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Plant-Animal *Connections*

"MV Wildtype"

MV WILDTYPE

Ailanthus webworm moth on orange butterflyweed.

PHOTO COURTESY OF JUDY HOLLAND-MCCHESNEY

ACTING **LOCALLY** *on the Island of Martha's Vineyard*

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In 2006 the Polly Hill Arboretum (PHA), a small public garden in Massachusetts on the island of Martha's Vineyard, introduced a fledgling program called "MV Wildtype" in an effort to meet the needs of the Vineyard community. Its primary goal is to produce native plants from local wild-collected seed. The resulting plants are made available for many purposes including restoring habitat and maintaining biological corridors, landscaping with native plants, gardening, and augmenting cultural landscapes. Now, three years later, our model program produces over forty native plant species. Buyers include gardeners, homeowners, landscapers, and conservation groups.

Martha's Vineyard is many things: a place of magical beauty, a historical landscape, an environmental habitat, a summer vacation spot, and, for some, a year-round home. Physically, it is a one-hundred-square-mile piece of land surrounded by water. Nowhere is species loss as impactful and quantifiable as on an island. The same factors that affect the worldwide loss of biodiversity—development, habitat fragmentation, invasive plants and animals—are dramatically illustrated on Martha's Vineyard where a finite land mass exhibits human impacts in quantifiable ways.

Similar to many places in North America and the world, Martha's Vineyard has endured the exploitation of its natural resources, the loss of habitat, and the extinction of species. The Island has witnessed wide-scale deforestation several times since being settled by Europeans in 1602; yet, remarkably, existing habitats rich in biodiversity speak to the resiliency of nature. In fact, despite repeated disturbances, both anthropogenic and natural (hurricanes and fire), the Island supports the rarest ecosystems to be found in the Commonwealth of Massachusetts as determined by the Massachusetts Natural Heritage and Endangered Species program. These include the critically imperiled sandplain grassland which contains the highest concentrations of rare plants species in the Commonwealth as well as many associated rare animal species.

Below are just a few examples of some of the endangered flora and fauna we have on Martha's Vineyard. For a more complete list, visit: *www.mass.gov/dfwele/dfw/nhesp/nhesp.htm.*

Flora:

- Sandplain blue-eyed grass – *Sisyrinchium arenicola* (Massachusetts Special Concern)
- Sandplain gerardia – *Agalinus acuta* (Massachusetts Endangered Plant)
- Sandplain flax – *Linum intercursum* (Massachusetts Special Concern)
- Nantucket shadbush – *Amelanchier nantucketensis* (Massachusetts Special Concern)

Fauna:

- Chain dot geometer – *Cingilia catenaria* (Massachusetts Special Concern)
- Slender clearwing sphinx – *Hemaris gracilis* (Massachusetts Special Concern)
- Imperial moth – *Eacles imperialis* (Massachusetts Special Concern)

While PHA's mission includes sharing knowledge of plants and scientific procedure through education, research, plant conservation, and exploration, we sought to take more specific action to preserve, conserve, and improve the local environment. The Arboretum is leading the effort to document plant diversity on the Island. Establishing ourselves as the "on-Island" education and conservation institution with expertise in the plant sciences allows us to promote the long-term sustainability of the Vineyard landscape.

"MV Wildtype"

When we evaluated ways to promote plant conservation, preserve genetic diversity, and increase our relevance to the local community, it was clear there was an unmet local need for a source of native plants. The most appropriate native plants for Vineyard landscapes are local ecotypes: plants grown from seed collected from Island plant populations, not brought over from off-Island, and not grown from seed collected elsewhere. Whether restoring habitat or gardening with native plants, you need more than good intentions, you need plants! "MV Wildtype" was devised to meet that need.

With that objective in mind, Arboretum staff began collecting seed from the principal habitats on the Island in 2006. We were fortunate to receive support from the Martha's Vineyard Vision Fund, an organization that funds Island students committed to sustainability issues. Our Vision Fellow, Christine Brissette, worked with staff and volunteers to scout and map populations of targeted plants; later we returned to harvest seed. Seed storage, treatment, germination, and plant production were made possible with the opening of our greenhouse/propagation facility that same year. While our focus was initially on charismatic natives with showy blooms like butterfly weed, successive years of collecting have included less showy plants—grasses, sedges, and woody plants. In addition to the production of local native plants, we also plan through "MV Wildtype" to encourage the greater use of native plants on the Island and to facilitate the connection of fragmented habitats.

It is important to use local genotypes of native plants primarily to preserve the local ecotype (genetic adaptation to a certain locality). This is especially important on an Island where separation from mainland populations (distance and geological time) develops specific plant traits that give them an adaptive advantage for survival. In conservation biology and restoration ecology, local plant sources are recommended to restore local ecosystems. In the case of conservation organizations on-Island, they have been unable through commercial sources to get back plants that are true to type—in this case, the local genotype. When a non-local source of plants is used, one risks introducing genetic material that may hybridize and, therefore, compromise the local genotype. Furthermore, botanical gardens and arboreta have the expertise to identify local populations, document their origin, and, provided they have the facilities, properly track their identity through the production process.

Success Factors

Three factors will determine the ultimate success of "MV Wildtype." The first is expanding our market by communicating to the Vineyard community—landscapers, horticultural professionals, and citizens—the critical way native plants sustain plant and animal relationships formed over millions of years of evolution. Through edu-

Coral hairstreak on slender mountain mint
PHOTO COURTESY OF JUDY HOLLAND-MCCHESNEY

Intern Christine Brissette collects island native seeds from wild populations, recording location, date, and habitat.

cation and outreach, Vineyarders must be made aware that they can, through the choices they make, restore the biological integrity and preserve the sense of place of the special Island they call home. They have the opportunity to enhance the cultural landscape while connecting to their natural biological heritage with the simple act of planting native plants.

The second factor for determining program success is educating the community about the role native plants play in supporting native insects and overcoming the aversion some people have to bugs, caterpillars, and insects in general. Native insects and native plants need each other, and we need both! The poster child for plant–animal codependence is butterfly weed (*Asclepias tuberosa*). The dramatic blooms draw a bevy of insect species, none more notable than the monarch butterfly which spends its entire life cycle (from eggs to larvae to adult) reliant upon this plant. The close relationship between insects and plants provides an opportunity to explain the web of life, and how critical plants are to our landscapes well beyond their ornate qualities.

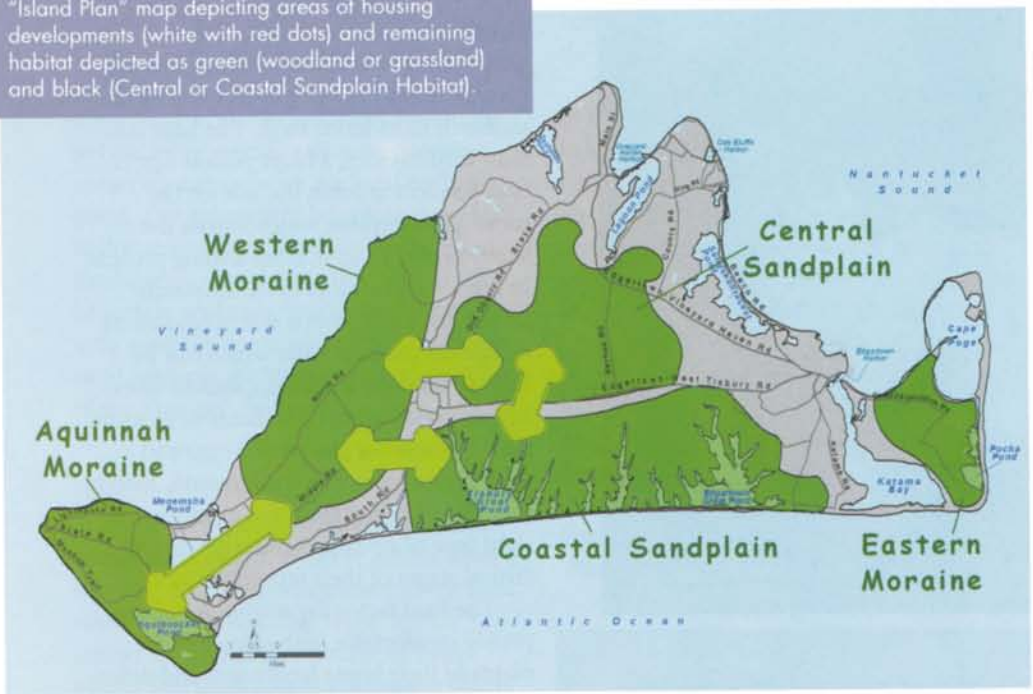
The above example is probably the most well documented case of co-evolution which is a difficult concept to illustrate because it is a continuing process. The monarch butterfly is perhaps the simplest example to explain. *Asclepsias* contain milky latex that is ingested by the monarch in its larval stage. The latex contains cardenolides, a heart poison that is toxic to most animals but not for the monarch caterpillar which ingests the leaves as part of its normal feeding process. In turn, the predators of the monarch caterpillar, mainly birds and other insects, do not eat the caterpillar which can be toxic to them or at least unpleasant to eat. In most cases insects use plants as hosts for their lifecycle—a place to lay eggs and a food source to sustain their growth. Insects may also find that the plant produces the right type of cover or protection during critical stages of their reproduction cycle.

The final factor for success is making people comfortable with using native plants in their home landscapes and defusing the argument that it is an either/or proposition. That is, if you decide to use native plants, you do not have to rule out planting exotic or non-native plants. You can use both and have a beautiful and dynamic garden. We reassure Island gardeners that their property can represent their personal style while including native plants, ornamental non-native plants, and plants for food. Planting a subset of a Vineyard garden with native plants can go a long way in maintaining the biological diversity of the Island.

The "Island Plan" and "MV Wildtype"

Martha's Vineyard, with its wealthy second-home owners and its year-round commercially dependent population, is at a historic pivot point. In its current state, one-third of Island land is conserved or protected from future development, another third, privately owned, and the remainder developed. Six island towns with associated houses and nearby housing developments are geographically spread across the land. The year-round population is 15,000 with the summer population swelling to 115,000.

The Island's planning authority, the Martha's Vineyard Commission, has initi-



"Island Plan" map depicting areas of housing developments (white with red dots) and remaining habitat depicted as green (woodland or grassland) and black (Central or Coastal Sandplain Habitat).

ated a community-driven long-range twenty-five- to fifty-year planning effort to address the long-term sustainability of Island life. This intensive and historic effort is known simply as the "Island Plan." One of its priority goals is to "preserve the Vineyard's natural environment, open spaces, scenic beauty, and habitat."

As director of the Polly Hill Arboretum, I joined the Island Plan's natural environment work group consisting of conservation leaders, administrators, scientists, educators, planners, and passionate citizens. The group's objectives are to outline goals and activities to conserve, protect, enhance, or restore the Island's natural biodiversity for future generations. Our immediate focus was to map critical habitat areas and define existing habitat fragmentation. One bold proposal is the concept of "undevelopment." In key habitat corridors where development and fragmentation have already occurred, efforts will be made to purchase available properties using funds provided by local land conservation organizations. The land would then be restored to reconnect fragmented habitat. Invasive plants and animals along with habitat fragmentation are cited as the two most critical factors in the loss of biodiversity worldwide.

Incorporated into this concept of fragmentation is development or altering of the land that creates a discontinuous connection between forests, grasslands, and other types of habitats. An example would be when a road or open area is created in a once continuous piece of land. The populations of plants and animals are affected as their ability to cross these barriers (dispersal) is hindered, and separation from their original populations occurs.

As described by Richard B. Primack in his book, *Essentials of Conservation Biology*, the resulting so-called "edge effect" is where a habitat, now subdivided, creates changes in the microenvironment on the fragment edge. Changes in light, temperature, wind, and—in certain cases—the incidence of fire can impact the vitality and composition of species in the fragment.

Within the "Island Plan," the Arboretum's "MV Wildtype" program has been recognized as the source for true-to-type, locally grown native plants that can be used by both homeowners and land conservation groups. The opportunity to learn as we grow and promote native plants is tremendous. Our own Arboretum property is a diverse and eclectic mix of non-native (non-invasive) and native plants. Recently the Arboretum has been using plants from "MV Wildtype" to restore its old agricultural fields to native sandplain prairie. Last year we planted the globally rare New England blazing star, *Liatris scariosa* var. *novae-angliae*, in our meadows. The process of collecting, storing, and propagating this plant had never been documented. This year we plan to monitor the insect populations in our fields to gain a better understanding of the codependence of this rare plant with the local insect fauna.

Conclusion

Arboreta and botanical gardens must share their expertise about local natural areas and help communities take practical measures to protect the local flora and associated dependent fauna. This national and global problem needs pragmatic solutions. Botanic gardens and arboreta are uniquely situated to grow, distribute, and promote native plants as well as work together with local conservation organizations. Local efforts to protect local landscapes will be the most effective. Often these efforts already fall naturally within the mission of public gardens. "MV Wildtype" is one such practical approach to address the loss of local habitat and preserve our biological heritage for future generations. What better way to reconnect to our biological heritage than the simple act of growing and planting native plants?

Timothy Boland serves as executive director of the Polly Hill Arboretum in West Tisbury, Massachusetts. You can contact Tim at tim@pollyhillarboretum.org. For more information on the Arboretum, visit www.pollyhillarboretum.org.