

INTERNAL REPORT 7

IDENTIFICATION AND CHARACTERIZATION OF FOREST COMMUNITIES AND HABITAT TYPES IN AND ADJACENT TO THE H. J. ANDREWS EXPERIMENTAL FOREST

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Identification and Characterization of Forest Communities

A total of 23 forest communities have been identified and characterized in a preliminary manner. Data used in formulating the classification had previously been collected on 300 reconnaissance plots located on the H. J. Andrews Forest and surrounding area. Vegetation classification was facilitated by similarity analysis and stand ordination procedures developed by Dr. Will Moir, formerly of Colorado State University. Results of stand ordination indicate the presence of strong moisture and temperature gradients along which forest stands array themselves.

The forest communities recognized in this classification are listed below. They are considered to be climax associations except where indicated. Main characteristics of each unit are shown in the attached summary table.

Tsuga heterophylla zone

1. Pseudotsuga menziesii/Holodiscus discolor^{1,2}
2. Pseudotsuga menziesii-Tsuga heterophylla/Corylus cornuta¹
3. Tsuga heterophylla/Castanopsis chrysophylla^{1,2}
4. Tsuga heterophylla/Rhododendron macrophyllum/Gaultheria shallon^{1,2}
5. Pseudotsuga menziesii/Acer circinatum/Gaultheria shallon (seral)
6. Tsuga heterophylla/Rhododendron macrophyllum/Berberis nervosa^{1,2}
7. Pseudotsuga menziesii/Acer circinatum/Berberis nervosa (seral)¹
8. Tsuga heterophylla/Acer circinatum/Polystichum munitum^{1,2}
9. Tsuga heterophylla/Polystichum munitum²
10. Tsuga heterophylla/Polystichum munitum-Oxalis oregana¹

Transitional zone

1. Tsuga heterophylla-Abies amabilis/Rhododendron macrophyllum/Berberis nervosa^{1,2}
2. Tsuga heterophylla-Abies amabilis/Rhododendron macrophyllum/Linnaea borealis
3. Tsuga heterophylla-Abies amabilis/Linnaea borealis^{1,2}
4. Pseudotsuga menziesii/Acer circinatum/Whipplea modesta (seral)

Abies amabilis zone

1. Abies amabilis-Tsuga mertensiana/Xerophyllum tenax¹
2. Abies amabilis/Vaccinium membranaceum/Xerophyllum tenax
3. Abies amabilis/Rhododendron macrophyllum-Vaccinium alaskaense/Cornus canadensis
4. Abies amabilis/Vaccinium alaskaense/Cornus canadensis¹
5. Abies procera/Achlys triphylla
6. Abies amabilis/Achlys triphylla
7. Abies procera/Clintonia uniflora (seral)
8. Abies amabilis/Tiarella unifoliata^{1,2}
9. Chamaecyparis nootkatensis/Oplopanax horridum

Communities marked with ¹ each have an established reference stand in which intensive environmental monitoring is currently under way. Observations made in these 14 reference stands include air and soil temperature, plant moisture stress, nutrient content of foliage, and phenology. For preliminary results of these measurements see Zobel's progress report for year-1 project entitled "Relation of biologically defined environmental measurements to distribution and productivity of forest ecosystems in the central Oregon Cascades."

Stands in communities marked with ² are currently being used by Dr. Denis Lavender in his study of litterfall and nutrient cycling in old-growth Douglas-fir stands. In most cases these plots are located in close proximity to reference stands.

We are currently preparing a manuscript entitled "Forest communities of the central portion of the western Cascades in Oregon," which will summarize methods used in classifying the vegetation and give detailed descriptions of the communities. It is anticipated that this manuscript will be published as a Coniferous Biome bulletin.

A by-product of work on this study has been the publication of "A checklist of vascular plants on the H. J. Andrews Experimental Forest, western Oregon" by Jerry F. Franklin and C. T. Dyrness (U.S. Forest Serv. Res. Note PNW-138, January 1971, 37 p.).

Vegetation Mapping on Experimental Watersheds

Most of this work was accomplished by Mr. Glenn Hawk (graduate student in botany at Oregon State University), who was employed for this purpose during the summers of 1970 and 1971. Watersheds that have been mapped include: (1) experimental watersheds 2 and 3, largely consisting of old-growth Douglas-fir forest at elevations of approximately 1,500 to 3,000 feet (total area about 400 acres), and (2) experimental watersheds 6, 7, and 8 (collectively known as the "Hi-15 watersheds") largely consisting of second-growth (130 year old) Douglas-fir forest at elevations of approximately 3,000 to 3,500 feet (total area about 170 acres).

Those units recognized in our classification of forest communities were found to provide a logical and useful framework for mapping vegetation in these areas. Information shown for each map delineation includes forest community, amounts of tree regeneration in the understory, and characteristics of the tree overstory, including species composition, tree age class, and canopy coverage. Characterization of mapping units is based on data collected on 125 reconnaissance plots, which were established and described during the course of the field survey work. These plots are distributed over the entire mapped area and their location is indicated on the maps. Information recorded for each reconnaissance plot included an estimate of coverage of each plant species present, slope, aspect, and a brief description of soil profile characteristics.

Forest communities found in significant amounts on watersheds 2 and 3 are Pseudotsuga menziesii/Holodiscus discolor, Tsuga heterophylla/Castanopsis chrysophylla, Tsuga heterophylla/Rhododendron macrophyllum/Gaultheria shallon, Pseudotsuga menziesii/Acer circinatum/Gaultheria shallon, Tsuga heterophylla/Rhododendron macrophyllum/Berberis nervosa, Pseudotsuga menziesii/Acer circinatum/Berberis nervosa, Tsuga heterophylla/Acer circinatum/Polystichum munitum, and Tsuga heterophylla/Polystichum munitum. Forest vegetation on watersheds 6, 7, and 8 falls primarily into three communities: Tsuga heterophylla-Abies amabilis/Rhododendron macrophyllum/Berberis nervosa, Pseudotsuga menziesii/Acer circinatum/Berberis nervosa, and Pseudotsugamenziesii/Acer circinatum/Whipplea modesta.

The vegetation maps are currently being drafted in final form at a scale of about 32 inches to the mile. Descriptive material accompanying the maps will include descriptions of the principal mapping units, a summarization of reconnaissance plot data, and an estimate of acreages within the various map units.

	Psme/Hodi <u>Pseudotsuga menziesii</u> / <u>Holodiscus discolor</u>	Psme-Tshe/Cococa <u>Pseudotsuga menziesii</u> / <u>Tsuga heterophylla</u> / <u>Corylus cornuta</u> var. <u>californica</u>	Tshe/Cach <u>Tsuga heterophylla</u> / <u>Castanopsis chrysophylla</u>	Tshe/Rhma/Gash <u>Tsuga heterophylla</u> / <u>Rhododendron macrophyllum</u> / <u>Gaultheria shallon</u>	Psme/Acci/Gash <u>Pseudotsuga menziesii</u> / <u>Acer circinatum</u> / <u>Gaultheria shallon</u>
<u>Tsuga heterophylla</u> zone					
Successional status	Climax	Climax	Climax	Climax	Seral
Elevation (feet)	1,500-2,000	1,500-2,000	1,500-2,600	1,600-2,800	1,200-2,800
Slope--aspect	Steep--S, SW	Steep--S, SW, W	Mod. to steep--S, SW	Gentle to steep--all	Gentle to steep--all
Landform	Smooth slopes	Smooth slopes	Ridgetops, upper slopes	Many	Bench and smooth slope
Soils	Shallow lithosols and regosols	Stony regosols from pyroclastics	Stony regosols from pyroclastics	Si. loam regosols from pyroclastics	Mod. deep si. lo. or si. cl. lo.
<u>Tree layer</u>					
Overstory Dominants	<u>Pseudotsuga menziesii</u>	<u>Pseudotsuga menziesii</u>	<u>Pseudotsuga menziesii</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Pseudotsuga menziesii</u>
Reproduction Dominants	<u>Pseudotsuga menziesii</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u> <u>Pseudotsuga menziesii</u>	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>
<u>Shrub layer</u>					
Dominants	<u>Acer circinatum</u> <u>Berberis nervosa</u>	<u>Acer circinatum</u> <u>Gaultheria shallon</u>	<u>Castanopsis chrysophylla</u> <u>Rhododendron macrophyllum</u> <u>Gaultheria shallon</u>	<u>Rhododendron macrophyllum</u> <u>Gaultheria shallon</u>	<u>Acer circinatum</u> <u>Gaultheria shallon</u>
Other significant species	<u>Holodiscus discolor</u> <u>Corylus cornuta</u> var. <u>californica</u> <u>Gaultheria shallon</u> <u>Symphoricarpos mollis</u>	<u>Corylus cornuta</u> var. <u>californica</u> <u>Berberis nervosa</u> <u>Castanopsis chrysophylla</u> <u>Cornus nuttallii</u>	<u>Acer circinatum</u> <u>Berberis nervosa</u> <u>Cornus nuttallii</u> <u>Taxus brevifolia</u>	<u>Acer circinatum</u> <u>Berberis nervosa</u> <u>Taxus brevifolia</u>	<u>Berberis nervosa</u>
<u>Herb layer</u>					
Dominants	(sparse) <u>Whipplea modesta</u>	(sparse) <u>Linnaea borealis</u> <u>Whipplea modesta</u>	(sparse) <u>Xerophyllum tenax</u> <u>Linnaea borealis</u>	(very sparse) <u>Linnaea borealis</u>	(very sparse) <u>Viola sempervirens</u> <u>Pyrola asarifolia</u>
Other significant species	<u>Synthyris reniformis</u> <u>Linnaea borealis</u> <u>Festuca occidentalis</u> <u>Polystichum munitum</u>	<u>Synthyris reniformis</u> <u>Polystichum munitum</u> <u>Achlys triphylla</u> <u>Chimaphila umbellata</u>	<u>Chimaphila umbellata</u> <u>Polystichum munitum</u> <u>Pteridium aquilinum</u> <u>Trientalis latifolia</u> <u>Viola sempervirens</u>	<u>Chimaphila umbellata</u> <u>Polystichum munitum</u> <u>Xerophyllum tenax</u> <u>Viola sempervirens</u> <u>Rubus ursinus</u>	<u>Linnaea borealis</u> <u>Rubus ursinus</u> <u>Chimaphila umbellata</u> <u>Whipplea modesta</u>

<u>Tsuga heterophylla</u> zone	<u>Tshe/Rhma/Bene</u> <u>Tsuga heterophylla/</u> <u>Rhododendron macrophyllum/</u> <u>Berberis nervosa</u>	<u>Psme/Acci/Bene</u> <u>Pseudotsuga menziesii/</u> <u>Acer circinatum/</u> <u>Berberis nervosa</u>	<u>Tshe/Acci/Pomu</u> <u>Tsuga heterophylla/</u> <u>Acer circinatum/</u> <u>Polystichum munitum</u>	<u>Tshe/Pomu</u> <u>Tsuga heterophylla/</u> <u>Polystichum munitum</u>	<u>Tshe/Pomu-Oxor</u> <u>Tsuga heterophylla/</u> <u>Polystichum munitum/</u> <u>Oxalis oregana</u>
Successional status	Climax	Seral	Climax	Climax	Climax
Elevation (feet)	1,600-3,000	2,100-3,800	1,500-2,700	1,500-2,800	1,100-2,400
Slope--aspect	Gentle to mod.--N, NE, NW	Moderate--S, SW	Steep--N, NE, E	Gentle to steep-- N, NW, NE	Gentle to steep--all
Landform	Smooth slope	Smooth slope	Smooth slope	Bench & smooth slope	Many
Soils	Deep, fine textured	Deep loam from andesite colluvium	Shallow loam and silt loam	Mod. deep loam and silt loam	Mod. deep si. loam from alluvium and colluvium
<u>Tree layer</u>					
Overstory dominants	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>
Reproduction dominants	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>
<u>Shrub layer</u>					
Dominants	<u>Rhododendron macrophyllum</u> <u>Berberis nervosa</u>	<u>Acer circinatum</u> <u>Berberis nervosa</u>	<u>Acer circinatum</u>	(sparse) <u>Berberis nervosa</u>	(sparse) <u>Berberis nervosa</u>
Other significant species	<u>Acer circinatum</u> <u>Taxus brevifolia</u> <u>Gaultheria shallon</u>	<u>Taxus brevifolia</u>	<u>Berberis nervosa</u>	<u>Taxus brevifolia</u> <u>Acer circinatum</u>	<u>Acer circinatum</u> <u>Gaultheria shallon</u> <u>Vaccinium parvifolium</u>
<u>Herb layer</u>					
Dominants	<u>Linnaea borealis</u>	(very sparse) <u>Chimaphila umbellata</u> <u>Viola sempervirens</u>	<u>Polystichum munitum</u>	<u>Polystichum munitum</u>	<u>Oxalis oregana</u> <u>Polystichum munitum</u>
Other significant species	<u>Polystichum munitum</u> <u>Coptis laciniata</u> <u>Chimaphila umbellata</u> <u>Viola sempervirens</u> <u>Rubus ursinus</u>	<u>Linnaea borealis</u> <u>Polystichum munitum</u> <u>Rubus ursinus</u> <u>Whipplea modesta</u>	<u>Coptis laciniata</u> <u>Linnaea borealis</u> <u>Rubus ursinus</u> <u>Viola sempervirens</u> <u>Vancouveria hexandra</u>	<u>Linnaea borealis</u> <u>Tiarella unifoliata</u> <u>Coptis laciniata</u> <u>Trillium ovatum</u> <u>Viola sempervirens</u> <u>Galium triflorum</u>	<u>Linnaea borealis</u> <u>Vancouveria hexandra</u> <u>Achlys triphylla</u> <u>Rubus ursinus</u> <u>Tiarella unifoliata</u> <u>Viola sempervirens</u> <u>Disporum hookeri</u>

Transitional	Tshe-Abam/Rhina/Bene <u>Tsuga heterophylla/</u> <u>Abies amabilis/</u> <u>Rhododendron macrophyllum/</u> <u>Berberis nervosa</u>	Tshe-Abam/Rhina/Libo <u>Tsuga heterophylla/</u> <u>Abies amabilis/</u> <u>Rhododendron macrophyllum/</u> <u>Linnaea borealis</u>	Tshe-Abam/Libo <u>Tsuga heterophylla/</u> <u>Abies amabilis/</u> <u>Linnaea borealis</u>	Psem/Acci/Whmo <u>Pseudotsuga menziesii/</u> <u>Acer circinatum/</u> <u>Whipplea modesta</u>
Successional status	Climax	Climax	Climax	Seral
Elevation (feet)	2,700-3,700	2,600-3,900	2,000-3,500	3,100-3,800
Slope--aspect	Gentle to steep-N, NE, NW	Gentle--all	Gentle--S, SE, SW	Moderate--S
Landform	Sm. slope or bench	Benches and hummocky	Benches and hummocky	Smooth slopes
Soils	Loam on andesite colluvium	Deep loam on andesite colluvium	Deep loam on andesite colluvium	Moderate deep loams from andesite colluvium
<u>Tree layer</u>				
Overstory dominants	<u>Tsuga heterophylla</u> <u>Pseudotsuga menziesii</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u> <u>Thuja plicata</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Pseudotsuga menziesii</u>
Reproduction dominants	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>	<u>Tsuga heterophylla</u>
<u>Shrub layer</u>				
Dominants	<u>Rhododendron macrophyllum</u> <u>Berberis nervosa</u>	<u>Rhododendron macrophyllum</u>	(very sparse) <u>Acer circinatum</u> <u>Berberis nervosa</u>	<u>Acer circinatum</u> <u>Berberis nervosa</u>
Other significant species	<u>Taxus brevifolia</u> <u>Acer circinatum</u>	<u>Acer circinatum</u> <u>Berberis nervosa</u> <u>Taxus brevifolia</u>	<u>Taxus brevifolia</u>	<u>Rosa gymnocarpa</u> <u>Symphoricarpos mollis</u>
<u>Herb layer</u>				
Dominants	(very sparse) <u>Linnaea borealis</u>	<u>Linnaea borealis</u>	<u>Linnaea borealis</u>	<u>Linnaea borealis</u> <u>Whipplea modesta</u>
Other significant species	<u>Chimaphila umbellata</u> <u>Polystichum munitum</u> <u>Rubus nivalis</u> <u>Rubus ursinus</u>	<u>Cornus canadensis</u> <u>Chimaphila umbellata</u> <u>Viola sempervirens</u> <u>Pyrola asarifolia</u> <u>Rubus nivalis</u>	<u>Viola sempervirens</u> <u>Tiarella unifoliata</u> <u>Chimaphila umbellata</u> <u>Cornus canadensis</u> <u>Coptis lacinata</u>	<u>Viola sempervirens</u> <u>Chimaphila umbellata</u> <u>Rubus ursinus</u> <u>Achlys triphylla</u> <u>Asarum caudatum</u> <u>Galium triflorum</u>

<u>Abies amabilis</u> zone	Abam-Tsme/Xete <u>Abies amabilis</u> / <u>Tsuga mertensiana</u> / <u>Xerophyllum tenax</u>	Abam/Vame/Xete <u>Abies amabilis</u> / <u>Vaccinium membranaceum</u> / <u>Xerophyllum tenax</u>	Abam/Rhma-Vaal/Coca <u>Abies amabilis</u> / <u>Rhododendron macrophyllum</u> / <u>Vaccinium alaskaense</u> / <u>Cornus canadensis</u>	Abam/Vaal/Coca <u>Abies amabilis</u> / <u>Vaccinium alaskaense</u> / <u>Cornus canadensis</u>	Abpr/Actr <u>Abies procera</u> / <u>Achlys triphylla</u>
Successional status	Climax	Climax	Climax	Climax	Seral
Elevation (feet)	4,600-5,300	4,200-4,700	3,000-4,000	2,900-3,800	4,200-4,700
Slope--aspect	Gentle to mod.--all	Mod. steep--N, NW	Moderate--all	Moderate--N, NE, NW	Mod.--steep--all
Landform	Ridgetops	Ridge & upper slopes	Many	Many	Smooth slopes & ridge
Soils	Shallow br. podzolics	Br. podzolics	Deep br. podzolics	Deep br. podzolics	Mod. deep br. podzolics from ash
<u>Tree layer</u>					
Overstory dominants	<u>Abies amabilis</u> <u>Tsuga mertensiana</u>	<u>Abies procera</u> <u>Abies amabilis</u> <u>Pseudotsuga menziesii</u>	<u>Tsuga heterophylla</u> <u>Pseudotsuga menziesii</u>	<u>Tsuga heterophylla</u> <u>Pseudotsuga menziesii</u>	<u>Abies procera</u>
Reproduction dominants	<u>Abies amabilis</u> <u>Tsuga mertensiana</u>	<u>Abies amabilis</u>	<u>Abies amabilis</u> <u>Tsuga heterophylla</u>	<u>Abies amabilis</u> <u>Tsuga heterophylla</u>	<u>Abies amabilis</u>
<u>Shrub layer</u>					
Dominants	(very sparse) <u>Vaccinium membranaceum</u>	(sparse) <u>Vaccinium membranaceum</u>	<u>Rhododendron macrophyllum</u> <u>Vaccinium alaskaense</u>	(sparse) <u>Vaccinium alaskaense</u>	(sparse) <u>Acer circinatum</u>
Other significant species	None	None	<u>Berberis nervosa</u> <u>Taxus brevifolia</u>	<u>Berberis nervosa</u> <u>Acer circinatum</u> <u>Taxus brevifolia</u>	<u>Vaccinium membranaceum</u>
<u>Herb layer</u>					
Dominants	<u>Xerophyllum tenax</u>	<u>Xerophyllum tenax</u>	(sparse) <u>Cornus canadensis</u> <u>Xerophyllum tenax</u>	(sparse) <u>Cornus canadensis</u>	<u>Achlys triphylla</u> <u>Smilacina stellata</u>
Other significant	None	<u>Achlys triphylla</u> <u>Smilacina stellata</u> <u>Rubus lasiococcus</u>	<u>Linnaea borealis</u> <u>Chimaphila umbellata</u> <u>Clintonia uniflora</u>	<u>Linnaea borealis</u> <u>Tiarella unifoliata</u> <u>Chimaphila umbellata</u> <u>Clintonia uniflora</u>	<u>Galium oreganum</u> <u>Pteridium aquilinum</u> <u>Clintonia uniflora</u> <u>Rubus lasiococcus</u> <u>Pyrola secunda</u>

<u>Abies amabilis zone</u>	Abam/Actr <u>Abies amabilis/</u> <u>Achlys triphylla</u>	Abpr/Clun <u>Abies procera/</u> <u>Clintonia uniflora</u>	Abam/Tiun <u>Abies amabilis/</u> <u>Tiarella unifoliata</u>	Chno/Opho <u>Chamaecyparis</u> <u>nootkatensis/</u> <u>Oplopanax horridum</u>
Successional status	Climax	Seral	Climax	Climax
Elevation (feet)	3,900-4,600	4,100-4,300	3,300-4,200	3,800-4,500
Slope--aspect	Gentle to steep--S, W	Moderate--all	Moderate to steep--all	Steep--N
Landform	Upper and midslopes	Many	Many	Upper smooth slopes
Soils	Mod. deep br. podzolics	Mod. deep br. podzolics from ash	Fine textured br. podzolics	Black loam andonite
<u>Tree layer</u>				
Overstory dominants	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Abies procera</u>	<u>Pseudotsuga menziesii</u> <u>Tsuga heterophylla</u>	<u>Chamaecyparis nootkatensis</u> <u>Pseudotsuga menziesii</u> <u>Abies amabilis</u> <u>Tsuga heterophylla</u>
Reproduction dominants	<u>Abies amabilis</u>	<u>Abies amabilis</u>	<u>Abies amabilis</u>	<u>Abies amabilis</u> <u>Chamaecyparis nootkatensis</u>
<u>Shrub layer</u>	(sparse)	(sparse)	(sparse)	(sparse)
Dominants	<u>Vaccinium membranaceum</u> <u>Acer circinatum</u>	<u>Vaccinium membranaceum</u>	<u>Vaccinium membranaceum</u>	<u>Oplopanax horridum</u>
Other significant species	<u>Berberis nervosa</u> <u>Symphoricarpos mollis</u>	None	<u>Acer circinatum</u>	<u>Ribes lacustre</u> <u>Rubus spectabilis</u>
<u>Herb layer</u>				
Dominants	<u>Achlys triphylla</u>	<u>Clintonia uniflora</u> <u>Smilacina stellata</u> <u>Cornus canadensis</u>	<u>Tiarella unifoliata</u> <u>Achlys triphylla</u> <u>Cornus canadensis</u>	<u>Smilacina stellata</u> <u>Montia sibirica</u>
Other significant species	<u>Tiarella unifoliata</u> <u>Asarum caudatum</u> <u>Chimaphila umbellata</u> <u>Linnaea borealis</u> <u>Viola sempervirens</u> <u>Viola glabella</u>	<u>Achlys triphylla</u> <u>Viola sempervirens</u> <u>Rubus lasiococcus</u> <u>Pteridium aquilinum</u> <u>Pyrola secunda</u> <u>Galium oreganum</u>	<u>Smilacina stellata</u> <u>Clintonia uniflora</u> <u>Streptopus curvipes</u> <u>Viola sempervirens</u> <u>Vancouveria hexandra</u> <u>Rubus lasiococcus</u>	<u>Tiarella unifoliata</u> <u>Cornus canadensis</u> <u>Achlys triphylla</u> <u>Asarum caudatum</u> <u>Polystichum munitum</u> <u>Athyrium filix-femina</u>