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Article

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The Aventiinae, Boletobiinae, Eublemminae, Pangraptinae, Phytometrinae, and Scolecocampinae (Lepidoptera: Noctuoidea: Erebidae) of Great Smoky Mountains National Park, U.S.A.

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Abstract

Twenty-five species of Erebidae are documented from Great Smoky Mountains National Park (GSMNP) from the following subfamilies: Aventiinae (1 species), Boletobiinae (7 species), Eublemminae (1 species), Pangraptinae (2 species), Phytometrinae (6 species), and Scolecocampinae (8 species). Each species is documented with an adult image, description/diagnosis, flight period, park distribution, abundance, elevational range, general distribution, and larval hosts. The most common (155 specimens) and widespread (40 localities) species was *Pangrapta decoralis* Hübner. *Scolecocampa liburna* (Geyer) is the next most common (87 specimens) and widespread (30 localities). The most species rich locality was the combination of the 11 localities along the Foothills Parkway, Cocke Co., Tennessee.

Key words: systematics, all taxa biodiversity inventory, North Carolina, Tennessee, host plants

This is the first paper in a series documenting the Erebidae of Great Smoky Mountains National Park (GSMNP) as part of the All Taxa Biodiversity Inventory (ATBI) project.

The higher level classification of the Noctuoidea has undergone some major reclassification (Fibiger and Lafontaine 2005, Lafontaine and Fibiger 2006, Lafontaine and Schmidt 2010, Zahiri *et al.* 2011). The trifid forewing venation, where M2 is approximately halfway between M1 and M3, giving vein Cu a 3-branched or trifid appearance occurs in the Oenosandridae, Notodontidae, and Doidae. The quadrifid forewing venation, where M2 is approximate to M3, giving vein Cu a 4-branched or quadrifid appearance occurs in the Arctiidae, Lymantriidae, Nolidae, and Noctuidae. Recent molecular evidence from nuclear genes (Zahiri *et al.* 2011) confirms that the quadrifid noctuoids form a monophyletic group. Furthermore, the molecular evidence supports four additional monophyletic subgroups within the quadrifid group. These subgroups are the 1) quadrifine subfamilies, where M2 in the hind wing is present giving vein Cu a 4-branched appearance, 2) trifine subfamilies, where M2 is absent in the hind wing giving vein Cu a 3-branched appearance, 3) Nolinae, and 4) Eutelliinae. The new classification chosen by Zahiri *et al.* (2011) now include the families Erebidae (quadrifine subfamlies), Noctuidae (trifine subfamiles), Nolidae, and Eutelliidae. I follow this arrangement in this paper.

The Aventiinae was treated as a subtribe of the Catocalini and included one species, *Laspeyria flexula* (Denis & Schiffermüller), from Europe (Goater *et al.* 2003). Later, it was treated as a subfamily, Aventiinae, based on the position of the ostium bursae at the base of the 8th abdominal segment in the female genitalia and the juxta being subdivided into a dorsal, more heavily sclerotized part that resembles an inverted Y and a ventral part that is a less sclerotized, semilunar-shaped plate (Fibiger and Lafontaine 2005). Vein M2 in the hind wing is in the primitive condition, approximately 1/3 up the cell and is not adjacent to M3 as in the Catocalinae. Therefore, Fibiger and Lafontaine (2005) give it a tentative rank of subfamily. The genus *Oruza* is included in the Aventiinae (Lafontaine and Schmidt 2010) with two North American species. This genus contains 51 species and is distributed worldwide (Poole 1989).

The Boletobiinae have a broad-winged geometridlike appearance; the labial palpus is long, thin, and roughly scaled; and the frons is fully scaled (Fibiger and Lafontaine 2005). In North America, there are three genera included, *Parascotia, Mycterophora*, and *Metalectra* with a total of 17 species. Only the genus *Metalectra* is found in Great Smoky Mountains National Park, with four of the 11 known species. The genus *Dyspyralis* includes four species, of which three are found in the Park. *Dyspyralis* is tentatively placed in the Boletobiinae, pending further molecular analysis (Lafontaine and Schmidt 2010).

The Eublemminae are small to very small moths that are often colorful with slender bodies. Autapomorphies include: 1) larva with MD1 and MSD2 setae enlarged on the abdomen (presently only confirmed in *Eublemma*); 2) male genitalia with the ampulla of the clasper and digitus short and broad, similar in length, overlapping, and fused basally; and 3) cucullus of valve entirely membranous, setose, apically rounded, and unarmed. Other characters include the following: lower half of the frons bare, both fore- and hind wings broad and almost equally long, and the valve broadest medially at the position of the clasper-digitus complex. There are five species in North America and one in Great Smoky Mountains National Park.

The Pangraptinae was treated as a tribe of the Eublemminae in Fibiger and Lafontaine (2005). Recent molecular studies of the Noctuoidea have resulted in the Pangraptinae being strongly supported as a sister group to a clade consisting of the Herminiinae, Aganainae, and Arctiinae (Zahiri *et al.* 2011). In North America, there are two species, both of which occur in the Park. Like the Aventiinae and Eublemminae, the hind wing has vein M2 in the

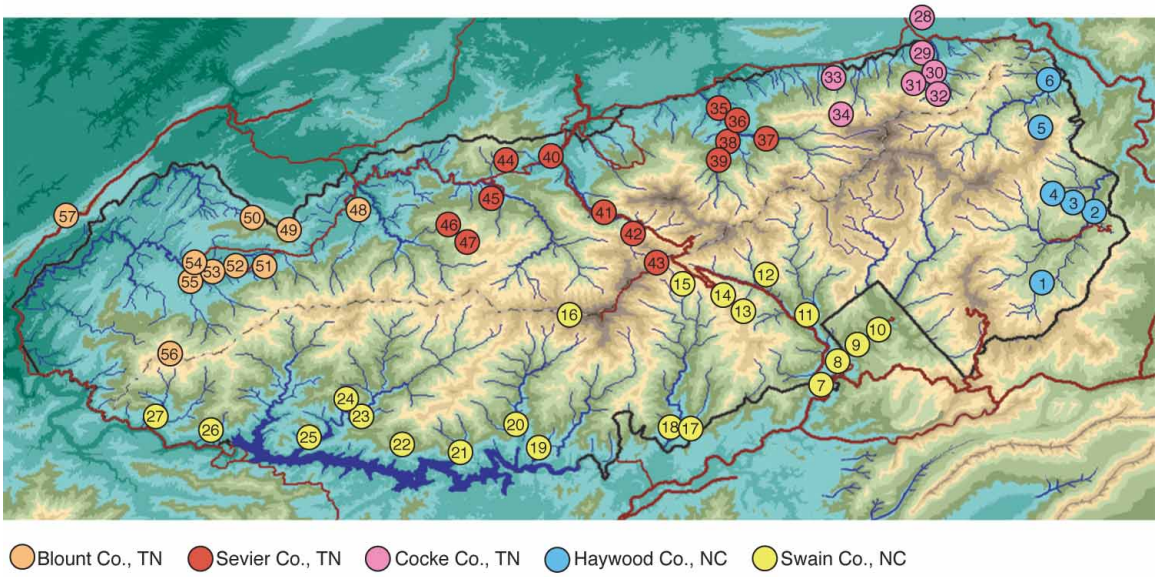
primitive condition approximately 1/3 of the way up the discal cell. In the male genitalia, the uncus is medially globular and setose; the valve is tapered with an elongate sacculus as long as the valve; the juxta is conelike with a dorsal window; the aedeagus is broadest at the ductus ejaculatorius; and the vesica has two large spinelike cornuti. In the female genitalia, the antrum is short and heavily sclerotized with a long membranous area of the ductus bursae posterior to a part of the ductus bursae with spined sclerites; the appendix bursae and basal part of the corpus bursae is coiled; and the corpus bursae is oval with a few sclerotized platelike signa (Fibiger and Lafontaine 2005).

The Phytometrinae have the M2 vein in the hind wing in the primitive condition being parallel to the M3 vein and approximately 1/3 up the cell. Characters that define the Phytometrinae are in the male and female genitalia. In the male genitalia, the valves are entire with the clasper near the center of the valve and with sclerotized processes on the dorsal and ventral margins. In the female genitalia, there are two circular invaginations adjacent to the ostium bursae and the corpus bursae is membranous with spicules on the inner surface of the bursa that are concentrated near the middle of the bursa to form a vague signa (Fibiger and Lafontaine 2005). In North America, there are 27 species of which only six occur in the Park. The genus *Hyperstrotia*, of which three species occur in the Park, are tentatively placed in the Phytometrinae based on the tympanal characters discussed by Richards (1933) (Lafontaine and Schmidt 2010).

The Scolecocampinae were defined by Richards (1933) by the enclosed tympanal pocket IV, which he treated as being convergently similar, but not homologous to the closed pocket in the Noctuidae. In the male genitalia, the valve is usually split with the costa and extends dorsoapically into a long, free process; the sacculus is slender, equally prominent, and reaching to or beyond the costal apex. In the female genitalia, the corpus bursae is ovate and membranous, with a band of prominent medial spines (Fibiger and Lafontaine 2005). There are 36 species in North America and eight in Great Smoky Mountains National Park.

Material and methods

Methods and materials were discussed in Pogue (2005). Adult and larval common names are from Covell (1984). Each species is sequentially numbered. All collecting localities are listed in Table 1 and shown on Map 1. Locality 28 represents the Foothills Parkway, which is not shown on the map, but represents the general direction of the Foothills Parkway in relation to the Park. Scientific and common names of plants were verified from The Plants Database (USDA, NRCS 2008).



MAP 1. Collecting localities of Aventiinae, Boletobiinae, Eublemminae, Pangraptinae, Phytometrinae, and Scolecocampinae. Numbers refer to localities in Table 1.

TABLE 1. Collecting localities of GSMNP Aventiinae, Boletobiinae, Eublemminae, Pangraptinae, Phytometrinae, and Scoleocampinae.

Locality No.	State	County	Locality	UTM N	UTM E	Latitude	Longitude	Elev. ft / m
1	NC	Haywood	Purchase Knob, nr. 1st gate	3938555	312525	35.5748 N	83.0689 W	4400 / 1341
1	NC	Haywood	Purchase Knob, 0.5 mi N of gate	3939295	312401	35.5814 N	83.0704 W	4640 / 1414
1	NC	Haywood	Purchase Knob, on road in meadow	3939582	312443	35.5840 N	83.0700 W	4520 / 1378
1	NC	Haywood	Purchase Knob at house	3939810	312176	35.5860 N	83.0730 W	4800 / 1463
1	NC	Haywood	Purchase Knob	3939847	312149	35.5863 N	83.0733 W	4924 / 1501
1	NC	Haywood	Purchase Knob NW of house, forest	3939804	312007	35.5859 N	83.0749 W	4911 / 1497
1	NC	Haywood	Purchase Knob, by Ferguson cabin	3939198	312279	35.5805 N	83.0717 W	4600/ 1402
2	NC	Haywood	Cove Creek Road	3945535	314380	35.6380 N	83.0500 W	3760 / 1146
3	NC	Haywood	Cataloochee, just off paved road to Cosby	3945240	311307	35.6348 N	83.0839 W	2600 / 792
3	NC	Haywood	Cataloochee, pull off at Sal Patch Gap	3945700	313351	35.6393 N	83.0614 W	3440 / 1049
3	NC	Haywood	Cataloochee, service rd. off Cataloochee rd.	3945811	313758	35.6404 N	83.0569 W	3540 / 1079
4	NC	Haywood	Piney Mountain	3946085	314573	35.6430 N	83.0480 W	3880 / 1183
5	NC	Haywood	0.72 mi from Mt. Sterling trailhead on Mt. Sterling trial	3952488	309173	35.6997 N	83.1091 W	4440 / 1353
6	NC	Haywood	Big Creek, 0.4 mi from entrance	3958867	309527	35.7572 N	83.1067 W	1800 / 549
7	NC	Swain	Oconaluftee Staff Apartments	3932698	291266	35.5159 N	83.3018 W	2024 / 617
8	NC	Swain	Big Cove Road, site c	3931177	291121	35.5040 N	83.3030 W	2080 / 634
9	NC	Swain	Big Cove Road, site p	3932160	291779	35.5130 N	83.2960 W	2040 / 622
9	NC	Swain	Big Cove Road, site w	3931834	291499	35.5100 N	83.2990 W	2030 / 619
10	NC	Swain	Big Cove Road, site b	3932935	291888	35.5200 N	83.2950 W	2120 / 646
11	NC	Swain	Smokemont	3937410	290359	35.5600 N	83.3130 W	2250 / 686
12	NC	Swain	8.3 mi NW of GSMNP entrance on 441, Kephart Prong Trail	3940466	286398	35.5867 N	83.3575 W	2825 / 861
13	NC	Swain	Beetree Ridge	3939471	283062	35.5770 N	83.3940 W	4860 / 1481
14	NC	Swain	Thomas Divide trail, 13.5 mi NE GSMNP entrance on 441	3940265	282711	35.5841 N	83.3981 W	4634 / 1412
15	NC	Swain	Deep Creek Trail, 15.2 mi NE GSMNP entrance on 441	3941998	280456	35.5992 N	83.4234 W	4815 / 1468
16	NC	Swain	Mt. Buckley	3938060	272869	35.5620 N	83.5060 W	6560/1999
17	NC	Swain	Wiggins-Watson Cemetery	3954195	284689	35.7302 N	83.4064 W	2200 / 671
18	NC	Swain	Deep Creek Ranger Station	3926502	278706	35.4592 N	83.4385 W	2120 / 646
19	NC	Swain	0.7 km up creek from mouth of Goldmine Creek	3926331	268498	35.4553 N	83.5508 W	2140/652
20	NC	Swain	0.4 km up trail from lake at Forney Creek	3927775	267749	35.4682 N	83.5595 W	2100 / 640
21	NC	Swain	0.5 km from mouth of Chambers Creek, 300 ft. up hillside on NW side	3924950	263269	35.4417 N	83.6080 W	1990 / 607

continued next page

TABLE 1. (continued)

Locality No.	State	County	Locality	UTM N	UTM E	Latitude	Longitude	Elev. ft / m
22	NC	Swain	Welch Ridge, 300 ft. above Lake Fontana	3926205	251764	35.4502 N	83.7350 W	1720 / 524
23	NC	Swain	Hazel Creek, Proctor Cemetery	3928884	252456	35.4745 N	83.7283 W	1800 / 549
24	NC	Swain	Hazel Creek, below Bradshaw Cemetery	3929179	252174	35.4771 N	83.7314 W	1840 / 561
24	NC	Swain	Hazel Creek, Bradshaw Cemetery	3929336	252196	35.4785 N	83.7312 W	2040 / 622
25	NC	Swain	0.2 km W of mouth of Hazel Creek	3928576	253041	35.4718 N	83.7217 W	1900 / 579
26	NC	Swain	0.7 km S of Payne Cemetery	3927198	244115	35.4572 N	83.8195 W	2000 / 610
27	NC	Swain	0.2 mi NE Twentymile Ranger Station	3928719	239253	35.4696 N	83.8735 W	1520 / 463
28	TN	Cocke	Foothills Parkway south overlook	3955061	298425	35.8090 N	83.2310 W	1860 / 567
28	TN	Cocke	Foothills Parkway	3965815	299437	35.8160 N	83.2200 W	2400 / 732
28	TN	Cocke	Foothills Parkway East	3964979	298179	35.8082 N	83.2337 W	2400 / 732
28	TN	Cocke	Foothills Parkway, 2nd pullout	3964970	295513	35.8100 N	83.2300 W	1800 / 549
28	TN	Cocke	Foothill Parkway East, 1.3 mi N of 321	3964955	298142	35.8086 N	83.2382 W	1801 / 549
28	TN	Cocke	Foothill Parkway East, 2.1 mi W of 321	3955297	242007	35.7097 N	83.8517 W	1570 / 479
28	TN	Cocke	Foothill Parkway East, 2.2 mi N of 321	3965161	298410	35.8099 N	83.2312 W	2400 / 732
28	TN	Cocke	Foothills Parkway, 1st parking lot nr. Cosby	3964806	297756	35.8070 N	83.2380 W	1801 / 549
28	TN	Cocke	Foothills Parkway, pull-off between 2nd and 3rd overlook up trail to right	3965527	299567	35.8152 N	83.2185 W	2280 / 695
28	TN	Cocke	Foothills Parkway N, 4.5 mi from Hwy. 321, 3rd overlook	3966593	300358	35.8250 N	83.2100 W	1920 / 585
28	TN	Cocke	Foothills Parkway East at I-40	3967869	302828	35.8370 N	83.1830 W	1330 / 405
29	TN	Cocke	0.25 mi inside entrance to Cosby	3962756	298273	35.7900 N	83.2321 W	1350 / 411
29	TN	Cocke	0.6 mi from state route 32 on road to Cosby campground	3961139	299992	35.7758 N	83.2127 W	1765 / 538
30	TN	Cocke	1.2 mi from state route 32 on road to Cosby campground	3960271	299942	35.7680 N	83.2130 W	1910 / 582
31	TN	Cocke	Cosby picnic area off Gabes Mountain trail	3959052	300163	35.7570 N	83.2103 W	2200 / 671
32	TN	Cocke	Cosby campground area	3958252	301075	35.7500 N	83.2000 W	2600 / 792
32	TN	Cocke	Cosby ATBI house	3961354	299896	35.7777 N	83.2138 W	1760 / 536
32	TN	Cocke	Cosby Ranger Station, below	3962063	299442	35.7840 N	83.2190 W	1680 / 512
32	TN	Cocke	Cosby Ranger Station	3961387	299879	35.7780 N	83.2140 W	1750 / 533
33	TN	Cocke	Maddron Bald Trail	3960340	295061	35.7676 N	83.2670 W	1900 / 579
34	TN	Cocke	Albright Grove Trailhead	3956976	293816	35.7370 N	83.2799 W	2000 / 610
35	TN	Sevier	Greenbrier, 2.6 mi Rt.321	3954571	284324	35.7133 N	83.3841 W	1620 / 494
36	TN	Sevier	Greenbrier area, end of Ramsey Cascade Rd., uphill from parking lot	3953270	286667	35.7021 N	83.3579 W	2050 / 625

continued next page

TABLE 1. (continued)

Locality No.	State	County	Locality	UTM N	UTM E	Latitude	Longitude	Elev. ft / m
37	TN	Sevier	Greenbrier area, Old Settlers Trail	3954109	284587	35.7092 N	83.3811 W	1675 / 511
38	TN	Sevier	Greenbrier covered picnic area, 3.5 mi S Rt. 321	3953511	284065	35.7037 N	83.3867 W	1760 / 536
39	TN	Sevier	Return on Greenbrier loop road, 3.85 mi S of Rt. 321	3952889	284087	35.6981 N	83.3863 W	1760 / 536
40	TN	Sevier	Park Headquarters	3952000	270417	35.6870 N	83.5370 W	1480 / 451
41	TN	Sevier	above Chimneys Campground	3946720	274457	35.6390 N	83.4910 W	2920/ 890
42	TN	Sevier	7 mi S of Sugarlands Visitor Center	3946354	276778	35.6376 N	83.4652 W	3640 / 1109
43	TN	Sevier	Road Prong Trail, 1.3 mi W of Jct. 441 & Clingmans Dome Rd.	3943217	278342	35.6097 N	83.4473 W	5260 / 1603
44	TN	Sevier	Laurel Falls trail	3950695	265687	35.6720 N	83.5890 W	2300 / 701
45	TN	Sevier	Elkmont	3948640	266434	35.6540 N	83.5800 W	2200 / 671
46	TN	Sevier	E of Campsite #20, nr. creek on Meigs Mountain Trail	3947795	263946	35.6476 N	83.6072 W	2570 / 783
46	TN	Sevier	W of Campsite #20	3947885	263903	35.6484 N	83.6077 W	2520 / 768
46	TN	Sevier	E of Campsite #20	3947812	264146	35.6478 N	83.6050 W	2550 / 777
47	TN	Sevier	Jake's Creek Trail, above Campsite 27	3945002	264199	35.6225 N	83.6036 W	3600 / 1097
47	TN	Sevier	Jake's Creek Trail, Campsite 27	3945031	264335	35.6228 N	83.6021 W	3550 / 1082
47	TN	Sevier	Jake's Creek Trail, nr. Campsite 27	3945045	264277	35.6229 N	83.6033 W	3590 / 1094
47	TN	Sevier	Jake's Creek Trail	3945069	264155	35.6231 N	83.6041 W	3640 / 1109
47	TN	Sevier	Elkmont, Jake's Creek Trail	3947971	266239	35.6497 N	83.5820 W	2398/ 731
48	TN	Blount	Tremont	3947301	256311	35.6413 N	83.6913 W	1360 / 415
49	TN	Blount	Campsite 6, along Scott Mtn. Trail	3945124	249410	35.6201 N	83.7667 W	3324 / 1013
49	TN	Blount	Campsite 6, Scott Mtn. Trail at creek	3945161	249493	35.6205 N	83.7658 W	3225 / 983
49	TN	Blount	Campsite 6, Scott Mtn. Trail	3945205	249480	35.6208 N	83.7660 W	3292 / 1003
50	TN	Blount	Ace Gap Trailhead	3950872	243766	35.6703 N	83.8308 W	1700/518
51	TN	Blount	Cades Cove Ranger Station	3943213	248428	35.6025 N	83.7770 W	1880 / 573
51	TN	Blount	Cades Cove Loop, nr. gate to	3943803	248354	35.6060 N	83.7780 N	1820 / 555
51	TN	Blount	Cades Cove ATBI house, 2000 m SW	3943081	243315	35.6000 N	83.8333 W	1740 / 530
51	TN	Blount	Vicinity of Cades Cove	3943572	248311	35.6057 N	83.7784 W	1880 / 573
52	TN	Blount	Cades Cove Primitive Baptist Church	3943252	245073	35.6020 N	83.8140 W	1800 / 549
53	TN	Blount	John Oliver Cabin	3944390	246826	35.6100 N	83.7950 W	1860 / 567
54	TN	Blount	Cades Cove Loop, Abrams Creek	3942637	242517	35.5940 N	83.8420 W	1706/ 520
55	TN	Blount	Cades Cove, Forge Creek Road	3941517	242847	35.5840 N	83.8380 W	1778 / 542
56	TN	Blount	Gregory Bald	3934368	240099	35.5207 N	83.8660 W	4949 / 1508
57	TN	Blount	Foothills Parkway West at East end	3956265	245059	35.7170 N	83.8180 W	1001 / 305

Species accounts

The species of the Aventiinae, Boletobiinae, Eublemminae, Pangraptinae, Phytometrinae, and Scolecocampinae of Great Smoky Mountains National Park are listed in alphabetical order within each subfamily checklist. The author and year of publication follow the species name. Original spellings of the species epithets are used and are not changed to be in agreement with the gender of the genus name (Poole 1989). Dates that include brackets, e.g [1858] 1857, mean that the publication was stated to have been published in 1857, but external information indicates that it was actually published in 1858. The assignment to subfamily in the text follows the checklist of Lafontaine and Schmidt (2010).

Subfamily Aventiinae Tutt, 1896

Oruza albocostaliata (Packard, 1876)

1. *Oruza albocostaliata* (Packard) The White-Edge
(Fig. 1, Map 2)

Identification. Forewing length 9.9–11.2 mm. This species is easily recognizable by the cinnamon-colored forewing with a distinct white band along the costa that continues across the thorax. Antemedial line is white, curved and continues to the posterior margin. Reniform spot is an indistinct area of black scales. Postmedial line is white, slightly sinuate, and continues to posterior margin. Subterminal line consists of a series of somewhat triangular black spots that are between the wing veins and are bordered proximally by a white line. The size and shape of these black spots are somewhat variable. Terminal line consists of a series of tiny, black, triangular spots between the wing veins. Some black scales are randomly scattered over the forewing. Except for the white costa, the hind wing is similar in color and pattern to the forewing. A faint, black discal spot is present and is variable in size, sometimes with only a few scales. Postmedial line from the forewing continues across the entire hind wing. Terminal line in hind wing is the same as forewing.

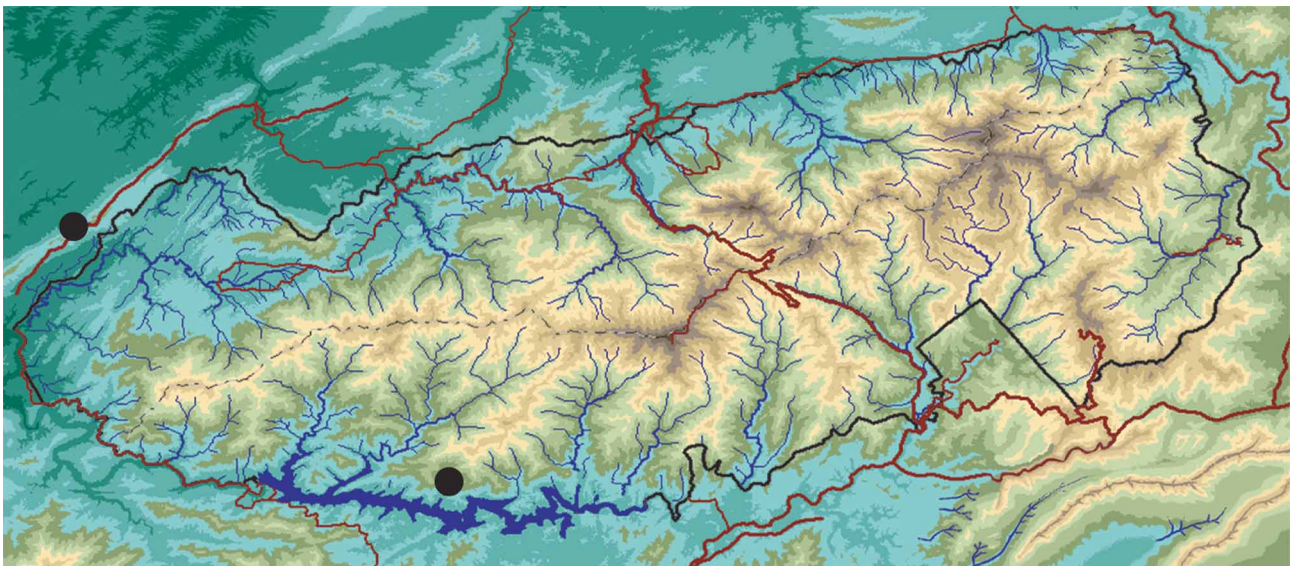
Flight period. June to July.

Collected localities. North Carolina: Swain Co.: 300 feet above lake on Welch Ridge. Tennessee: Blount Co.: W Foothills Parkway at E end. (3 specimens)

Elevation range. 1001–1720 ft. (305–524 m)

General distribution. This species ranges from Massachusetts to South Carolina, west to Missouri and Texas. It is common in wooded areas of southeastern Ohio.

Larval hosts. Unknown.



MAP 2. Collecting localities of *Oruza albocostaliata*.

FIGURES 1–32. Adults. 1, *Oruza albocostaliata*, m, Maryland, Prince Georges Co., Aquasco, 12 June 1997, J. Glaser; 2, *Metalectra discalis*, m, Tennessee, Blount Co., Ace Gap Trailhead, GSMNP, 24 July 2000, M.G. Pogue, USNMENT 00154045; 3, *Metalectra discalis*, m, Maryland, Prince Georges Co., Adelphi, 17 Aug. 1969, D.C. Ferguson; 4, *Metalectra quadrisignata*, m, North Carolina, Jackson Co., Balsam, 3200 ft., 21 June 1974, D.C. Ferguson; 5, *Metalectra quadrisignata*, f, Maryland, Montgomery Co., Violette's Lock, 29 July 1975, D.C. Ferguson; 6, *Metalectra richardsi*, m, Maryland, Montgomery Co., Colesville, 11 Aug. 1980, D.C. Ferguson; 7, *Metalectra richardsi*, m, South Carolina, Charleston Co., McClellanville, Wedge Plantation; 1 May 1972, D.C. Ferguson; 8, *Metalectra tantillus*, m, South Carolina, Charleston Co., McClellanville, Wedge Plantation; 23 Apr. 1974, D.C. Ferguson; 9, *Metalectra tantillus*, m, Florida, Putnam Co., Welaka, University Reserve, 7 Apr. 1971, D.C. Ferguson; 10, *Dyspyralis illocata*, f, Canada, Nova Scotia, Queens Co., Lake Kajimukujik, 20 July 1957, D.C. Ferguson; 11, *Dyspyralis illocata*, m, Canada, Nova Scotia, Queens Co., Lake Kajimukujik, 21 July 1957, D.C. Ferguson; 12, *Dyspyralis nigellus*, m, Maryland, Montgomery Co., Colesville, 8 July 1986, D.C. Ferguson; 13, *Dyspyralis nigellus*, m, Maryland, Baltimore Co., Soldiers Delight, 17 July 1993, J. Glaser; 14, *Dyspyralis puncticosta*, m, New Hampshire, Winnipesaukee, Long Island, 4 Aug. 1972, E. Jäckh; 15 *Dyspyralis puncticosta*, f, Arkansas, Washington Co., Devil's Den State Park, 7 July 1966, R.W. Hodges; 16, *Eublemma minima*, m, Tennessee, Cocke Co., Foothills Parkway, GSMNP, 17 Sep. 2001, J. Brown, USNMENT 00152848; 17, *Eublemma minima*, m, Texas, Cameron Co., Brownsville, 9 Nov. 1969, A. & M.E. Blanchard; 18, *Ledaea perditalis*, m, Florida, Collier Co., Big Cypress Swamp Preserve, Turner Rd., 1.5 mi US Hwy 41, 18 Mar. 1997, M.G. Pogue; 19, *Ledaea perditalis*, m, Florida, Putnam Co., Welaka, University of Florida Preserve, 26 Mar. 1987, D.C. Ferguson; 20, *Pangrapta decoralis*, m, North Carolina, Swain Co., 8.3 mi NE GSMNP ent. on 441, Kephart Prong trail, 2825 ft., 10 June 2003, M.G. Pogue, USNMENT 00155798; 21, *Pangrapta decoralis*, m, Tennessee, Cocke Co., 2.6 mi from St. Rt. 321, Greenbrier entrance, 1620 ft., 27 July 2007, M. Pogue, D. Adamski, M. Metz, GSMNP 1209; 22, *Pangrapta decoralis*, f, North Carolina, Swain Co., 13.5 mi NE GSMNP ent. on 441, Thomas Divide trail, 4634 ft., 8 June 2003, M.G. Pogue, USNMENT 00155702; 23, *Pangrapta decoralis*, f, Tennessee, Sevier Co., Jake's Creek trail, near Campsite #27, GSMNP, 22 July 2004, M.G. Pogue, USNMENT 00221776; 24, *Pangrapta decoralis*, f, Tennessee, Sevier Co., 1.3 mi W of Jct. 441 & Clingmans Dome Rd., Road Prong trail, 5260 ft., 28 July 2003, M.G. Pogue, USNMENT 00156584; 25, *Hemeroplanis habitalis*, m, Florida, Highlands Co., Lake Placid, Archbold Biological Station, 19 Feb. 1985, D.C. Ferguson; 26, *Hemeroplanis habitalis*, m, Oklahoma, Murray Co., Arbuckle Mts., 1 km W Turner Falls, 19–30 July 1984, Don & Mignon Davis; 27, *Hemeroplanis habitalis*, m, Florida, Hillsborough Co., Lutz, 10 May 1916; 28, *Hemeroplanis obliqualis*, m, Oklahoma, Sequoyah Co., Tenkiller Lake, 3 mi W Blackgum, 6–9 July 1979, D. & M. Davis; 29, *Spargaloma sexpunctata*, m, Maryland, Montgomery Co., Colesville, 8 Aug. 1984, D.C. Ferguson; 30, *Spargaloma sexpunctata*, f, Maryland, Montgomery Co., Colesville, 6 Aug. 1984, D.C. Ferguson; 31, *Hyperstrotia pervertens*, m, Maryland, Dorchester Co., 3 mi E Hurlock, 17 May 2004, J. Glaser; 32, *Hyperstrotia pervertens*, f, New York, Erie Co., Sardinia, Richmond Gulf, 25 July 1940, L.R. Rupert.

Subfamily Boletobiinae Grote, 1895

Metalectra discalis (Grote, 1876)
Metalectra quadrisignata (Walker, [1858] 1857)
Metalectra richardsi Brower, 1941
Metalectra tantillus (Grote, 1875)
Subfamily Boletobiinae (insertae sedis)
Dyspyralis illocata Warren
Dyspyralis nigellus (Strecker)
Dyspyralis puncticosta (Smith)

2. *Metalectra discalis* (Grote, 1876) Common Fungus Moth
(Figs. 2–3, Map 3)

Identification. Forewing length 10.0–13.0 mm. *Metalectra discalis* has a dark brown forewing mixed with cream-colored, gray, and reddish-brown scales. Basal and medial areas darker than rest of wing, but this may be less evident in worn specimens. Reniform spot is black and quadrate. Orbicular spot is black and obscure, not present in all specimens. There is a slightly curved row of white spots in the subterminal area. Hind wing has a similar pattern to forewing with a black, rectangular, discal spot; a curved line of small white spots; and a pair of white bars in the anal area. Similar to *Metalectra quadrisignata* (Walker), but *M. discalis* is darker in overall appearance with a wider black medial area that is less distinct than in *M. quadrisignata*.

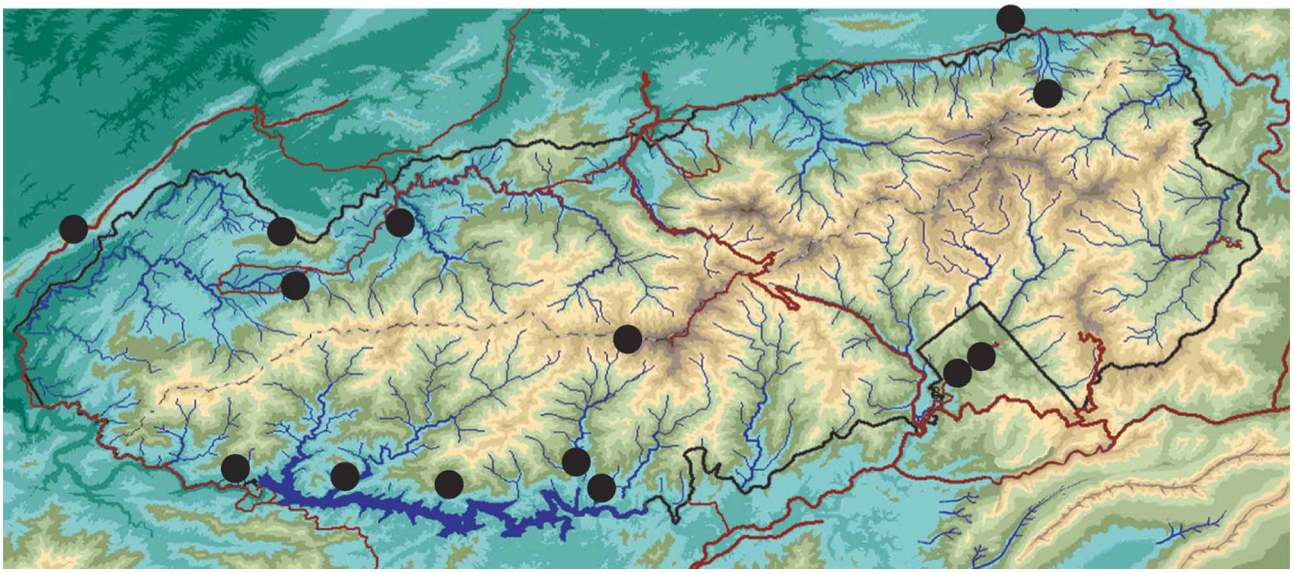
Flight period. May to early September.

Collected localities. North Carolina: Swain Co.: Big Cove Rd., site b, site p, site w; Mt. Buckley; 300 feet above lake on Welch Ridge; 0.7 km up creek from mouth of Goldmine Creek; 0.7 km S Payne Cemetery; 0.4 km up trail from lake on Forney Creek; 0.2 km W mouth Hazel Creek. Tennessee: Blount Co.: Ace Gap Trailhead; Foothills Parkway West at E end; Cades Cove Ranger Station; Tremont; Cocke Co.: Foothills Parkway N, 4.5 mi from Rt. 321, 3rd overlook; Foothills Parkway, pull-off between 2nd and 3rd overlook up trail to right; Cosby Ranger Station (20 specimens)

Elevation range. 1001–6560 ft. (305–1999 m)

General distribution. This is an eastern species distributed from Quebec, Canada, south to Florida, and west to Nebraska, Oklahoma, and Texas.

Larval hosts. Larvae feed on dry fungi (Covell 1984).



MAP 3. Collecting localities of *Metalectra discalis.*

3. *Metalectra quadrisignata* (Walker, [1858]) Four-spotted Fungus Moth
(Figs. 4–5, Map 4)

Identification. Forewing length 9.0–13.0 mm. *Metalectra quadrisignata* has a brown forewing. Basal area is brown at base with a distal black band with a white, crenulate antemedial line. Reniform spot is black and quadrate with a black, slightly thinner, zigzag medial line extending to posterior margin. Orbicular spot is small, black, and round.

There is a slightly curved row of white spots in the subterminal area. Hind wing has a similar pattern to forewing with a black, rectangular discal spot; a curved line of small white spots; and a pair of white bars in the anal area. Similar to *M. discalis*, but the ground color of the forewing is brown in *M. quadrisignata* versus dark brown in *M. discalis*. The zigzag medial line is distinct in *M. quadrisignata* and absent in *M. discalis*.

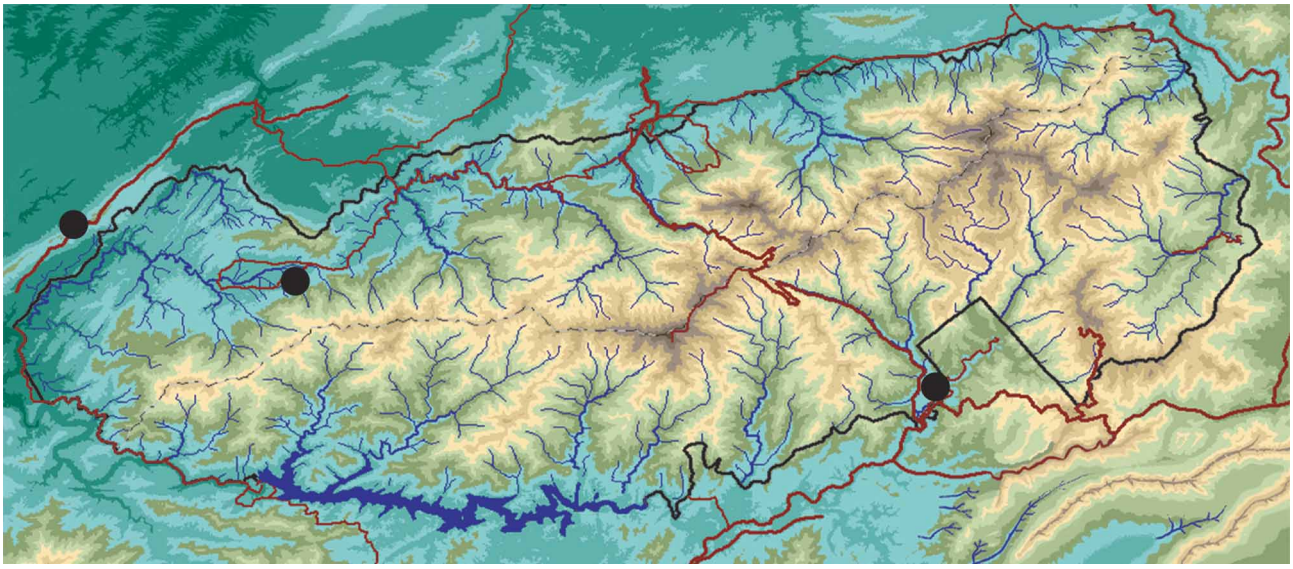
Flight period. May to August.

Collected localities. North Carolina: Swain Co.: Big Cove Rd., site c. Tennessee: Blount Co.: Tremont; Foothills Parkway West at E end; Cades Cove Ranger Station. (5 specimens)

Elevation range. 1001–2080 ft. (305–634 m)

General distribution. This is an eastern species distributed from southeastern Canada to Florida and west to Missouri, Oklahoma, and Texas.

Larval hosts. Larvae have been reported feeding on a species of bracket fungus (Covell 1984).



MAP 4. Collecting localities of *Metalectra quadrisignata.*

4. *Metalectra richardsi* Brower, 1941 Richards' Fungus Moth
(Figs. 6–7, Map 5)

Identification. Forewing length 7.0–9.0 mm. *Metalectra richardsi* is the smallest species of this genus in the Park. The forewing ground color is reddish brown with a broad, black medial line from costa to posterior margin. Antemedial line is a thin, white crenulate band that is bordered distally by a broken line of black scales. Postmedial line is a jagged, slightly sinuate line of black scales. Subterminal line is a thin, white, S-shaped band from costa to middle of forewing. Terminal line is a series of fairly prominent black triangles that are connected giving a wavy appearance to the line. Hind wing is dissimilar to forewing. Ground color is gray with a black discal bar, short white bar in anal area, and wavy black terminal line. Fringe is reddish brown with some black spots, especially in middle of wing. The small size, reddish-brown forewing color, and the hind wing being dissimilar in pattern to forewing will distinguish *M. richardsi* from other *Metalectra* species in the Park.

Flight period. Mid May to mid August.

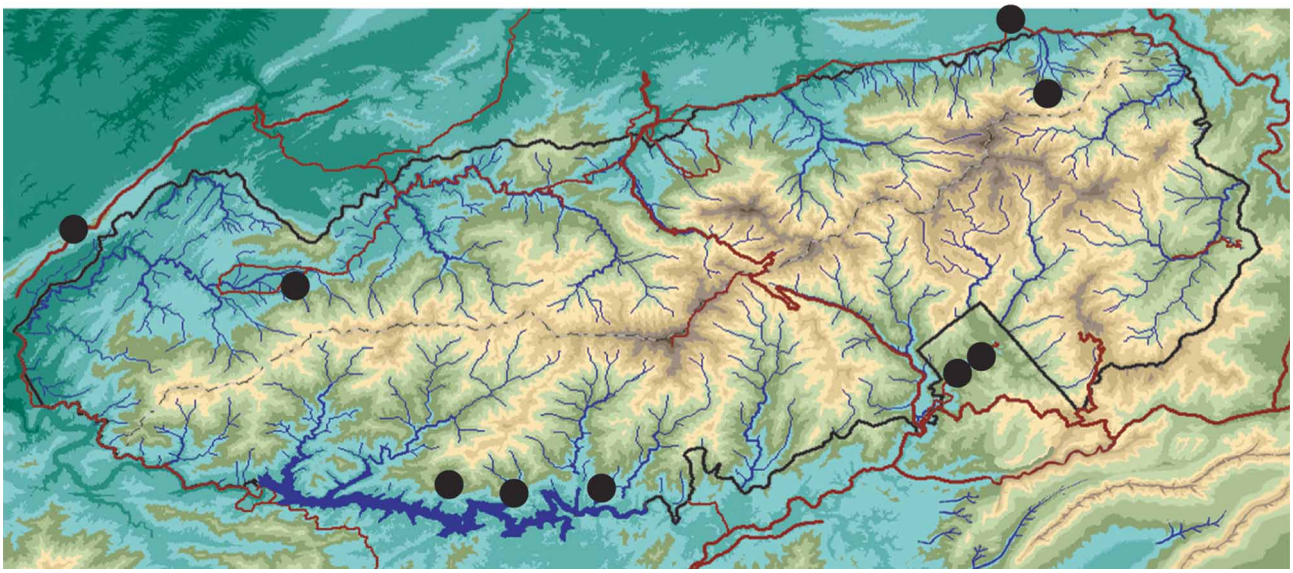
Collected localities. North Carolina: Swain Co.: Big Cove Rd., site b, site p, site w; 0.5 km from mouth of Chambers Creek 300 feet up hillside on NW side; 0.7 km up creek from mouth of Goldmine Creek; 300 feet above

lake on Welch Ridge. Tennessee: Blount Co.: Cades Cove Ranger Station; Foothills Parkway West at E end; Cocke Co.: Cosby Ranger Station; Foothills Parkway, south overlook; Foothills Parkway, at I-40; Foothills Parkway East; Foothills Parkway East, 1.3 mi N of 321. (26 specimens)

Elevation range. 1001–2400 ft. (305–732 m)

General distribution. This is an eastern species distributed from Massachusetts, south to Florida, and west to Ohio, Oklahoma, and Texas.

Larval hosts. Unknown, but probably fungi (Covell 1984).

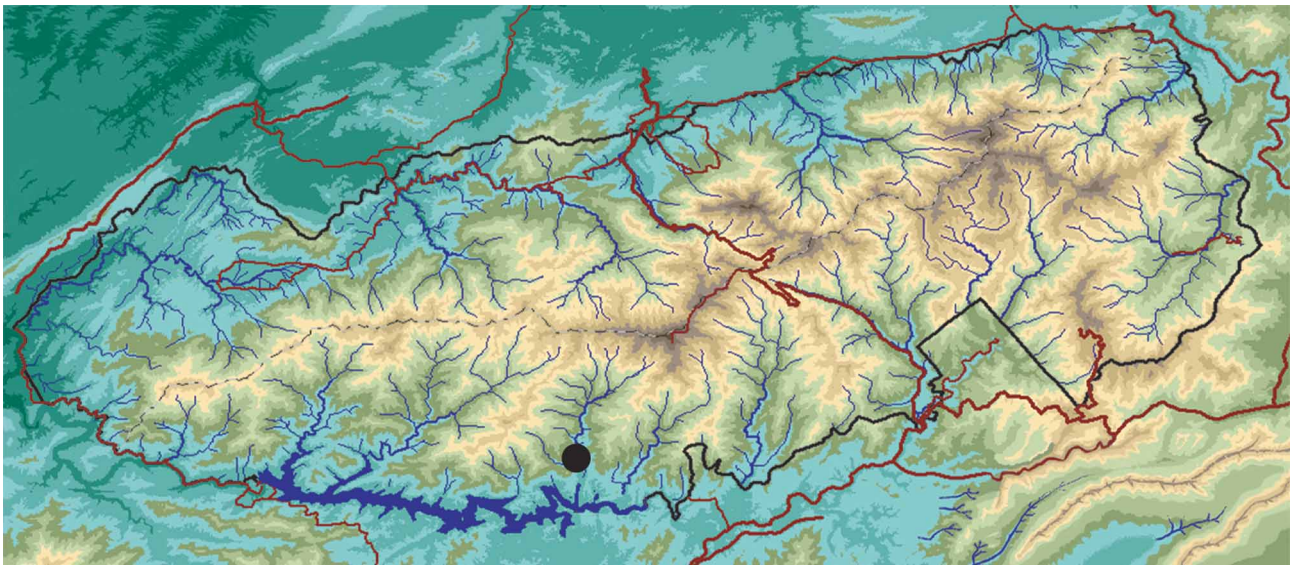


MAP 5. Collecting localities of *Metalectra richardsi.*

5. *Metalectra tantillus* (Grote, 1875) Black Fungus Moth

(Figs. 8–9, Map 6)

Identification. Forewing length 9.0–11.0 mm. *Metalectra tantillus* has dark gray forewings irrorated with white, irregular spots and short lines. The forewing lines are present but obscure and consist of the basal, antemedial, medial, postmedial, and subterminal. The terminal line consists of a series of white dots between the veins. Hind wing is similar in color and pattern to forewing and has a pair of white bars in anal area. *Metalectra tantillus* is distinct from the other species of *Metalectra* in the Park by the very dark gray wings with obscure white lines.



MAP 6. Collecting localities of *Metalectra tantillus.*

Flight period. Mid June.

Collected localities. North Carolina: Swain Co.: 0.4 km up trail from lake on Forney Creek. (1 specimen)

Elevation range. 2100 ft. (640 m)

General distribution. This is mainly a southeastern species distributed from Pennsylvania to Florida and west to Mississippi and Louisiana.

Larval hosts. Larva reared on bark of dead maple, but was probably feeding on fungi (Covell 1984).

6. *Dyspyralis illocata* Warren, 1891

(Figs. 10–11, Map 7)

Identification. Forewing length 6.3–7.4 mm. *Dyspyralis illocata* has cream-colored forewings with a broad, black, medial band that extends from the antemedial to medial line. The black band is not solid but variously interspersed with cream-colored scales. Along the costa from the distal margin of the medial black band to the apex is a series of cream-colored and black dashes. There is a large, irregular-shaped, subapical black spot that extends to vein M1. This spot can also be interspersed with cream-colored scales. Terminal line is a series of black dashes, some can be triangular in shape, between the wing veins. Hind wing is variable from cream colored to pale gray. The head, vertex, prothoracic collar, and the anterior portion of the tegulae and mesothorax is black to grayish brown.

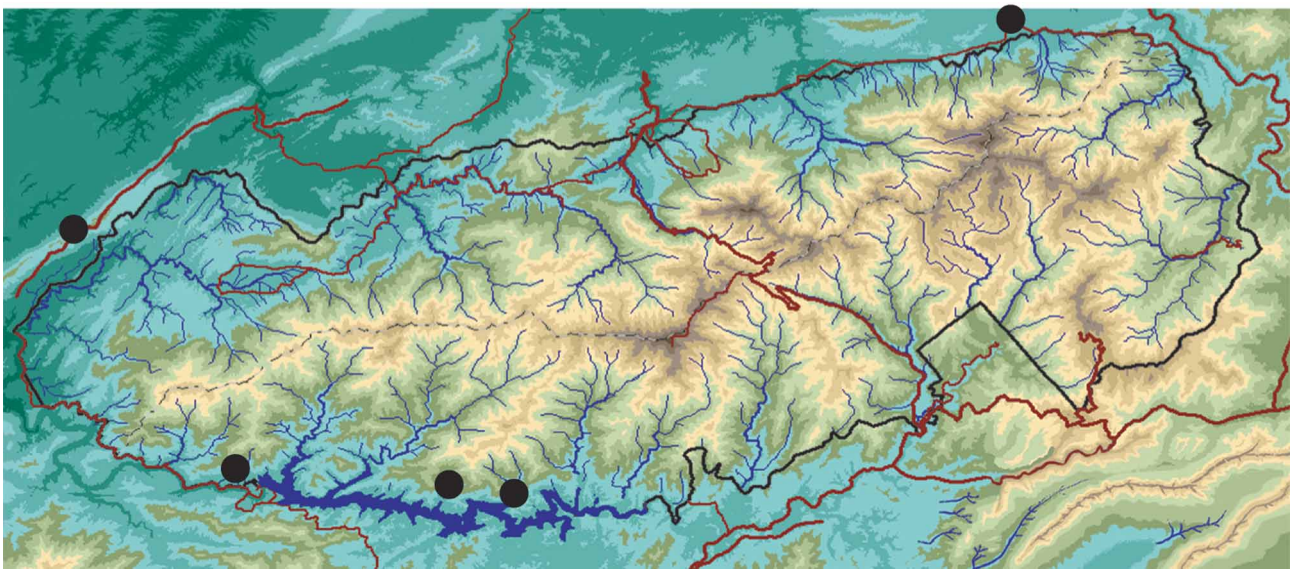
Flight period. June to mid August.

Collected localities. North Carolina: Swain Co.: 0.5 km from mouth of Chambers Creek, 300 ft. up hillside on NW side; 0.7 km S Payne Cemetery; Welch Ridge, 300 ft. above Lake Fontana. Tennessee: Blount Co.: Foothills Parkway West at east end; Cocke Co.: Foothills Parkway East, 1.3 mi N. of 321. (9 specimens)

Elevation range. 1001–2000 ft. (305–610 m)

General distribution. This is mainly a northeastern species that ranges from Nova Scotia, Canada, and Maine to northern Georgia and west to Ohio and Illinois.

Larval hosts. Unknown.



MAP 7. Collecting localities of *Dyspyralis illocata.*

7. *Dyspyralis nigellus* (Strecker), 1900

(Figs. 12–13, Map 8)

Identification. Forewing length 8.4–9.9 mm. *Dyspyralis nigellus* is the largest of the *Dyspyralis* from the Park. Forewing is dark gray and variable with worn specimens lacking almost all pattern. There is a small white reniform

spot at the distal end of the discal cell. In well-marked specimens there is a faint, black, slightly zig-zag antemedial line; reniform spot is bordered proximally by an indistinct black mark; postmedial line is irregular, black and in fresh specimens bordered white distally; a series of four white spots on costa distal to postmedial line to apex; the black subterminal area contrasts with the dark gray terminal area; and the terminal line is a series of black dashes that can be triangular shaped and contiguous. Hind wing is pale gray with no markings. Abdomen has a prominent, dorsal black tuft of scales between the second and third segments.

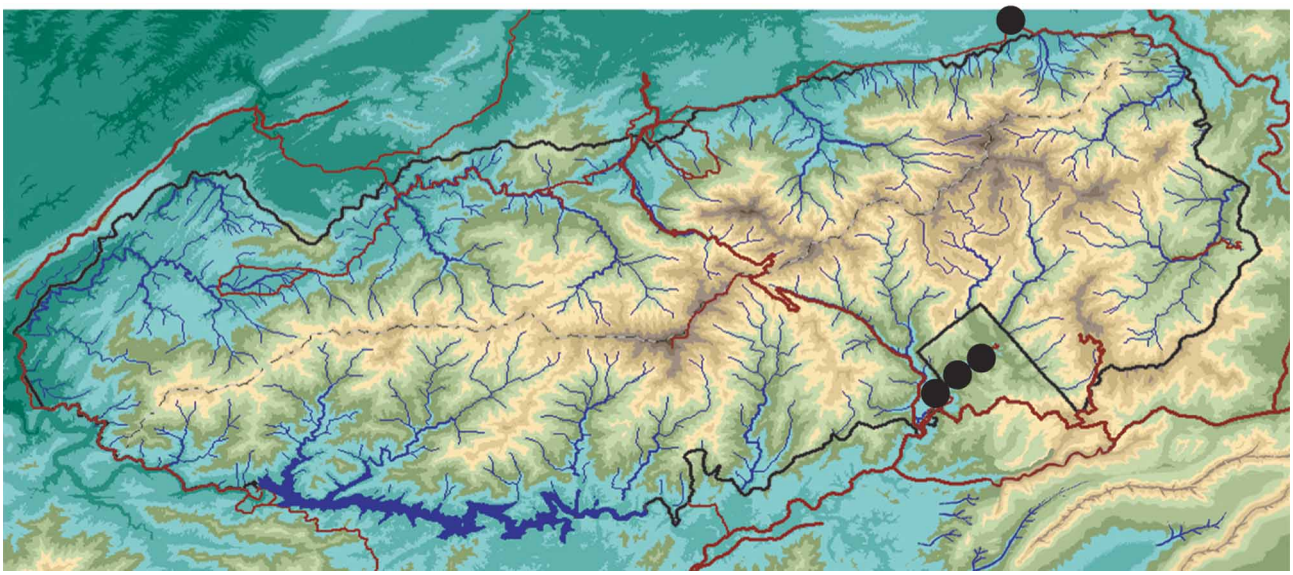
Flight period. Late June to mid August.

Collected localities. North Carolina: Swain Co.: Big Cove Road, site b site c, site p. Tennessee: Cocke Co.: Foothills Parkway East, 1.3 mi N of 321. (7 specimens)

Elevation range. 1801–2120 ft. (549–646 m)

General distribution. This species is distributed from Nova Scotia and Quebec in Canada, south through the northeastern states to Maryland and West Virginia, in Great Smoky Mountains National Park (North Carolina and Tennessee), northern Georgia, and west to Illinois, Kansas, and east Texas.

Larval hosts. Unknown.



MAP 8. Collecting localities of *Dyspyralis nigellus.*

8. *Dyspyralis puncticosta* (Smith), 1908
(Figs. 14–15, Map 9)

Identification. Forewing length 6.2–8.1 mm. *Dyspyralis puncticosta* has a dirty white forewing ground color. Forewing markings include an irregular shaped, black spot on costa that extends to M vein; antemedial line black, originating from a black spot on costa line angled toward wing base then angled toward outer margin, then angled back toward wing base to posterior margin; postmedial line black, originating from a black spot on costa, slightly sinuate, never a solid line but consisting of a series of irregular black scales; terminal area mostly brown; terminal line black, a series of spots between veins. Hind wing is light brown with no discal spot. Anterior half of tegulae and mesothorax are black. Abdomen has a prominent, dorsal black scale tuft with white apices between the second and third segments.

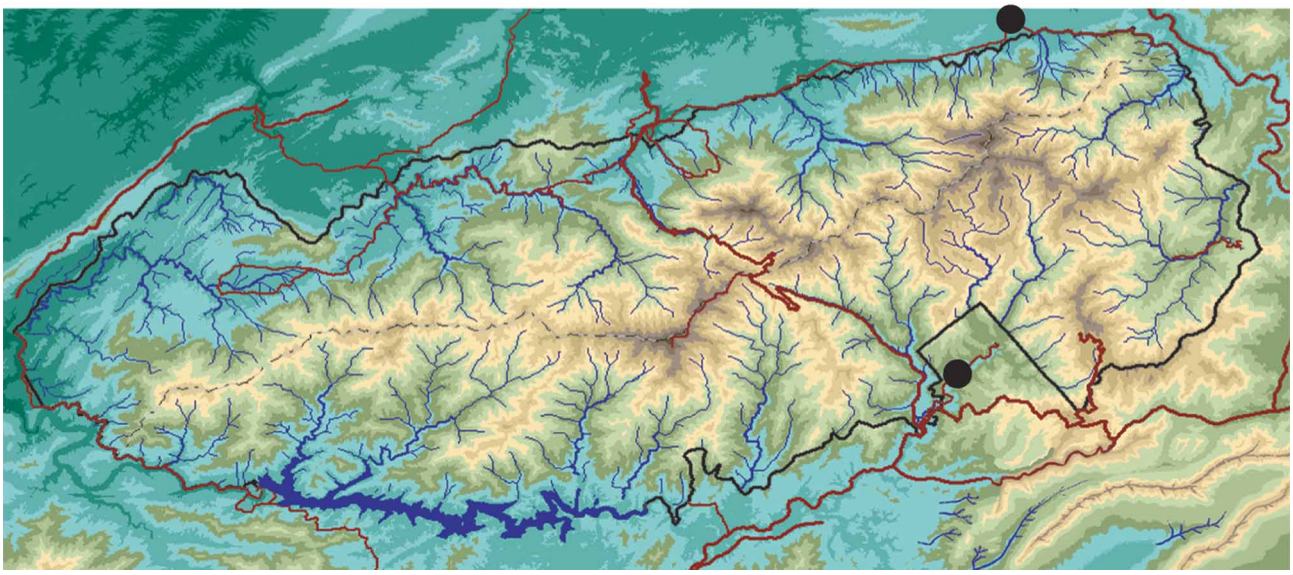
Flight period. July to mid August.

Collected localities. North Carolina: Swain Co.: Big Cove Road, site p. Tennessee: Cocke Co.: Foothills Parkway East, 1.3 mi N of 321. (2 specimens)

Elevation range. 1801–2040 ft. (549–622 m)

General distribution. This species is distributed from Maine south to North Carolina and Great Smoky Mountains National Park (North Carolina and Tennessee), Georgia, and west to Arkansas and Iowa.

Larval hosts. Unknown.



MAP 9. Collecting localities of *Dyspyralis puncticosta.*

Subfamily Eublemminae Forbes, 1954

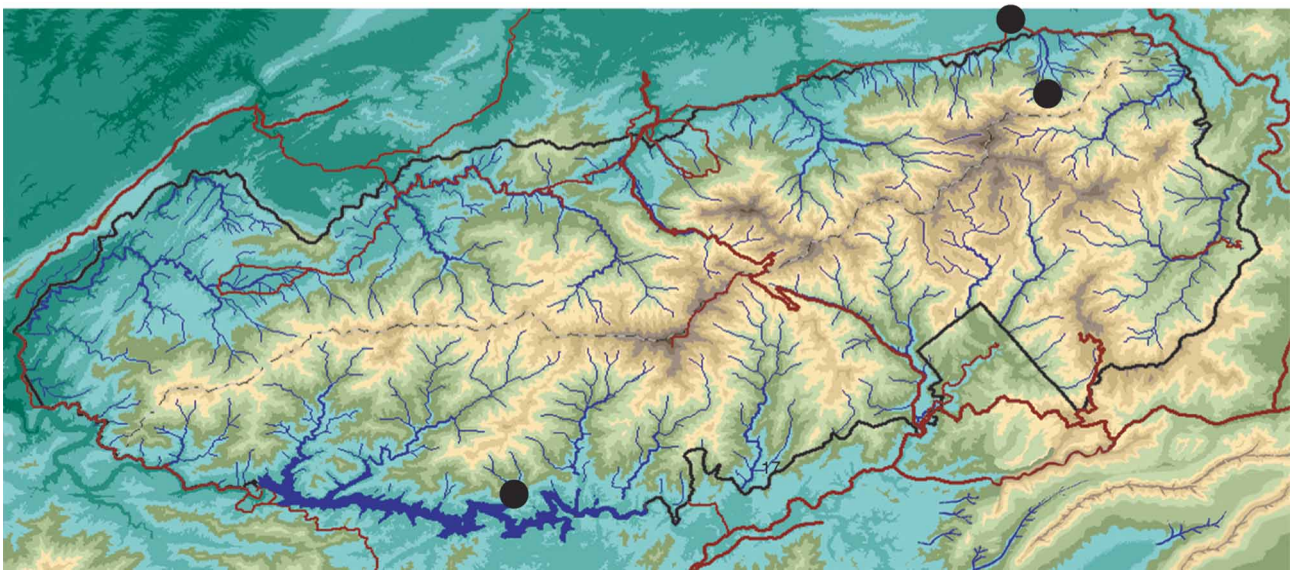
Eublemma minima (Guenée, 1852)

1. *Eublemma minima* (Guenée, 1852) Everlasting Bud Moth

(Figs. 16–17, Map 10)

Identification. Forewing length 6.5–8.0 mm. This is one of the smaller species of Eublemminae. Forewing ground color is cream with a distinct broad gray median band; reniform spot may be either absent or represented by one or two minute black dots; a wavy, white, subterminal line in a field of brown in the terminal area, and along the outer margin a series of black spots most prominent at the apex and tornus. Hind wing is white.

Flight period. Early May and mid-September; can be found in all months of the year in Florida.



MAP 10. Collecting localities of *Eublemma minima.*

Collected localities. North Carolina: Swain Co.: 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side. Tennessee: Cocke Co.: Cosby Ranger Station; Foothills Parkway, south overlook. (4 specimens)

Elevation range. 1750–2400 ft. (533–732 m)

General distribution. This is a common species from North Carolina to Florida, west along the Gulf Coast to Texas, and to Arizona and southern California. It has been collected as a stray in Massachusetts.

Larval hosts. Pearly everlasting (*Anaphalis* spp., Asteraceae) and rabbit tobacco (*Pseudognaphalium obtusifolium* (L.), Asteraceae) (Covell 1984).

Subfamily Pangraptinae Grote, 1882

Ledaea perditalis (Walker, 1859)
Pangrapta decoralis Hübner, 1818

1. *Ledaea perditalis* (Walker, 1859) Lost Owlet

(Figs. 18–19, Map 11)

Identification. Forewing length 10.0–13.0 mm. *Ledaea perditalis* has a light brown forewing with a black, oblique band from end of discal cell to posterior margin. This band is reduced to a few black scales forming a thin line at end of discal cell and broadens abruptly toward posterior margin. This black oblique band is adjacent to a distal, dark gray, indistinct band from subapically on costa to posterior margin. Orbicular and reniform spots are tiny black dots. Subterminal line is a series of irregular black spots that become contiguous in posterior third. Outer margin of forewing is angulate in middle. Hind wing is white to light brown with an incomplete double band of black scales in approximately the distal 2/3 of wing. This double band seems to be a continuation of the black forewing band. Adjacent to the light brown marginal band is a faint series of black spots that seem to be a continuation of the subterminal line in the forewing.

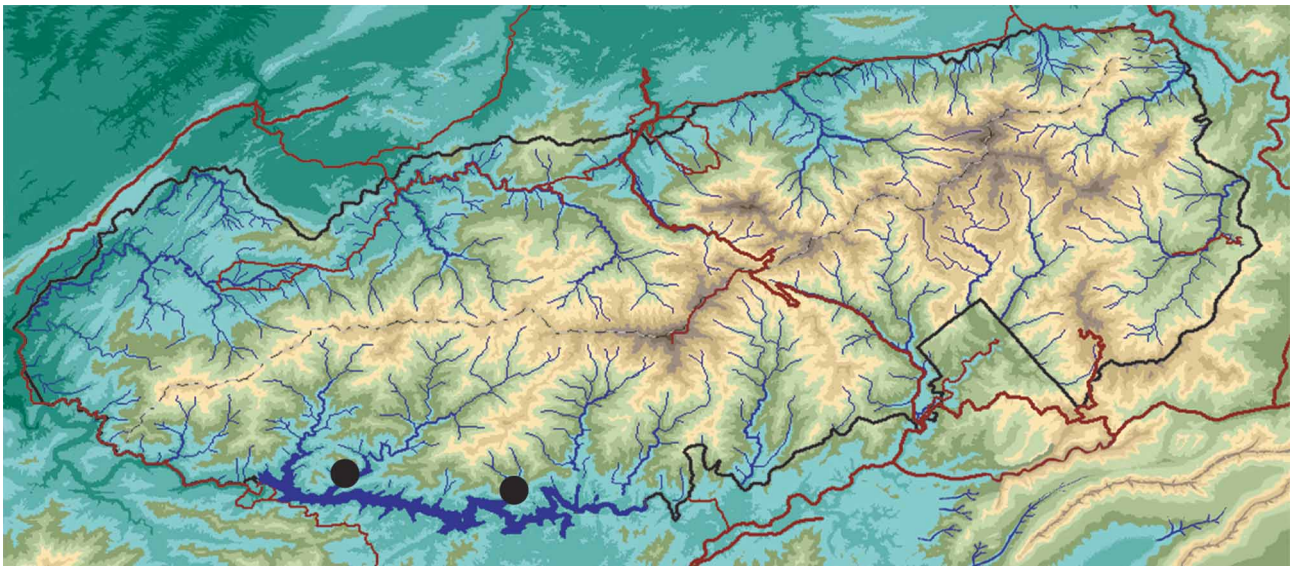
Flight period. 14–15 June.

Collected localities. North Carolina: Swain Co.: 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; 0.2 km W of mouth of Hazel Creek. (2 specimens)

Elevation range. 1900–1990 ft. (579–607 m)

General distribution. Distributed from Maine to Florida and west to Michigan, Kansas, Oklahoma, and Texas.

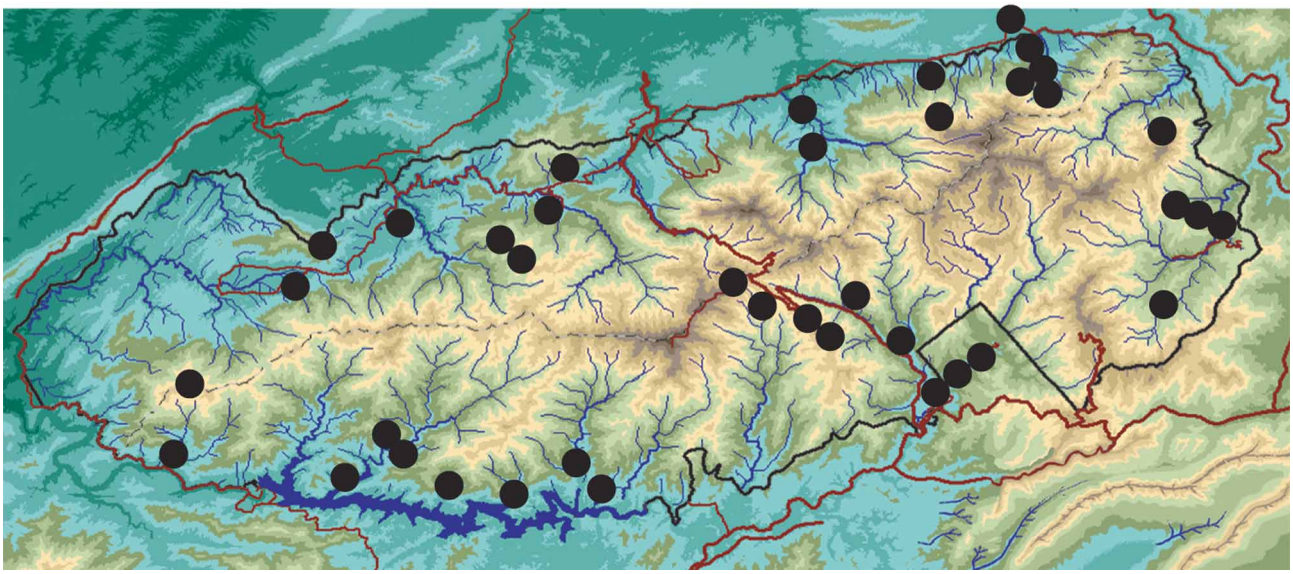
Larval hosts. Common buttonbush (*Cephalanthus occidentalis* L., Rubiaceae) (Tietz 1972) and woolgrass (*Scirpus cyperinus* (L.) Kunth, Cyperaceae) (Covell 1984).



MAP 11. Collecting localities of *Ledaea perditalis.*

2. *Pangrapta decoralis* Hübner, 1818 Decorated Owlet
(Figs. 20–24, Map 12)

Identification. Forewing length 11.0–13.0 mm. *Pangrapta decoralis* has a light brown forewing with an indistinct, crenulate, dark brown antemedial line. Orbicular spot is indistinct to absent, when present it is a faint area of reddish-brown scales. Reniform spot is well developed with a black center surrounded by white scales that are inundated with reddish-brown scales. Postmedial line is a broad band of black and reddish-brown scales that is angulate toward outer margin at reniform spot. There is a white triangular patch adjacent to the postmedial line, distally on the costa. A variably distinct, white triangular patch is present at the apex of the forewing. Subterminal area consists of an area of reddish-brown scales below the white costal triangle to below the reniform spot; then becomes an area of gray scales that tends to become whiter as it reaches the posterior margin. Terminal line is a thin, scalloped, black line. Fringe consists of a yellowish-brown initial row of scales, a thin black line, and a row of shorter, dirty white scales tipped with black. Hind wing is similarly patterned to the forewing with the antemedial line and postmedial band extending on to the hind wing. A small, black discal spot is present between the antemedial and postmedial lines. Fringe as in the forewing, but more scalloped.



MAP 12. Collecting localities of *Pangrapta decoralis.*

Flight period. Late April to early September.

Collected localities. North Carolina: Haywood Co.: 0.72 mi from Mt. Sterling trailhead on Mt. Sterling trail; Cataloochee, just off paved road to Cosby; Cataloochee, pull off at Sal Patch Gap; Cove Creek Rd.; Piney Mt.; Purchase Knob; Purchase Knob nr. 1st gate; Purchase Knob, at house; Purchase Knob, 0.5 mi N of gate; Purchase Knob, on road in meadow; Purchase Knob, by Ferguson cabin; Purchase Knob, NW of house, forest; Swain Co.: Beetree Ridge; Big Cove Rd., site b, site c, site p, site w; 0.4 km up trail from lake on Forney Creek; Thomas Divide trail, 13.5 mi NE of GSMNP ent. on 441; Deep Creek trail, 15.2 mi NE of GSMNP ent. on 441; Kephart Prong trail, 8.3 mi NW of GSMNP ent. on 441; Hazel Creek, Proctor Cemetery; Hazel Creek, below Bradshaw Cemetery; 0.2 km W of mouth of Hazel Creek; 0.5 km from mouth of Chambers Creek, 300 ft. up hillside on NW side; 0.7 km up creek from mouth of Goldmine Creek; 0.7 km S of Payne Cemetery; Smokemont; 0.2 mi NE of Twentymile Ranger Station; 300 feet above lake on Welch Ridge. Tennessee: Blount Co.: Cades Cove Ranger Station; Campsite 6, Scott Mountain trail, head of spring; Campsite 6, along Scott Mountain trail; Campsite 6, Scott Mountain trail at creek; Gregory Bald; Tremont; Cocke Co.: 0.6 mi from state Rt. 32 on road to Cosby Campground; Albright Grove trailhead; Cosby ATBI house; 1/4 mi inside entrance to Cosby; Cosby Ranger Station; Cosby picnic area off Gabes Mountain trail; Foothills Parkway; Foothills Parkway, 2.1 mi W Hwy. 321; Foothills Parkway, 2nd pullout; Foothills Parkway East, 1.3 mi N of 321; Foothills Parkway, 1st parking lot near Cosby; Foothills Parkway East at I-40; Maddron Bald trail; Sevier Co.: Laurel falls trail; E of Campsite #20; Campsite #20, nr. creek; Jake's Creek trail; Campsite #27, Jake's Creek trail; Jake's Creek trail, nr. Campsite #27; Jake's Creek trail,

above Campsite #27; Elkmont; Elkmont, Jake's Creek; Greenbrier, 2.6 mi from state Rt. 321; Greenbrier covered picnic area, 3.5 mi S Rt. 321; Road Prong trail, 1.3 mi W of Jct. 441 & Clingmans Dome Rd. (155 specimens)

Elevation range. 1330–5260 ft. (405–1603 m)

General distribution. An eastern North American species from Nova Scotia and Quebec in Canada. In the U.S. it is distributed from Maine to Florida and west to Minnesota, Illinois, Oklahoma, and Texas.

Larval hosts. Various species of blueberry, including lowbush blueberry (*Vaccinium angustifolium* Aiton, Ericaceae) and highbush blueberry (*Vaccinium corymbosum* L.) (Tietz 1972). David Wagner also reared *P. decoralis* on sourwood (*Oxydendrum arboreum* (L.) DC., Ericaceae) from Tennessee, Cocke Co., Cosby, jct. Foothills Parkway East and I-40. One larva was collected on 20 June 2001 and an adult emerged on 16 July. Eric Metzler (unpublished data) also found larvae to be abundant on sourwood in southeastern Ohio.

Subfamily Phytometrinae Hampson, 1913

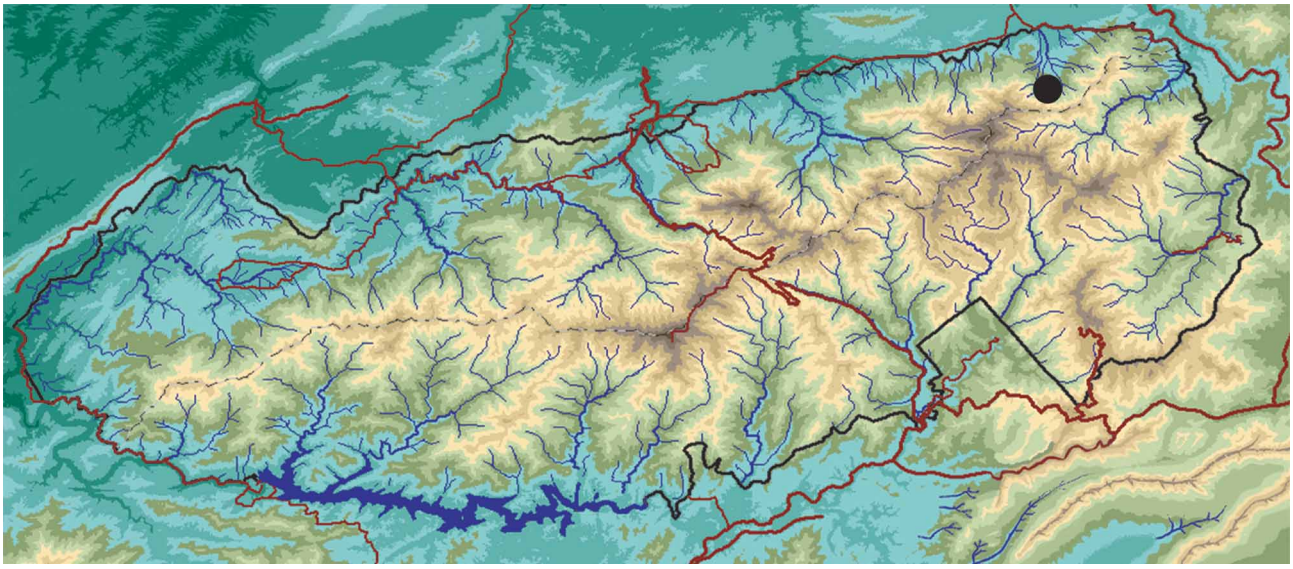
Hemeroplanis habitalis (Walker)
Hemeroplanis obliqualis (Hy. Edwards)
Spargaloma sexpunctata Grote, 1873

Subfamily Phytometrinae (insertae sedis)

Hyperstrotia pervertens (Barnes & McDunnough, 1918)
Hyperstrotia secta (Grote, 1879)
Hyperstrotia villificans (Barnes & McDunnough, 1918)

1. *Hemeroplanis habitalis* (Walker)

(Figs. 25–27, Map 13)



MAP 13. Collecting localities of *Hemeroplanis habitalis.*

Identification. Forewing length 10.3–11.6 mm. *Hemeroplanis habitalis* has an elongate labial palpus with distal segment porrect and a bare frons. Forewing has a rufous forewing ground color. Forewing markings are variable and can be faint. Antemedial line straight, dark brown bordered proximally with bright rufous, line can be a series of irregular black spots; renform spot black, can be faint; postmedial line variable, straight, dark brown bordered proximally with bright rufous, can be a series of small black dots, or a faint cream-colored line bordered distally by

bright rufous and black spots absent; postmedial line a series of white spots bordered proximally by a few black scales; terminal line a series of black somewhat triangular spots between wing veins. Hind wing is dirty white basally with rufous and gray scales to margin; terminal line a series of black spots between veins.

Flight period. Mid May.

Collected localities. Tennessee: Cocke Co.: Cosby, below Ranger Station. (2 specimens)

Elevation range. 1680 ft. (512 m)

General distribution. This is a southern species distributed from Great Smoky Mountains National Park and North Carolina, south to Florida and west to Arkansas and east Texas.

Larval hosts. Unknown.

2. *Hemeroplanis obliqualis* (Hy. Edwards)

(Figs. 28, Map 14)

Identification. Forewing length 9.9–11.0 mm. *Hemeroplanis obliqualis* can be distinguished from *H. habitalis* by the form of the reniform spot and the color of the antemedial and postmedial lines in the forewing. The reniform spot is a faint, ferruginous, vertical line in the middle of the discal cell in *H. obliqualis* and is a well developed, black spot overlain with ferruginous ground color scales in *H. habitalis*. The antemedial and postmedial lines in *H. obliqualis* are ferruginous with a slightly darker brown shading distally on the antemedial line and proximally on the postmedial line. In *H. obliqualis* these lines appear to be a slightly darker ferruginous than the ground color and varying amounts of small, irregular shaped black dots of scales along both lines.

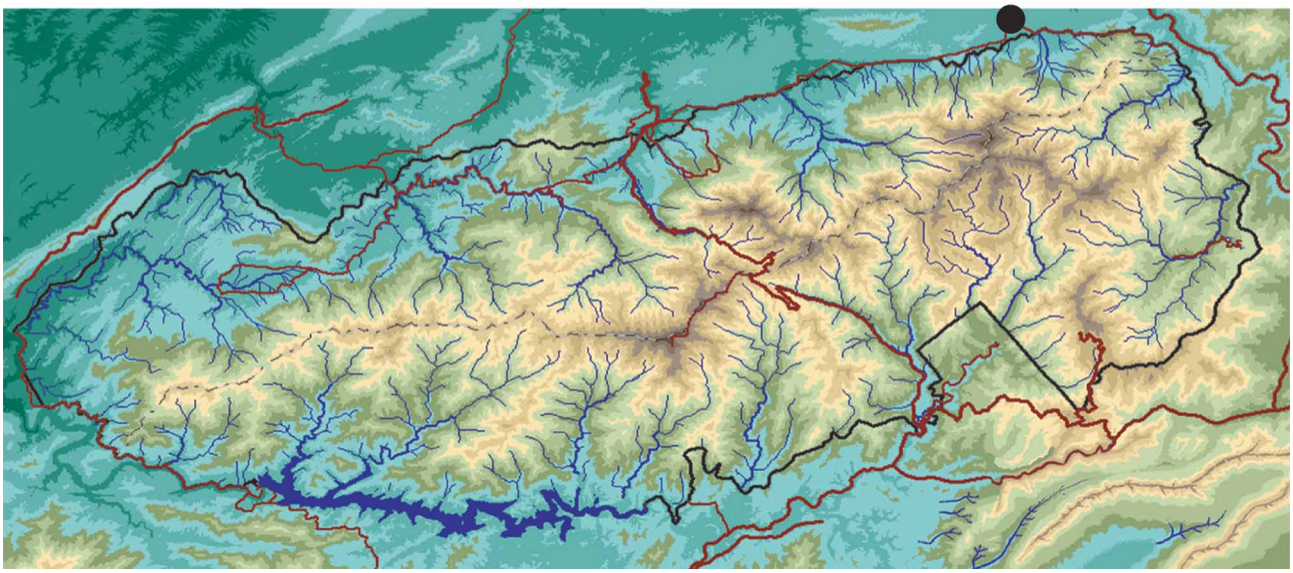
Flight period. Late June to mid August.

Collected localities. Tennessee: Cocke Co.: Foothills Parkway East, 1.3 mi N of 321; Foothills Parkway East, 2.2 mi N of 321; Foothills Parkway, south overlook. (4 specimens)

Elevation range. 1801–2400 ft. (549–732 m)

General distribution. This appears to be a rare species known only from Arkansas, Oklahoma, Tennessee, and northern Georgia.

Larval hosts. Unknown.



MAP 14. Collecting localities of *Hemeroplanis obliqualis*.

3. *Spargaloma sexpunctata* Grote Six-spotted Gray

(Figs. 29–30, Map 15)

Identification. Forewing length 12.1–14.1 mm. *Spargaloma sexpunctata* has a grayish-brown forewing ground color with a wide, dark brown medial band that has a distinct proximal border and an obscure distal margin; outer

margin angulate. Antemedial line is brown, crenulate, and not always distinct; orbicular spot consists of a few black scales; wide, dark brown medial band; reniform spot absent; postmedial line faint, more or less forms the distal margin of the wide medial band, deeply crenulate; subterminal line faint, brown, crenulate, arising from a distinct, dark brown subapical spot on the costa with three irregular-shaped black spots below and a white line that margins the subapical spot and the three black spots distally; terminal line faint, consisting of small gray spots between wing veins. Hind wing grayish brown with a continuation of the medial band and subterminal line of the forewing. Labial palp elongate, approximately 3 X length of head, and frons is bare.

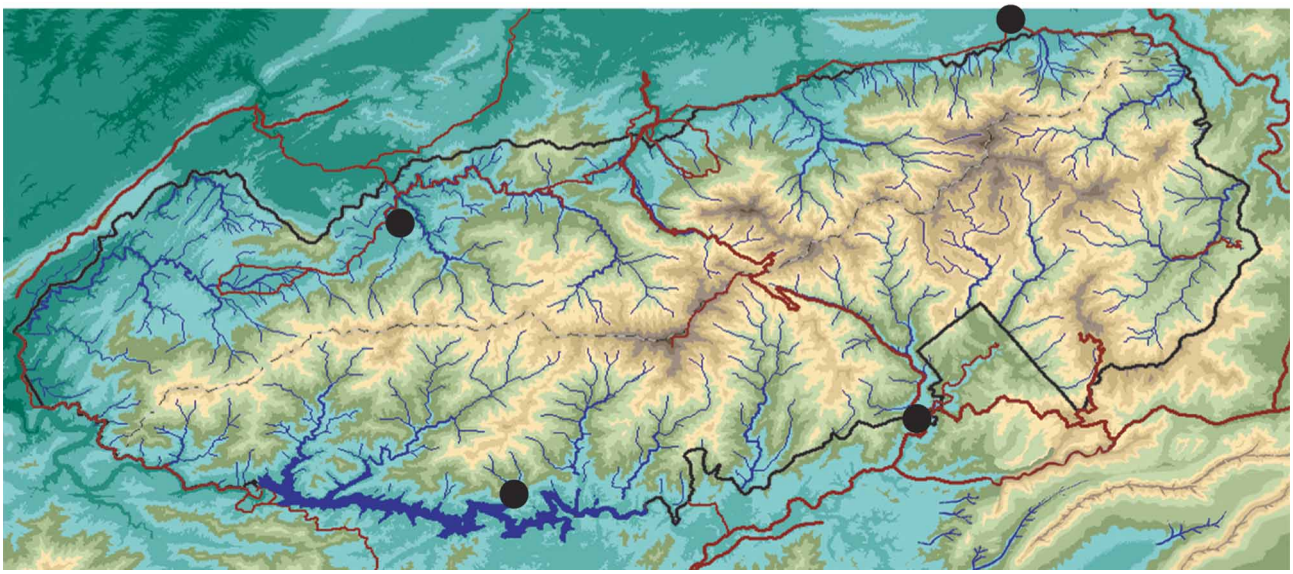
Flight period. Mid May to early August, apparently multiple brooded.

Collected localities. North Carolina: Swain Co.: 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; Oconaluftee Staff Apartments. Tennessee: Blount Co., Tremont. Cocke Co.: Foothills Parkway East; Foothills Parkway; Foothills Parkway south overlook. (8 specimens)

Elevation range. 1390–2400 ft. (424–732 m)

General distribution. Distributed from Nova Scotia, Canada, south to Great Smoky Mountains National Park and west to Nebraska, Arkansas, and Mississippi.

Larval hosts. Dogbane (*Apocynum* sp., Apocynaceae) (Covell 1984).



MAP 15. Collecting localities of *Spargaloma sexpunctata.*

4. *Hyperstrotia pervertens* (Barnes & McDunnough) Dotted Graylet
(Figs. 31–32, Map 16)

Identification. Forewing length 8.5–10.0 mm. *Hyperstrotia pervertens* is a light gray, nondescript moth. Forewing with white antemedial and postmedial lines (some specimens may have a thin black line associated with these white lines), reniform spot a small black dot, and outer margin with small dark gray elongate spots. Hind wing is light gray.

Flight period. End of May to early September.

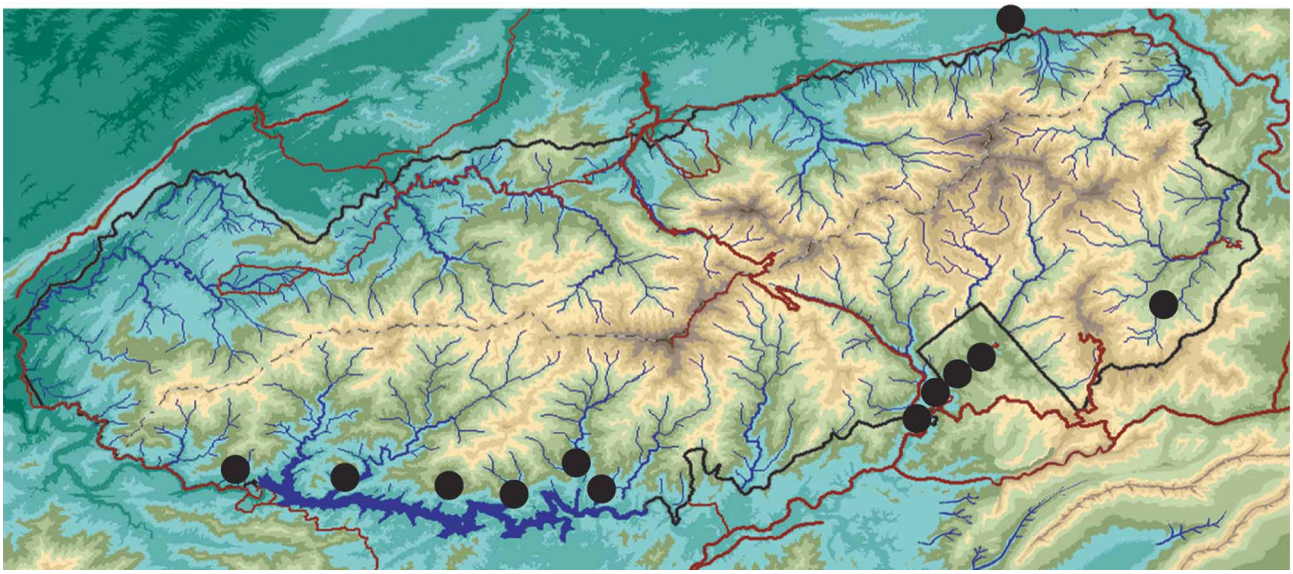
Collected localities. North Carolina: Haywood Co.: Purchase Knob, NW of house; Swain Co.: Big Cove Rd., site b, site c, site p; 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; 300 feet above lake on Welch Ridge; 0.7 km up creek from mouth of Goldmine Creek; 0.7 km S of Payne Cemetery; 0.4 km up trail from lake along Forney Creek; 0.2 km W mouth of Hazel Creek; Oconaluftee Staff Apartments.

Tennessee: Cocke Co.: Foothills Parkway; Foothills Parkway East, 1.3 mi N of 321. (27 specimens)

Elevation range. 1720–4911 ft. (524–1497 m)

General distribution. Widely distributed from Maine to Florida, west to Texas, Missouri, and Ohio.

Larval hosts. Bur oak (*Quercus macrocarpus* Michx., Fagaceae) and American elm (*Ulmus americana* L., Ulmaceae).



MAP 16. Collecting localities of *Hyperstrotia pervertens.*

5. *Hyperstrotia secta* (Grote) Black-patched Graylet
(Figs. 33–34, Map 17)

Identification. Forewing length 8.0–9.5 mm. *Hyperstrotia secta* is very similar to *H. villificans*, but has a large black patch along the posterior margin of the forewing, similar to *Tripudia rectangula*. The forewing reniform spot consists of 2 small black dots that are not coalesced as they may be in some specimens of *H. villificans*, and the marginal dots are smaller and darker than in *H. villificans.*

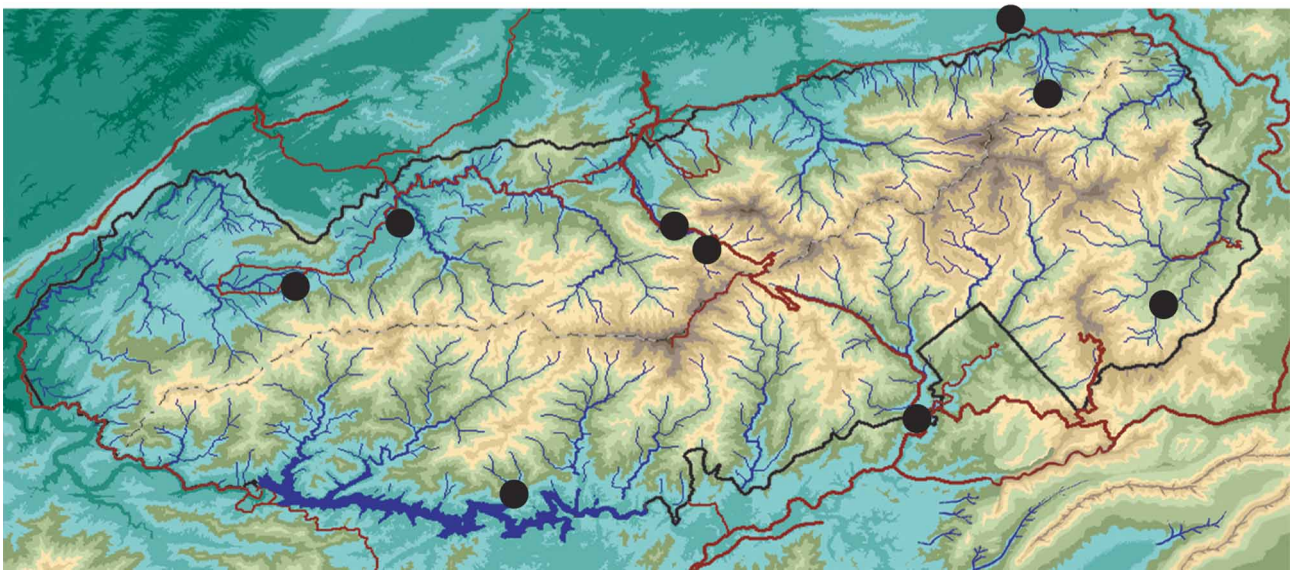
Flight period. May to July.

Collected localities. North Carolina: Haywood Co.: Purchase Knob, NW of house; Swain Co.: 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; Oconaluftee Staff Apartments. Tennessee: Blount Co.: Cades Cove Ranger Station; Tremont; Cocke Co.: Cosby Ranger Station; Foothills Parkway East, 1.3 mi N of 321; Sevier Co.: ca. 7 mi S Sugarlands Visitor Center; above Chimneys Campground. (10 specimens)

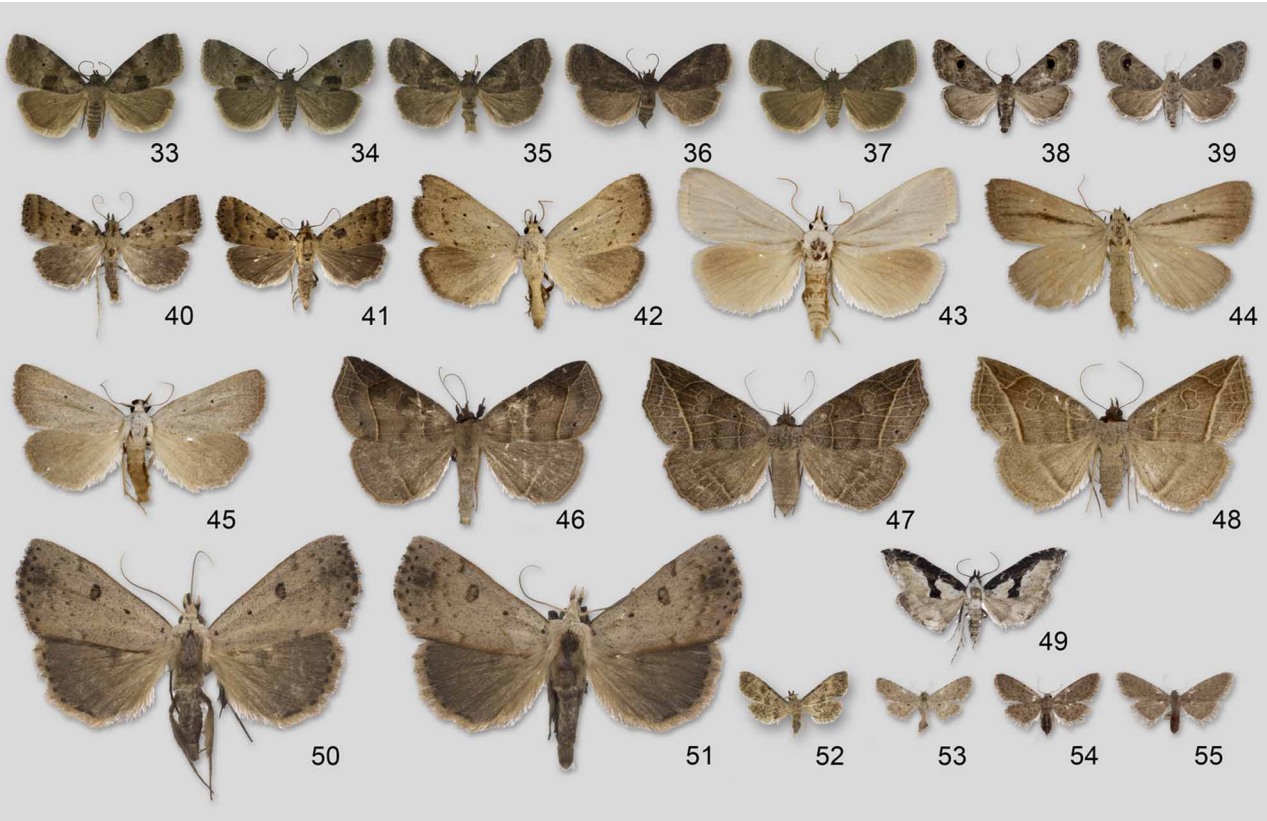
Elevation range. 1390–4911 ft. (424–1497 m)

General distribution. From Massachusetts to North Carolina, west to Texas, Missouri, Illinois, and Michigan.

Larval hosts. White oak (*Quercus alba* L.) and northern red oak (*Q. rubra* L., Fagaceae).



MAP 17. Collecting localities of *Hyperstrotia secta.*



FIGURES 33–55. Adults. 33, *Hyperstrotia secta*, m, North Carolina, Jackson Co.: Balsam, 24 June 1974, D.C. Ferguson; 34, *Hyperstrotia secta*, f, Maryland, Prince Georges Co.: Beltsville, 26 May, 1986, D.C. Ferguson; 35, *Hyperstrotia villificans*, m, North Carolina, Swain Co.: Hazel Creek, Bradshaw Cemetery, GSMNP, 2040 ft., 23 July 2007, M. Pogue, D. Adamski, M. Metz, GSMNP 0047; 36, *Hyperstrotia villificans*, f, North Carolina, Swain Co.: Hazel Creek, Bradshaw Cemetery, GSMNP, 2040 ft., 23 July 2007, M. Pogue, D. Adamski, M. Metz, GSMNP 0046; 37, *Hyperstrotia villificans*, f, Maryland, Montgomery Co.: Colesville, 8 Aug. 1980, D.C. Ferguson; 38, *Abablemma brimleyana*, m, Florida, Putnam Co., University Reserve, Welaka, 5 Apr. 1972, D.C. Ferguson; 39, *Abablemma brimleyana*, f, South Carolina, Charleston Co., Wedge Plantation, McClellanville, 3 June 1978, D.C. Ferguson; 40, *Arugisa lutea*, m, Florida, Monroe Co., Big Pine Key, 26 Nov. 1976, D.C. Ferguson; 41, *Arugisa lutea*, m, Maryland, Dorchester Co., Decoursey Bridge Rd., 13 Aug. 1993, J. Glaser; 42, *Gabara subnivosella*, m, Tennessee, Blount Co., Ace Gap Trailhead, 24 July 2000, M.G. Pogue; 43, *Gabara subnivosella*, m, Kansas, Johnson Co., Shawnee Mission Park, 17 June 1962, J.R. Heitzman; 44, *Gabara subnivosella*, m, Massachusetts, Nantucket Co., Nantucket, 12 July, 1928; 45, *Gabara subnivosella*, m, Massachusetts, Dukes Co., Martha's Vineyard, 23 July, F.M. Jones; 46, *Isogona tenuis*, m, Tennessee, Blount Co., Campsite 6, along Scott Mtn. Trail, 3324 ft., 5 Aug. 2003, M.G. Pogue, USNM 00219096; 47, *Isogona tenuis*, f, Texas, Hidalgo Co., Santa Ann Refuge, 9 Mar. 1977, A. & M.E. Blanchard; 48, *Isogona tenuis*, f, Texas, Nickel Creek, Guadalupe Mts., 5000 ft., 22 May 1973, A. & M.E. Blanchard; 49, *Nigetia formosalis*, m, North Carolina, Haywood Co., Cataloochee, downhill from pull-off, 3440 ft., 19 July 2007, M. Pogue, D. Adamski, M. Metz; 50, *Scolecocampa liburna*, m, Tennessee, Sevier Co., Greenbrier area, end of Ramsey Cascade Rd., uphill from parking lot, 2066 ft., 26 June 2004, M.G. Pogue, USNM 00221326; 51, *Scolecocampa liburna*, m, Tennessee, Sevier Co., Greenbrier area, end of Ramsey Cascade Rd., uphill from parking lot, 2066 ft., 26 June 2004, M.G. Pogue, USNM 00221327; 52, *Sigela brauneata*, m, Tennessee, Cocke Co., 0.6 mi from Jct. of Rt. 32 on road to Cosby campground, 1765 ft., GSMNP, 28 July 2007, M. Pogue, D. Adamski, M. Metz, GSMNP 1907; 53 *Sigela penumbrata*, m, Texas, Nueces Co., N. Padre Island, 21 June 1977, A. & M.E. Blanchard; 54, *Sigela penumbrata*, m, Florida, Monroe Co., Big Pine Key, 26 Nov. 1976, D.C. Ferguson; 55, *Sigela penumbrata*, f, Florida, Dade Co., Homestead, 26 Nov. 1976, D.C. Ferguson.

6. *Hyperstrotia villificans* (Barnes & McDunnough) White-lined Graylet
(Figs. 35–37, Map 18)

Identification. Forewing length 8.0–9.5 mm. *Hyperstrotia villificans* is darker than *H. pervertens* with more distinct white antemedial and postmedial lines and various intensities of darker lines associated with these white lines;

reniform spot is usually 2 small dots or an elongate dash; outer margin with small, dark gray, elongate spots. Hind wing is gray.

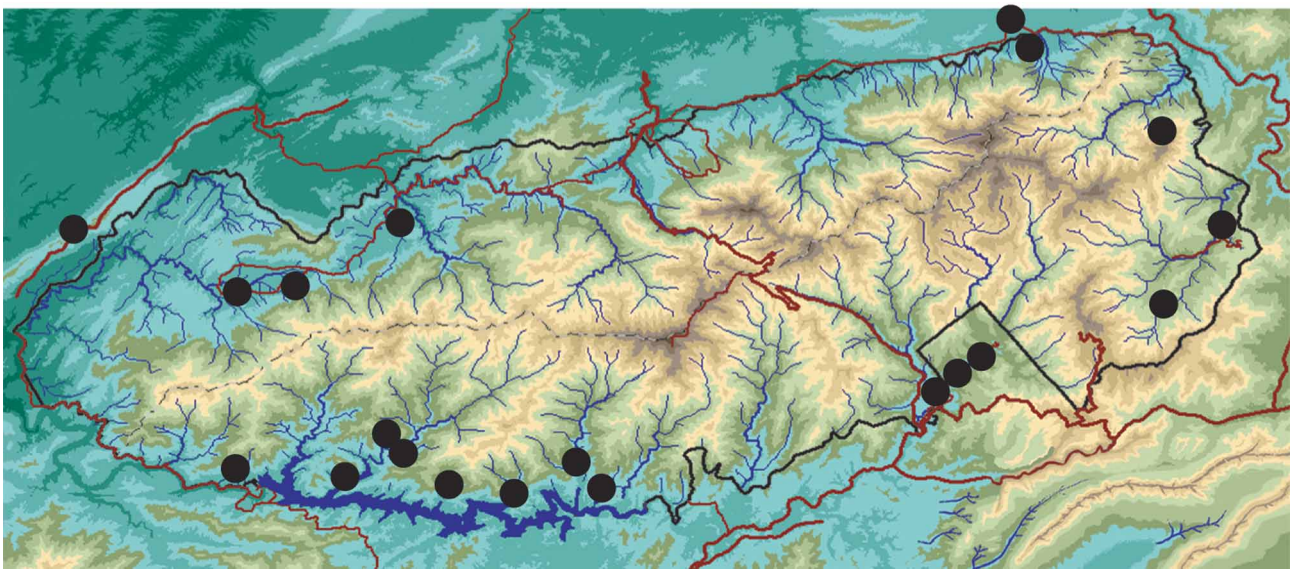
Flight period. Late April to August, apparently multiple brooded.

Collected localities. North Carolina: Haywood Co.: Cove Creek Rd.; Purchase Knob at house; 0.72 mi from Mt. Sterling trailhead on Mt. Sterling trail; Swain Co.: Big Cove Rd., site b, site c, site p, site w; 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; 300 feet above lake on Welch Ridge; 0.7 km up creek from mouth of Goldmine Creek; 0.7 km S of Payne Cemetery; 0.4 km up trail from lake on Forney Creek; 0.2 km W mouth of Hazel Creek; Hazel Creek, Bradshaw Cemetery; Hazel Creek, below Bradshaw Cemetery; Hazel Creek, Proctor Cemetery. Tennessee: Blount Co.: Cades Cove Ranger Station; Tremont; Foothills Parkway West at E end; John Oliver Cabin; Cocke Co.: Foothills Parkway East; Foothills Parkway East at I-40; Foothills Parkway East at pull-off between 2nd and 3rd overlook, up trail to right; Foothills Parkway East, 4.5 mi from Rt. 321, 3rd overlook; 0.6 mi from state route 32 on road to Cosby Campground. (51 specimens)

Elevation range. 1330–4800 ft. (405–1463 m)

General distribution. Ranges from Maine to Florida, west to Texas, Oklahoma, and Missouri.

Larval hosts. American elm (*Ulmus americana* L., Ulmaceae) (Covell 1984); oak (*Quercus* sp., Fagaceae and hickory *Carya* sp., Juglandaceae) (Wagner 2005).



MAP 18. Collecting localities of *Hyperstrotia villificans.*

Subfamily Scolecocampinae Grote, 1883

Abablemma brimleyana (Dyar, 1914)
Arugisa lutea (Smith, 1900)
Gabara subnivosella Walker, 1866
Isogona tenuis (Grote, 1872)
Nigetia formosalis Walker, 1866
Scolecocampa liburna (Geyer, 1837)
Sigela brauneata (Swett, 1913)
Sigela penumbrata Hulst, 1896

1. *Abablemma brimleyana* (Dyar, 1914)

(Figs. 38–39, Map 19)

Identification. Forewing length 7.0–7.8 mm. *Abablemma brimleyana* is a small species with a gray to pale gray forewing with a large black, circular reniform spot. The following description is under magnification. This is a

remarkable species as the forewing scales are dark gray to black basally and with a variable amount of white at the apex, which gives the appearance of a finely striated black and white pattern of the forewing. The reniform spot is black margined by a varying amount of gray scales; on the costa above the reniform is an irregular spot of black scales from which a shading of rufous margins the reniform distally; the terminal line consists of a series of fine lines between veins that are contiguous at the costa and anal angle, proximal to this line are spots of silvery gray between veins and the terminal line is bordered by a row of pale yellow scales distally. Hind wing is gray with a fine, black terminal line. Scales of the head and thorax are like the forewing being gray to black with white apices.

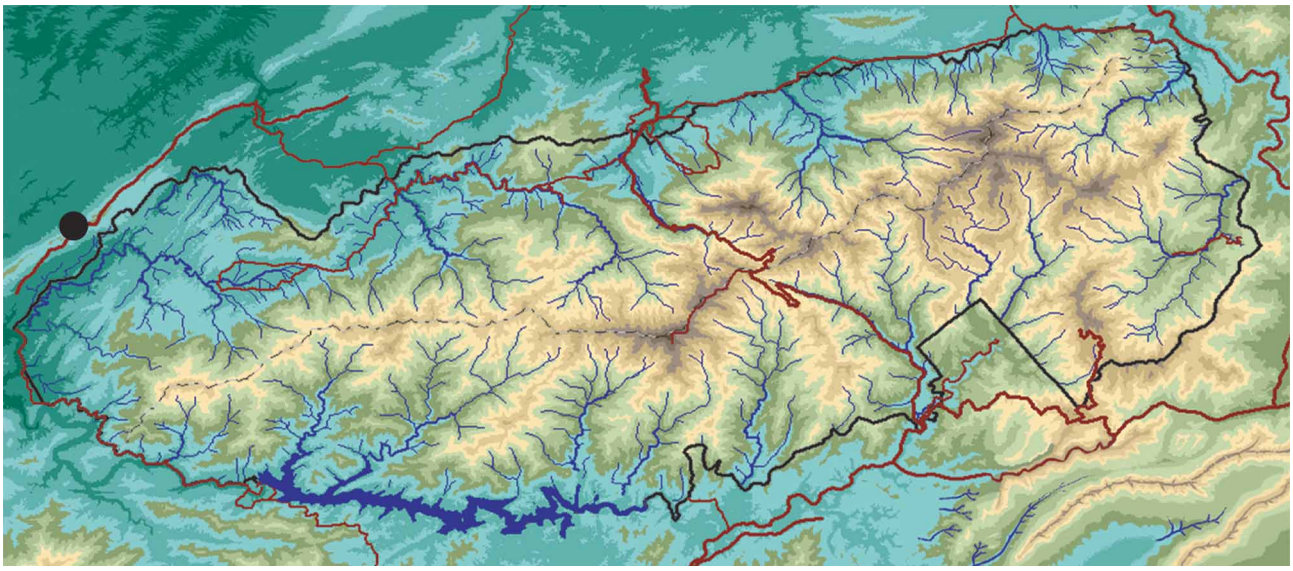
Flight period. Mid July.

Collected localities. Tennessee: Blount Co.: W Foothills Parkway at E end. (1 specimen)

Elevation range. 1001 ft. (305m)

General distribution. This is mainly a southern species distributed from Maryland south to Florida and west to Nebraska, Mississippi, and southern and eastern Texas.

Larval hosts. Unknown.



MAP 19. Collecting localities of *Abablemma brimleyana*.

2. *Arugisa lutea* (Smith, 1900) Common Arugisa
(Figs. 40–41 Map 20)

Identification. Forewing length 8.5–11.4 mm. *Arugisa lutea* forewing ground color is cream colored with a pale yellowish cast with a large, gray, quadrate orbicular spot. At the base of the forewing on the costa is a small patch of black scales; antemedial line begins with a black dash on the costa that is almost contiguous with the large, gray orbicular spot; medial line begins with a black spot on the costa and then becomes a series of small black spots that run in a vertical line to the posterior margin of the forewing; reniform spot absent; postmedial line absent; subterminal area is a narrow band of black scales; terminal line consists of a series of triangular black spots between the wing veins. Hind wing is gray with no markings. Labial palpi are porrect and about twice the length of the head and the frons is scaled.

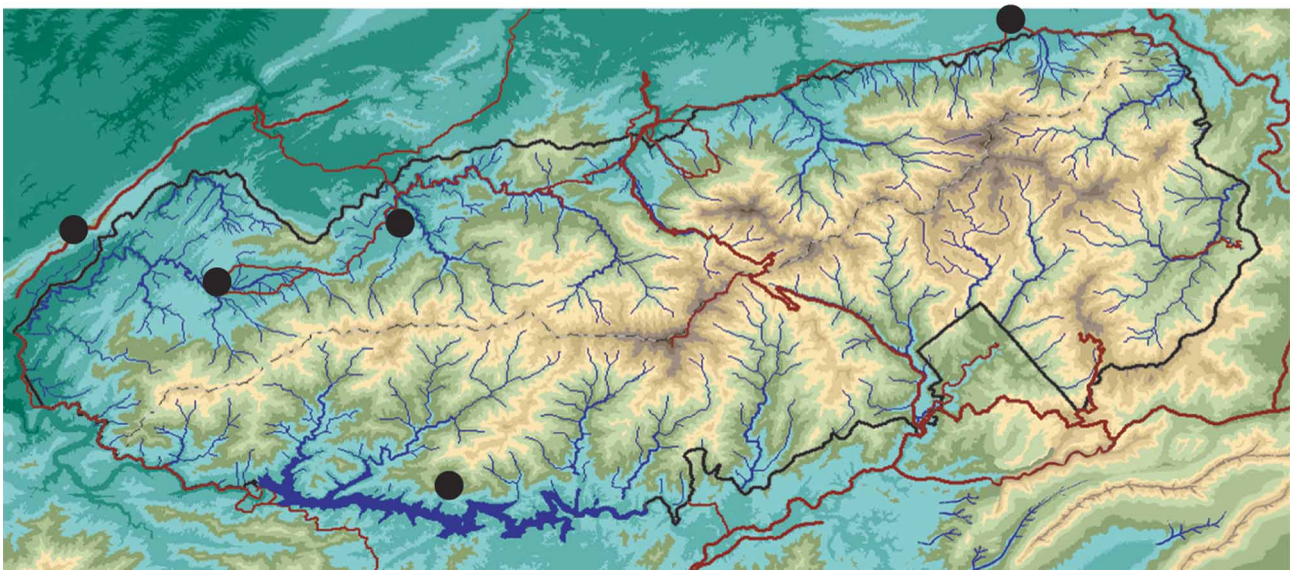
Flight period. June to August, probably more than one brood.

Collected localities. North Carolina: Swain Co.: Welch Ridge, 300 ft above Lake Fontana. Tennessee: Blount Co.: Cades Cove Loop, Abrams Creek; Tremont; Foothills Parkway West at E end; Cocke Co.: Foothills Parkway at I-40; Foothills Parkway at 2nd pullout; Foothills Parkway, 1.3 mi N of 321. (8 specimens)

Elevation range. 1001–1801 ft. (305–549 m)

General distribution. This is a southern species distributed from Maryland south to Florida and west to and Misssissippi and eastern Texas.

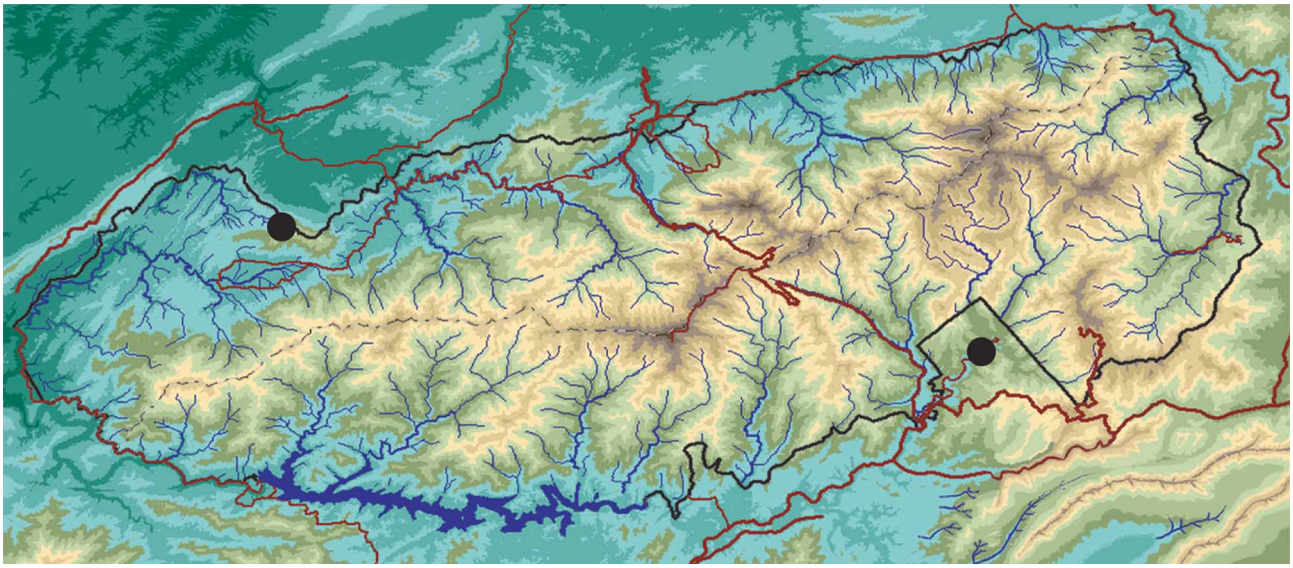
Larval hosts. Living and dead grasses, such as Kentucky Bluegrass (*Poa pratensis* L., Poaceae) (Covell 1984).



MAP 20. Collecting localities of *Arugisa lutea*.

3. *Gabara subnivosella* Walker, 1866

(Figs. 42–45, Map 21)



MAP 21. Collecting localities of *Gabara subnivosella.*

Identification. Forewing length 10.5–13.7 mm. *Gabara subnivosella* is a variable species with a forewing ground color ranging from white to light brown. Forewing pattern can be absent, especially in specimens with white wings, to having a minute spot of scales representing the orbicular and reniforms spots, a postmedial line that curves from costa around end of discal cell then angled to posterior margin, and some specimens have a horizontal streak of brown just below orbicular and reniform spots. Specimens can exhibit the following combination of patterns: 1) complete absence, 2) orbicular and reniform spots, 3) orbicular and reniform spots with horizontal streak, and 4) orbicular and reniform spots and postmedial line. Hind wing varies from off white to a medium brown. The metathroax is bare, covered with minute spicules, obvious in a dorsal view. Male has filiform antennae with a pair of long, lateral setae and many finer setae on ventral surface. Head has a porrect, brown labial palpus that is approximately twice as long as eye width; the frons is bare.

Flight period. Late July to mid August.

Collected localities. North Carolina: Swain Co.: Big Cove Rd., site b. Tennessee: Blount Co.: Ace Gap Trailhead. (2 specimens)

Elevation range. 1700–2120 ft. (518–646m)

General distribution. Distributed from Maine south to Florida, and in the mid-west from Michigan to Oklahoma.

Larval hosts. Unknown.

4. *Isogona tenuis* (Grote, 1872) Thin-lined Owlet
(Figs. 46–48, Map 22)

Identification. Forewing length 10.8–15.5 mm. *Isogona tenuis* has a brown forewing ground color that is darker along the costa. Forewing is well marked with all pattern elements cream colored. All forewing veins are highlighted with cream-colored scales; antemedial line is sharply curved between costa and R vein then straight to posterior margin; reniform spot large, at end of discal cell; postmedial line is Y-shaped at M1 vein, with proximal branch from costa and distal branch from apex that forms a straight angled line to posterior margin; subterminal line faint and crenulate; terminal line cream colored; outer margin abruptly angle at M3 vein. Hind wing concolorous to somewhat lighter than forewing with continuation of postmedial line across middle of hind wing. Labial palpus is porrect and elongate, approximately 3 X eye width; frons is bare. Thorax has a dark brown prothoracic collar.

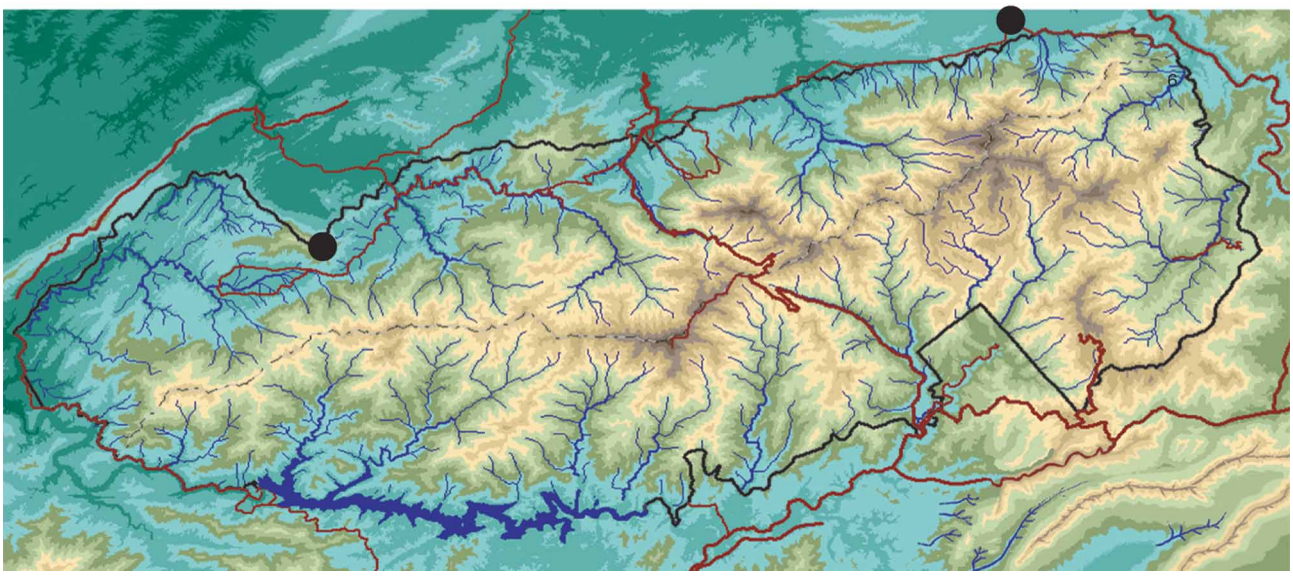
Flight period. June to August, probably more than one brood.

Collected localities. Tennessee: Blount Co.: Campsite 6 along Scott Mountain Trail; Cocke Co.: Foothills Parkway. (2 specimens)

Elevation range. 2020–3324 ft. (616–1013 m)

General distribution. Distributed from Pennsylvania south to Florida and west to Ohio, Illinois, Missouri, Oklahoma, Louisiana, east Texas, and Kansas.

Larval hosts. Hackberry (*Celtis* sp., Ulmaceae) (Covell 1984).



MAP 22. Collecting localities of *Isogona tenuis.*

5. *Nigetia formosalis* Walker, 1866 Thin-winged Owlet
(Fig. 49, Map 23)

Identification. Forewing length 7.5–9.3 mm. *Nigetia formosalis* is a small species that is easily recognized by the white forewing, black costa, and black medial band. Head is black, labial palpus appressed to frons with elongate scales giving the palpus a triangular appearance, and frons bare. Forewing is white with a black, horizontal costal

band with a series of short white dashes on costa from just prior to medial band to apex; medial band black; terminal area with gray scales tipped with white; terminal line a series of black spots between veins that decrease in size toward termen; fringe black at apex, white medially, and brownish rufous and white to termen. Hind wing is pale gray with a thin, black terminal line and a white dash bordered by black scales at anal angle.

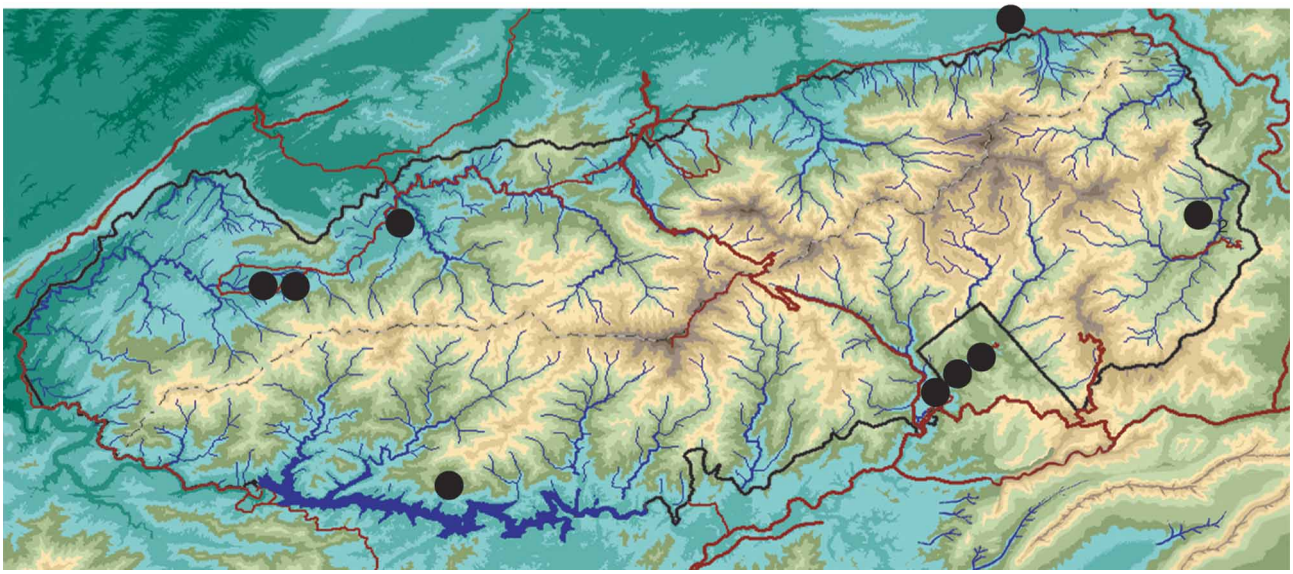
Flight period. Late May to mid September, probably multiple brooded.

Collected localities. North Carolina: Haywood Co.: Cataloochee, pull off at Sal Patch Gap; Swain Co.: Big Cove Rd., site b, site c, site p; 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; 300 ft. above Lake Fontana on Welch Ridge. Tennessee: Blount Co.: vicinity Cades Cove; Cades Cove Ranger Station; Cades Cove Primitive Baptist Church; Cades Cove ATBI house, 2000 m SW; Tremont; Cocke Co.: Foothills Parkway. (30 specimens)

Elevation range. 1360–3440 ft. (415–1049 m)

General distribution. Distributed from New York south to Florida and west to Michigan, Missouri, Arkansas, Mississippi, east Texas, and Oklahoma.

Larval hosts. Unknown.



MAP 23. Collecting localities of *Nigetia formosalis.*

6. *Scolecocampa liburna* (Geyer, 1837) Dead-Wood Borer Moth
(Figs. 50–51, Map 24)

Identification. Forewing length 15.3–18.1 mm. *Scolecocampa liburna* has a light-brown forewing with a distinct, black, oval reniform spot. Forewing has a small black spot at base; antemedial line faint, zig zag, made up of rufous scales and is usually absent or only a few rufous scales are evident; orbicular spot small and black; reniform spot is variable in its intensity it can be either solid black, black with a rufous center, or a black outline with a ground color center; postmedial line a slightly curved series of faint black spots; subterminal line a series of faint crescent-shaped black spots that more or less parallels postmedial line; terminal area has a large black patch distal to reniform spot; terminal line a series of black spots between veins; fringe ground color with black spots between black spots of terminal line. Hind wing is dark gray with terminal line a series of black spots between veins; fringe light brown. Labial palpus is porrect, black with some white scales dorsally and a light brown apex, and approximately 5 X eye width.

Flight period. June to August, probably multiple brooded.

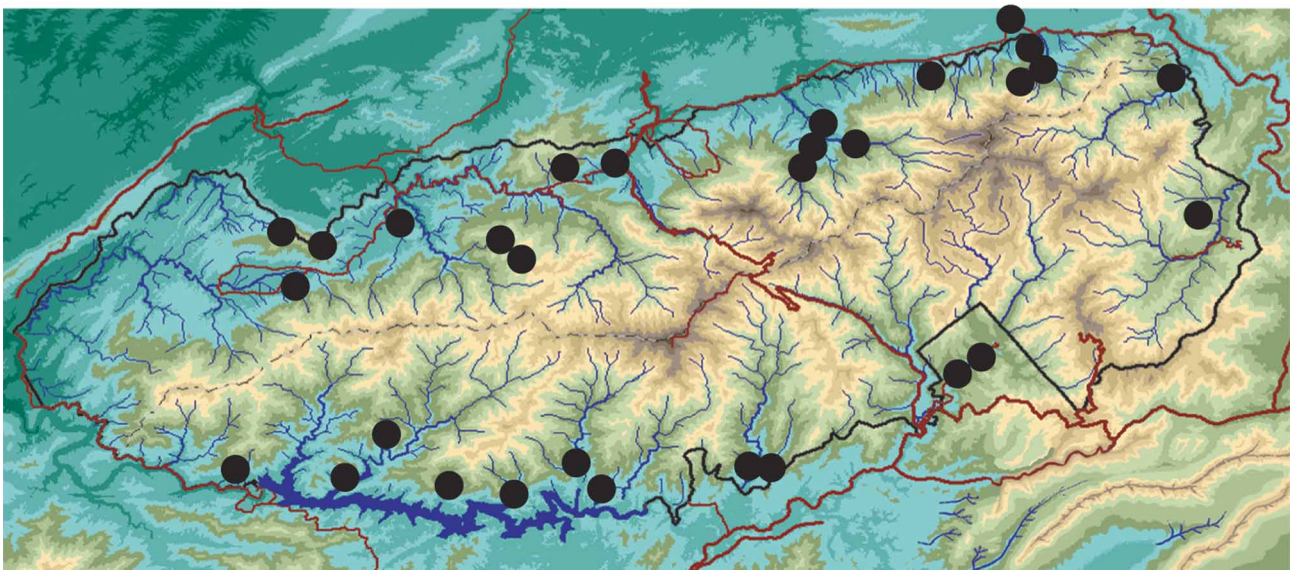
Collected localities. North Carolina: Haywood Co.: Big Creek, 0.4 mi from entrance; Cataloochee, service rd. off Cataloochee rd. Swain Co.: Big Cove Rd., site b, site p; Deep Creek Ranger Station; Forney Creek, 0.4 km up trail from Lake Fontana; Hazel Creek, below Bradshaw Cemetery; 0.2 km W mouth of Hazel Creek; 0.5 km from

mouth of Chambers Creek, 300 ft. up hillside on SW side; 0.7 km up creek from mouth of Goldmine Creek; 0.7 km S Payne Cemetery; 300 ft. above Lake Fontana on Welch Ridge; Wiggins-Watson Cemetery. Tennessee: Blount Co.: Ace Gap Trailhead; Cades Cove Ranger Station; Cades Cove Campground; nr. gate to Cades Cove Loop; Scott Mountain Trail, Campsite 6, head of spring; Campsite 6 along Scott Mountain Trail; Tremont; Cocke Co.: 0.6 mi from Jct. of Rt. 32 on road to Cosby Campground; 1.2 mi from state route 32 on road to Cosby campground; Cosby Campground; Cosby Campground area; 0.25 mi inside entrance to Cosby; Cosby Ranger Station; Cosby picnic area, off Gabes Mountain Trail; Foothills Parkway; Foothills Parkway, 3rd overlook from Cosby; Foothills Parkway, pull-off between 2nd & 3rd, up trail to right; Foothills Parkway, 2nd pullout; Foothills Parkway East; Foothills Parkway, 1st overlook; Maddron Bald Trail; Sevier Co., Laurel Falls Trail; Campsite 20, nr. creek on Meigs Mountain Trail; W of Campsite 20; Greenbrier area, end of Ramsey Cascade Road, uphill from parking lot; Greenbrier area, Old Settlers Trail, off Ramsey Cascade Road; Greenbrier covered picnic area, 3.5 mi S Rt. 321; Greenbrier picnic shelter; Jake's Creek Trail, nr. Campsite 27; Jake's Creek Trail, above Campsite 27; Jake's Creek Trail; Park Headquaters; return on Greenbrier Loop Road, 3.85 mi S Rt. 321. (87 specimens)

Elevation range. 1350–3640 ft. (411–1109 m)

General distribution. Distributed from New York south to Florida and west to Michigan, south to Arkansas, Mississippi, Louisiana, and east Texas.

Larval hosts. Larva bores into decaying logs and stumps of chestnut (*Castanea* sp., Fagaceae), oak (*Quercus* sp., Fagaceae), and hickory (*Carya* sp., Juglandaceae) (Covell 1984). Larvae have been found under bark of trees especially tulip poplar (*Liriodendron tulipifera* L., Magnoliaceae) (Rings *et al.* 1992).



MAP 24. Collecting localities of *Scolecocampa liburna*.

7. *Sigela brauneata* (Swett, 1913)
(Fig. 52, Map 25)

Identification. Forewing length 5.2–6.9 mm. *Sigela brauneata* is a small species with a white forewing mottled with black and dark brown scales. Prominent markings include a series of small, black quadrate spots along costa, a small orbicular spot, and an obscure reniform spot with a few scales that are angled toward posterior margin. Terminal line a series of small, flat black triangular spots between wing veins, some of which are contiguous. Hind wing is white and heavily mottled with black scales, darker than forewing, and with a thin, black, marginal border.

Flight period. Mid-May to July.

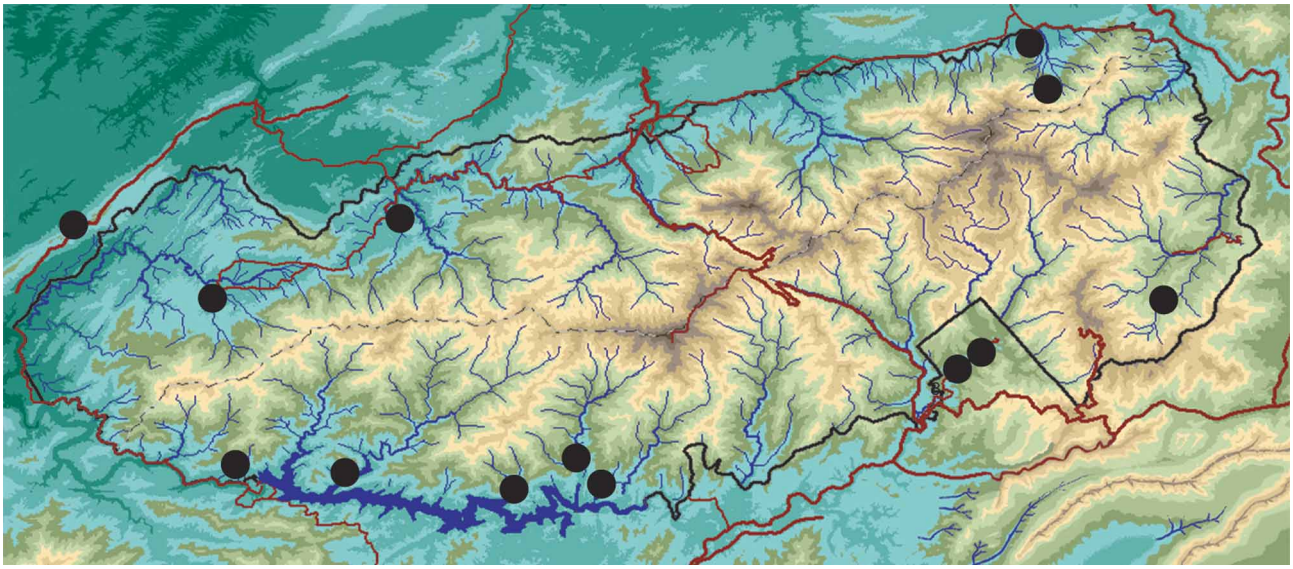
Collected localities. North Carolina: Haywood Co.: Purchase Knob, at house; Swain Co.: Big Cove Rd., site b, site p; 0.5 km from mouth of Chambers Creek, 300 feet up hillside on NW side; 0.7 km up creek from mouth of Goldmine Creek; 0.7 km S Payne Cemetery; 0.4 km up from lake on Forney Creek; 0.2 km W mouth of Hazel

Creek. Tennessee: Blount Co.: Tremont; Cades Cove, Forge Creek Road; Foothills Parkway West at E end; Cocke Co.: Cosby Creek, Cosby House; Cosby Ranger Station; 0.6 mi from Jct. of Rt. 32 on road to Cosby Campground. (25 specimens)

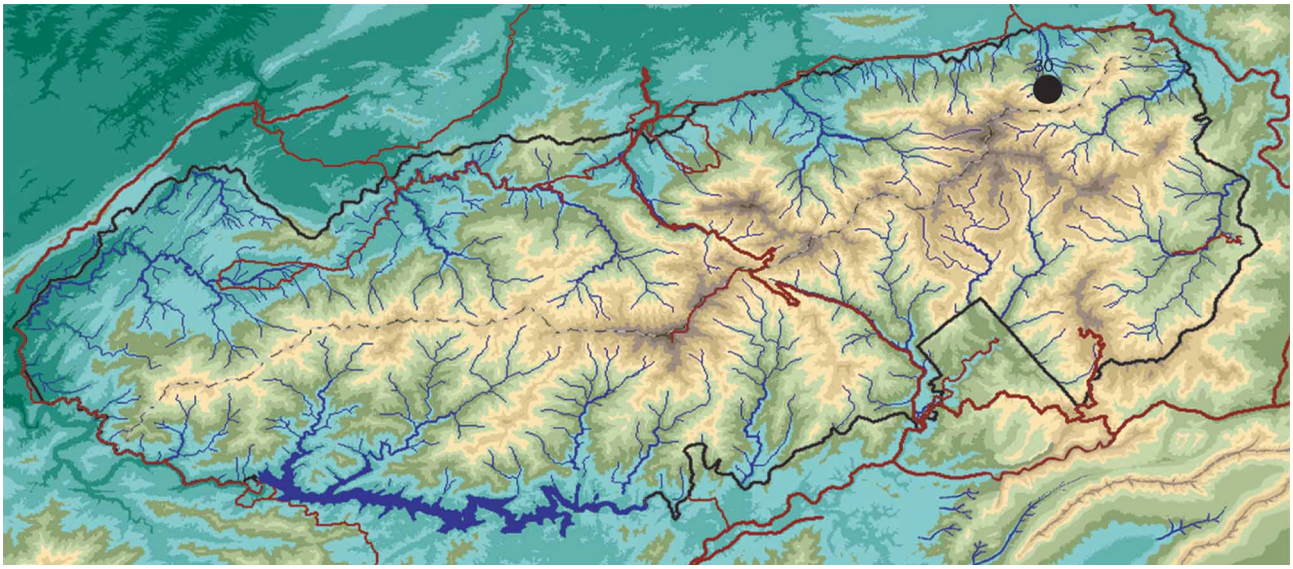
Elevation range. 1001–4800 ft. (305–1463 m)

General distribution. Distributed from Maryland south to Florida and west to southern Ohio, Tennessee, and Texas.

Larval hosts. Unknown.



MAP 25. Collecting localities of *Sigela brauneata*.



MAP 26. Collecting localities of *Sigela penumbrata*.

8. *Sigela penumbrata* Hulst, 1896

(Figs. 53–55, Map 26)

Identification. Forewing length 4.8–7.4 mm. *Sigela penumbrata* is a small species with a dirty white forewing sprinkled with brown scales. Pattern is greatly reduced with the antemedial line a black spot on costa; medial line a black spot on costa; orbicular spot a tiny black spot below medial line; postmedial line a series of tiny black spots angled from costa to posterior margin; terminal line a series of black spots between veins. Hind wing is concolor-

ous with forewing and sprinkled with brown scales; a tiny black discal spot; postmedial line a continuation from forewing; terminal line as in forewing.

Flight period. Mid-May.

Collected localities. Tennessee: Cocke Co.: Cosby Ranger Station. (2 specimens)

Elevation range. 1680 ft. (512 m)

General distribution. Distributed from Great Smoky Mountains National Park, Georgia, Florida, and southeast coast of Texas.

Larval hosts. Unknown.

Discussion

The most common (155 specimens) and widespread (40 localities, Map 12) species was *Pangrapta decoralis* (Pangraptinae). The larvae of *P. decoralis* have been reared from species of blueberry (*Vaccinium* spp., Ericaceae) and in Great Smoky Mountains National Park from sourwood (*Oxydendrum arboreum* (L.) DC., Ericaceae). The next most abundant (87 specimens) and widespread (30 localities, Map 24) was *Scolecocampa liburna* (Scolecocampinae). The larvae of *S. liburna* bore into decaying wood and have been found under the bark of trees.

The most diverse locality for these subfamilies in Great Smoky Mountains National Park is Foothills Parkway, Cocke Co., Tennessee with 16 species. Foothills Parkway is represented by 11 separate localities for this group of subfamilies. Site b along Big Cove Road and Welch Ridge, 300 feet above Lake Fontana, Swain Co., North Carolina had the next most species with 10. All of these sites have been well collected and this probably accounts for their high species richness.

Most of the specimens from Great Smoky Mountains National Park have been collected with light traps and some species may be more common than indicated here. As an example, species of *Metalectra* are common at flowers at night, but are not strongly attracted to lights (E. Metzler, pers. comm.). Another example is moths that are more attracted to bait than lights. This is the case with species of *Dyspyralis* where they are much more common at bait than at lights (E. Metzler, pers. comm.).

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