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DISTRIBUTION OF A NORTHERN FAUNA OF NOCTUIDAE IN THE
MOUNTAINS OF OREGON

Additional key words: endemism, non-target species, biogeography.

Although the Oregon butterfly fauna has been well studied (Dornfeld 1980), comparatively little was known about the Oregon moth fauna until about 1960. During the past 30 years, extensive collecting has been conducted in the state, most notably by Stanley G. Jewett, Jr., C. William Nelson, James H. Baker, Elmer L. Griepentrog, Victor B. McHenry, Kenneth J. Goeden, and Jeffrey C. Miller. From 1992 through 1995, the U. S. Forest Service also conducted extensive blacklight (UV) trap sampling in the Cascade Range and the Blue Mountains to assess the impacts on nontarget Lepidoptera of *Bacillus thuringiensis* subsp. *kurstaki* sprays for suppression of outbreaks of western spruce budworm (*Choristoneura occidentalis* Freeman: Tortricidae) (see Grimble et al. 1992 for details of the sampling protocols in these studies).

Various components of this moth fauna show biogeographic connections with the northern Pacific Coast, California, the Great Basin, and the northern Rocky Mountains. In this paper, we report on a northern fauna of Noctuidae that is transcontinental across Canada from Quebec to British Columbia, extending southward through the Appalachians to North Carolina, the Rocky Mountains, and the mountains of Oregon. The fauna has been enumerated by Rockburne and Lafontaine (1976), Prentice (1962) and from a survey of museum records. Only those species typical of northern hardwood-conifer forests, meadows, or wetlands are included in this study; ubiquitous and/or migratory species throughout most of North America, such as *Heliothis zea* (Boddie) and *Peridroma saucia* (Hbn.), are excluded from consideration.

This northern noctuid fauna is largely confined to three mountainous regions of Oregon; the northern Coast Range, the Cascade Range, and the Blue Mountains. The northern Coast Range consists of low mountains 300–600 m in elevation, with a few higher peaks to 900 m, extending from Clatsop County to coastal Lane County. The Cascade Range extends from Multnomah and Wasco Counties south to Jackson and Klamath Counties. The lower Cascade foothills of the western slope extend from 150–1500 m, whereas the high Cascades are 1200–2100 m in elevation, with high volcanic peaks over 3000 m. The Blue Mountains extend from Crook County northeast to Wallowa County,

TABLE 1. Distribution of northern species of Noctuidae in the Coast Range (CO), Cascade Range (CA), and the Blue Mountains (BM) of Oregon. X = collected, O = not collected).

Species	CO	CA	BM
<i>Abrostola urentis</i> Gn.	X	X	O
<i>Acronicta fragilis</i> Gn.	X	X	X
<i>Acronicta funeralis</i> G.& R.	X	X	O
<i>Acronicta grisea</i> Wlk.	X	X	X
<i>Acronicta impleta</i> Wlk.	X	X	X
<i>Acronicta impressa</i> Wlk.	X	X	X
<i>Acronicta innotata</i> Gn.	O	O	X
<i>Acronicta lepusculina</i> Gn.	O	O	X
<i>Acronicta radcliffei</i> (Harv.)	X	X	O
<i>Agroperina inficita</i> (Wlk.)	O	O	X
<i>Agrotis obliqua</i> (Sm.)	O	X	X
<i>Agrotis venerabilis</i> Wlk.	O	X	X
<i>Aletia oxygala</i> (Grt.)	X	X	X
<i>Alypia langtoni</i> Couper	X	X	O
<i>Amphipoea americana</i> (Speyer)	X	X	O
<i>Amphipyra pyramidoides</i> Gn.	X	X	O
<i>Amphipyra tragopoginis</i> (Cl.)	X	X	X
<i>Anaplectoides prasina</i> D.& S.	X	X	X
<i>Anaplectoides pressus</i> (Grt.)	O	X	X
<i>Anathix puta</i> (G. & R.)	O	X	X
<i>Androloma maccullochi</i> (Kby.)	X	X	X
<i>Anhimella contrahens</i> (Wlk.)	O	X	X
<i>Apamea alia</i> (Gn.)	X	X	X
<i>Apamea amputatrix</i> (Fitch)	X	X	X
<i>Apamea finitima</i> Gn.	X	X	X
<i>Apamea impulsiva</i> (Gn.)	X	O	O
<i>Apamea indocilis</i> (Wlk.)	X	X	X
<i>Apamea inordinata</i> (Morr.)	O	O	X
<i>Apamea lignicolora</i> (Gn.)	X	X	O
<i>Apamea plutonia</i> (Grt.)	X	O	O
<i>Apamea vultuosa</i> (Grt.)	X	X	X
<i>Aplectoides condita</i> (Gn.)	O	X	X
<i>Autographa ampla</i> (Wlk.)	X	X	X
<i>Autographa mappa</i> (G.& R.)	X	X	O
<i>Autographa pseudogamma</i> (Grt.)	O	X	X
<i>Autographa sansoni</i> Dod	X	X	O
<i>Brachylomia algens</i> (Grt.)	X	X	X
<i>Catabena lineolata</i> Wlk.	O	X	O
<i>Catocala briseis</i> Edw.	X	X	X
<i>Catocala relicta</i> Wlk.	X	X	X
<i>Catocala semirelicta</i> Grt.	X	X	X
<i>Chersotis juncta</i> (Grt.)	O	O	X
<i>Chortodes inquinata</i> (Gn.)	O	X	O
<i>Chortodes rufostrigata</i> (Pack.)	O	O	X
<i>Cosmia calami</i> (Harv.)	O	X	O
<i>Cucullia florea</i> Gn.	X	X	X
<i>Cucullia intermedia</i> Speyer	O	X	X
<i>Cucullia omissa</i> Dod	X	X	X
<i>Cucullia postera</i> Gn.	O	X	X
<i>Cucullia speyeri</i> Lint.	O	X	X
<i>Diachrysis aeroides</i> (Grt.)	X	X	X

TABLE 1. Continued.

Species	CO	CA	BM
<i>Diarsia rosaria</i> (Grt.)	X	X	X
<i>Egira dolosa</i> (Grt.)	O	X	X
<i>Enargia decolor</i> (Wlk.)	O	X	X
<i>Enargia infumata</i> (Grt.)	O	X	X
<i>Eosphoropteryx thyatyroides</i> (Gn.)	X	X	X
<i>Eremobina claudens</i> (Wlk.)	O	X	X
<i>Eueretagrotis perattenta</i> (Grt.)	O	O	X
<i>Euplexia benesimilis</i> McD.	X	X	X
<i>Eupsilia tristigmata</i> (Grt.)	X	X	X
<i>Eurois stricta</i> Morr.	O	X	X
<i>Eurois occulta</i> (L.)	O	X	X
<i>Eutricopsis nexilis</i> (Morr.)	O	O	X
<i>Euxoa declarata</i> (Wlk.)	X	X	X
<i>Euxoa divergens</i> (Wlk.)	X	X	X
<i>Feralia comstocki</i> (Grt.)	X	X	X
<i>Galgula partita</i> Gn.	X	X	O
<i>Graphiphora haruspica</i> (Grt.)	X	X	X
<i>Hecatera sutrina</i> (Grt.)	O	X	O
<i>Heliothis phloxiphaga</i> G.& R.	X	X	X
<i>Helotropha reniformis</i> (Grt.)	X	X	O
<i>Homorthodes furfurata</i> (Grt.)	O	X	X
<i>Hyppa xylinoides</i> (Gn.)	X	X	X
<i>Lacanobia grandis</i> (Gn.)	O	X	O
<i>Lacanobia lilacina</i> (Harv.)	X	X	X
<i>Lacanobia lutra</i> (Gn.)	X	X	X
<i>Lacanobia nevadae</i> (Grt.)	O	X	X
<i>Lacanobia radix</i> (Wlk.)	X	X	X
<i>Lacanobia subjuncta</i> (G.& R.)	X	X	X
<i>Lacanobia tacoma</i> (Stkr.)	X	X	O
<i>Lacinipolia olivacea</i> (Morr.)	X	X	X
<i>Lacinipolia vicina</i> (Grt.)	O	X	X
<i>Leucania insueta</i> Gn.	X	X	X
<i>Lithacodia albidula</i> (Gn.)	X	X	O
<i>Litholomia napaea</i> (Morr.)	X	X	X
<i>Lithomoia solidaginis</i> (Hbn.)	X	X	X
<i>Lithophane amanda</i> (Sm.)	X	X	X
<i>Lithophane baileyi</i> Grt.	O	X	O
<i>Lithophane georgii</i> Grt.	X	X	X
<i>Lithophane innominata</i> (Sm.)	X	X	X
<i>Lithophane petulca</i> Grt.	X	X	X
<i>Lithophane thaxteri</i> Grt.	O	X	X
<i>Luperina passer</i> (Gn.)	X	X	X
<i>Marathyssa inficita</i> (Wlk.)	O	X	X
<i>Melanchra adjuncta</i> (Gn.)	X	X	X
<i>Melanchra pulverulenta</i> (Sm.)	X	X	O
<i>Mniotype ducta</i> (Grt.)	O	X	X
<i>Mniotype tenera</i> (Sm.)	X	O	O
<i>Nephelodes minians</i> Gn.	O	O	X
<i>Nycteola cinereana</i> N.& D.	O	X	X
<i>Nycteola frigidana</i> (Wlk.)	X	X	O
<i>Ochropleura plecta</i> (L.)	X	X	O
<i>Oligia illocata</i> (Wlk.)	X	X	X
<i>Oncocnemis piffardi</i> (Wlk.)	O	X	O

TABLE 1. Continued.

Species	CO	CA	BM
<i>Oncocnemis riparia</i> Morr.	O	X	X
<i>Orthosia hibisci</i> (Gn.)	X	X	X
<i>Orthosia revicta</i> (Morr.)	X	X	X
<i>Orthosia segregata</i> (Sm.)	O	O	X
<i>Papestra cristifera</i> (Wlk.)	X	X	X
<i>Papestra quadrata</i> (Sm.)	O	O	X
<i>Paradiarsia littoralis</i> (Pack.)	O	O	X
<i>Phlogophora periculosa</i> Gn.	X	X	O
<i>Platyperigea meralis</i> (Morr.)	O	O	X
<i>Platypolia anceps</i> (Steph.)	O	X	O
<i>Polia nimbose</i> Gn.	X	X	O
<i>Polia purpurissata</i> (Grt.)	X	X	X
<i>Protolampra rufipectus</i> (Morr.)	X	X	X
<i>Proxenus miranda</i> (Grt.)	X	X	O
<i>Pyrrhia exprimens</i> (Wlk.)	X	X	X
<i>Raphia frater</i> Grt.	X	X	X
<i>Rhyacia quadrangula</i> (Zelt.)	O	X	X
<i>Scoliopteryx libatrix</i> (L.)	X	X	X
<i>Sideridis maryx</i> (Gn.)	O	X	X
<i>Sideridis rosea</i> (Harv.)	X	X	X
<i>Spaelotis clandestina</i> (Harr.)	O	O	X
<i>Stretchia plusiaeformis</i> Edw.	O	X	X
<i>Synedoida adumbrata</i> (Behr)	O	X	X
<i>Syngrapha alias</i> (Ottol.)	X	X	X
<i>Syngrapha epigaea</i> (Grt.)	X	X	X
<i>Syngrapha rectangula</i> (Kby.)	X	X	O
<i>Syngrapha viridisigma</i> (Grt.)	O	X	X
<i>Ufeus satyricus</i> Grt.	O	X	X
<i>Xanthia togata</i> (Esper)	X	X	O
<i>Xestia collaris</i> (G. & R.)	O	X	X
<i>Xestia smithii</i> (Snell.)	X	X	X
<i>Xylena cineritia</i> Grt.	O	X	X
<i>Xylena curvimacula</i> (Morr.)	O	X	X
<i>Xylena nupera</i> (Lint.)	X	X	X
<i>Xylena thoracica</i> (Putnam-Cramer)	O	X	X
<i>Xylotype acadia</i> B. & Benj.	X	X	X
<i>Zale duplicata</i> (Bethune)	O	O	X
<i>Zale lunata</i> (Drury)	X	X	X
<i>Zale minerea</i> (Gn.)	X	X	O

and include the Ochoco, Strawberry, Elkhorn, Wallowa and Innaha Mountain ranges. Elevations are circa 1200–1800 m, with high peaks of 2700–3000 m. Both the Coast Range and the Cascade Range generally have a cool, moist climate due to the influence of the Pacific Ocean, although it is drier in the rain shadows on the eastern slopes. The Blue Mountains have a dry, more severe continental climate similar to the northern Rocky Mountains of Idaho and Montana.

To date a total of 143 of the 200 species of northern Noctuidae with a transcontinental distribution across Canada have been collected in the mountains of Oregon. Table 1 outlines the known distributions of these species in the Coast Range, Cascade Range, and the Blue Mountains. At present, we know of 707 species of Noctuidae recorded through-

TABLE 2. Number and percent of northern species of Noctuidae shared among the Coast Range (CO), Cascade Range (CA), and the Blue Mountains (BM) of Oregon.

Species	CO	CA	BM	CO/CA	CA/BM	CO/CA/BM
Number	4	8	15	22	34	60
Percent	3	6	10	15	24	42

out the state, and so these northern taxa comprise about 20% of the total Oregon fauna. Table 2 indicates the number and percent of northern species shared among the three mountain regions. For species restricted to a single region, the Blue Mountains have the highest number (15) and the Coast Range the fewest (4). However, the Cascade Range has the highest total number of northern species with 124, followed by the Blue Mountains with 109 and the Coast Range with 86.

This northern fauna is isolated and relictual in Oregon today, surviving on montane islands surrounded by broad expanses of desert lowlands and valleys. We postulate that these species dispersed southward into Oregon during the various glaciations of the Pleistocene. The modern distribution of endemically restricted species may suggest three dispersal routes into the state during the Pleistocene. These include a northeastern route into the Blue Mountains from the adjacent mountains of northern Idaho and Montana, a north-south route through the Cascades from British Columbia, and possibly some dispersal along the lower mountains of the Coast Range. Examples of such endemics include *Orthosia segregata* (Sm.), *Papestra quadrata* (Sm.), and *Zale duplicata* (Bethune) in the Blue Mountains; *Lacanobia grandis* (Gn.), *Oncocnemis piffardi* (Wlk.), and *Lithophane baileyi* Grt. in the Cascades; and *Mniotype tenera* (Sm.), *Apamea impulsiva* (Gn.), and *A. plutonia* (Grt.) in the Coast Range. Moreover, it is significant that a number of northern species known from the Washington Cascades do not cross the Columbia River valley into the Oregon Cascades. These include *Lithophane pexata* Grt., *L. fagina* Morr., *Anomomya speciosa* (Hbn.), and *A. perquiritata* (Morr.).

In conclusion, about 71% of the northern transcontinental noctuid fauna are known to occur in the mountains of Oregon. It is doubtful that many additional species of this fauna remain to be discovered in Oregon, with perhaps the exception of the high Willowa Mountains where little survey work has yet been done.

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