWGNRA[SW,WW]=1	4/8/2000	6/28/2003
Horace's Duskywing	28	46	29-May	WAR:Yards Creek[SW,WW]=1	18-Jul	13	MID:Rar4JC(Rutgers)	18-Oct	MON:Thompson Pk[AB]=1	5/10/2005	10/18/08
Wild Indigo Duskywing	62	67	19-Apr	MOR:Mountainside Pk[VC]=4	13-Jul	112/123	MER:4JC one party	30-Sep	MON:Earle [SW,WW]=1	4/13/1998	10/23/1993
Common Checkered-Skipper	40	34	24-Apr	MON:Sandy Hook[VC]=1	13-Jul	10	MER:4JC one party	26-Oct	SOM:Negri Nepote[PM]=2	4/23/07 4/24/02	11/14/05 x2
Common Sootywing	9	15	17-May	MON:Thompson Pk [VC]=1	3-Aug	5	MON:Assunpink[JS,CW]	22-Aug	SUS:Hyper Humus[TH]=1	4/30/2002	9/19/2005
Arctic Skipper			NO RECORDS IN 2008 or 2007							5/20/2001	6/21/1997
Swarthy Skipper	14	21	13-Jun	MER:Pole Farm [SM,FB]=3 SUS:Walpack [SW,WW]=1	3-Aug	11	MON:Assunpink[JS,CW]	18-Sep	MON:Big Brook [VC]=3	5/22/1995	9/21/03 9/30/07
Least Skipper	117	118	6-Jun	WAR:White Lake [DA]	1-Sep	100+	SUS:Vernon [VC]	24-Sep	WAR:White Lake [TH]=1	5/21/2004	10/19/2006 7/14/01
European Skipper	22	32	6-Jun	WAR:White Lake [DA]	19-Jun	100s	MON:Big Brook [VC] SUS:Hyper	12-Jul	SUS-WAR Spring4JC=2	5/25/2004	7/14/06
Fieri Skipper	27	29	12-Jul	SUS-WAR:Spring 4JC=6	12-Jul	8	Humus[JB,MB]	16-Oct	SUS:Fredon[SW,WW]=1	7/3/2004	11/26/2001
Leonard's Skipper	2	6	1-Sep	SUS:KVSP [TH]=1	Only two records in 2008			3-Sep	SUS:Vernon AT [VC]=2	8/11/2005	9/28/2005
Cobweb Skipper	5	3	4-May	MOR:Boonton [TM]=5	18-May	11	MOR:Mountainside [NABA]	11-Jun	MON:Earle [SW,WW]=1	4/24/2002	6/9/93
Indian Skipper	16	13	15-May	MOR:Mountainside Pk[VC]=4	18-May	8	MOR:Mountainside [NABA] MER:Rar4JC	18-Jun	SUS:Fredon[SW,WW]=1	5/6/1990 5/7/95	6/30/2003
Peck's Skipper	155	107	13-May	SOM:Somerset [PW]=3	18-Jul	56/98	Griggstown[CW]	5-Oct	MOR:Willowood [JS]=1	5/7/06	10/23/1995
Tawny-edged Skipper	82	57	24-May	SOM:Bridgewater [JS]=1	9-Aug	12	MOR:Schooley Mtn[JS]	18-Sep	MON:Big Brook [VC]=4	5/14/2002	10/14/1996
Crossline Skipper	20	24	11-Jun	MON:Earle [SW,WW]=1	17-Jul	20+	SUS:Flatbrookville [TH]	5-Aug	MON:Thompson Pk[VC]=4	5/11/2002	7/5/03 x2 7/8/08
Long Dash	2	11	28-Jun	MOR:Willowood [TH]=1	Only two singleton records in 2008			8-Jul	SUS:Vernon [VC]=1	5/24/2002	
Northern Broken-Dash	63	58	19-Jun	MON:Big Brook [VC]=2	13-Jul	32	MER:Mer4JC (1 party)[JS]	26-Aug	ESS:Hatfield Sw [VC]=2	5/27/1995	10/11/2004
Little Glassywing	61	58	13-Jun	MER:Pole Farm [SM,FB]=5	12-Jul	84/246	SUS-WAR:Spring4JC	16-Aug	SUS:Vernon [NABA]=2	6/11/02	8/18/02
Sachem	111	86	13-May	SOM:Somerset [PW]=1	18-Jul	198/301	SOM-MID:Raritan 4JC	26-Oct	SOM:Negri Nepote[PM]=2	5/8/2002	11/1/2005
Arogos Skipper	1	No rep	30-Jun	MOR:Kenvil [TH]=3	Only one record in 2008					6/30/2002	8/2/2004
Delaware Skipper	47	43	27-Jun	SUS:Vernon AT Land [DA]=2	12-Jul	39/116	Spring 4JC	16-Aug	SUS:Vernon [NABA]=3	6/12/2004	9/1/2004
Mulberry Wing	15	11	6-Jul	MOR:GrSw4JC =13	26-Jul	44	SUS:High Pt [JB,MB]	26-Jul	SUS:High Pt [JB,MB]=46	6/27/2004	8/26/2003
Hobomok Skipper	55	47	18-May	MOR:Mountainside [NABA]=1	8-Jun	30+	SUS:Canal Rd[SW,WW]	5-Jul	MOR:GreatSwam4JC=1	5/7/06	7/10/1999
Zabulon Skipper	95	94	17-May	MON:Thompson Pk [VC]=4	3-Sep	21	SUS:Vernon AT[VC,FK]	15-Oct	SUS:Fredon[SW,WW]=1	4/30/2004	10/17/1997
Broad-winged Skipper	24	47	13-Jul	MER:Mer4JC=2	5-Aug	53	MON:Thompson Pk[VC] MID:Pigeon&Helmetta [JS=7]	10-Sep	MON:Sandy Hook [TH]=1 on Rar4JC	6/28/06 x2	9/22/2004 8/8/2004
Dion Skipper	6	18	6-Jul	SUS:Montague[SW,WW]=1	18-Jul	7	MON:Thompson Pk[VC] MID:Pigeon&Helmetta [JS=7]	28-Jul	MON:Sandy Hook [TH]=1 on Rar4JC	6/20/1998	8/8/2004
Black Dash	30	28	29-Jul	MID:Monroe [TJ]=1	12-Jul	19/46	SUS-WAR:Spring4JC	28-Jul	SUS:Vernon AT[VC]=1	6/20/04 x2	8/24/2003 10/6/96 10/9/07
Dun Skipper	92	76	11-Jun	SOM:Duke Farms [PW]=2	12-Jul	35/168	SUS-WAR:Spring4JC MOR:Mountainside [NABA]	24-Sep	WAR:White Lake [TH]=1	5/25/2004	10/9/07
Dusted Skipper	4	6	15-May	MOR:Mountainside Pk [VC]=1	18-May	2	MON:Thompson Pk[VC] MID:Pigeon&Helmetta [JS=7]	11-Jun	MON:Earle [SW,WW]=1	5/13/2006	6/20/2006
Pepper and Salt Skipper	4	4	25-May	SUS:Bethlehem[JS et al]=4 WAR:Yards Creek [SW,WW,TH]=4	25-May	4	SUS:Bethlehem Twp [JS]	7-Jun	SUS:High Pt [MG,JB2]=2	5/19/2001	6/21/1997
Common Roadside-Skipper	1	1	29-May	WAR:Yards Creek [SW,WW,TH]=4	Only one record in 2008					5/14/2000	8/1/1998
Ocala Skipper			NO RECORDS IN 2008							8/15/2000	10/22/1995
TOTALS	5752	5188		101 SPECIES IN 2008							

Our daily observations of butterflies provide lots of opportunities to add to the relatively meager knowledge.

NECTAR SOURCES: With the increasing interest in planting butterfly gardens or restoring habitats, it is important to know what butterflies use. How does the use of native nectar sources compare with exotics. Attractiveness varies from place to place.

LARVAL HOSTS: Caterpillars of some species are generalists, while others are host specific to a particular species or genus or group of plants. There is undoubtedly lots to learn about the local host preferences of even common species.

PREDATION: Several people sent interesting reports of predation on butterflies from spiders to frogs.

INVASIVE PLANTS: What is the impact that invasive plants (with or without deer) have on native nectar plants and larval host species

Annotated List of North and Central New Jersey Butterflies for 2008

Compiled by Michael Gochfeld with editorial corrections by S. Wander, T. Halliwell, J. Springer

For many of the species I have provided a comparison of the frequency of records in 2008 (total 5752 records) vs 2007 (total 5188 records). This does not, however, indicate the numbers seen, only the frequency of encounters. For species with more than 10 records, those that were substantially more frequent in 2008 (greater than 50% more records than expected) include Giant Swallowtail, Falcate Orangetip, Harvester, Brown Elfin, Olive Juniper Hairstreak, 'Spring' Azure, Silver-bordered Fritillary, and Juvenal's Duskywing.

Species that were substantially less frequent in 2008 (>50% fewer records than expected) included *Satyrium* hairstreaks, particularly Coral and Striped, Red Admiral, Hackberry Emperor; Hoary Edge, Southern Cloudywing, Horace's Duskywing, Common Sootywing, and European, and Broad-winged Skippers. **In comparing records for the two years one must keep in mind that overall there were 10% more reports in 2008 than in 2007.**

Although it is difficult and a nuisance to keep track of wear condition or freshness, it is quite helpful when trying to figure out the pattern of broods. "Fresh" or "worn" is almost never mentioned for skippers, perhaps because worn skippers are so difficult to identify.

I very much appreciate the careful reading and corrections offered by Tom Halliwell, Jim Springer and Sharon Wander, as well as Sharon's detailed copy editing. Any lingering errors are my responsibility.

Pipeline Swallowtail: Highly local, but locally common along the Palisades (BER) where Dutchman's Pipe grows profusely. Slightly more records in 2008 vs. 2007 (33 vs.26). Also recorded in SUS, WAR, MOR, MON and SOM counties. An active program of planting the host and raising and releasing the butterfly accounts in large part for a half-dozen early Sept SOM records. Recorded several times at KVSP, but no breeding noted this year [TH]. Egg cluster found mid-July in MID:Monroe [TJ]. Released adults laid on Dutchman's Pipe and on *Aristolochia gigantea*, but mid-instar larvae perished on the latter [PW,PM]. The only 4JC record was from BER:Greenbrook (Palisades).

Pipeline Swallowtail is the distasteful model for Batesian mimics: Black, Spicebush, and black female Tiger Swallowtails; Red-spotted Purple; and some moths. (Ries & Mullen in *American Butterflies*—Fall/Winter 2007 vol. 15, No 3/4).

Zebra Swallowtail: No records in 2008 or 2007; recorded in 2006 and 2004.

Black Swallowtail: Slightly fewer reports in 2008 (99) vs.2007 (106), but probably an average year. First on 4/24 MON:Sandy Hook [VC] and next on 5/4 SUS:Mecca Lk [JS]. Fresh individuals noted 6/20 BER:Celery Farm [DB], with double digits only in mid-July. High counts 7/5 (50) MID: Helmetta [TJ] and 7/18 (46) Rar4JC. Last on 10/18 SOM:Negri Nepote [PM] is one day short of all-time late date (10/19/2006).

Giant Swallowtail: Certainly the highlight of 2008. A 7/3 SUS:Canal Rd sighting [YG,CL] presaged a mid-summer invasion. Not seen again until 7/26 at SUS:Canal Rd, then

nearly daily records from 8/15 to 9/7 with last record 9/21 SUS:Muckshaw Pond [FP et al]. Twenty-two records vs. only four sightings of singles in 2007. Its host Prickly Ash (*Zanthoxylum americanum*) is abundant in nwNJ. (See article by R. Dirig on 2008 NY status and other notes in this issue). Max a remarkable 27 on 9/4 SUS:Vernon [VC]. A nearby farmer reported seeing Giants in mid-May and having them on Butterfly Bush all summer (see article below). One Brooklyn record 7/11 [VC].

Eastern Tiger Swallowtail. Generally good year, about the same number of records (254) as 2007 (220), but "Not as many as usual in nwNJ" [TH]. Earliest record 4/16, a week earlier than 2007. Latest 10/3 MOR:Parsippany [EM]. Almost daily records from 1-3 individuals until first double-digit day (5/25 MER:Baldpate Mt [CW]. Small second peak in mid-July, with a major third peak throughout Aug. But no triple-digit days, unlike 2007.

Spicebush Swallowtail: Slightly more common in 2008 (188 records) vs. 2007 (157 records), with peak count of 60 at MOR:Schooley [VC] vs. only 35 in 2007. Earliest date 5/6 (2 wks later than 2007). No apparent peak throughout May-June until 15 on Spring4JC (7/12), 10 on Mer4JC (7/13), and 28 Rar4JC (7/18). Second, larger, peak in first half of Aug with many double-digit days through first wk of Sept. Latest 9/18, 3 wks earlier than in 2007.

Checkered White: An erratic species well known for ephemeral colonies. No Sandy Hook records in 2008 or 2007. Only records are up to three individuals at UNI: Newark Airport on two visits from 6/8 to 8/7 [MG].

Cabbage White: Several people reported this species as less common than usual in cNJ. The number of observations was slightly greater in 2008 (483) than 2007 (394 records), but there were fewer triple-digit counts. The Rar4JC recorded 1844 (3rd highest), with 1630 by one party [CW]. Mer4JC had 1405; all other counts were 420 or lower. First recorded 3/24 (about same as 2007). First peak from late-Apr to mid-May. Second peak in mid-June with one party high of 300 on 6/17 MON:Thompson Park [VC]. Largest peak in mid-July through first week of Aug with several triple-digit counts. Then continued fairly high through mid-Sept, with double-digit counts even to 10/26 SOM:Negri Nepote [PM], but no records after 11/1 ESS:DeKorte [LG] compared with last 2007 record on 11/21.

Falcate Orangetip: Disjunct distribution: occurs in nwNJ and MER-MON. Many more observations in 2008 (33) than 2007 (only 10). Seen from 4/12 (10 days earlier than 2007) to 6/5 (12 days later than 2007). High count of 40 MOR:Mountainside [FP], which was the only double-digit locale in 2008. These fly constantly, stopping only briefly to nectar. Hosts at SUS:Flatbrookville appears to be Tower Mustard (*Arabis glabra*) and at Waterloo, Rock Cress (*Arabis laevigata*) [TH].

Clouded Sulphur: Less numerous than in most years, but 170 records in 2008 vs. 140 in 2007. Only three 4JC had double digits. First record 4/16 (vs. 3/27 in 2007) and last 10/26 SUS:Whittingham [TH]. For the most part, poor numbers in both years. First peak mid-June to July 1 and second peak mid-July to early Aug. Third peak late Aug thru most of Sept.

Orange Sulphur: Generally low numbers most of the season in cNJ & nwNJ : 254 records in 2008 vs. 209 in 2007. First record 4/1, but no triple-digit peak until 7/6, remaining fairly common for about two weeks. Scattered double-digit numbers in late Aug & Sept, with a high of 60 on 9/7 at SUS:Vernon [MG]. Another peak of 40+ per day from 9/24 through a late sighting of 66 on 10/26 SOM:Negri Nepote [PM]. Last seen 11/2 SUS:KVSP [TH].

Cloudless Sulphur: Probably an average year. Only 15 reports vs. 21 last year. First on 8/3 MER:Assunpink [JS,CW]. Last on 10/16 at MON:Sandy Hook [KK]. Very few reports were singletons, unlike 2007.

Little Yellow: One on 9/11 MON:Sandy Hook [KK]. No NJ records in 2007. There were three Sandy Hook records in 2006.

Harvester: Even more observations in 2008 (33) than 2007 (18). First at MOR:Brookside [AK] on 5/14 was earliest record by 9 days. Most observations from the Brookside Park colony (MOR:Mendham) monitored by AK, showing peak numbers in late May, mid-June to early July, and late July into Aug, with latest record on 10/11 [AK]. Other observations from SUS:Blue Mt Lk (5/30) [JB,MB], and a new KVSP locality (6/8). [TH]. Also at Spring4JC, SOM:SHS, and MOR: GrSw4JC. Not found on many visits to former SOM:D&R Canal colony.

American Copper: A very local but often common species. More records in 2008 (82) than 2007 (67) from 4/16 MON:Big Brook [VC] to 10/6 SUS:Fredon [WW]. High counts tend to be in MON, with 200+ at Big Brook 6/19 [VC] and in 2007 a high count of 257 at Sandy Hook.

Bronze Copper: 2008 records are 1 at SUS:Frankford on Spring4JC 7/12 [TH,KW] and 1 at Wallkill NWR on 7/30, which was "about 50 meters on the NY side of the state line." [KW]. In 2007 the two records of Bronze Copper, the first since 1996, were one of the season highlights. These were at Vernon and Flatbrookville. Although these records are encouraging, no consistent colony is apparent.

Bog Copper: The only record was 6/27 MID:Jamesburg [TJ]. No visits were made to Mashipacong Bog, the only known place for the species in nwNJ. This is a protected area with no imminent threats [WW], although vulnerable to succession in the long run [TH].

Coral Hairstreak: Almost all *Satyrium* hairstreaks were down again in 2008. As bad as 2007 was with 14 reports (9 from SUS), 2008 was much worse with only seven reports, including three Spring4JC parties, plus additional records from SUS, MOR, and two from MON. Except for the earliest report of 35-40 on 6/19 at MON:Big Brook [VC] the remaining six reports totaled only 12 individuals.

Acadian Hairstreak: No 2008 records. Last seen 7/2/2005 SUS:Sparta (Spring4JC), the only recent colony.

Edward's Hairstreak: As in 2007, reported from only two locations:, SUS:Crater Lk Rd=2 on 7/9 [JB] and Spring4JC=1 on 7/12 (at same location), and two reports of 3 each time on 7/16 & 7/21 from Sunrise Mt [TH]. The 2007 reports were from Sunrise Mt [TH], KVSP, and SUS:AT above Mecca Lk. [JS].

Banded Hairstreak: A poor year all around in 2008 (41 records) as in 2007 (42 records). First 6/11 MON:NWSEarle [WW,SW] to 7/22 SUS: Frankford [FW], but a respectable peak of 196 on 7/12 Spring4JC.

Hickory Hairstreak: A tricky identification, leading to both under- and over-reporting. Photo documentation a good idea anytime. Not as many reports as last year. 7 records, including 4 parties of Spring4JC on 7/12, for a total of 16 vs. 196 Banded HS. Also at SUS:Paulinskill 1 on 7/1 [TH], WAR:Blairstown 7/4 [NABA], and SUS:Wallkill 4JC on 7/13.

Striped Hairstreak: Another disappearing species, with only six records in 2008 vs. fifteen in 2007, when we called it "scarce." Earliest reports 7/12 on Spring4JC (4) and 7/13 on Mer4JC(1). Then singles on 7/17 BER:Flat Rock Brook [VC], 7/26 SUS:High Point SP [JB,MB], and finally 8/1 MOR:Schooley Mt [VC]. In 2005 six 4JC reported 35; in 2006 five 4JC reported 34, in 2007 four reported 18, but in 2008 only two reported 6.

Oak Hairstreak: A usually rare, erratic species with only one 2008 report on 7/8 at SUS:Vernon AT [VC]. Three reports each in 2007 and 2006; one in 2005. No consistently reliable sites.

Brown Elfin: Twelve reports vs. only two in 2007. All in Sussex or Warren, with seven reports from Crater Lk Rd beginning 4/19 [SW,WW] until 6/1 [JS]. Seven reports were double digit, with a high of 47 on 5/13 Crater Lk Rd [JH].

Frosted Elfin: MON:Assunpink WMA has had the only colony in our region, but none found there since possibly one individual 5/14/2005.

Henry's Elfin: Six reports, half from Allaire SP and half from Sandy Hook, between 4/18 and 5/10. High count was 78 at Sandy Hook on 4/24 [VC].

Eastern Pine Elfin: Another species with disjunct distribution, occurs SUS-WAR and pine barrens (reaching MON). All nine 2008 records at usual locations in nwNJ, beginning with 3 on 4/22 SUS:Crater Lk Rd [JB,MB]; peak of 7 on 5/4 at SUS: Flatbrookville [JS]. Last on 6/6 at SUS:Walpack [SW,WW]. Sought in vain at MON:Allaire on four days 4/13 to 4/30 [JM].

Juniper Hairstreak: 54 records in 2008 vs. 31 in 2007, when it was considered above average. Earliest 4/10 (1) SUS:Canal Rd [VC] was 16 days earlier than in 2007, which was considered "early" and one day later than all-time early record of 4/9/2002. The highest count of 36 was for the spring brood at Sandy Hook [VC], and the last first-brood record was 6/8 SOM:Somerset [PW]. This brood is often missed in cNJ [MG]. First summer-brood record was 7/12 (8) recorded by four parties on Spring4JC, with a high count of 25 SUS:Flatbrookville [TH]

et al] on 7/17. Last record 8/17 WAR:Hardwick Twp [JB,MB], compares with an 8/25/2007 record.

White M Hairstreak: An erratic species, with only three 2008 records compared with twelve in 2007, fourteen in 2006, and two in 2005. 1 at MON:NWSEarle 7/29 [WW,SW] and 1 at PAS:West Paterson (Rifle Camp Park) on 8/15 [VC]. 1 at MOR:Brookside 8/26 TH. "Normally there are just 2-4 per year"[TH 2006].

Gray Hairstreak: More numerous in 2008 (68 records) than 2007 (49 records). "This is not a common butterfly in northwest NJ. Though never more than 1 or 2 at a time, I saw more Grays in northwestern NJ this year than ever before" [TH]. Records scattered over the entire region from 4/17 MOR:Frelinghuysen [AK] to 10/16 MOR:Mountainside Pk [VC]. All single digits except 12 on Spring4JC (7/12) and 19 on Mer4JC (7/13).

Red-banded Hairstreak: Numbers vary from year to year for this species, which was a very rare visitor only 15 years ago. Not quite as frequent in 2008 (52 records) as in 2007 (59 records). It is rare in nWNJ, but there were four Sussex records in 2008 vs. two in 2007. No double-digit days, and most counts 4 or less, with one count of 7 on 9/3 SOM:Somerset[MG]. The 52 records include SUS=4, BER=4, ESS=2; PAS=1, MOR=5, MID=2, SOM= 26; MON=6, MER=2. Missed on all 4JC this year. The 10/15 SOM:Somerset [PM] record occurred after a 3-wk hiatus and was late for this species, although there is a 11/9/2006 record.

Eastern Tailed-Blue: 220 records in 2008 vs. 154 in 2007. First on 4/16 MON:Big Brook (4) [VC], and first SUS record 5/4 Flatbrookville (2)[TH]. Double digits from SUS to MON from 5/11 to 5/18, with an early peak of 75 on 5/18 MOR:Mountainside [NABA]. A second peak from 5/25-5/26 in both SUS & SOM. Then small numbers daily until 54 at MON:Big Brook Pk on 6/19 [VC]. Third peak apparent from 7/5 MOR:GrSw4JC (total=90) and 7/6 MON:All4JC (total=108), continuing to about 7/18. Possible fourth peak from 7/26 through end of Aug. Another emergence in mid-Sept, and last seen 10/16 MOR:Mountainside Pk [VC]

'Spring' Azure Complex: For the most part, observers are not distinguishing the various groups that have been reported to be discrete species, such as the Holly Azure and Cherry Gall Azure, and some don't try to distinguish Spring and Summer Azure. The article by David Wright in this issue sorts out the temporal and spatial occurrence of six taxa of azures in NJ (p.15). Earliest report on 4/8 is on the latish side of the range of early dates. The 2001 to 2007 first dates are between 3/15 and 4/12. After 4/8, sightings are continuous until a two-week gap from 5/25 (taken as the end of the "Spring Azures") and 6/11. Some sightings from 6/11 to 6/20 were attributed to "Spring Azure," with the latest 6/20 at BER:Celery Farm [FW].

Summer Azure: There is supposed to be a spring brood of the *neglecta* Azure, but it has not been recognized or reported. Whereas 2007 was a "Low year throughout" with 81 records, 2008 (105 records) was more typical. Earliest report as "Summer" was 6/1 at SUS:Muckshaw Ponds [TH]. First double-digit day 6/17 at MON:Thompson Pk [VC]. A possible

peak in mid-July coinciding with Spring4JC (11 on 7/12), Mer4JC (26 on 7/13), and Rar4JC (10 on 7/18). Continuous sightings through first wk of Sept with a late 9/21 record at SUS:KVSP [TH], but seen until 10/8 in 2007.

Appalachian Azure: Only four records. 5/5 MER: Baldpate Mt (1) [CWy] is all-time early date (previously 5/7/2006, also at Baldpate Mt). Other records: 5/17 HUN:Mt Cushetunk (1) [JS] and HUN: Tower Hill Res (3) [JS]. Last seen on 6/11 SUS:Culvers Gap (2)[FW]. As in 2007 no visits were made to the colony at SOM: Sourlands in May.

Northern Metalmark: Only four reports vs. 9 in 2007. Reported by three parties on Spring4JC on 7/12 totaling 64, and 25+ on 7/10 at SUS:Vernon [NABA]. Currently the largest colony is about 1 mi north of WAR:White Lk, with smaller colonies on east shore of White Lk, at KVSP, and near jct of PVT and Stillwater Rd in SUS:Fredon Twp[JB].

American Snout: Very scarce in both 2008 (nine records) and 2007 (ten records). All singles, except 2 on Spring4JC on 7/12. Recorded 6/8 SUS:Canal Rd [SW,WW] (typical first date) to 8/5 MON:Thompson Pk [VC], but seen through mid-Sept in 2007. Away from nWNJ only 1 Somerset & 1 Monmouth record.

Variiegated Fritillary: 20 years ago considered a rare southern stray, mainly to Cape May in late summer, but the number of sightings has steadily increased in recent years. Similar number of records in 2008 (31) to 2007 (32), and mostly in cNJ: MER=2, MON=8, MID=2, SOM=8; but nNJ records as well: MOR=2, WAR=1 SUS=8.

Great Spangled Fritillary: Status about the same as 2007 with 149 records vs. 125. Widespread in nWNJ but a poor year in most cNJ locations [MG]. First on 6/6 WAR:White Lk. (1) [DA], then recorded almost daily until one-wk gap from 9/7 to 9/14. Four records in second half of Sept and last on 10/9 MOR:Willowwood [TH]. Several apparent peaks. Double-digit counts occurred from 6/13 to 7/3 with an apparent increase on 7/5 (MOR:GrSw4JC=72), and a massive peak of 717 on Spring4JC (7/12) when four parties had triple digits. Double-digit counts by most parties on Mer4JC (7/13), but only 8 on entire Rar4JC (7/18). After 7/17 only one double-digit count until 8/9-8/24, when several double-digit counts probably represent third brood. A small fourth peak in early Sept. Records from SUS=68,

Aphrodite: Only two singleton records: 7/12 Spring4JC and 7/22 SUS:Frankford [FW]. A good species for photo documentation.

Silver-bordered Fritillary: A highly local, habitat-vulnerable species. More 2008 records (13) than 2007 (only 7). First on 5/11 at MID:Mounts Mills was also the season high of 16 [JS]. Last on 8/23 SUS:Blue Mt Lk [JS,TH]. Most records from nWNJ (mostly Crater Lk Rd & Blue Mt Lake, the latter colony discovered in 2007), but two records from MID:Mounts Mills colony[JS]. TJ checked the MID:Monroe pipeline colony 2x in July and 2x in late-Aug & Sept without finding any. "This area is cut down to the ground, sprayed for mosquitoes, and used by

ORVs" [TJ]. Apparently gone from the Dellenbach sandpit marsh (MID:Pigeon Swamp SP), due to a deliberate habitat restoration, planting Red Maple and Sweet Gum [MG]. Host plant in Dellenbach and Monroe was Lance-leaved Violet.

Meadow Fritillary: More frequent in 2008 (47 records) than 2007 (32 records). "Three broods at White Lake. The early one exploded all at once with huge numbers in late April" [TH]. First date of 4/24 WAR:White Lk (110) [WW,TH], and also SUS:Flatbrookville (3) [TH]. High counts continued to 5/10, and none between 5/14 and 5/25. Second brood appeared in small numbers 5/25, with no double digits until 6/18 at White Lake [TH], and then low numbers through mid-July with only 8 on Spring4JC (7/12). Probable third brood emerged third wk of July and possible fourth brood recorded from 8/17 WAR:Lafayette [JB,MB] to 9/7 SUS:Vernon [MG]. Former colony site on SOM:Duke Farms mowed prematurely [PW].

Silvery Checkerspot: No records in 2008 or 2007. Reported 5/30/2006 at Vernon.

Harris' Checkerspot: Not found in 2008. Last reported in 2003.

Pearl Crescent: This normally ubiquitous and common species was scarce in cNJ [MG] and MON [VC], but not as scarce as in 2007, and was probably average in nwNJ. Overall, 266 records in 2008 vs 184 in 2007. First on 4/23 MER:Mercer Co Pk. [HK], then none until 5/4, followed by scattered mostly single-digit records until an obvious but short-lived peak beginning 5/24 in nwNJ, ending 6/1. Then a dearth of June records with a max of 6 on 6/7 SUS:Wallkill [JB,MB] through 7/1. July numbers more typical, with triple-digit numbers on Allaire4JC (301 on 7/6), GrSw4JC (112 on 7/12), Spring4JC (616 on 7/12), Wall4JC (703 on 7/13), and a respectable 2826 on Mer4JC (7/13), but a below-average 210 on Rar4JC (7/18). Numbers tapered off by the last week of July, and stayed in single and low double digits until an estimated 100 on 9/1 SUS:Vernon [VC] and 350 on 9/7 SUS:Vernon [MG]. By mid Sept, numbers were back in the 1 to 30 range until the last sighting SOM:Nepote [PM] on 10/26. Phenology in 2008 similar to 2007.

Baltimore Checkerspot: Larvae observed at SUS:Vernon on 5/29 [VC] and SUS:Garrison Rd on 6/1 [JS]. 22 adult records in 2008 vs. 20 in 2007. First adult on 6/7 SUS:Wallkill [JB,MB]. Recorded mainly in Sussex & Warren, including all parties on Spring4JC and Wall4JC. One Morris Co record at Willowood 6/28 [TH]. One SOM record at Scherman-Hoffman 7/16 [JG] was the latest. High count of 137 on Spring4JC (7/12) was close to that count's all-time high of 154 (in 2007), and included a single-party high count of 63. This species is vulnerable to habitat loss.

Question Mark: Much less frequent in 2008 (54 records) than 2007 (75 records). First reported 4/14 SOM:D&R Canal [PM]. Only two Apr and two May records, becoming more regular from 6/15 through 9/1 with no apparent peak. Three Oct records to 10/14 SUS:Vernon AT [VC].

Eastern Comma: 101 records in 2008 vs. 90 in 2007. First on 3/3 ESS:Mills Reserve (Montclair) [AB] preceded any Cabbage, Spring Azure, or Mourning Cloak records. Then a gap until 3/26, with overwintering adults continuing to appear

through Apr, followed by 10-day gap. Spring brood appeared 5/6 BER:Palisades [VC]. First summer dark form recorded 6/5 SUS:Green Twp [JB,MB], and reported regularly through June, with 11 on 6/16:SUS:Vernon AT [TH] and 16 in the same places on 6/26 [VC]. Color morph not mentioned again until orange form reported 8/26. The flight period ended on the early date of 10/26 MOR:Whittingham [TH]. The unusual lack of Nov. records was noted in 2007 as well.

Gray Comma: No report since 2004.

Compton Tortoiseshell: Fewer records in 2008 (13) than in 2007 (19). Overwintering adults from 3/23 at SUS:KVSP [TH] to 5/26. Summer brood from 7/12 only to 7/15. No fall records.

Mourning Cloak: 68 records in 2008 vs. 69 in 2007. First on 3/24 at PAS:Weis Ecology [MJ], which is three wks later than first 2007 record. Overwintering adults continued probably to 5/14. Then 10-day hiatus, with fresh individuals reported at WAR:White Lk (3 on 5/25) [TH]. Gap in records from 6/18 to 7/6, then continuous to 7/22 with a max of 7 on Crater Lk Rd on 7/9 [JB]. One isolated Aug record on 8/16 SUS:Vernon [NABA]. Then scattered records, mainly singletons, from 9/1 to 10/11. July sightings were only in SUS & WAR, and 52 of 64 records are from MOR & PAS northward. The same pattern occurred in 2007 for 56 of 69 records.

Milbert's Tortoiseshell: Last year TH said it was too soon to determine a "typical year for this species." The only 2008 record was 9/4 at SUS:Vernon AT Lands [VC]. In 2007 there were three records, in 2006 two records, and in 2005 nine locations, all from SUS. The same question applies in 2008 as last year, "Was it just a low year or were there few visits to known locations?" [MG]

American Lady: Widespread but never numerous with 136 records in 2008, down from 153 in 2007, and "no large numbers" [TH]. Recorded almost daily from 4/12 MER:Assunpink [JS,CW] to 8/10, with neither peak nor gap, and with a single-party high of only 18 and 4JC high of 40 on Spring4JC (7/12). Then a six-day break and more sporadic records once or twice a week from 8/16 to 9/24, with 3 sporadic singleton records in Oct to 10/15 SOM:Somerset [PM]. No geographic pattern evident. The 6/29 to 7/24 peak seen in 2007 was not evident in the 2008 records. However, the entire flight period in 2008 was the same as in 2007, but shifted one week earlier. At Sparta Mt on 5/27 an Am. Lady was eaten by a Bullfrog [TH].

Painted Lady: Very variable from year to year. More than twice as many records in 2008 (33) as in 2007 (12). Seen on four 4JC, but only 2-3 individuals. Earliest 4/23 SOM:Duke [PW], and latest 9/24 MON:Thompson Pk [VC], but max count only 5 on 8/5 at Thompson Pk [VC]. Certainly no memorable influx. Scattered records in a non-flight years raise the suspicion of releases from commercially reared caterpillars.

Red Admiral: This species, not previously known to overwinter in NJ, was flying in Cape May on warm days in Jan 2007 and again in Jan 2008 (WK). The first date for nNJ was 3/24 MOR:Rockaway [SG], which is the earliest by two wks

(previous early date 4/9/2002), and suggests overwintering nearby. Overall fewer than half as many records as last year (83 vs. 192), which was a big flight year. Single-party max 6 on 7/8 SUS:Vernon AT [VC], with a total of 9 on Spring4JC (7/12) compared with triple-digit numbers in 2007 (See article on Red Admiral migration in Wisconsin in 2007 Pearly Eye.) Six April records followed by a gap from 4/23 to 5/4, then another gap from 5/5 to 5/24 followed by regular records through 8/26. Then only four Sept records, last on 9/30 SOM: Duke Farms (1) [PW] and last observation for the year on 10/26 SUS:Stillwater [EM].

Common Buckeye: If 2007 with 38 records was "Probably a normal year" [MG], then 2008 with 62 records was a good year. First reported at MOR:Troy Meadows [NABA] on 6/15, followed by two more June records. Then quite regular from 7/6 through mid-Sept, with last record 10/20 SOM:Negri Nepote (1) [PM]. First double digits on 7/13 [Mer4JC], then no further double digits until 9/10 when it became common in MON. More frequent in cNJ (MER=8 MID=1 MON=16 SOM=15) than further north: (HUN=2, ESS=1, MOR=8, PAS=1 SUS=7 WAR=1 SUS-WAR=2).

Red-spotted Purple: Considered "Not particularly common" in 2007 [TH], this species was even less frequent in 2008, with 53 vs. 70 records. Earliest on 5/27 SOM:D&R Canal [PM], then quite regular in small numbers until last record 9/18 MON:Big Brook [VC], with no week-long gaps. Slight peak in mid-July probably an artifact of increased 4JC effort, with a single-party high of 9 on Spring4JC [FW,DB].

White Admiral: The white-banded morph, also called Banded Purple, is mainly a northern species, becoming the predominant morph north of the range of the distasteful Pipevine Swallowtail Model (see Reis & Mullen article in *American Butterflies* Fall/Winter 2007). No records in 2008 vs. two records in 2007 and single records in 2006 and 2005, all from SUS.

Viceroy: Slightly less frequent in 2008 (70 records) than in 2007 (76 records). Scattered, with 83% of records in nNJ: BER=1 ESS=2 MOR=7 SUS=33 WAR=8 SUS-WAR=3 compared with cNJ: MER=7, MID=1, MON=7 SOM=1. First seen SUS:Blue Mt Lk on 6/1 [JB,MB], then regular through 9/24. Last on 10/14 SUS:Vernon [VC] is latest ever. First double-digit day 7/28 SUS:Vernon AT [VC], then another peak in early Sept, with very fresh individuals reported on 9/22, and many early instars on willow at WAR:White Lk on 9/23 [WW].

Hackberry Emperor: Much less common in 2008 (22 records) than 2007 (35 records). First brood from 6/8 SUS:Vernon AT [SW,WW] through 6/26, then three-week gap, and "very worn first-brood individuals reported on 7/16 at SOM:Duke Farms [PW] and 7/19 WAR:Karen Nash Garden (3) [TH]. Second brood from 7/28 with a possible third brood from 8/30 to 9/23 SOM:Negri-Nepote[PM]. Identifying broods just on the basis of gaps can be tricky. The two mid-July records after a three-week hiatus, would have been attributed to a new brood, were it not for the description "worn" and the specific statement of "all very worn 1st brood" for the 7/19 record [TH].

Tawny Emperor: About the same frequency in 2008 (19 records) as 2007 (22 records). First 6/26 SUS:Vernon AT [VC].

Single-party peak 7 on 7/12 Spring4JC. I repeat last year's statement regarding the "bipolar disorder" whereby this species is rare to absent in cNJ. "Although we have lots of Hackberry trees and a fair number of Hackberry Emperors, I don't have any SOM:Somerset records for Tawny Emperor[MG]. It is common in nwNJ and also near Cape May" [MG]. The only record away from SUS-WAR was the last at MON:Sandy Hook (3) on 9/10 [TH], "no doubt a second brood which does not occur in nwNJ" [TH]. Most records are singles. E. Mahler reported it several times at a feeder offering overripe bananas (see note below on p.18).

Northern Pearly-Eye: Status same in 2008 (29 records) as 2007 (27 records). First on 6/27 SUS:Vernon AT Lands [DA]. Recorded fairly commonly on 7/12 by all 7 parties on Spring4JC with max party count=14 and total of 53. Recorded only in SUS, WAR, and MOR counties. Reports of very worn individuals on 7/28 and 8/24 suggestive of different July and Aug broods.

Eyed Brown: Nine records in 2008 vs. six in 2007. The Vernon colony at the AT lands produced counts of 30+ on 6/16 [TH] and 47 on 6/26 [VC], which contrasts with 100+ counts in 2007. The first record was 6/16 SUS:Vernon AT lands and the latest was 7/28 SUS:Canal Rd, which is two wks later than in 2007. "In the Vernon area between Rt 94 and Rt 517 and along the AT. Eyed Browns occur in a number of wet meadows, separated by unsuitable habitat"[VC]. All records from the Vernon AT lands, Pochuck Creek, Canal Rd, and Rt 94 to 517 are from the same area. "There may be a few separate colonies here, but, if so, they are quite close and part of the same extensive wetland. The Wallkill River NWR 4JC butterflies should be considered as a different location. They are on the other side of Pochuck Mountain" [TH].

Appalachian Brown: 45 records in 2008 vs. 40 in 2007. Normal frequency and numbers. Regular in June, with 1-4 per day in SUS, SOM, MID, MOR. More widespread in July, with single-party max of 23 on 7/12 [Spring4JC]. No obvious gaps, but slight increase in late Aug with 8 at ESS:Hatfield Swamp [VC]. Only one later record: SUS:KVSP on 9/7 [TH].

Little Wood-Satyr: Essentially the same status in 2008 as in 2007 (117 records vs. 103). First seen on 5/21 at MOR:Willowood[AK], then regular with no obvious gaps until last records on 7/18 on Rar4JC [CW] and WAR:White Lk [TH]. However, on 6/26 "very fresh" individuals at Vernon [VC], may represent a second brood (or species). Although LWS is considered univoltine over much of its range, it does frequently have two broods in NJ (G&B 1997). As in 2007, the peak counts were in late May (75 on 5/25 at WAR:White Lk [TH]) and (60+ on 5/30 at KVSP [TH]) and early June (100+ on 6/1 at Johnsonburg [SW,WW]), and 405 ("actual count") on 6/5 at SUS:Green Twp [JB,MB].

Common Ringlet: The southward advance of this species seems to be stalled in nwNJ, with all 56 records in SUS-WAR-MOR. Double-digit counts from 5/25 to mid-June, with max of 41 on 8/9 at SUS:Montague [JB,MB]. On 9/7 individuals seen at several points in Vernon [MG,CW,PW].

Common Wood-Nymph: A typical year, with 92 records in 2008 vs. 88 in 2007. First noted 6/17 at MON:Thompson Pk [VC], followed by massive numbers on 6/28 with 80 at MOR:Willowood [TH]. Triple-digit numbers on GrSw4JC (120 on 7/5), Spring4JC (262 on 7/12), Wall4JC (232 on 7/13), and Mer4JC (185 on 7/13). Less common in SOM, with only 11 on Rar4JC (7/18) and 5 at Duke4JC on 7/26, even though double-digit counts continued elsewhere into mid-Aug.

Monarch: Overall "A fine breeding year. Lots around in June-July. Seemed to be a rather poor fall migration, however," [TH], 263 records in 2008 vs. 275 in 2007. An early 4/25 record in SOM:Somerset was followed by a few counts of 1's and 2's from 5/5 to 6/6 in all regions. A few double-digit counts occurred in June, with a max of 20-30 on 6/8 at SOM:Duke [PW]. In July all parties reported double-digit numbers on the Allaire4JC (7/6) and Wall4JC (7/13), and most parties did so on Spring4JC (7/12). But only two of five Mer4JC (7/13), one of five GrSw4JC (7/12), and one of four Rar4JC (7/18) parties scored >10. Double-digit records appear scattered throughout July until 8/17 Aug, with a max of 45-50 at Vernon on 7/28 [VC]. After 8/17 numbers fell off, with a resurgence on 9/7 SUS:Vernon=20 [MG et al] and WAR:Raccoon Ridge=25 [BH]. The only triple-digit count was 105 on 9/17 at Raccoon Ridge, but after 9/20 daily counts did not exceed 10. Despite daily hawk watches into early Nov, the last Monarch at Raccoon Ridge was on 10/18 vs. 11/1/2007.

Silver-spotted Skipper: 2008 was slightly better than 2007 with 187 records vs 141 in 2007, but records were still few in cNJ and there "Appeared to be fewer than usual" in nwNJ [TH]. Record earliest First date 4/26 SUS:Swartwood[RK et al] and MER:Assunpink [JS] was typical. There were almost daily sightings of only 1-4 individuals through 6/12. Numbers increased in mid-June with 8 at DWGNRA on 6/14 [SW,WW] and 13 at MON:Thompson Pk on 6/17 [VC], and sporadic double-digit reports continued to mid-July. Two triple-digit party counts on Spring4JC totaled 433, but counts reverted to single digits for the last two wks of July. An obvious peak occurred from 8/1 to 8/27, followed by sporadic reports (all single digits) through Sept.

Long-tailed Skipper: Four records. First seen on 9/1 MON:Sandy Hook [AM], then 9/18 HUN:Flemington [RR], and 9/29 MON:Monroe [TJ]. Last seen on 10/16 Sandy Hook [KK]. Last previous record in 2005. Many Cape May records in 2008.

Hoary-Edge: Definitely rare in 2008, with only 6 records vs. 19 in 2007. First reported on 6/20 SUS:KVSP [TH] and last on late date of 8/16 SUS:Vernon [NABA]. Latest known late date 8/20/1993, but in past decade latest is 7/21/2001. Other records from PAS:Ringwood SP on 6/24 [TH], and two parties on SUS-WAR:Spring4JC (7/12).

Southern Cloudywing: Uncommon in 2008, with 9 records vs. 16 in 2007. Recorded from SUS & WAR=5, MON=2, and MOR=2. Eight records from 6/11 to 7/17 (worn) and only one record in Aug.

Northern Cloudywing: This species is more numerous and more northern than the preceding species, and its 2008 status

(33 records) was similar to 2007 (30 records). Peak numbers in second wk of June. No records outside of SUS-WAR-MOR. Last record 7/22 (5) at MOR:Mountainside Pk [VC] were noted as "very fresh," indicating a late brood. This was true also of 7/26 record in 2007.

Dreamy Duskywing: Slightly more frequent in 2008 (13 records) than 2007 (9 records). Seen first on 5/11(2) at MER:Assunpink [JS], and last on 6/1 SUS:Flatbookville [JS]. No double digits. No timely visits to SOM:Sourlands where this species is regular. Only one brood

Sleepy Duskywing: Only two reports (but none in 2007). 11 on 4/19 HUN:Milford Bluffs [JS] and 12 on 4/22 Milford Bluffs [TM] This is one of the few species that, like Falcate Orangetip & E. Pine Elfin, occurs in nwNJ and in the Pine Barrens, but is apparently absent in between from SOM and MID.

Juvenal's Duskywing: Much more frequent in 2008 (75 records) than 2007 (39 records). First recorded 4/19 at MOR:Mountainside Pk [VC], with peak numbers beginning in early May to end of month. Last on 6/14 at SUS:Walpack [SW,WW].

Horace's Duskywing: Less frequent in 2008 (28 records) than 2007 (47 records) which was described as "A banner year!" 2008 was probably more typical. This species is known to have a spring brood, which is usually overlooked until late June when the more numerous Juvenal's have faded away. However, there was a 5/29 identification at WAR:Yards Creek [SW,WW] which complements the 5/26/2007 record. Possibly four broods (late May, July to early-Aug, late-Aug to Sept, and Oct). The 8/4 individual at HUN:Amwell Lk [SM] was "old," while the 8/26 ESS:Hatfield Swamp individual was "fresh" [VC]. On 10/12 WW reported an "extremely fresh female" at SUS:Fredon. Last seen on record late date of 10/18 MON:Thompson Pk [AB]. Previous late date 10/10/2006.

Wild Indigo Duskywing: Slightly less frequent in 2008 (62 records) than 2007 (67 records) which was "generally a slow year" First identified 4/19 MOR:Mountainside Pk [VC], which is quite early. Regular observations of spring brood from 5/6 SUS:Fredon [WW] to 6/2. A single mid-June record on 6/11, then fresh individuals of summer brood on 6/26 SUS:Vernon AT [VC] and regular from 7/6 to 7/30. Only five Aug records, so the eight early-Sept records probably represent a third brood followed by a three-wk gap until a very late 9/30 record at MON:NWSEarle [SW,WW]. Numbers were generally low, with double-digit counts of 40 at WAR:Yards Creek on 5/29 [SW,WW], 123 on Mer4JC 7/13, including a single-party count of 112 [CW], 16 on Rar4JC (7/18) and 60+ at MOR:Mountainside Pk on 7/22 [VC].

Common Checkered-Skipper: Traditionally a "southern immigrant," this species has colonized cNJ in the past decade. Apr & May records represent a spring brood, most likely local overwintering. Its *Malva* host plant is a common roadside and lawn weed. 40 records in 2008 vs. 34 in 2007. First sighting on 4/24 MON:Sandy Hook [VC] corresponds to previous early dates 4/23/07 and 4/24/06. In nwNJ "far fewer than last year" [TH], with first record on Spring4JC (7/12) [CW]. However,

more common there in Sept, which is the time when southern immigrants are typically encountered. Regular colonies at MER:SBMWS[SM] and SOM: Negri Nepote [PM]. MID:New Brunswick colony site seriously overgrown and no skippers found on Rar4JC[MG,FB].

Common Sootywing: My 2007 "impression that this species has declined greatly in cNJ for no apparent reason," was heightened in 2008, with only 9 records vs. 15 in 2007. Date range 5/17 to 8/22, with a max of 5 on 8/3 MON:Assunpink [JS,CW]. It has been a common species, relying on ubiquitous weedy hosts, mainly Lambs Quarters, but also Amaranths and Ragweed. In nwNJ "This species is not very common." [TH], and the only record was 8/22 SUS:Hyper Humus [TH], which was also the latest record. We did note that "this is such a widespread and often common species that it is puzzling that its occurrence is localized (G&B 1997), and Art Shapiro (1974) also noted its "spotty" occurrence in NY.

Arctic Skipper: A search of usual habitat at SUS:High Point SP on 6/1 [JB] and 6/7 [MG] found none as in 2007 and 2006. However, "the area is huge. It may be hanging on, away from roads, but I'm not optimistic" [TH]. This species was marginal in NJ and may have disappeared. Attempts to find it at the appropriate season late-May to late-June should be documented, even if unsuccessful. It was often encountered nectaring on Wild Geranium along road shoulders. It is a grass feeder, and its larval host in the east is not known.

Swarthy Skipper: Less frequent in 2008 (14 records) than 2007 (21 records), and seems to have declined over past 20 years. Seen first on 6/13 MER:Pole Farm (3) [SM,FB] and last on 9/18 MON:Big Brook (3) [VC], with no apparent gaps. Only one double-digit count (11) on 8/3 MON:Assunpink [JS,CW] compared with several in 2007.

Least Skipper: 2008 was similar to 2007 (117 records vs. 118), which was considered a below average year. It was noted last year that this species has an interesting phenology that differs in nwNJ and cNJ. [TH] As in 2007, in nwNJ this was seen almost daily in June after the first 6/6 record at SUS:Walpack [SW,WW] & WAR:White Lk.[DA] with several double-digit counts at Vernon, and on 6/15 at MOR:Troy Meadows [NABA], but never more than 26. Increased numbers in mid-July are probably real, since three of four GrSw4JC parties found 25 or more on 7/5. Double digits in late July in SOM & MER may represent another brood. Seen almost daily throughout the region in Aug, with a few double-digit reports, not exceeding 30. The season max was 100+ on 9/1 at Vernon [VC], which presaged higher numbers through the first three wks of Sept, but only in Sussex. No double-digit counts in cNJ after 8/10, but many in nwNJ including the second-highest count of 75+ on 9/21 at SUS:Muckshaw Pond [TH,FP]. Last seen 9/24 at WAR:White Lk [TH].

European Skipper: The 2007 account was brief: "In nwNJ seemingly not as abundant as usual [TH]". In retrospect, this seems understated, there were no triple digit days, and no clear peaks." But 2008 was even poorer with 22 records vs. 32 in 2007. It was first noted on 6/6 at WAR:White Lk. [DA]; double-digit days occurred until 6/15 MOR:Troy Meadows

[NABA]. Only one triple-digit count was reported, of "hundreds" at MON:Big Brook Pk on 6/19 [VC]. Stragglers often occur into mid-July, and 2 were noted on Spring4JC (7/12).

Fiery Skipper: Not an unusual year: 27 records in 2008 vs 29 in 2007. First reported on 7/12 Spring4JC from SUS:Hyper Humus [KW,TH], a typical early date, but this southern immigrant is usually scarce in nwNJ. Records were well distributed: SUS=9, BER=2 ESS=2 MOR=1 SOM=5 MID=1 MER=2 MON=4. "Big at Hyper Humus" [TH] where season maximums of 8 were found 7/12 [KW,TH] and 7 on 8/3 [JB,MB]. Local breeding there was suspected [SW,WW]. 2007 had several Oct records in SOM which were not repeated in 2008. The latest, a 10/16 record SUS:Fredon [WW,SW] after a three-week gap.

Leonard's Skipper: This species, listed by NJDEP as "special concern," probably warrants "threatened" status. Only 2 reports in 2008, of 1 at SUS:KVSP on 9/1 [TH] and 2 at SUS:Vernon AT on 9/3 [VC,FK]. This is a highly localized species with scattered small colonies, that generally has to be looked for specifically. "I didn't check most of the northwest NJ places where I've seen them in the past." [TH]. None found at the (former?) SOM:Somerset colony impacted by development [MG], nor on an 8/23 visit to SUS:Flatbrookville [JS], a known colony site.

Cobweb Skipper: This skipper, which flies from early May to early June, is highly local in nwNJ. There were 5 records in 2008 (vs. 3 in 2007). First reported at MOR:Boonton (5) on 5/4 [TM], with 4 there nine days later on 5/13 [TM]. Counts of 10 and 11 at MOR:Mountainside Pk on 5/15 [VC] and 5/18 [NABA], and the last record at MON:NWS Earle (1) on record late date of 6/11 [SW,WW]. Previous late date 6/9. In 2007 reported also at SUS:Flatbrookville and MON:Thompson Pk (all records were singletons). In Cape May Cobwebs were flying Apr 23-30.

Indian Skipper: A typical year, with scattered reports of small numbers. 16 records in 2008 vs. 13 in 2007. seen first on 5/15 MOR:Mountainside (4)[VC] and last on 6/18 at SUS:Fredon [SW,WW]. Fourteen records in SUS and two in MOR.

Peck's Skipper: Slight improvement over 2007 with 155 records vs. 107, but in cNJ generally scarce and in low numbers, and no triple-digit days. Only two broods in nwNJ [TH]; possibly three in cNJ. First cNJ sighting on 5/13 (3) SOM:Somerset [PW], and in nwNJ first on 5/25 with WAR, MOR and HUN records). First double digits (10) on 5/26 SOM:Bunker Hill [PW], and then no double digits until 6/8 with 25 at KVSP [TH] and 10 at SUS:Swartswood [SW,WW]. Then recorded regularly in small numbers including only 4 on Mer4JC (7/13). Spring4JC reported none. New brood appeared simultaneously in north with 15 on 7/16 in BER:Allendale [FW] and 98 on Rar4JC (7/18) (peak day of season). Numbers continued moderately high into mid-Aug until a surge in double-digit counts in mid-Aug, possibly indicating another brood. Followed by single digits until 16 on 9/4 at SUS:Vernon [VC] and 16 on 9/21 at SOM:Somerset Farms [MG]. Numbers

dwindled quickly with only three later records, the last 10/5 MOR:Willowwood [JS].

Tawny-edged Skipper: More frequent in 2008 (82 records) than 2007 (57 records), probably reflecting an average year, since 2007 was considered a "down" year in both nwNJ [TH] and cNJ [MG]. This species has overlapping broods. First brood reported simultaneously on 5/24 SOM:Bridgewater [JS] and 5/25 SUS:Wallkill [KW]. Then reported almost daily with no apparent gaps until 9/5. Observers seldom mention the condition of skippers; however, the 7/16 SOM:Duke Farms individual was reported as "fresh" [PW]. For this relatively common skipper, the lack of records from neNJ is interesting. The nwNJ records include SUS=24 WAR=7 MOR=11 HUN=6. The cNJ records include SOM=21 MER=7 MON=6.

Crossline Skipper: Status in 2008 (20 records) similar to 2007 (24 records) which "Seemed about average" in nwNJ [TH]; but decidedly uncommon in cNJ, and almost absent in 2008 with records in SOM=1, MER=2 and MON=3. Seen earlier in cNJ with records on 6/11 MON:NWSEarle [SW,WW] and, 6/13 MER:Pole Farm [SM,FB] than in nwNJ, first record 7/8 SUS:Vernon [VC]. Seen by three parties on Spring4JC (total=14) on 7/12. Continuing daily records in mid-July, with a peak of 20+ 7/17 at SUS:Flatbrookville [TH], and no apparent gap until the last report on 8/5 MON:Thompson Pk [VC]. In 2007 a clear gap was evident in mid-July, with subsequent peaks or possibly broods appearing 7/22/2007 and 8/14/2007, whereas in 2008 the broods overlapped.

Long Dash: This is another species "for which you need to visit their specific local colonies" [TH]. 2008 yielded only two reports: 1 at MOR:Willowwood on 6/28 [TH] and 10 at SUS:Vernon on 7/8, reported as "very fresh, very late" [VC]. Previous latest date recently 7/5/2003, but historically recorded to mid-July with a very unusual 9/9 record (G&B 1997). Other known colonies not found or perhaps not visited in 2008 include: High Point/Stokes, Flatbrookville, White Lake, Mendham, Swartwood, and Walpack. This species typically has one spring brood from mid-May into July, but Smith:(1900) suspected a summer brood (Aug-Sept).

Northern Broken-Dash: About the same in 2008 (63 records) as 2007 (58 records), and way down in both nwNJ and cNJ in recent years vs. a decade ago. First seen on 6/19 MON:Big Brook [VC], and first SUS record 7/1 Paulinskill [TH]. Daily in mid-July, with 1st double-digit day 7/5 with total of 43 on GrSw4JC including two double-digit parties. Overlapping broods with no apparent gaps, as fresh individuals emerged in late July. Only 5 Aug records, the last on 8/26 ESS:Hatfield Swamp [VC], which is three wks later than 2007. "This used to be the commonest skipper in our yard (SOM:Somerset), but I saw very few in 2007 [MG]" Ditto for 2008 [MG]. Although recorded in all 20 years of Rar4JC, the 2008 count (5) was second lowest, and last four years are all below average.

Little Glassywing: Status in 2008 (61 records) same as 2007 (58 records), and in both years "Probably somewhat lower than normal" [TH]. Apparently two broods. First sighted on 6/13 MER:Pole Farm [SM,FB], then continuous almost daily records until 7/22, followed by two later records: 3 on 7/28

MOR:Mountainside Pk [VC] and 2 on the late date of 8/16 SUS:Vernon [NABA]. Two double-digit counts in June (6/19 MON and 6/28 MOR), followed by many party double-digits 7/5 on GrSw4JC (total=131) and 7/6 All4JC (total=38). Peak on 7/12 Spring4JC (total=246), with single-party high of 84. Peak in MOR & MON possibly a week earlier than in SUS. "Worn" individuals noted 7/8 and 7/15, but no mention of "fresh" ones.

Sachem: More frequent in 2008 (111 records) than 2007 (86 records). First on 5/13 SOM:Somerset [PW] raises question of local overwintering. Until recently this species did not occur before mid-July (G&B 1997). In 2007 the first record was also in May in the same Somerset yard. Four records in May and one in June, mostly from the Williams yard (SOM:Somerset). Sachem numbers increased in early July, mainly augmented by immigrants, many of them worn [MG]. By mid-July Sachems had spread out widely in SOM-MID-MON, and first nNJ records were on 7/15 BER:Celery Farm [FW]. "This species doesn't usually make it to nNJ" [TH]. The only SUS reports were 9/24 and 10/1 at Fredon [WW], the first occurrence ever at this well-studied location. Other Oct records included MOR:Willowwood on 10/5 & 10/7 [JS,TH], MID:Piscataway on 10/8, and five SOM records, the last 10/26 at Negri Nepote [PM]. Very few records were of singletons, as this skipper typically occurred in numbers of 2-4 or more individuals. As in 2007, for much of the summer Sachem was the most numerous butterfly in many gardens. Interestingly, the first Ocean Co records are 7/12 when it also became widespread in cNJ & nNJ, consistent with immigrants rather than established colonists along the coast.

Arogos Skipper: Only one report in 2008, of 3 worn individuals on 6/30 MOR:Kenvil [TH]. This ties the previous recent late date of 6/30/2002. This species was not reported in 2007, but there were records from Kenvil on 7/4/06 and 7/4/05.

Delaware Skipper: This species is commonest in nwNJ and sparsely distributed in cNJ. No change from 2007 (47 records) to 2008 (48 records), but "another species that seems to have declined in central NJ in recent years" [MG]. First recorded 6/27 SUS:Vernon AT[DA], with first double digits on 7/5 GrSw4JC (total=24), 7/12 Spring4JC (total=116) and 7/13 Wall4JC (total=21), then continuous single-digit counts, mostly singles, until 8/1. Then two-wk gap to a single record of 3 on 8/16 SUS:Vernon [NABA]. The single Aug 2007 record was "very fresh" suggesting a late brood. This species was considered to have a single brood from June-Sept in nNJ with two discrete broods in the south (G&B 1997).

Mulberry Wing: 15 records in 2008 vs. 11 in 2007. First on 7/5 GrSw4JC (total=13) and widespread on Spring4JC on 7/12 (total=18). Peak count 44 on 7/26 at SUS:High Point [JB,MB], which was also the late date.

Hobomok Skipper: Similar status in 2008 (55 records) and 2007 (47 records). First on 5/18 MOR:Mountainside Pk [NABA], with first double digits on 6/5. Peak 30+ on 6/8 SUS:Canal Rd [SW,WW]. A gap in nwNJ from 6/23 to 7/5 indicates end of first brood. Usually scarce by July (G&B 1997). One record on 7/5 MOR GrSw4JC and last on 7/12 Spring4JC,

Most numerous in nwNJ: SUS=36 WAR=6 MOR=2 SOM=7. MER=2.

Zabulon Skipper: Status about the same in 2008 (95 records) as 2007 (94 records), and more frequent than Hobomok (51 and 47 records). First reported on 5/17 (4) MOR:Thompson Pk [VC], then almost daily until 6/28, with straggling reports of 1s and 2s through July. An Aug brood apparent from 8/3, with counts of 5 to 8/day in SUS, SOM & MER and stragglers elsewhere in Aug. Double-digits appear again 8/26, signifying possible third brood continuing into early Aug. After 9/7 only three records in second half of Sept and a three-week gap to the almost latest date of 10/15 SUS:Fredon [WW]. Latest date is 10/17/1997.

Broad-winged Skipper: This *Phragmites* specialist, which sometimes reaches great abundance in coastal marshes, is usually considered single brooded with peak abundance in first half of July (G&B 1997). Not numerous at all in 2007 (47 records) it was even less frequent in 2008 (24 records). First reported 7/13 on Mer4JC and Wall4JC, but no double-digits until 7/26 (13) at SUS:High Pont [JB,MB]. Counts of 53 on 8/5 MON:Thompson Pk [VC] and 46 on 8/13 ESS:Hatfield Swamp [VC] may represent new emergence. Last reported MON:Sandy Hook 9/10 [TH].

Dion Skipper: This large, generally uncommon skipper was recorded only six times in 2008 vs. 18 in 2007. After the first record on 7/6 SUS:Montague [SW,WW], all reports were on 4JCs, with three parties reporting a total of 9 on Spring4JC (7/12), 2 on Wall4JC (7/13) and 7 on Rar4JC (7/18).

Black Dash: Status similar in 2008 (30 records) and 2007 (28 records). First record MID:Monroe on 6/29 [TJ], and recorded frequently in nwNJ through 7/28 SUS:Vernon AT [VC], with a

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Other Abbreviations:

NABA: NABA-North Jersey Butterfly Club field trip.
4JC=Fourth of July Counts (compiler)
All4JC=MON:Allaire (J. McKee),
Duke4JC=SOM: Duke Farms (M. Gochfeld),
GreenB4JC=BER:Greenbrook Sanctuary (N.Slowik)
GrSw4JC=MOR:Great Swamp (C. Williams),
Mer4JC=Mercer County (F. Bader),
Rar4JC=SOM-MID:Raritan (M. Gochfeld),

peak of 46 on Spring4JC. Rare away from nwNJ; recorded in MID=2 and MON=1

Dun Skipper: A typical year, slightly better (92 records) than 2007 (76 records). First seen on 6/11 SOM:Duke Farms [PW], then several mid-June records followed by 12-day gap to 7/1 WAR:White Lk [TH]. Almost daily records from 7/1 to 8/20, with four records in late Aug, two SOM records 9/4 & 9/5, and then a final record 9/24 WAR:White Lk [TH], a typical late date. In 2008 double digits began 7/5 with a peak on 7/12 and continued to 7/25-7/26.

Dusted Skipper: Four records in 2008 (six in 2007). 5/15 MOR:Mountainside Pk [VC] ties the earliest date. Then seen 5/18 Mountainside Pk [NABA], 5/30 SUS:KVSP [TH], and 6/11 MON:NWS Earle [SW,WW]. This species has an extremely short flight period, with extreme dates of 5/15/06 and 6/20/06.

Pepper and Salt Skipper: Another sparse year, with only four records (same as last year). Reported 5/25 HUN:Bethelhem Twp at two locatoins [JS et al], 6/1 SUS:High Point [JB], and 6/7 SUS:High Point gas line [MG et al]. The latter sightings on Blue Flag Iris.

Common Roadside-Skipper: Only 2008 report was 4 at WAR:Yards Creek on 5/29 [WW,SW,TH]. "Nice to know that this colony persists even though the public can't access the area" [TH]. This rare species was reported only once in 2007 at MON:Allaire SP. In 2005 and 2006 it was reported from WAR:Raccoon Ridge.

Ocola Skipper - No records in 2008; last recorded 8/27/2007 BER: DeKorte Pk [VC]. Four reports in 2006 and eight in 2005.

SandyH4JC=MON:Sandy Hook (K.Keating),
Spring4JC=SUS-WAR:Springdale (W.Wander)
WallJC=SUS:Wallkill River NWR (K.Witkowski).

ABBREVIATIONS (some areas occupy more than 1 county)

All locations include the first three letters of the county in capital letters.
BER=Bergen, ESS=Essex, HUD=Hudson, HUN=Hunterdon,
MER=Mercer, MID=Middlesex, MON=Monmouth, MOR=Morris,
PAS=Passaic, SOM=Somerset, SUS=Sussex, UNI=Union,
WAR=Warren
AT=Appalachian Trail,
GSNWR=Great Swamp National Wildlife Refuge
KVSP=Kittatinny Valley State Park,
NWS Earle=MON: Naval Weapons Station Earle
PVT=Paulinskill Valley Trail
SBMWS=Stony Brook-Millstone Watershed Reserve
SHS=Sherman-Hoffman Sanctuary, SUF=Suffolk Co NY
WMA=Wildlife Management Area
Lk=Lake, Mt=Mount, Mountain,, Pk=Park, Twp=Township

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GIANT SWALLOWTAIL---2008

HIGHLIGHT

Compiled by M Gochfeld

The northward movement of Giant Swallowtails in Aug-Sept 2008 was unprecedented in modern history (i.e. past 50 years), but perhaps not unexpected. There were four northern NJ sightings in 2007, and last year Bob Dirig provided an account of Giant Swallowtail populations in central NY (Pearly-Eye 2007), and he provides an update on this population below. The first 2008 NJ sighting was by Y. Garcia & C. Lyons at Canal Rd on 7/3 with no more sightings until 7/28 at Canal Rd [V. Corsello]. However, from 8/15 to 9/21 there were 18 reports and 57 sightings, mostly different individuals. Emails below reflect the initial suspicions that records in the same neighborhood "probably" reflected one wandering vagrant. But in retrospect there was a heavy movement, certainly involving far more individuals than were actually seen. Several of the reports and photographs document very ragged butterflies, often with chunks of wing missing, although B. Hardiman reports (below) seeing a fresh, intact individual on 8/17 and V. Corsello saw 3 fresh on 9/4.

The worn condition and northward movement of many of the Giants suggests that these were long-distant migrants, and since there were only two south Jersey records (including first for Cape May Co) and no central Jersey records, it seemed reasonable that these were coming from the southwest. However, after reading Dirig's article, it is likely that some of the Giants, particularly fresh ones, represented local emergence from earlier breeders, themselves offspring of 2007 breeders. Unlike the May-June records in central NY, and a 6/5 fresh Giant in Ontario, there were no spring reports by NABA members from the Vernon area, despite lots of field work. However, a Vernon-area farmer told V. Corsello that he saw Giants in May and throughout the summer (see below).

The main larval host is Prickly Ash (*Zanthoxylum americanum*) which is abundant in the Vernon-Canal Road area, while further south it uses the rarer Hop Tree or Wafer Ash (*Ptelea trifoliata*) as well as Citrus trees. Egg-laying, larvae, and chrysalids were reported by the Wanders and V. Corsello. Here are some (slightly edited) emails. The first two suspected at first, that only one butterfly might be involved in multiple sightings.

Cynthia Allen, Cape May Courthouse 8/31/08

"I was stunned when I saw one in my garden around 5:15 PM Sunday and then it flew off. It is missing a large chunk of its wing. Will [Kerling] thinks this is a different individual from the one seen by Chris Vogel at CM Point State Park on 8/27. Many Giant ST's have been moving through Maryland, Delaware, and the Philly area this summer, so it is reasonable to expect that we would see them here and we may see more."

Brian Hardiman WAR:Columbia Twp 8/17 & 9/1

"I recently e-mailed you about a Giant Swallowtail on 8/17. I had a second sighting of this species in the same location on 9/1, and was able to get some photos. It Nectared on *Sedum* "Autumn Joy" and Rhododendron. The location is on the Delaware River. You can see how worn this individual is. The first one (8/17) had its "swallowtail" and the rest of the wings intact. I'm guessing, however, that it's the same individual."

Vinny Corsello 9/4/08

"I don't know if the Giant Swallowtails are the same as the ones from yesterday. Three were very fresh, one was not fresh. Today is another story. I went up to the AT Lands again and today they were in large numbers. What I mean by that is a total of 27 Giant Swallowtail sightings. They were mostly in wooded area's but at one time there were six in the meadow with the small boardwalk (from Rt 94). In the woods there were another 6 or 7 flying around the trees at the same time. On Rt 515 there were three road kills and the others were on a farm. Most of them were worn, but a few were still fresh. None were seen on or near Canal road."

Gochfeld 9/7/08

On 9/7 several of us visited the AT at Rt94 and Canal Road to savor some of Vinny's riches. We did see one individual along Canal Road (north of the road break) and one in a wooded clearing west of the RR tracks and boardwalk. Neither paused, although the latter circled the clearing overhead before continuing northward. We were envious of people who saw them nectaring.

Sharon Wander SUS: Fredon 9/17

"Today (9/17) we found a Giant Swallowtail larva on Prickly Ash in Vernon. This may be the first confirmed evidence of breeding in NJ! This adorable critter is an obvious bird-dropping mimic (called the Orange Dog for its use of Citrus as a foodplant). This one was about 3-3.5 cm long (maybe 3rd instar), on top of a leaf right along the trail and about 3 feet off the ground. This was in the woods west of the RR tracks from the Rt. 94 AT parking lot (Vernon).

Vinny Corsello 12/30

I did find five Giant Swallowtail Chrysalids on the AT lands on 12/5 on the twigs of Prickly Ash. I plan to go back and find some more before the farmer who leases this section of the AT lands for hay trims back a lot of "brush" come spring. I searched the AT Trail itself but found none. I became friends with this farmer over the summer, and he told me that he had Giant Swallowtails on his butterfly bush just about all summer and he started to see them in mid May. He also said that he started to see them in 2006.

Harry Pavulaan Virginia

"Giant Swallowtails were not so good this past year in northern Virginia. Saw only one on a hilltop where there usually are several at once. Also only found one larva on Wafer Ash. In 2007 they were more common around here. Population irruption must have moved north of us in 2008."

Giant Swallowtails in Central and Western New York, 2008

By Robert Dirig (Cornell University)

P.O. Box 891, Ithaca, NY 14851-08 (red2@cornell.edu)

Giant Swallowtails (*Papilio cresphontes*) had another "boom" year in central and western New York, appearing in thirteen counties throughout the 2008 season, based on posts to the NYSButterflies email group. A dozen spring brood adults were reported from May 26th to June 19th, indicating local overwintering of wild pupae near Binghamton, Lockport, Syracuse, Geneva, and Ithaca. About fifty sightings of summer brood adults were recorded between July 21st and Sept. 8th (all but nine of them in August), including the first known records from Cayuga, Oswego, Otsego, and Steuben Counties. This very visible summer flight probably represented adults developing from eggs laid by the earlier generation, as well as some butterflies dispersing from nearby colonies. It has been very exciting to have this magnificent swallowtail with us again this year.

I found second- and third-instar larvae on Prickly Ash (*Zanthoxylum americanum*) in a wetland outside of Ithaca (Tompkins County) on August 24th. Returning on October 3rd, about a dozen third- and fifth-instar caterpillars were on the same shrubs, suggesting two or three separate egg-laying events at this site in August or early September. I checked the later larvae weekly throughout October, as the foodplant leaves first yellowed, then dropped or withered after several light frosts, until October 26th. As days grew cooler and darker, apparently full-grown caterpillars seemed just to sit on the leaves. Perhaps they were malnourished after the leaves stopped photosynthesizing, or were too cold to transform. On October 26th, while bending a Prickly Ash branch for closer inspection, a leaf petiole detached and fell with a caterpillar still clinging to it. Although summer caterpillars have been disease- and parasite-free, four larvae were diseased late in October, probably weakened by cold and poor-quality food. It will be interesting to see if pupae can be found beneath the shrubs after the snow melts in early spring, or if any adults appear in late May-early June 2009 at this site.

During my last October visit, the extreme oddness of this association struck me: Here a quintessentially southern butterfly — which gracefully floats through sunbeams among palms, tangled vines, and wild citrus in steamy Florida hammocks — was trying to reproduce in a boreal fen in New York, where a few of its host shrubs receive their daily meed of morning sun, but are otherwise shaded by towering Hemlocks! Such are the paradoxes and eternal optimism of species at the edge of their natural range.

OCEAN COUNTY RECORDS

Ocean County brings several features: unique habitats including Pine southern position, and coastal plain. It also has a resident natu Wainwright, who contributes regular observations from Toms River. somewhat of an orphan lying outside the main sphere of activity of both North Jersey and South Jersey, although both groups have field tri NABA-North Jersey had two field trips: May 4th led by C. Williams to Grove and June 21 led by J. Springer to Lakehurst-Whiting and Colliers

The 586 records include the following dates that are earlier or later than those shown above. Species that do not occur in cNJ and nNJ are "unique".

Amer Copper	1	Toms River	10/7	SW	later
Bog Copper	150	Lakehurst Bog	6/21	NABA	earlier & higher
Brown Elfin	2	Warren Grove	4/13	CW,PW,JS	earlier
Hoary Elfin	60	Warren Grove	5/4	NABA	unique
E Pine Elfin	1	Lakehurst	4/19	HZ	earlier
Hessel's H-S	18	Warren Grove	5/4	NABA	unique
White M H-S	1	Tom's River	9/7	SW	later
Gray H-S	1	Tom's River	10/5	SW	later
Spring Azure	1	Tom's River	3/22	SW	earlier
C.Buckeye	1	Warren Grove	5/4	NABA	earlier
C.Buckeye	1	Tom's River	6/11	SW	earlier
Georgia Satyr	1	Lakehurst Bog	6/21	NABA	unique
Sleepy Dusky-W	8	Warren Grove	5/4	NABA	later
Dotted Skipper	1	Colliers Mills	6/21	NABA	unique
Two-spot Skip	6	Lakehurst Bog	6/21	NABA	unique
Broad-wing Sk	2	Tom's River	7/2	SW	earlier

EARLY AND LATE DATES BY YEAR

Tom Halliwell prepared a table of early and late dates by species through 2006. This has been supplemented by inserting any changes for 2007 and 2008. The tabulation by year is interesting. A lot of early dates as in 2002 and 2004 suggests early spring across a lot of species, while the 2003 late dates indicates a warm autumn. 2006 had a lot of both, while 2007 and 2008 had cold wet springs and cold wet autumns. These data are constrained by the fact that every new record makes it less likely to have a more extreme record in the future. But this is countered by the increasing numbers of butterflies afield each year.

YEAR	RECORD EARLY DATES	RECORD LATE DATES
1999	0	2
2000	10	3
2001	9	9
2002	22	3
2003	3	27
2004	24	6
2005	7	9
2006	10	10
2007	2	8
2008	4	3

The record early dates in 2008 were for Harvester (5/14), Appalachian Azure (5/5), Red Admiral (3/24), & Silver-spotted Skipper (4/26). Record late dates were Viceroy (10/14), Horace's Duskywing (10/18) and Cobweb Skipper (6/11).

AZURES OF NEW JERSEY

Introduction: Michael Gochfeld

It has long been known that the "Spring Azure" complex (*Celastrina ladon*) in the broadest sense (*sensu lato* as the taxonomists say) is not a single species in the biological sense. Different-looking butterflies with different host requirements co-occur. When two distinct species are so similar that they have been considered a single species, they are often called "sibling species", although this implies that they are evolutionarily very closely related, even though that doesn't always turn out to be true. During my ornithology studies I became interested in sibling species of birds, so it seemed natural that I would keep an eye on sibling butterfly species such as the Azure complex. But since butterflyers (like bird watchers) want to identify the creatures we see to a SPECIES, it has become convenient to ignore the subtle differences that, can only be positively determined in the laboratory. It is simpler to list all as "Spring" Azures---recognizing it is a complex with quotation marks. And that works for most purposes when you cannot narrow your identification in the field. However, more and more butterflyers are trying to narrow down their identifications.

Butterflyers including the NABA Checklist Committee have been comfortable accepting the Appalachian Azure (*Celastrina neglectamajor*), because of its close association with its unique host, Black Cohosh, and its May-June flight period. On the other hand, the pale-looking, habitat generalist Summer Azure (*C. neglecta*), is also a host generalist, and is usually listed separately as well, although when the "Spring" complex stops flying and the "Summer" first appears, is often unclear. Our NABA list keeps this taxon as a subspecies *C. ladon neglecta* or "Summer" Spring Azure, which seems an awkward compromise. In some places *neglecta* may also have a spring brood.

In *Butterflies of New Jersey* (G&B 1997), we tried to reflect the current state of knowledge which was still preliminary, because some of the species of "Spring" Azure had not yet been formally described or given a name, by the two azure specialists, David Wright and Harry Pavulaan. Since then, the taxonomy and nomenclature have been updated (although probably not finalized), and in this issue David Wright has summarized the taxonomic challenge and indicated the distribution, ecologic (habitat and host), and temporal (phenology) characteristics of the six currently recognized species in New Jersey. After reading this article the field observer may still settle for lumping all March-May observations as "Spring" Azure, or may try to sort out the forms, perhaps aided by photographs or specimens.

Even within some of these species, azures show considerable variability, and several pattern 'forms' are recognized including *violacea*: smaller, darker, distinct large spots, but no discal patch or dark margin. *Marginata*: gray below with broad black margin and no discal spot. *Lucia*: dark discal patch below. Even these forms are not distinct, and are of little use alone in distinguishing species.

Interestingly virtually none of the 170 azure records submitted for the *Pearly-Eye 2008*, even mention the above forms. Have we forgotten to look closely.

NOTE: The term *sensu stricto* and *sensu lato* are often written *sensu strictu* and *sensu latu*. Is there a Latin scholar among us to point to the correct spelling.

CITATION G&B (1997) refers to Gochfeld, M. and J. Burger 1997. *Butterflies of New Jersey*. Rutgers Univ Press, New Brunswick.

EDITORS NOTE: The six species of azures D. Wright discusses in his article below have had a variety of English names including:

Celastrina lucia. Northern Azure. Blueberry Azure. (Less appropriately Eastern Spring Azure). Occurs mostly as forms 'lucia' and 'marginata', rarely as 'violacea'.

Celastrina ladon. Spring Azure in the narrow sense (*sensu stricto*). Listed as "Spring" Spring Azure by NABA. Also Edwards Azure in reference to Edwards' name *C. violacea*, which is a synonym of *ladon*. Occurs mostly as dusky gray 'violacea', but darker forms occur northward.

Celastrina idella. Holly Azure. Pine Barrens Azure in G&B (1997). Occurs mainly as form 'violacea', but occasionally as other forms.

Celastrina serotina. Cherry Gall Azure. Late Spring Azure. Mostly as pale 'violacea', but darker forms occur in north.

Celastrina neglectamajor. Appalachian Azure.

Celastrina neglecta. Summer Azure. Listed as "Summer" Spring Azure by NABA.

Classification of New Jersey Azures: How to Make Sense of Taxonomy.

By David Wright

The study of natural history is a wonderful hobby. The excitement of exploration and the joy of learning are its rewards. We should never dampen this enthusiasm with confounding jargon and technical arguments. When the editor asked me to provide a summary of current azure taxonomy, my first question was how to avoid spoiling the fun. I will share with you helpful hints that have served me well when trying to make sense of confusing taxonomic concepts.

In the late 1970's it became apparent to Harry Pavulaan and me that two separate entities flew in the spring in the New Jersey Pine Barrens. Given the changing status of *Celastrina* systematics and the recognition of new sympatric species in the Appalachians, we suspected a sibling species pair occurred in southern New Jersey. The first flight, consisting of larger, dark individuals (forms "lucia" and "marginata"), flew in April when its blueberry host was in bud. The second flight, consisting of smaller brighter individuals (form "violacea"), followed in May, and was eventually found to feed on *Ilex*.

In 1999 we published a formal description of *Celastrina idella* (Holly Azure) as "a distinctive spring univoltine *Ilex*-feeding species from the middle Atlantic seaboard" based on "smaller size, wing color, flight period, pupal diapause, and larval host."

The NJ Pine Barrens is the northern limit of *idella*'s coastal plain range where it overlaps with the somewhat earlier Northern Azure. In 2005 we described *Celastrina serotina* (Cherry Gall Azure) whose larvae feed on leaf galls. "The commonly-used species epithet, *ladon*, for most of these species in texts is unfortunate and incorrect. *Celastrina ladon* is a species restricted to the Appalachian and Ozark ranges, just reaching the NJ Piedmont. It has a unique scale arrangement on the fore wings (long overlapping scales) and lacks sex scales (androconia), as clearly shown in Fig. 21 of Wright & Pavulaan (1999)--see web site below.

Given the confused history of our Azures, it is important to clarify some concepts.

(1) **Scientific names.** Natural history documentation has many important facets; most importantly of which are the form, habitat, and ecology of the organisms we study. Taxonomy is a convenient method to document this biodiversity. Scientific names (genus, species) anchor the information and allow us to communicate clearly without mistakes. The same name can be used all over the world avoiding difficulties of translation. The natural history student would be well served to learn to use scientific names. Once begun, it becomes just as easy as using common names.

(2) **Species.** A usable definition of "species" and reliable methods of identifying particular species are essential for measuring biodiversity. Unfortunately, a number of different definitions have been created and many don't apply in every case. The one that works consistently for me is the "nature test".¹ When it can be applied, the nature test is the ultimate court of appeal: two related entities that can coexist successfully in the wild are two different species. In other words, if entities maintain their separate identities year after year, they are species.

(3) **Speciation.** One thing in life is certain; that is change. In the natural world, species evolve and species become extinct. Our brains are programmed to easily understand extinction. However, there is a certain mystique about how species evolve. We ask how did it come to be there are so many azures? The answer is ecological specialization. Host plant utilization can be a strong constraint on reproduction, especially when potential hosts bloom at different periods. Azures have flower-feeding larvae; their eggs must be laid at a critical time in order to guarantee survival. When azure populations are separated in time due to divergent flowering times (allochryony), they are prevented from mixing and they diverge genetically.

Eventually, they accrue enough genetic differences to become separate species. The latest comprehensive resource on butterfly taxonomy is Jonathan Pelham's 2008 catalogue.² The complete list of New Jersey azures found in this work is as follows:

Celastrina lucia
Celastrina ladon

Celastrina idella
Celastrina serotina
Celastrina neglectamajor

Celastrina neglecta

These species can be conveniently divided into the three distinct groups above. Each species has a standard flight window, preferred habitat, and suite of flowering hosts. Group 1 (*lucia*, *ladon*) flies in **early spring** in a

single annual flight (univoltine). *Lucia* is found in coastal pine barrens and on ridge top woodlands in the northwest part of the state. It selects blueberries, chokecherry, and chokeberry as hosts. *Ladon* flies in rich Appalachian-type woodlands of the Piedmont and favors Flowering Dogwood and viburnums as hosts.

Group 2 (*idella*, *serotina*, *neglectamajor*) follows in **late spring**, also in a single annual flight (univoltine). *Idella* flies in coastal pine barrens and selects hollies as host. *Serotina* flies on the ridge top woodlands in northwest NJ and utilizes later-blooming cherry flowers (such as Black Cherry), leaf galls of same plant, and later-blooming viburnum (such as Nannyberry). *Neglectamajor* flies in rich woodlands of the Piedmont and uses a single host (Black Cohosh).

Group 3 (*neglecta*), consisting of a single species, flies throughout the state in **summer** and **fall** in multiple flights (multivoltine). It utilizes a wide variety of hosts over its extended appearance, including shrubby dogwoods, spirea, ivy, mints, Maleberry, Sweet Pepperbush, Wingstem etc.

Lastly, the different regions of state they occupy and the order in which they appear can also conveniently partition the azures.

Coastal Pine Barrens: *lucia* – *idella* – *neglecta*.
Appalachian Woodlands: *ladon* – *neglectamajor* – *neglecta*.
Northwest Ridge Top Woods: *lucia* – *serotina* – *neglecta*. Each region of the state has a unique floral sequence from spring to fall that is exploited by an azure. Taxonomy agreeably documents this biodiversity.

References:

1. Clench, H. K. 1975. Classification and Taxonomy. (Pages 42-49) In W. H. Howe, The Butterflies of North America. NY: Garden City, Doubleday.
2. Pelham, Jonathan P. 2008. A catalogue of the butterflies of the United States and Canada with a complete bibliography of the descriptive and systematic literature. The Journal of Research on the Lepidoptera. 40:1-652.

For more details consult the illustrated taxonomic descriptions:

Wright D.M. and H. Pavulaan. 1999. *Celastrina idella* (Lycaenidae: Polyommatainae): A new butterfly species from the Atlantic Coastal Plain. The Taxonomic Report 1(9):1-11. <http://www.tils-ttr.org/ttr/ttr-1-9.pdf>

Pavulaan, H. and D.M. Wright. 2005. *Celastrina serotina* (Lycaenidae: Polyommatainae): a new butterfly species from the northeastern United States and eastern Canada. The Taxonomic Report 6(6):1-10. <http://www.tils-ttr.org/ttr/ttr-6-6.pdf>

Editors Note: The Spring Azure complex has often been listed as *Celastrina argiolus*, another unfortunate name, since that refers to the Holly Blue of Europe.

FOURTH OF JULY COUNTS

Species seen on 2007 4JCs but not in 2008 Cloudless S., White M & Red-banded H-S, Milbert's Tortoiseshell, Hackberry Emperor, Com. Ringlet. Species Seen in 2008 but not 2007 Harvester, Bronze Copper, Aphrodite, Silver-spotted Fritillary,

Allaire, NJ. 3rd year. 6 July 2008. Compiler J. McKee. 7 obs in 3 parties recorded 1108 individuals of 34 species. Imminent threats to habitat: Gypsy moths attacking the oaks, and stilt grass taking over from other species of grass in all shaded or moist areas. This adversely affects skippers. More stilt grass, fewer milkweed plants compared with 2007. Trends not apparent in three years. New species: Viceroy, C. Checkered-Skipper, Sachem. New high counts for E. Tailed-Blue, Pearl Crescent, Monarch, N. Broken Dash

Duke Farms, 4 JC 4th year. July 26, 2008. Compiler M. Gochfeld 9 obs in 2 parties saw 479 individuals and 26 species. This count is confined to the 4500 acres of Duke Farms, all of which is preserved for outdoor education and environmental protection, but mowing regime not optimal in many areas, and long-term management uncertain. 9 observers in two parties. Habitat changes since last year: Some previously excellent meadows mowed before count this year. There was a general dearth of many species compared to 2007. Hairstreaks and grass skippers particularly scarce. Cabbage Whites at 190 was a new low count reflecting its relative scarcity in summer 2008. Clouded Sulphurs were very scarce all season. Orange Su. were scarce despite the abundance of alfalfa. Other low counts were Red Admiral and Red-sp Purple while Gray H-S, Summer Azures, Common Wood-Nymph, Least Skipper, Peck's Skipper and Sachem were high counts.

Garret Mountain Reservation & Riflecamp Park, NJ. First year. July 12, 2008 Compiler J. Labriola New count in Passaic Co. Elev. 400-550 ft. Deer and mountain bikes alter the habitat. Two obs recorded 12 species and 59 individuals; of interest was a single American Copper, the 1st record in several years.

Great Swamp, NJ. 14th year, 05 July 2008. Compiler C. Williams. 14 obs in 5 parties reported 1087 individuals of 34 species, both all time lows. No new species or high counts. All-time low counts for Cabbage White, both sulphurs, Gr. Spangled Fritillary, Red Admiral and Silver-spotted Skipper. Rained off and on all day.

Greenbrook Sanctuary, NJ. 27th year, 12 July 2008. Compiler N. Slowik.

6 obs reported 59 individuals of 12 species, including 5 Pipevine Swallowtails.

Mercer County, NJ. 6th year. 13 July 2008. Compiler F. Bader. 21 obs in five parties recorded 5563 (highest ever) individuals of 39 species. Species new to count: Variegated Fritillary, Fiery, Zabulon, & Broad-winged Skipper. New high counts for Spicebush Swallowtail, E.Tailed-Blue, Pearl Crescent (3x higher than previous high of 938), Painted Lady, C.Buckeye, C.Wood-Nymph, Horace's and Wild Indigo Duskywings and Sachem. Red Admiral tied for low with 3, probably typical of a non-flight year. N Broken-Dash, L.Glassywing and Dun Skipper were all-time lows. E.Comma was missed for first time and Mourning Cloak for 2nd time.

Raritan Canal, NJ. 20th year, 18 July 2008; Compiler: M. Gochfeld 11 observers in 4 parties recorded 2910 individuals of 43 species. Although I had the impression that butterflies were relatively scarce in July, the species count was the 3rd highest in 20 years. Most species were in the average to low range, but some new highs were set, including Common Buckeye, the 2nd new high in succession for Horace's D-W and Sachem. Sachem was far and away the most numerous grass skipper in summer. Spicebush Swallowtail had 2nd highest count The Wild Indigo Duskywing count was the 3rd lowest. One party had a huge number of Cabbage Whites (1630, most in one field); other parties commented on the dearth of this species. Pearl Crescent numbers below average, whereas it was remarkably abundant on the adjacent Mercer Count 6 days earlier. *Satyrium* hairstreaks almost absent., Clouded Sulphur was a low count and very scarce all season.

Springdale, NJ. 17th year, 12 July 2008. Compiler W. Wander. 35 observers in 7 parties recorded 4645 individuals of 61 species. Bronze Copper in Frankford was new to the count. Harvester, Olive Juniper Hairstreak and Silver-bordered Fritillary were recorded for only the 3rd time in 17 years. New high counts were set for Am Copper, Gray H-S, E Tailed-Blue, Gr. Spangled Fritillary (n=717), Pearl Crescent, Silver-spotted and Fiery Skippers.

Wallkill River National Wildlife Refuge, NJ. 9th year 5 July 2008. Compiler K. Witkowski. 9 obs in 3 parties recorded 1685 individuals of 40 species. A typical count with neither new species nor unusual misses, nor low nor high counts, except new high for N.Broken Dash.

BUTTERFLY FEEDER by Eileen Mahler

I had good success attracting butterflies to a feeder, a glass dish suspended by 3 metal chains hung on my lilac tree. The bait used was over-ripe bananas mixed with molasses. I tried over-ripe peaches, but they didn't work. I put bananas into the freezer, and they didn't need much mashing when I took them out. There rarely was more than 1 butterfly at a time on the bait.

Starting on July 18, the following species started coming to the feeder

Mourning Cloak	Common Wood-Nymph
Tawny Emperor	Question Mark
Eastern Comma	Red Admiral
Northern Pearly-Eye	

NOTES FROM THE NORTH

Alan Wormington wrote: "We have had a good summer here (Point Pelee) for interesting southern stuff -- Southern Dogface, Horace's Dusky-Wing, several Cloudless Sulphurs, and on Aug 2 an immaculate White-M Hairstreak. In Toronto a colony of Marine Blue was found, indicating that a female had arrived earlier in the season and laid eggs.

SOUTH JERSEY BUTTERFLY LOG

In 2008 the South Jersey Butterflies, spearheaded by Jack Connor, initiated an online spreadsheet log so that observers could directly enter details on their sightings. Some observers recorded only highlights, while others entered every sighting. The resulting log of 6250 records on 97 species submitted by 52 Observers, is a rich source of information.

Late Cape May County records include

Although our season effectively ended by Nov 2nd, South Jersey kept having butterflies till the year's end.

Gray Hairstreak 11/1
Black Swallowtail 11/2
Pearl Crescent 11/2
Clouded Sulphur 11/3
Cabbage White 11/3
Fiery Skipper 11/9
Variegated Fritillary 11/11
Eastern Tailed Blue 11/12
Monarch 11/15
American Copper 11/15
Sachem 11/15
Cloudless Sulphur 12/13
Orange Sulphur 12/15
American Lady 12/15
Red Admiral 12/15
Common Buckeye 12/19
Anglewing sp. 12/29

RARE SIGHTINGS IN SOUTH JERSEY 2008

Palamedes Swallowtail: On 9/12/2008 M. O'Brien found a Palamedes Swallowtail along the yellow/blue trail at Cape May Point State Park. The swallowtail was in the clearing just beyond the large pine grove (about 0.4 miles from the parking lot). Palamedes has been reported in HUD, WAR, BUR & CAPE MAY. The Hudson Co specimen was taken in 1908. The species is common as far north as Dismal Swamp.

The most widespread host of the Palamedes swallowtail is the Redbay Tree (*Persea borbonia*) in the Laurel family. This tree is seriously impacted by a fungal disease, Laurel Wilt, transmitted by the Redbay Ambrosia Beetle, which was first detected in the U.S. only in 2002, but is already causing widespread tree death from South Carolina to Florida.

Queen: A Queen was found in Cape May Point by P. Sutton on 10/5. It was nectaring AND laying eggs on Tropical Milkweed. On photos it looks fairly worn. Pat wrote "I googled wedding releases and most use Monarchs and Painted Ladies. A few use other species, but none of the first 10 I looked at used Queens." This could be a wild Queen or a horticultural hitchhiker. D. Moskowitz reported a Queen in cNJ in 2002.

Long-tailed Skipper: Seen commonly in Cape May County, 57 records from 9/4 to 11/3.

Loggers Invaded Butterfly Haven, Photos Show

By ANDREW C. REVKIN (NY Times 3-7-2008)

"Illegal loggers have chopped their way deep into unique forest reserves in a mountain range in central Mexico where millions of monarch butterflies from eastern North America roost for the winter, according to researchers who posted satellite photographs of the area on a NASA Web site Wednesday evening.

"Forests of oyamel fir trees in Michoacán and Mexico States have for thousands of years been a winter haven for the resplendent orange and black butterflies, the most famous "charismatic megafauna" of the insect world, said Lincoln P. Brower, a professor emeritus of biology at Sweet Briar College in Virginia, who has studied the butterflies and their shrinking winter habitat for decades.

"The images, posted online at earthobservatory.nasa.gov, show fresh clear-cutting in an area that held large butterfly colonies last year, as seen in aerial surveys, said Daniel Slayback, a geographer based at the NASA Goddard Space Flight Center in Greenbelt, Md., who has been tracking the butterfly wintering grounds with Dr. Brower. The images were taken by the commercial Ikonos satellite for the Monarch Butterfly Sanctuary. For full story go to http://www.nytimes.com/2008/03/07/science/earth/07butterfly.html?_r=

Other Tiger Swallowtails in New Jersey?

The familiar Eastern Tiger Swallowtail may not be our only Tiger.

CANADIAN TIGER SWALLOWTAIL (*Pterourus canadensis*)

It is worth remembering that S. Wander found a road-killed Canadian Tiger Swallowtail in 2001. This was the first and still only state record. Although historically considered a subspecies of Eastern Tiger Swallowtail (ETS), the Canadian Tiger Swallowtail was separated in 1991, based on detailed physiological and genetic characteristics. The Canadian has only one generation per year, while ETS has two. The Canadian Tiger Swallowtail does not generally have the black female form that mimics Pipevine Swallowtail. The inner margin of hindwing upperside has wide black stripe (whereas the otherwise similar ETS has a thin black stripe in that area).

<http://www.butterfliesandmoths.org/species?l=1374>

<http://bugguide.net/node/view/7367>

APPALACHIAN TIGER SWALLOWTAIL (*P. appalachiensis*)

In 2002 Harry Pavulaan and David Wright published a description of the Appalachian Tiger Swallowtail as a species distinct from the Eastern Tiger Swallowtail.

For scientific description, map, and photographs consult the following web sites. <http://www.tils-ttr.org/ttr/ttr-3-7.pdf>
<http://www.butterfliesandmoths.org/species?l=5089>

Could Appalachian Tiger Swallowtail Occur in NJ?

A very large Tiger Swallowtail was photographed in NJ in 2008 as a possible Appalachian Tiger Swallowtail. The image was sent to H Pavulaan who responded: "Unfortunately, the photos are inconclusive. Wing shape of the big one with damaged right FW has *glaucus* wing shape but also the broad black bar along the anal margin of the HW. The last photo, with a male sitting on the ground could be *appalachiensis* but we'd need to see the venter. Best photo proof: female upperside! By the way, *appalachiensis* could well be in northern New Jersey. I caught one typical female in Ulster County a few years ago in the Shawangunks. There are two records from western NY along the Pennsylvania border." H.Pavulaan

The Pearly-Eye 2008 is a publication of the NABA North Jersey Butterfly Club, a chapter of the North American Butterfly Association Inc.(NABA). It is intended to highlight activities of the club and to provide an overview of the status of butterflies in central and northern New Jersey in 2008 (from Mercer and Monmouth counties north). Editor-Michael Gochfeld (54 Hollywood Avenue, Somerset, NJ 08873). gochfeld@ehsi.rutgers.edu

The Club meets on the first Tuesday of the month (except in July when there is usually no regular meeting and in November when it meets 2nd Tuesday) at 7:30 pm in the Haggerty Education Center of the Frelinghuysen Arboretum, 53 East Hanover Avenue, Morristown, NJ. A list of field trips, directions to meetings, and other useful information can be found on the chapter's website at <http://www.naba.org/chapters/nabanj/> (click on chapters).

The officers for 2007-2008 are:

Michael Pollock, president (michael.pollock@njudubon.org)

Joe Burgiel, vice-president (burgiel@alum.mit.edu)

Deedee Burnside, treasurer (deedeeburnside@optonline.net)

Alice Koster, secretary (ajkoster@aol.com)

The officers for 2009-2010 are

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Alice Koster, secretary (ajkoster@aol.com)

Membership in the NABA-North Jersey Butterfly Club is included with annual membership in the North American Butterfly Association. (NABA Membership Services, 4 Delaware Road, Morristown, NJ 07960 or go to website: <http://www.naba.org> for further information

2008 NABA-NORTH JERSEY Meetings and Field Trips

Field Trips:

May 4th - Pine Barrens, Ocean County, C. Williams

May 18th - Mountainside Park, Morris County, A. Baytas

May 25th - Wallkill River NWR. K. Witkowski

June 15 - Swartswood State Park and environs, Sussex County, W. & S. Wander

June 21 - Lakehurst, Ocean County, J. Springer

July 4 - Flatbrookville, Sussex County, T. Halliwell

July 19 - Karen Nash Memorial Butterfly Garden, Washington, Warren County, T. Gonzales

Aug 10 - Willowood Arboretum, Fairview Farm, etc., Morris and Somerset Counties, T. Halliwell

Aug 23 - High Point State Park, Sussex W. and S. Wander

Sept 8 & 9 - Cape May, Cape May County. S. & W. Wander

Meetings:

Jan 8 - "Turkey, The Making of the Field Guide," A. Baytas

Feb 5 - "Big Bend, Texas," J. Springer

Mar 4 - "Butterflies of the Cloud Forest of Ecuador," C. Williams

Apr 1 - "Dragonflies of New Jersey," G. Nixon

May 6 - "South Jersey Butterfly & Moth Adventures" P. Sutton

June 3 - "Puerto Rico, Butterflies and More," J. Glassberg

Aug 5 - "Butterflies of Zambia and Malawi" by M. Barrett

Sept 2 - "Butterflies And Their Host Plants" S. Wander

Oct 7 - "Favorite North Jersey Butterfly Spots: Flatbrookville" T. Halliwell

Nov 5 - "Butterflies Gone Wild—The 2008 NABA Meeting in California" S. & W. Wander

Dec 3 - Member's Night

4th of July Butterfly Counts - 2008

	G. Swamp (7/5)	Allaire (7/6)	Garret Mt (7/12)	Springdale (7/12)	Greenbrook (7/12)	Walkkill (7/13)	Mercer (7/13)	Raritan (7/18)	Duke Farm (7/26)
Pipevine Swallowtail					5				
Black Swallowtail	2	7	2	10		22	39	46	6
Eastern Tiger Swallowtail	3	1	4	23	1	7	9	27	14
Spicebush Swallowtail	2	5	2	15	3	5	10	28	2
Cabbage White	97	205	6	420	22	160	1405	1844	190
Clouded Sulphur	3	4	3	70		55	26	1	2
Orange Sulphur	35	136		203	1	108	209	104	10
Harvester	1			2					
American Copper	2	27	1	143		2		1	
Bronze Copper				1					
Coral Hairstreak		1		4					
Edwards' Hairstreak				1					
Banded Hairstreak	11	1		196		31		1	
Hickory Hairstreak				16		1			
Striped Hairstreak				5			1		
Juniper Hairstreak				8		1	5	5	1
Gray Hairstreak	1	2		11		1	19	3	4
Eastern Tailed-Blue	90	108		94		21	258	59	46
"Summer" Azure	3	4		11	1	1	26	10	2
Northern Metalmark				64					
American Snout				2					
Variegated Fritillary						2	1	1	
Great Spangled Fritillary	72			717		76	39	8	1
Aphrodite Fritillary				1					
Silver-bordered Fritillary				13					
Meadow Fritillary				8					
Pearl Crescent	112	301		616		703	2826	210	19
Baltimore Checkerspot				137		26			
Question Mark	1			8	1	1		1	
Eastern Comma	1			16	3	8		1	3
Compton Tortoiseshell				2					
Mourning Cloak				8					
American Lady		22	1	40		8	13	2	2
Painted Lady		2		3			3	3	
Red Admiral	4	2		9	1	7	3	1	3
Common Buckeye	5	6		1			23	8	
"Red-spotted Purple"				21			6		2
Viceroy		1		8		8	1	4	
Tawny Emperor				10					
Northern Peary-Eye				53		1			
Eyed Brown						2			
Appalachian Brown	36	3		56		22		9	
Little Wood-Satyr	92	34	16	21	14	3	40	1	
Common Wood-Nymph	120	46		262		232	185	11	5
Monarch	24	86	2	182		79	58	29	28
Silver-spotted Skipper	8	12	1	433	3	13	43	18	3
Hoary Edge				7					
Southern Cloudywing				3				1 (sp.)	
Northern Cloudywing				1					
Horace's Duskywing				1		1	6	14	2
Wild Indigo Duskywing	5	1		10		1	123	16	6
Common Checkered-Skipper		1		1			10	1	
Common Sootywing							2		
Swarthy Skipper		3							
Least Skipper	86	7		29		6	8	2	33
European Skipper				2					
Fiery Skipper				6			1		
Peck's Skipper	2	2					4	98	72
Tawny-edged Skipper				1			4	7	5
Crossline Skipper				14				2	
Northern Broken-Dash	43	9		56		12	37	5	
Little Glassywing	131	38		246		16	9	1	
Sachem		4					92	309	17
Delaware Skipper	24	3		116		21	6	2	1
Mulberry Wing	13			18		5			
Hobomok Skipper	1								
Zabulon Skipper	1		2				1		
Broad-winged Skipper						2	2	3	
Dion Skipper				9		2		7	
Black Dash	22	3		46		4		1	
Dun Skipper	35	21	1	166	4	9	10	5	
TOTAL SPECIES	34	34	12	61	12	40	39	43	26
TOTAL INDIVIDUALS	1088	1108	41	4656	59	1685	5563	2910	479