

IMPROVING THE RESILIENCY OF OUR RESTORATIONS: REVISING GENOTYPE SPECIFICATION IN THE FACE OF CLIMATE CHANGE

As the recently released Intergovernmental Panel on Climate Change's Summary for Policymakers indicates, climate change is already having impacts across the globe. While the most obvious changes are in the arctic, increases in extreme precipitation events, heat waves, and droughts are widespread. Adaptation is essential as we make plans for future endeavors, including ecological restoration.

One of the most important considerations for restoration is the modification of genotype specifications to adapt to the changing climate. Considerations that should be addressed while formulating these adjustments include forecast local climate trends, soil and geologic boundaries, and possible range modifications that may result from climate change.

The likely local climate trends will vary significantly depending on whether mankind adopts meaningful controls on greenhouse gas emissions. High emissions versus low emissions scenarios will have dramatically different impacts on plant communities. As climate change effects become increasingly evident and extreme, meaningful emission controls will likely be instituted. Unfortunately, this may not happen quickly enough to result in a low emissions scenario. As a result, a mid-range scenario seems more likely. Here in the eastern Midwest, this scenario will result in the retreat of boreal species from the Great Lakes States, and a shift away from mesic beech-maple forests toward more heat and drought adapted oak-hickory associations. Based on this scenario, an extension of the current acceptable genotype areas to the south and slightly to the west of your restoration site is appropriate. Acceptable genotype areas should be pulled in from the north and slightly from the east. In addition to shifting acceptable genotypes, seeds sources should contain the high genetic diversity that is more likely to foster adaptability. In today's fragmented landscape, this may mean pulling from two or more foundation collection sites.

When establishing these new acceptable genotype guidelines, it is also important to respect geologic boundaries that affect substrate characteristics. For example, here in Indiana, the Wisconsin glacial boundary meanders across the south-central portion of the state. North of this boundary are soils derived from relatively recent calcareous till and outwash. South of this boundary are older, leached, more acidic soils on Illinoian till or in unglaciated areas. In this instance, shifting the acceptable boundary south into an area with markedly different substrate characteristics and plant communities is not advisable.

A final factor to consider is the likely shift in plant ranges resulting from climate change. If you are at the southern edge of a plants range, it may not be worthwhile to include that species in your restoration plans, particularly if it has boreal affinities. This brings up the controversial issue of assisted migration of species from further south. While many are critical of this manmade "interference", the fragmentation and climate change that make this an issue are also anthropogenic. Further, the likely rapid pace of climate change in coming decades and centuries will impoverish diversity by forcing out poorly adapted species far faster than better adapted ones can take their place.

PLANT FEATURE: ROUND-LEAF RAGWORT (SENECIO OBOVATUS)



Dry shade is one of the most difficult environments for landscaping. Fortunately we have an attractive spring wildflower with nearly evergreen foliage that thrives in these conditions. Round-leaf Ragwort is native to upland woods, particularly wooded ridges that are often very dry in the summer. The low round foliage generally remains below three inches in height. Clusters of small sunny yellow daisies bloom on 1 foot stalks in late April and early May. A couple of weeks later the wind-dispersed seeds ripen. For a neat appearance in a more formal landscape, the flower stalks may be mown after blooming with a lawnmower at a mowing height of 3-4 inches to leave the foliage intact. Although it may wilt during drought, the foliage typically remains attractive throughout the growing season and into the winter. Round-leaf Ragwort does not like being buried in tree leaves, so the fallen leaves should be raked or blown off in the fall. In the landscape, the plant may be used as a monoculture for a groundcover, or planted with other native species tolerant of dry shade such as Blue-Stemmed Goldenrod (*Solidago caesia*), Short's Aster (*Aster shortii*), Beak Grass, (*Diarrhena americana*) and Northern Sea Oats (*Chasmanthium latifolium*). For a restoration, appropriate associates may be found in our [Upland Woodland Mix](#).