

What's holding back the native shrub market?©

J.D. Lubell^a

Department of Plant Science and Landscape Architecture, Unit 4067, University of Connecticut, Storrs, Connecticut 06269-4067, USA.

INTRODUCTION

Native plant species provide support for pollinators and other ecological systems (Burghardt et al., 2009; Tallamy, 2007) and are a suitable landscape alternative to invasive plants (Gagliardi and Brand, 2007). Despite increased demand for native plants to use in developing sustainable landscapes, the pace of expansion of the native market has seemed to lag behind the apparent rise in interest (Becker, 2015). Some of the issues holding back the market for native shrubs include the need for education about landscape use, lack of liner sources for growers, poor quality of nursery stock, and lack of cultivars as well as perceived drawbacks of cultivar use.

NEED FOR EDUCATION

With familiar garden plants like forsythia, hydrangea and lilac, consumers believe they know how to use them and so they feel confident in buying them. Consumers tend to shy away from native species because they are less familiar with natives and do not see them in the neighbors' yard. The same goes for landscape designers, who often have a set list of proven plants they go to over and over again. For the native market to grow, information developed through research about how to use native plants appropriately in landscapes must be provided to growers' sales staff, landscape designers and consumers.

The adaptability of native shrubs has received only limited research attention and we don't really know how suitable they might be for challenging landscape sites. To test the adaptability of native shrubs, I have planted over a dozen native species in the ultimate challenging landscape site - a commuter parking lot on the University of Connecticut campus in Storrs, Connecticut (Figure 1). Each species provides ornamental interest, but have not been used extensively for landscaping because their landscape adaptability was unknown. Invasive Japanese barberry (*Berberis thunbergii*) and winged euonymus (*Euonymus alatus*) were also planted as controls to understand how the natives perform compared to these tough, old landscaping standbys.



Figure 1. UConn parking lot native shrub trial.

Eight native species had excellent performance (Table 1), equivalent to the invasive control plants, Japanese barberry and winged euonymus (Shrestha and Lubell, 2015; Lubell, 2013). These species are American filbert (*Corylus americana*), buttonbush (*Cephalanthus occidentalis*), creeping sand cherry (*Prunus pumila* var. *depressa*), northern bush

^aE-mail: jessica.lubell@uconn.edu

honeysuckle (*Diervilla lonicera*), sweet fern (*Comptonia peregrina*) (Figure 2), sweet gale (*Myrica gale*) (Figure 3), sweetbells (*Eubotrys racemosa*), and Virginia rose (*Rosa virginiana*) (Figure 4). These pleasant findings indicate how much potential there is for expanded use of native shrubs by the nursery and landscape industry.

Table 1. Aesthetic quality index for six Connecticut native and two non-native shrub species established in a commuter parking lot on the University of Connecticut campus (Storrs, CT) evaluated in July of 2010, 2011 and 2012.

Species	Aesthetic quality index (AQI) ¹		
	2010	2011	2012
Native species			
American filbert	6.6 b ²	7.7 b	8.8 a
Buttonbush	8.7 a	8.5 a	8.6 a
Northern bush honeysuckle	6.3 b	8.7 a	8.5 a
Steeplebush	5.0 c	6.8 c	7.7 b
Sweet fern	9.0 a	8.8 a	8.9 a
Sweet gale	8.5 a	8.7 a	9.0 a
Non-native species			
'Crimson Pygmy' barberry	8.6 a	8.7 a	9.0 a
'Compactus' winged euonymus	8.8 a	8.6 a	8.6 a

¹All five plants per experimental unit ($n=6$; except for sweet gale where $n=4$) were rated by three people. Mean ratings are composite of separate visual ratings of 1-3 (3=best) for each density and uniformity of shape; foliage color; disease, insect or deer damage.

²Mean separation within columns (lowercase letters) by Fisher's least significant difference test ($P\leq 0.05$).



Figure 2. *Comptonia peregrina*.



Figure 3. Sweet gale the next inkberry?



Figure 4. *Rosa virginiana*.

For native shrubs I have produced a guide for landscape use that lists both commonly available and under-utilized native shrubs with photographs showing landscape uses. I have also developed a manual for landscape use, propagation and production of lesser-known New England native shrubs with ornamental potential.

GROWERS LACK LINER SOURCES

Consumers are demanding more native plants from growers (Halleck, 2015). Once growers receive the message, they need to figure out how to produce the plants. Here is the typical way nurseries grow plants. Production of a new crop starts with identification of a liner source. Bought in liners are transplanted to containers. Containers are lined out in nursery growing blocks where they are irrigated, pruned, spaced, overwintered, transplanted, and re-spaced over a period of 2 to 5 years before delivery to market. During this production time, growers utilize container stock as a source of material for cutting propagation for continuing production of the crop. Growers often prefer to propagate plants from cuttings instead of seed, because cuttings produce uniform crops and the majority of consumers want uniform plants that will perform identically in the landscape.

What typically happens for native plants that are new to production is that growers

are unable to locate a liner source. In those rare cases where a liner source can be found, the liners are usually available in limited supply, and what is available was propagated from seed, which typically produces non-uniform crops. Without a liner source, the only remaining option for a grower to source propagules is to collect material from the wild. To accomplish this, growers must first find an employee with a skill set that will enable them to identify the native species of interest, and to find the plants in the wild in sufficient quantity for initiating a new crop. Second, growers must be willing and able to spend the resources to send their employee out collecting over hundreds of miles. Further complicating this process is that native plants are often found in the wild on state or private lands where it is illegal to collect without permission.

POOR QUALITY OF NURSERY STOCK

Growers do not approach native production with the same quality control as they do with mainstream nursery plants, the majority of which are exotic. There is a grower mindset that people expect natives to look wild or unkempt, and while this may be true for some buyers, wild looking plants will not sell well to a broader group of purchasers. If native plants are going to sell then they have to be of the same caliber and quality as any exotic nursery plant.

What probably happens in production is that natives are the last plants to get attention, and important cultural practices, such as pruning and container spacing, are done too late or not at all. For example, in 2010 I received #2 containers of northern bush honeysuckle (*Diervilla lonicera*), a little known native that is beginning to experience more use. These plants were grown too close together in the nursery and were more upright and leggy in appearance than is typical for this plant. They would not have sold well at the garden center. In 2012 I also received plants of this species, and this time they looked really good because they had been pruned and spaced appropriately. Clearly this demonstrates that natives can be grown to the same level of quality as mainstream crops, like hydrangea or pieris, but it is not happening quickly enough.

One reason why natives do not get the attention they need during production, is that information about optimal growing conditions is not always known. To produce attractive, uniform crops in only two to five years requires a lot of water and high fertility. Plants that will not tolerate these growing conditions present a greater challenge for producers. When new plants do not grow well using already established production methods, growers have to make adjustments to accommodate the new crop. This might include altering the growing media composition, fertility level, rate of irrigation, or timing of transplanting to larger containers of salable size. An example of how growers have tweaked production for a special need by a native is with mountain laurel (*Kalmia latifolia*). By altering container media and fertility practices, growers are now able to produce stellar-looking mountain laurel.

Native plant displays at garden centers are not as showy and appealing to consumers as exotic plant displays. In part this may be because native plants are not as showy as exotics, which have been hand-picked from all over the world, but may also be because native plants are still produced in small container sizes and with lower overall quality. The result is a collection of weak looking, non-flowering plants which don't compare favorably to exotic counterparts.

LACK OF CULTIVARS

The most successful commercial nursery plants are cultivars or selections of a species with superior ornamental traits. Cultivars must be propagated asexually to preserve the desirable trait or traits, and the vegetative propagules are referred to as clones. With vegetative propagation growers have the ability to produce a very uniform crop, which, as I mentioned, is often important for landscape design. Only a small percentage of mainstream crops are not propagated asexually because vegetative propagation is not possible for one reason or another. Instead they are propagated sexually from seed.

The uniformity that comes from vegetative propagation is one aspect of what is needed to transform under-utilized native plants into sought after commercial products. In

addition to uniformity, cultivars are going to present and perform better for the consuming public. Much of the success realized with exotic plants comes from the fact that superior ornamental genotypes have been selected. For any new plant, native or exotic, it is important to have cultivars because they will generate greater interest among consumers.

I experienced firsthand the problems that come with native material produced from seed. In my work to evaluate landscape suitability of under-utilized native shrubs I received seed propagated material of American filbert (*C. americana*), buttonbush (*Cephalanthus occidentalis*) (Figure 5) and steplebush (*Spiraea tomentosa*) (Figure 6). Plants exhibited significant differences in appearance and performance right from the start. I evaluated the plants in the landscape over 3 years and noted differences in traits such as leaf shape and color, plant size, density of habit and flower production (Figures 5 and 6). Some individual plants were stellar performers and others fell short, but the lack of uniformity in the seedling grown material left me longing for cutting propagated plants. I also evaluated plants of sweet fern (*Comptonia peregrina*), sweet gale (*Myrica gale*) and northern bush honeysuckle (*Diervilla lonicera*) that were propagated asexually. These species were uniform and produced a more desirable landscape effect.



Figure 5. Seed propagated plants produce non-uniform plants, *Cephalanthus occidentalis*.



Figure 6. *Spiraea tomentosa* as a landscape plant.

PERCEIVED DRAWBACKS OF CULTIVARS

Some groups of environmentally conscience garden consumers suggest that native cultivars, or natives, are problematic because they do not support pollinators the same as the straight species, result in a less diverse landscape, and impact wild populations of native plants through genetic drift. Research studies confirming these concerns have not been published in the scientific literature yet.

A couple of limited projects have been described on the usefulness of cultivars in comparison to wild material to support pollinators. One is a University of Vermont study that monitored pollinator visitation on 12 herbaceous perennial species and one named cultivar of each species. Preliminary reports from this project suggest that 50% of the cultivars studied supported pollinators similarly to their wild counterparts (White, 2016). Those cultivars that did not were more complex hybrids. Another study at Mt. Cuba Center in Delaware focused on four cultivars of the annual plant coreopsis. All four coreopsis cultivars attracted pollinators, but one cultivar was superior to the other three at attracting pollinators (Troy, 2013). Similar studies with other taxa are currently being conducted at the University of Delaware, in conjunction with the Mt. Cuba Center, and at the State Botanical Garden of Georgia. At UConn I established in 2015 a research planting to evaluate the effectiveness of cultivars of native shrubs to support pollinators. This planting includes six species with two or more cultivars for a total of 15 genotypes, which were selected to allow study of a range of cultivar traits.

Developing native shrubs into mainstream landscape plants will require the use of existing nursery infrastructure, which utilizes clonal propagation of selected genotypes (Wilde et al., 2015). This is the only way to generate plants that meet consumer quality standards in the quantities needed to compete with exotics in the marketplace. Change occurs slowly in the nursery industry, and adoption of more native shrubs is no exception to the rule. My research has identified a dozen native shrubs with great potential for broad landscape use. We provided several Connecticut nurseries with liner material and propagation protocols for starting production of these plants. To date, about 40% of these shrub species have been added to production in Connecticut. Over time, due to the large number of breeding efforts underway, cultivars of native shrubs should become available and this will also help natives gain more traction with the general gardening public.

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