

## ACIDIC COVE FOREST (SILVERBELL SUBTYPE)

**Concept:** Acidic Cove Forests are low to mid elevation mesophytic mountain and foothill forests dominated by combinations of acid-tolerant trees. The Silverbell Subtype covers examples of the southwestern ranges of the Blue Ridge, in which *Halesia tetrapeta* is a significant component. It is known from the Tennessee side of the Great Smoky Mountains and from Joyce Kilmer-Slickrock Wilderness but may be found elsewhere in southwestern North Carolina.

**Distinguishing Features:** Acidic Cove Forests are distinguished by a canopy dominated by *Liriodendron tulipifera*, *Betula lenta*, *Acer rubrum*, *Tsuga canadensis*, and other species tolerant of highly acid condition. The Silverbell Subtype is distinguished from the other subtypes by canopy dominance by *Halesia tetrapeta* and *Tsuga canadensis*, while generally lacking *Liriodendron tulipifera*. It occurs as somewhat higher elevations than the Typic Subtype but lacks the abundant *Betula alleghaniensis* of the High Elevation Subtype. It has a somewhat more diverse flora than other Acidic Cove Forest subtypes and may be somewhat transitional to Rich Cove Forest. The Silverbell Subtype is similar to Canada Hemlock Forest but has only weak dominance or codominance by *Tsuga canadensis*.

**Synonyms:** *Tsuga canadensis* - *Halesia tetrapeta* - (*Fagus grandifolia*, *Magnolia fraseri*) / *Rhododendron maximum* / *Dryopteris intermedia* Forest (CEGL007693).

**Ecological Systems:** Southern and Central Appalachian Cove Forest (CES202.373).

**Sites:** The Silverbell Subtype occurs in sheltered, mesic sites such as narrow rocky gorges, steep ravines, and low gentle ridges within coves. The Silverbell Subtype is known from 2700-2800 feet in elevation (Ulrey 2002), higher on average than the Typic Subtype and lower than the High Elevation Subtype but overlapping both.

**Soils:** Despite its limited range, the Silverbell Subtype occurs on a wide range of soil map units, all Inceptisols, including Typic Dystrudepts (Ditney, Cataska, Soco, Stecoah), Humic Dystrudepts (Jeffrey, Sylva, Whiteoak), Lithic Dystrudepts (Unicoi), Typic Humadepts (Spivey, Santeetlah), and Humic Endoaquepts (Sylco). Soils are generally very acidic and low in base saturation and in levels of nutritive cations, but they are slightly less extreme than in the Typic Subtype.

**Hydrology:** Sites are well drained but mesic due to topographic sheltering and low slope position.

**Vegetation:** The Silverbell Subtype typically is dominated by *Tsuga canadensis* and *Halesia tetrapeta*. Surprisingly for an Acidic Cove Forests, *Acer saccharum* may also codominates or be abundant. Other frequent canopy species include *Liriodendron tulipifera*, *Fagus grandifolia*, *Betula lenta*, *Acer rubrum*, and *Quercus rubra*. Understory trees, in addition to the canopy species, frequently include *Acer pensylvanicum* and *Magnolia fraseri*. *Tilia americana* var. *heterophylla* and *Magnolia acuminata* also occur in a surprising number of the plots in small numbers. The shrub layer tends to be less dense than in the other subtypes, but *Rhododendron maximum* is the dominant species. The herb layer is well developed. In Ulrey (2002) constancy tables, *Dryopteris intermedia* has the highest average cover and constancy. Other constant herbs include *Eurybia divaricata*, *Solidago curtissii*, *Laportea canadensis*, *Tiarella cordifolia*, *Polystichum acrostichoides*, *Viola rotundifolia*, *Stellaria pubera*, *Mitchella repens*, *Polygonatum biflorum*,

*Arisaema triphyllum*, *Medeola virginica*, *Viola hastata*, *Nabalus* sp., *Athyrium asplenoides*, *Thelypteris noveboracensis*, and again surprisingly, *Caulophyllum thalictroides* and *Prosartes lanuginosa*.

**Range and Abundance:** Ranked G2. The Silverbell Subtype appears to be limited to the southwestern part of the Mountain Region and adjacent Tennessee. It is definitively known only in the Great Smoky Mountains and the Joyce Kilmer-Slickrock Wilderness.

**Associations and Patterns:** The Silverbell Subtype occurs as large patches where it is present. It can occur in close proximity to both the High Elevation and Typic Subtype. It grades to various oak forests on drier slopes and may potentially grade to Rich Cove Forest on richer soils.

**Variation:** Variation is not well known. The Silverbell Subtype is narrowly defined.

**Dynamics:** The dynamics of the Silverbell Subtype are presumably similar to those of Acidic Cove Forests and Mountain Cove Forests in general. This subtype has had particularly severe impacts from the hemlock woolly adelgid, given its large component of *Tsuga canadensis* and occurrence in remote wilderness areas where treatment is difficult.

**Comments:** The Silverbell Subtype was defined by Ulrey (2002), who showed that it differs in its combination of soil fertility and elevation from other Acidic Cove Forests as well as being distinct in numerical classification and ordination. An association recognizable as this subtype was also described by Newell (1997) in her analysis of vegetation of Joyce Kilmer-Slickrock Wilderness but was not found in Shining Rock Wilderness. It was not recognized in other local studies, which tend to classify communities more coarsely. It appears to be transitional to Rich Cove Forest, with several characteristic species commonly present, while at the same time being transitional to Canada Hemlock Forest. However, this subtype remains little studied beyond its initial recognition. The coexistence of heavy *Tsuga* cover with species of rich soils warrants investigation. The limited range of this association is also curious, given that all the component species range widely in the mountains.

#### Rare species:

#### References:

Newell, C.L. 1997. Local and regional variation in the vegetation of the Southern Appalachian Mountains. Ph.D. dissertation, University of North Carolina, Chapel Hill.

Ulrey, C.J. 2002. The relationship between soil fertility and the forests of the Southern Appalachian region. Ph.D. dissertation, North Carolina State University, Raleigh.