

## Moth Records from Burkes Garden, Virginia

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In contrast to butterflies (Clark & Clark, 1951; Covell, 1972), the species composition and distribution of moths have not been well-studied in Virginia. The proceedings of a recent (1989) symposium (Terwilliger, 1991) detailed the biological and legal status of numerous plants and animals found in the Commonwealth. Nine species of Lepidoptera were reported, with only one moth (*Catocala herodias gerhardi* Barnes & Benjamin) designated as threatened (Schweitzer, in Hoffman, 1991). Covell (1990) suggested that baseline data are needed to understand the diversity and population dynamics of both moths and butterflies. He urged that more resources be appropriated in order to develop regional lepidopteran checklists, and to learn how best to preserve these insects as components of our natural heritage.

During the summer of 1987, the foraging strategies of a population of rare bats was studied in Burkes Garden, Virginia by Virginia M. Dalton. Nocturnal flying insects were sampled on a weekly basis to determine local species composition and abundance. The specimens accumulated by these surveys provide material for taxonomic baseline inventories of this interesting part of southwestern Virginia, toward which the following summary of the moths is an initial contribution.

### Materials and Methods

Burkes Garden is a high, almost completely enclosed limestone-bedded valley located in the Ridge & Valley Physiographic Province in the northeastern quadrant of Tazewell County (Cooper, 1944, Hoffman & Kleinpeter, 1948). The mean level of the valley floor is about 1060 m above sea level, and the surrounding rim of mountains rise to 1360 m. Burkes Garden has the shortest growing season (159 days) recorded in Virginia (Crockett, 1972),

and an average annual rainfall of about 119 cm (47 inches) (Cooper, 1944). The region was formerly characterized by oak-chestnut forest, but the chestnut (extirpated in Virginia) is now replaced largely by hickory. Remnants of relict boreal forest persist at elevations above 1100 m; Beartown Mountain on the western rim retains a vestige of the red spruce forest that occurred there prior to intensive lumbering in the early decades of this century. Above 1050 m occurs a northern hardwoods forest with a mixture of spruce (*Picea rubens* Sarg.), American beech (*Fagus grandifolia* Ehrh.), and yellow birch (*Betula alleghaniensis* Britt.) (Woodward & Hoffman, 1991). The valley floor has been largely deforested and converted into pastureland. Sinkholes, caves, and springs are of frequent occurrence.

The moths examined in this study were trapped mostly in the western end of Burkes Garden, in the general vicinity of Station Spring at an elevation of about 1100 m. Collections were made with two 15-watt blacklight traps each containing a 200 ml jar with a paper towel moistened with ethyl acetate. Sampling was conducted between sunset and sunrise; collecting jars were removed from the traps hourly and placed on ice.

More than 1,350 adult moths were captured during the 1987 season; all identifications were made by the author. The total number of moths is somewhat greater than the total accounted in the following lists, as some were too tattered and worn to permit accurate identification. The Lepidoptera from the Dalton survey are deposited in the VPI&SU Branch of the Virginia Museum of Natural History, Blacksburg, Virginia.

In the following lists, species are arranged in the sequence adopted by Hodges et al. (1983). When no number follows a species name in the "No. collected" column, one specimen of such species is implied.

List of Species		Drepanidae		
Checklist no.	No. collected	6251	<i>Drepana arcuata</i> Walker	12
Hodges et al., 1983		Geometridae		
Oecophoridae		6261	<i>Heliomata cycladata</i> Grote & Robinson	15
		6273	<i>Itame pustularia</i> (Guenée)	11
882	<i>Agonopterix robiniella</i> (Packard)	6278	<i>Itame evagaria</i> (Hulst)	2
992	<i>Ethmia zelleriella</i> (Chambers)	6299	<i>Itame coortaria</i> (Hulst)	10
1003	<i>Ethmia trifurcella</i> (Chambers)	6331	<i>Semiothisa promiscuata</i> Ferguson	
		6348	<i>Semiothisa fissinotata</i> (Walker)	3
Cosmopterigidae		6360	<i>Semiothisa quadrinotaria</i> (Herrich-Schäffer)	10
		6386	<i>Semiothisa ocellinata</i> (Guenée)	14
1524	<i>Triclonella pergandeella</i> Busck	6443	<i>Glenoides texanaria</i> (Hulst)	
		6583	<i>Anacamptodes ephyraria</i> (Walker)	2
Epermeniidae		6586	<i>Anacamptodes defectaria</i> (Guenée)	
		6588	<i>Iridopsis larvaria</i> (Guenée)	12
2330	<i>Epermenia pimpinella</i> Murtfeldt	33	6590 <i>Anavitrinella pampinaria</i> (Guenée)	4
			6597 <i>Ectropis crepuscularia</i> (Denis & Schiffmuller)	2
Yponomeutidae			6620 <i>Melanolophia canadaria</i> (Guenée)	2
			6621 <i>Melanolophia signataria</i> (Walker)	36
2401	<i>Ateva punctella</i> (Cramer)	8	6640 <i>Biston betularia</i> (Linnaeus)	26
			6667 <i>Lomographa vestaliata</i> (Guenée)	
Sesiidae			6704 <i>Erastria coloraria</i> (Fabricius)	
			6735 <i>Euchlaena pectinaria</i> (Denis & Schiffmuller)	2
2554	<i>Synanthedon acerni</i> (Clemens)	2	6739 <i>Euchlaena irraria</i> (Barnes & McDunnough)	5
			6743 <i>Xanthotype sospeta</i> (Drury)	
Tortricidae			6753 <i>Pero honestaria</i> (Guenée)	3
			6797 <i>Ennomos magnaria</i> Guenée	108
3492	<i>Cydia pomenella</i> (Linnaeus)		6798 <i>Ennomos subsignaria</i> (Hübner)	3
3632	<i>Choristoneura fractivittana</i> (Clemens)		6837 <i>Probole nyssaria</i> (Guenée)	5
			6841 <i>Plagodis keutzingi</i> (Grote)	
Limacodidae			6842 <i>Plagodis phlogosaria</i> (Guenée)	3
			6843 <i>Plagodis fervidaria</i> (Herrich-Schäffer)	
4652	<i>Tortricidia testacea</i> Packard	19	6884 <i>Besma endropiaria</i> (Grote & Robinson)	10
4654	<i>Tortricidia flexuosa</i> (Grote)	7	6965 <i>Eugonobapta nivosaria</i> (Guenée)	
			6987 <i>Antepione thisoaria</i> (Guenée)	5
Pyralidae			7047 <i>Nemoria rubrifrontaria</i> (Packard)	
			7196 <i>Eulithis diversilineata</i> (Hübner)	
4949	<i>Ostrinia nubilalis</i> (Hübner)		Lasiocampidae	
4980	<i>Helvibotys helvialis</i> (Walker)	5		
5159	<i>Desmia funeralis</i> (Hübner)			
5241	<i>Pantographa limata</i> (Grote & Robinson)	7	7698 <i>Malacosoma disstria</i> Hübner	4
5524	<i>Hypsopygia costalis</i> (Fabricius)		7701 <i>Malacosoma americanum</i> (Fabricius)	35
5627	<i>Omphalocera munroei</i> Martin		Saturniidae	
Thyrididae				
			7708 <i>Citheronia sepulcralis</i> Grote & Robinson	
6077	<i>Thyris sepulchralis</i> Guerin		7715 <i>Dryocampa rubicunda</i> (Fabricius)	5
			7719 <i>Anisota senatoria</i> (J. E. Smith)	
Thyatiridae			7757 <i>Antherea polyphemus</i> (Cramer)	3
			7758 <i>Actias luna</i> (Linnaeus)	2
6237	<i>Pseudothyatira cymatophoroides</i> (Guenée)	2	7767 <i>Hyalophora cecropia</i> (Linnaeus)	

	Sphingidae		8797	<i>Catocala subnata</i> Grote	2
			8846	<i>Catocala sordida</i> Grote	2
7775	<i>Manduca sexta</i> (Linnaeus)		8857	<i>Catocala ultronia</i> (Hübner)	3
7787	<i>Ceratonia undulosa</i> (Walker)	3	8858	<i>Catocala crataegi</i> Saunders	2
7809	<i>Sphinx kalmiae</i> (J. E. Smith)	2	8863	<i>Catocala mira</i> Grote	2
7824	<i>Paonias excacaetus</i> (J. E. Smith)	4	8864	<i>Catocala grynea</i> (Cramer)	5
7825	<i>Paonias myops</i> (J. E. Smith)	8	8867	<i>Catocala blandula</i> Hulst	2
7894	<i>Hyles lineata</i> (Fabricius)		8876	<i>Catocala micronympha</i> Guenée	
			8887	<i>Trichoplusia ni</i> (Hübner)	2
	Notodontidae		8924	<i>Anagrapha falcifera</i> (Kirby)	7
			9062	<i>Cerma cerintha</i> (Treitschke)	
7915	<i>Nadata gibbosa</i> (J. E. Smith)	14	9146	<i>Acontia delecta</i> Walker	
7919	<i>Peridea basitriens</i> (Walker)		9199	<i>Acronicta rubricoma</i> Guenée	
7921	<i>Peridea ferruginea</i> (Packard)	5	9207	<i>Acronicta innotata</i> Guenée	5
7951	<i>Symmerista albifrons</i> (J. E. Smith)	12	9221	<i>Acronicta funeralis</i> Grote & Robinson	2
7957	<i>Dasylophia anguina</i> (J. E. Smith)	7	9226	<i>Acronicta superans</i> Guenée	
7975	<i>Macrurocampa marthesia</i> (Cramer)		9237	<i>Acronicta interrupta</i> Guenée	3
7994	<i>Heterocampa guttivitta</i> (Walker)	3	9241	<i>Acronicta fragilis</i> (Guenée)	4
7995	<i>Heterocampa biundata</i> (Walker)		9243	<i>Acronicta ovata</i> Grote	
7998	<i>Lochmaeus manteo</i> Doubleday		9250	<i>Acronicta inclara</i> J. E. Smith	
7999	<i>Lochmaeus bilineata</i> (Packard)		9251	<i>Acronicta retardata</i> (Walker)	3
8011	<i>Schizura leptinoides</i> (Grote)		9254	<i>Acronicta afflicta</i> Grote	5
8012	<i>Oligocentria semirufescens</i> (Walker)	3	9284	<i>Agriopodes teratophora</i> (Herrich-Schäffer)	
8017	<i>Oligocentria lignicolor</i> (Walker)	2	9348	<i>Apamea amputatrix</i> (Fitch)	
	Arctiidae		9457	<i>Amphipoaea americana</i> (Speyer)	2
			9545	<i>Euplexia benesimilis</i> McDunnough	
			9669	<i>Spodoptera ornithogalli</i> (Guenée)	12
8089	<i>Hypoprepia miniata</i> (Kirby)	17	9684	<i>Elaphria grata</i> Hübner	
8090	<i>Hypoprepia fucosa</i> (Kirby)	17	9688	<i>Galgula partita</i> Guenée	4
8098	<i>Clemensia albata</i> (Packard)		9699	<i>Platysenta sutor</i> (Guenée)	
8140	<i>Hyphantria cunea</i> (Drury)	78	9889	<i>Lithophane petulca</i> (Grote)	
8170	<i>Apantesis vittata</i> (Fabricius)	3	9939	<i>Eupsilia devia</i> (Grote)	
8197	<i>Grammia virgo</i> (Linnaeus)		9957	<i>Sunira bicolorago</i> (Guenée)	
8203	<i>Halysidota tessellaris</i> (J. E. Smith)	25	10292	<i>Melanchra adjuncta</i> (Guenée)	
8211	<i>Lophocampa caryae</i> Harris	7	10304	<i>Trichordestra legitima</i> (Grote)	6
8214	<i>Lophocampa maculata</i> Harris		10397	<i>Lacinipolia renigera</i> (Stephens)	174
8255	<i>Pygarctia abdominalis</i> Grote	2	10406	<i>Lacinipolia olivacea</i> (Morrison)	
8262	<i>Ctenucha virginica</i> (Esper)		10431	<i>Faronta diffusa</i> (Walker)	17
8267	<i>Cissiceps fulvicollis</i> (Hübner)		10438	<i>Pseudaletia unipuncta</i> (Haworth)	29
	Lymantriidae		10446	<i>Leucania multilinea</i> (Walker)	62
			10455	<i>Leucania scirpicola</i> Guenée	11
			10462	<i>Leucania pseudargyria</i> Guenée	2
8294	<i>Dasychira vagans</i> (Barnes & Benjamin)		10502	<i>Himella intracta</i> (Morrison)	
8316	<i>Orgyia leucostigma</i> (J. E. Smith)	9	10659	<i>Agrotis volubilis</i> Harvey	
	Noctuidae		10661	<i>Agrotis malefida</i> Guenée	2
			10663	<i>Agrotis ipsilon</i> (Hufnagel)	47
			10670	<i>Feltia jaculifera</i> (Guenée)	3
8443	<i>Bomolochia bijugalis</i> (Walker)		10674	<i>Feltia subgothica</i> (Haworth)	
8534	<i>Plusiodonta compressipalpis</i> Guenée		10762	<i>Euxoa divergens</i> (Walker)	3
8689	<i>Zale lunata</i> (Drury)		10805	<i>Euxoa tessellata</i> (Harris)	13
8719	<i>Euparthenos nubilis</i> (Hübner)		10851	<i>Euxoa redimicula</i> (Morrison)	3
8727	<i>Parallelia bistriaris</i> Hübner		10891	<i>Ochropleura plecta</i> (Linnaeus)	51
8739	<i>Caenurgina erechtea</i> (Cramer)	15	10926	<i>Spaelotis clandestina</i> (Harris)	9
8784	<i>Catocala obscura</i> Strecker		10942.1	<i>Xestia dolosa</i> Franclemont	105
8788	<i>Catocala relecta</i> Grote	2	11029	<i>Abagrotis alternata</i> (Grote)	2
8792	<i>Catocala vidua</i> (J. E. Smith)		11068	<i>Helicoverpa zea</i> (Boddie)	4

## Results and Discussion

The 160 species of moths reported here from Burkes Garden are surely only a fraction of the total expected from the region. The "microlepidoptera" in particular are strikingly underrepresented. Prolonged and specialized collecting might account for as many as 800 local species. No estimates are available for the number of moths native to Virginia, but the numbers recorded for the nearby states of Kentucky and Ohio are approximately 2,320 and 2,520, respectively (C. V. Covell and E. H. Metzler, pers. comm.).

Nonetheless, the results of this study provide initial baseline data on the diversity of the Burkes Garden moth fauna, as well as a first step toward achieving comparable information for the entire Commonwealth. Numerous inventory studies, for which the aid of volunteer amateur lepidopterists should be actively enlisted, would provide badly needed information about the geographic and seasonal occurrence of Virginian Lepidoptera. The availability of such data would permit identification of populations requiring legal protection.

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