



Climbing Vines on the Rise

Resource Brief

Importance

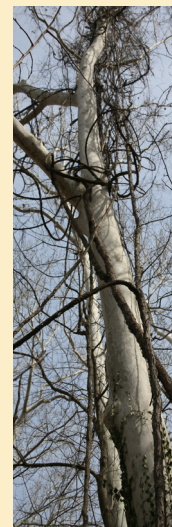
Vines in forests compete with trees for resources both above ground (light) and below ground (water). They can overtop or strangle trees, and the weight of the vines can break branches.

Growth in vine abundance has the potential to change the species composition and physical structure of a forest (Allen et al. 2007), carbon sequestration levels (van der Heijden et al. 2013), and the availability of food resources for wildlife (Schnitzer and Bongers 2002).

Recent research on woody vines (also called lianas) in tropical forests suggests lianas are increasing in importance (see Schnitzer and Bongers 2011 literature review), perhaps as a result of elevated carbon dioxide (Mohan et al.

2006) or increased forest disturbance (Schnitzer and Bongers 2002; Londre and Schnitzer 2006). A few studies have suggested that liana abundance may also be increasing in eastern U.S. temperate forests (Bragg 2004; Allen et al. 2007).

Common woody vines of the Mid-Atlantic, including grapes (*Vitis* spp.), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*), can grow large-diameter stems whose biomass rivals that of trees.



A large grape vine growing on CHOH's Cabin John Island.

Monitoring

The National Capital Region Network Inventory & Monitoring program (NCRN I&M) monitors forest vegetation in 400+ permanent plots across the region (Schmit et al. 2009). The NCRN has completed two rounds of forest monitor-

ing, and most plots (396) have now been sampled twice. The first round of sampling (2006-2009) established baseline information for National Capital Region (NCR) forests, and data from the second round of sampling (2010-2013) illustrates how the forests are changing. As part of NCRN's forest

vegetation monitoring, the presence of vines climbing on trees is recorded in every plot; this allows us to calculate vine abundance (the number of trees on which vines occur).

Change in Abundance of Common Vines on Trees

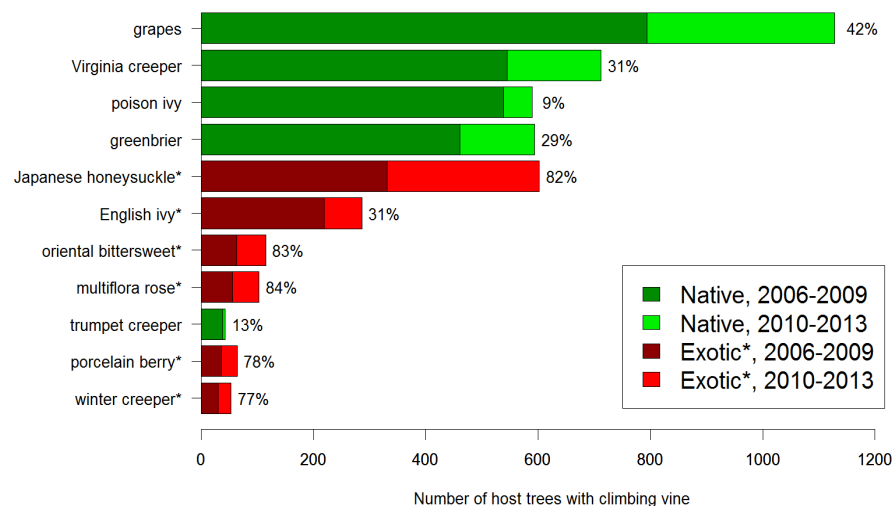


Figure 1. Bars show the number of host trees supporting various vine species between 2006-2009 (darker) and 2010-2013 (lighter). Native species are shown in green, exotics in red with asterisk. Rate of change in percent is shown at the end of each bar. In this period, the total number of host trees with climbing vines went from 3,184 to 4,456: a 40% increase in overall abundance.

Results

Vine abundance. The most abundant NCR climbing vines are native species (Figure 1). These include grapes, Virginia creeper, and poison ivy. Between 2010 and 2013, NCRN recorded more than 1,000 grapevines growing on trees!

Consistent with recent findings in tropical forests, the abundance of vines growing on trees in the NCR is increasing, with observed changes ranging from a 9% increase for poison ivy to 84% increase for multiflora rose (*Rosa multiflora*). The potential impacts of



greater woody vine abundance in eastern U.S. forests are not well understood, but could include reduced tree growth, increased tree mortality, and changes to forest carbon balances. Continued monitoring will help the NCRN answer important questions about the impacts of increased vine abundance on forests. For example, do vines prefer particular host tree species? If so, does increased vine abundance result in reduced growth or increased tree mortality for specific host species? Most forests in the NCR are second-growth; will vine abundance increase or decrease as the NCR forests reach late successional stages?

Exotic vines. Exotic vine abundance has increased considerably from 2006 to 2013. Abundance of multiflora rose, oriental bittersweet (*Celastrus orbiculatus*), and Japanese honeysuckle (*Lonicera japonica*) all increased by more than 80%. Although temperate forests like those in the NCR are not generally considered to be vine-rich ecosystems, the invasion of exotic vine species has greatly increased vine richness (# of species), and if these exotic vines continue to increase at the current pace, exotic vines will soon be more abundant than native vines.

The expansion of Japanese honeysuckle may foreshadow future changes for other exotic vines. Japanese honeysuckle was the fifth most abundant vine species during 2006-2009 monitoring, but rose to become the third most abundant vine during 2010-2013. If it continues to multiply at the same pace during the next 4 years, it may overtake all of the native species to become the most abundant NCR vine. Other studies in the mid-Atlantic region have documented

similar patterns; a study in the Piedmont region of New Jersey found that the most frequent vine to colonize tree trunks was Japanese honeysuckle, whose abundance was an order of magnitude larger than any other vine species (Ladwig and Meiners 2010)!

Vine-animal interactions. Many vines species provide food and shelter for wild animals, particularly birds. Birds in turn, are common dispersers of vine seeds, aiding in vine spread to new sites. Unfortunately, this is also true of many of NCR's exotic vine species. The spread of oriental bittersweet, for example, has been aided by bird dispersal (Ladwig and Meiners 2010). Continued spread of exotic vine species may have negative consequences for the native species they compete with and may have unforeseen long-term consequences for forest tree composition and structure.

Poison ivy. Anyone who has spent significant time in natural areas of the NCR has probably come across poison ivy—and may have experienced the discomfort of a poison ivy rash. Research in the last decade suggested that poison ivy may be growing more rapidly and becoming more toxic due to elevated carbon dioxide levels (Mahon et al. 2006). Although poison ivy does appear to be increasing in the NCR, it is expanding less than many of the other vine species. (We can't comment on whether or not it has become more toxic!)

References

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