Forgotten Flora

of Fall Zone Acidic Oak-Hickory Forest Communities

Fig. 1. Large "ice-rafted" quartzite cobble in unconsolidated gravels in Fall Zone variant of Acidic-Oak-Hickory Forest. Photo by R.H. Simmons.

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The Fall Line, or Fall Zone, is a first order physiographic boundary between the Piedmont Plateau on the west and the Atlantic Coastal Plain to the east. This zone of transition, where the hard, crystalline bedrock of the Piedmont descends under the soft sediments of the Coastal Plain, is defined by deeply entrenched stream valleys that commonly form gorges, waterfalls, and rapids. It was also the farthest navigable limit upstream for oceangoing vessels, thus most of the old, large cities along the Atlantic seaboard are situated along this line.

The flora and gravelly uplands of the Fall Zone and inner Coastal Plain of Montgomery and Prince George's counties, Maryland; District of Columbia; and City of Alexandria and Arlington, Fairfax, Prince William, and Stafford counties, Virginia are virtually identical. Throughout this region, Acidic Oak-Hickory Forest is especially well developed on ancient colluvial slopes and benches, with soils derived from thick, underlying lenses of weathered montmorillonite clay of the Potomac Formation (Fig. 1).

Hairy Angelica *Angelica venenosa*

Over long periods of time, these gravel terraces and the underlying Potomac Formation have become deeply dissected, especially near large streams and rivers, creating an extensive, dendritic drainage system and a landscape of steep slopes, numerous seeps and streams, and large, deep valleys. Consequently, most of the mid to upper ravine slopes in the Fall Zone of our area are characterized by a gravelly surface layer of colluvium of varying depths. Gentle, fan-like slopes and benches represent areas of ancient slope failure and soil slumping and are typically more mesic and less acidic than the gravel terraces and steep, upper slopes. These areas are often small in size, but support a remarkable diversity of plant species, including many that are otherwise rare or absent on the Coastal Plain. The small degree of base cation saturation provided by the clayey soils likely contributes to greater species richness than otherwise occurs in leached, acidic environments.

At the Fall Zone and inner Coastal Plain of our area, Acidic Oak-Hickory Forest generally occurs as a gradient between Oak-Heath Forest and Mesic Mixed Hardwood Forest, often on dry to submesic, acidic, west-facing and southwest-facing slopes with high solar exposure (Simmons 2015). Typical examples of Acidic Oak-Hickory Forest are often much more species rich than Oak-Heath Forest and include a diversity of upland oaks (*Quercus* spp.) and hickories (*Carya* spp.)

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in the canopy, a fairly diverse understory, with Flowering Dogwood (now *Benthamidia florida)* characteristic, and a host of woodland sedges, grasses, and wildflowers in the herb layer (Fig. 2).

These interesting communities have long attracted botanists who were drawn to the exceptional diversity of wildflowers and graminoids (grass-like plants) more characteristic of the Piedmont to the west (see map on pg. 4). Sites throughout the region were undoubtedly more common and nearly continuous in the past, attested by numerous collections in the DC Herbarium of the U.S. National Herbarium (US) at the Smithsonian Institution by late 19th and early 20th century botanists.

The official U.S. National Vegetation Classification (USNVC) for this vegetation type is Piedmont Acidic Oak-Hickory Forest: *Quercus alba - Quercus rubra - Carya tomentosa / Cornus florida / Vaccinium stamineum / Hylodesmum nudiflorum* Forest (USNVC: CEGL008475). In the Fall Zone of our region, however, Northern Red Oak (*Quercus rubra*) is virtually absent from the Fall Zone variant, with Black Oak (*Quercus velutina*) and Southern Red Oak (*Quercus falcata*) dominant, along with White Oak (*Quercus alba*) and other upland oaks to a lesser extent. Also, Deerberry (*Vaccinium stamineum*) and other heaths are rare in the Fall Zone variant, likely owing to the compressed, accordion-like topography of the Fall Zone vs. the flatwoods and rolling uplands of the Piedmont.

Fig. 2. Alonso Abugattas (aka Capital Naturalist) and arborist Scott Graham examining a relic population of Pennsylvania Sedge (*Carex pensylvanica*) and the flora of a colluvial slope in Fall Zone variant of Acidic Oak-Hickory Forest.

Fig. 3. Countless thousands of non-native invasive Oriental Bittersweet (*Celastrus orbiculatus*) seedlings spread into otherwise pristine interior forest by birds, typically Starlings and American Robin, gorging on berries from uncontrolled mast vines outside the forest.

Four members of the Celery Family (Apiaceae) are associated with Fall Zone Acidic Oak-Hickory Forest: Hairy Angelica (*Angelica venenosa*), Sanicle (*Sanicula marilandica*), Yellow Pimpernel (*Taenidia integerrima*), and Hairy-jointed Meadow Parsnip (*Thaspium barbinode*). Except for Hairy Angelica, all are rare in the Coastal Plain, according to the Digital Atlas of the Virginia Flora (VBA 2024) and Hairy Angelica is no longer common or frequently seen in the D.C. region.

The main threats to the future sustainability of these special places include high speed rail, herbivory by over-populous White-tailed Deer, and encroachment into these forest habitats by non-native invasive plants—particularly bird-dropped fruits of Porcelain-berry (*Ampelopsis glandulosa*), Oriental Bittersweet (*Celastrus orbiculatus*), and English Ivy (Hedera helix) (Fig. 3).

Acidic Oak-Hickory Forest habitats of the Fall Zone comprise a diverse assemblage of flora including, but not limited to, species in the following list (pg. 9). While Bosc's Panic Grass and Pasture Rose are near constants, others (e.g., Devil's Bit, Lily-leaved Twayblade, Striped Gentian, Small White Snakeroot, and Sanicle), are highly rare or sole occurrences.

LITERATURE CITED

Simmons, R.H. 2015. Native vascular flora of the City of Alexandria, Virginia. City of Alexandria Department of Recreation, Parks, and Cultural Activities, Alexandria, Virginia. http://alexandriava.gov/22560

Virginia Botanical Associates. 2024. Digital Atlas of the Virginia Flora (http://www.vaplantatlas.org). c/o Virginia Botanical Associates, Blacksburg. Accessed 25 February 2024.

Some Plants of Acidic Oak-Hickory Forest Habitats

Legend: Species of Conservation Concern in Maryland: (E) Endangered, (S1) Highly State Rare, (S2) State Rare, (S3) Watchlist

GRAMINOIDS

Grass Family (Poaceae)

Bosc's Panic Grass *Dichanthelium boscii*

Variable Panic Grass *Dichanthelium commutatum* var. *commutatum*

Two-flower Melic *Melica mutica* (S3)

Sedge Family (Cyperaceae)

Lined Sedge *Carex striatula* (S3)

Bashful Bulrush *Trichophorum planifolium* (S2)

FORBS

Bunchflower Family (Melanthiaceae)

Devil's Bit *Chamaelirium luteum* (S2)

Orchid Family (Orchidaceae)

Lily-leaved Twayblade *Liparis liliifolia* (S3)

Birthwort Family (Aristolochiaceae)

Virginia Snakeroot *Aristolochia serpentaria*

Caryophyllaceae (Pink Family)

Smooth Forked Nailwort *Paronychia canadensis*

Starry Campion *Silene stellata*

Buttercup Family (Ranunculaceae)

Round-lobed Hepatica *Anemone americana*

Rose Family (Rosaceae)

Cream Avens *Geum virginianum*

Bowman's-root *Gillenia trifoliata*

Pea Family (Fabaceae)

Butterfly Pea *Clitoria mariana* var. *mariana*

Smooth Tick-trefoil *Desmodium laevigatum* (S3)

Round-leaf Tick-trefoil *Desmodium rotundifolium*

Violet Bush-clover *Lespedeza frutescens* (S3)

Hairy Bush-clover *Lespedeza hirta* var. *hirta*

Wild Bean *Phaseolus polystachios* (S3)

Buckthorn Family (Rhamnaceae)

New Jersey Tea *Ceanothus americanus*

Celery Family (Apiaceae)

Hairy Angelica *Angelica venenosa*

Sanicle *Sanicula marilandica* (S3)

Yellow Pimpernel *Taenidia integerrima*

Hairy-jointed Meadow Parsnip *Thaspium barbinode*

Gentian Family (Gentianaceae)

Striped Gentian *Gentiana villosa* (S1; E)

Mint Family (Lamiaceae)

Wild Dittany *Cunila origanoides*

Wild Bergamot *Monarda fistulosa*

Narrow-leaf Mountain-mint *Pycnanthemum tenuifolium*

Hairy Skullcap *Scutellaria elliptica* var. *elliptica*

Potato Family (Solanaceae)

Virginia Ground-cherry *Physalis virginiana* (S3)

Broom-rape Family (Orobanchaceae)

Fern-leaf Yellow False Foxglove *Aureolaria pedicularia*

Aster Family (Asteraceae)

Small White Snakeroot *Ageratina aromatica*

Cornel-leaved Aster *Doellingeria infirma* (S3)

Godfrey's Thoroughwort *Eupatorium godfreyanum*

Hairy Thoroughwort *Eupatorium pubescens*

Upland Boneset *Eupatorium sessilifolium*

Woodland Sunflower *Helianthus divaricatus*

Pale-leaved Sunflower *Helianthus strumosus*

Whorled Rosinweed *Silphium asteriscus* var. *trifoliatum* (S3)

Elm-leaf Goldenrod *Solidago ulmifolia* var. *ulmifolia*

Wavy-leaved Aster *Symphyotrichum undulatum*

Upland Ironweed *Vernonia glauca*

SHRUBS

Olive Family (Oleaceae)

Fringetree *Chionanthus virginicus*

Rose Family (Rosaceae)

Hawthorns *Crataegus* spp.

Pasture Rose *Rosa carolina* ssp. *carolina*

TREES

Moscatel Family (Adoxaceae)

Black Haw *Viburnum prunifolium*

For more information on State (S) rankings, please refer to *List of Rare, Threatened, and Endangered Plants of Maryland* (March 2021).

Right: Colluvial slope at Arlington Ridge Acidic Oak-Hickory Forest, Arlington, VA.