

Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4

V. CONSTRUCTION OF HERBIVORE SPECIES LIST
(TASK 4)

In Task 4 we determined which species of forest understory and canopy gap herbivores are likely to be found in the area represented as the Southern Range of the Northern Spotted Owl.

V-1. Species List Construction

Species lists provide the initial qualitative assessment of the diversity and uniqueness of a particular habitat or geographic region. Although species catalogues alone convey a rather limited amount of information, nevertheless they form a critical basis for future investigations. A general lack of detailed distribution data for many arthropod species makes it difficult to predict their occurrence in a particular habitat. This information gap varies widely among

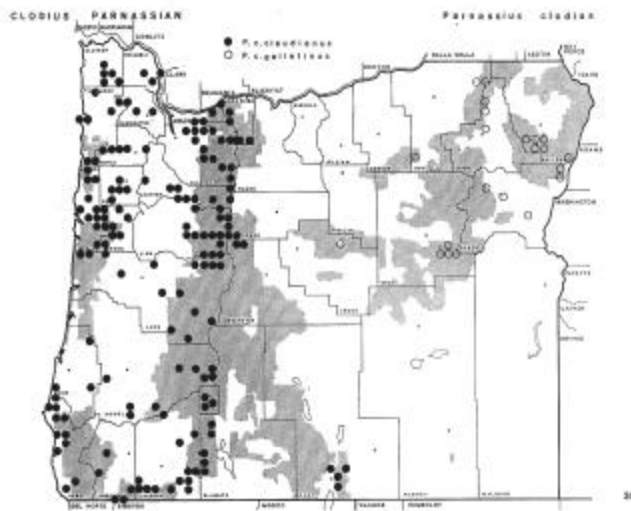


Figure V-1 Geographic distribution of *Parnassius clodius* (Lepidoptera: Papilionidae) in Oregon (after Hinchliff 1994).

individual taxa. Some groups such as Lepidoptera have been extensively studied in the study region (Ferguson et al. 1999, Opler et al. 1995). Published literature and existing databases provided a valuable source of species distribution information in the form of individual collection locality records (Figure V-1) or countywide distribution records (Figure V-2). The occurrences of additional species in the study region were based on information from existing

**Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4**

species lists (e.g. Parsons et al. 1991) or through consultations with experts. For example, Dr. Andrew Moldenke (Oregon State University) provided a comprehensive list of bee taxa from the Pacific Northwest.

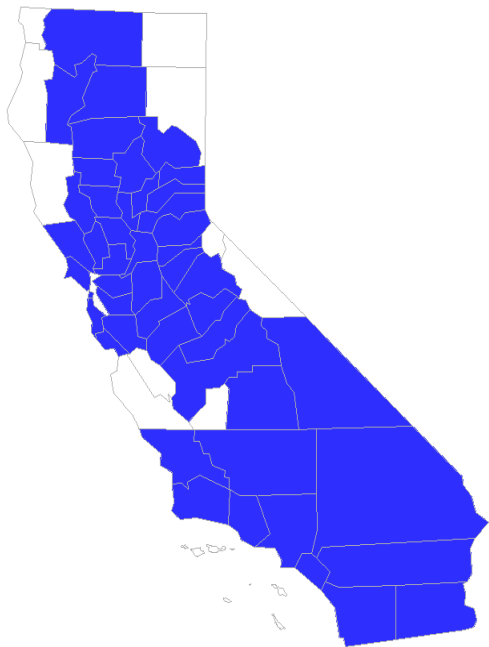


Figure V2. Geographic distribution of *Battus philenor* (Lepidoptera: Papilionidae) in California (after Opler et al. 1995).

The presence in the study region of arthropod taxa for which distribution records are incomplete or only poorly documented was estimated using published geographic distribution records for their host plants (Abrams 1940, 1950, 1954, Peck 1941, Abrams & Stinchfield 1960, Jepson 1957, Baldwin et al. 1993). For example, we used the distribution of snowbrush, *Ceanothus velutinus*, in California (Figure V-3) to predict likely distributions of some herbivores species known to feed on this host plant [e.g. *Ceanothus velutinus* is the host plant for *Aethaloida* spp., *Drepanulatrix* spp., and *Schizura* spp. (Miller & Hammond 2000)].

Nevertheless, the predicted distributions of arthropods within the study region based solely on the distribution patterns of their host plants should be interpreted with caution. Individual insect taxa are limited by a variety of factors (Price 1984, Begon et al. 1996, Schowalter 2000) and the resulting distribution of herbivorous species will also reflect such variables as the local abundance and phenology of the host plant, host plant specificity and dispersal capabilities of individual taxa (Strong et al. 1984, Lattin and Stanton 1993, Jensen 1996).

Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4

V-2. Results

The current database list contains a total of 2398 arthropod species (Appendix H). The largest number of species (n = 1341 records; Table V-1) was adapted from Parsons et al. (1991), which represents one of the most comprehensive taxonomic lists of forest-dwelling arthropods in the Pacific Northwest (Lattin 1993). Although this compilation is based on arthropod collections from mesic old-growth habitats, many taxa include species adapted to warmer and drier environments found further south (Lattin 1993). Thus, it is reasonable to suspect that a large proportion of species will be shared between habitats of the H. J. Andrews Experimental Forest and the study region of the Klamath-Siskiyou region.

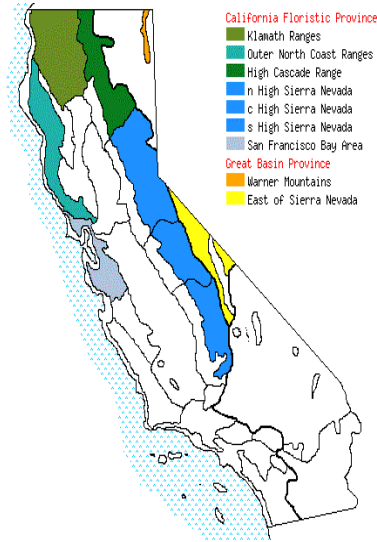


Figure V-3. Geographic distribution of *Ceanothus velutinus* (Rhamnaceae) in California (after Baldwin et al. 1993).

The most comprehensive distribution information of major taxa currently exists for Lepidoptera (Hinchliff 1994, Miller 1995, Miller and Hammond 2000, Ferguson et al. 1999, Opler et al. 1995) and Apoidea within Hymenoptera (Moldenke, personal communication¹). Surprisingly, the review of relevant literature contributed only 414 herbivore species to our list. This suggests a rather narrow focus of investigations and a strong bias towards a small subset of taxa, especially Nymphalidae, Tephritidae, or Lycaenidae.

¹ A. Moldenke, Ph.D. Research Associate Oregon State University, Department of Entomology, Corvallis, Oregon.

Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4

Table V-1. Source of data for the list of arthropod species likely to occur in the southern range of the Northern Spotted Owl habitat.

Source of data	No. contributed species	Primary taxa
ProCite Bibliography Database	414	Various groups
Hinchliff, J. 1994	134	Lepidoptera
Jensen 1996	21	Homoptera
Lattin 1998	32	Various groups
Miller 1995, Miller & Hammond 2000	542	Lepidoptera
Moldenke, <i>personal communication</i> ²	474	Coleoptera, Hymenoptera
Ferguson et al. 1999, Opler et al. 1995	280	Lepidoptera
Parsons et al. 1991	1341	Various groups
Total taxa in the species list	2398 *	

* Does not represent a true sum of the contributed taxonomic records due to species overlap among source databases.

V-3. Analysis

The precise number of arthropod species that occur in the southern range of the northern spotted owl is unknown. Appendix H is a list of species extracted from pertinent literature and represents our best estimate of the species that occur in the southern range of the northern spotted owl.

² A. Moldenke, Ph.D. Research Associate Oregon State University, Department of Entomology, Corvallis, Oregon.

**Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4**

To evaluate the completeness of our list we compared the relative number of species per family on our list to the relative number of species per family that occur in North America, north of Mexico. The validity of this comparison is based on the assumption that the relative numbers of species in families that occur in the region of interest are equal to the relative number of species that occur in those families in North America. Figure V-4 plots the proportion of species represented for each family that we found to occur in the region versus the proportion of species for those families in North America.

A line with a slope of one and intersecting the origin is superimposed on the graph. Families falling above this line contain a higher relative number of species on our list compared to the relative number of species in North America. These include families such as Noctuidae, Geometridae, Megachilidae, and Cerambycidae. Some of these families appear to be well known in the southern range of the northern spotted owl and we conclude that few additional species of these families may be found during general surveys. A note of caution is appropriate here. Because this region has a high degree of endemism, some families may have a higher relative number of species than they do in North America.

Families such as Cicadellidae, Curculionidae, Miridae, Chrysomelidae, and Pyralidae fall below the line on the graph, and have a smaller relative number of species compared to the relative number of species in North America. These families appear to be under-represented on the species list. It is likely that general or strategic surveys will add to the list of species in these families since some of these taxa lack major published works on the species in the area under consideration. Data gathered about some of these groups will be very useful when adequate field work has been done. Plant species richness is very likely to

**Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4**

be reflected in the species richness of some of these arthropod taxa (Lattin personal communication³).

The current species list should be viewed as a work-in-progress rather than a comprehensive catalogue of herbivorous arthropod taxa in the focal region. Although the species richness of some groups such Lepidoptera and Hymenoptera has been relatively well documented, other groups will require further taxonomic attention.

³ J.D. Lattin, Ph.D. Professor Emeritus Oregon State University, Department of Entomology, Corvallis, Oregon.

Forest Understory and Canopy Gap Herbivores:
V. Construction Of Herbivore Species List - Task 4

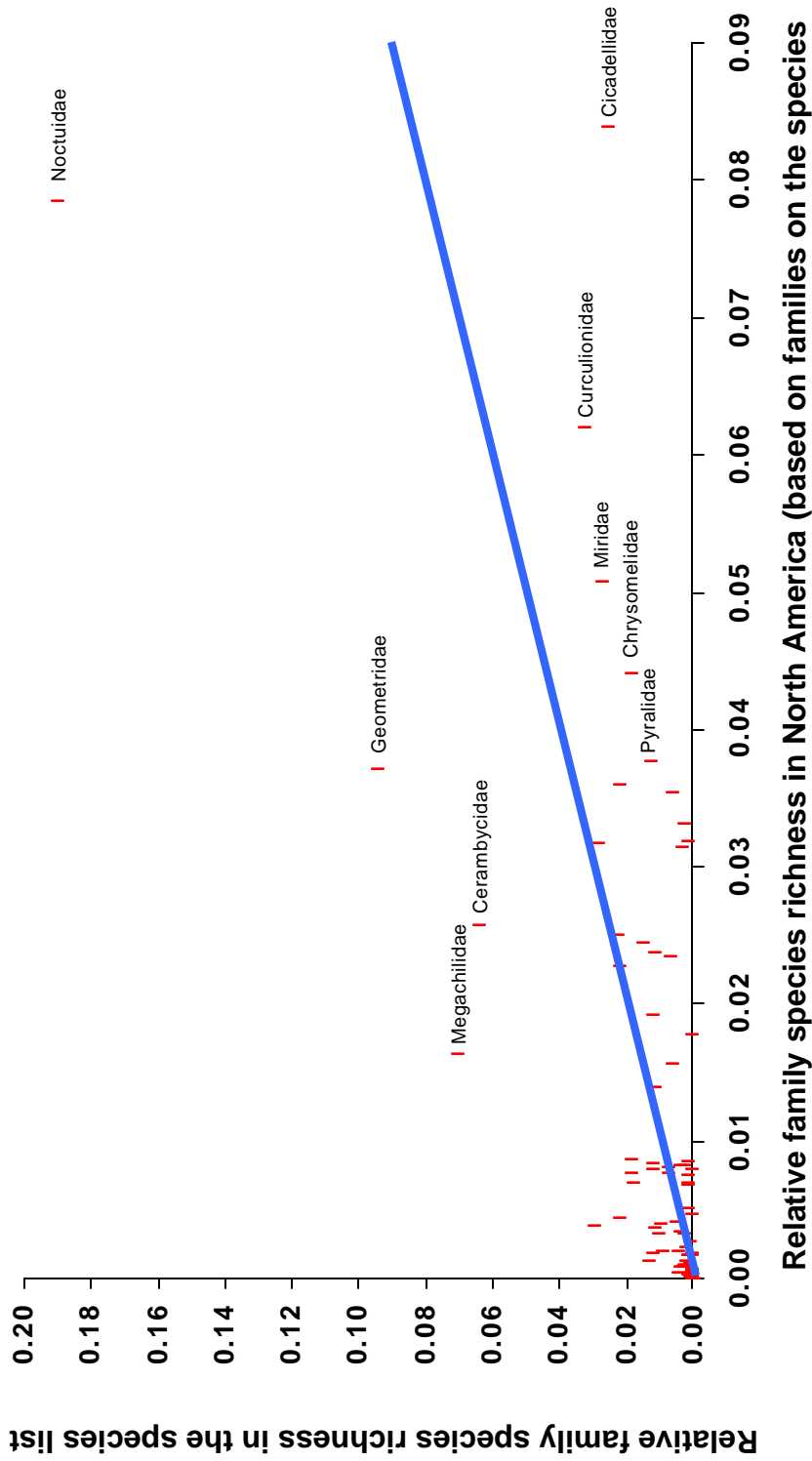


Figure V-4. Comparison of the relative number of species on the species list to relative number of species in North America