Indiana Plant Pick Revisited

The plant highlighted in the “Indiana Plant Pick” article of November/December 2009 — Rhamnus frangula ‘Ron Williams’ Fine Line® Buckthorn — generated the following response from Invasive Plant Species Assessment Working Group (IPSAWG). IPSAWG is a partnership between many agencies and organizations in Indiana to decrease the intentional introduction of invasive plant species into Indiana by assessing which plants in trade are, or have the potential to become, invasive. Their goal is to have all partner agencies and organizations utilizing their species assessment when recommending or selling plants. The INLA is a working partner of this organization.

After receiving IPSAWG’s comments, we asked Dale Deppe, President, Spring Meadow Nursery — the company that introduced Fine Line® Buckthorn — to respond. We also asked Rick Haggard, who is the industry’s potential appointee to the Governor’s Task Force on invasive species — the Invasive Species Council, to comment as well. We thank all the respondents for sharing their thoughts.

Are There Non-invasive Cultivars of Buckthorn?

Ellen M. Jacquard, Indiana Chapter of The Nature Conservancy, and Dr. Tiffany M. Knight, Washington University

The May/June 2009 issue of Indiana Nursery & Landscape News included the recommendations on invasive species in horticulture from the Invasive Plant Species Awareness Working Group (IPSAWG), which species to avoid planting in Indiana, and which to plant with caution. In the November/December 2009 issue, however, Fine Line® Buckthorn was recommended as a ‘Indiana Plant Pick’. This is a cultivar of glossy buckthorn, one of the more aggressive invasive shrubs in Indiana and on the IPSAWG list of species to NOT plant. It raises a good question — do cultivars of a particular species have the same level of invasiveness as the parent species, or are some cultivars distinct enough from the aggressive ones to be considered safe?

As in so many things, it all depends. IPSAWG used a simple approach to this question — unless the cultivar was documented through scientific study to have clearly different biological properties from the parent species rendering it significantly less invasive, cultivars were considered to have the same invasiveness as the parent species.

What makes this case — Rhamnus frangula “Ron Williams” trademark Fine Line — particularly interesting is that there have been a few recent studies of the cultivar that indicate it can produce fewer fruits, with lower germination. While nothing has been published, in 2005 Dr. Mark Starrett at the University of Vermont tested germination on an unknown number of seeds and reported in a letter to Spring Meadow Nursery that R. frangula had 83.7% germination vs. R. frangula Fine Line with 12%. He also noted that while buckthorn typically had four seeds per fruit, the Fine Line cultivar had one or two seeds, suggesting that the overall number of seeds produced on a shrub might be less, though this observation has not been statistically tested.

At Michigan State, Dr. Robert Schutztki conducted a germination study in 2008 with 200 seeds and reported a germination rate of 38% for R. frangula and 5.5% for R. frangula Fine Line in field plots with no supplemental irrigation. He is continuing this study and hopes to publish results in a few years.

Given variability in year-to-year growing conditions and growing site conditions, testing generally needs to go on for a number of years at a number of different locations before accurate estimates of fruit production and germination rates can be made. However, even though there is limited information available to date, many websites are now advertising Fine Line Buckthorn as non-invasive — “It has been proven to be an environmentally friendly plant that is not invasive like other types of buckthorn” (http://www.colorchoiceplants.com/fine_line.htm#ixzz20htbHfF7g).

That’s the real question — if a plant produces fewer seeds per shrub, and there is lower viability of seeds in the fruits that are produced, does it necessarily follow that the cultivar is “less invasive”? Unfortunately, it does not — and here’s why.

Plant populations grow or shrink depending on plant survivorship, growth, and fecundity (reproduction). If more plants are being produced and surviving than are dying, the population grows. If more plants are dying than are being produced and surviving, the population shrinks. Plant population persistence also depends on the stage structure (or age classes) of the population. For example, a population of 10 seedlings has a reasonable probability of going extinct, because small seedlings are quite vulnerable to mortality, whereas a population of 10 robust adult shrubs is more likely to persist for years into the future. Demographers have equations that model whether populations will grow, shrink, or remain the same size given numeric values taken from field data for survivorship, growth, and fecundity for plants in each stage class.

Dr. Tiffany Knight presented a summary of work on plant population modeling as it applies to horticultural cultivars of invasive plants at the 2007 Midwest Invasive Plant Network Conference, and her presentation can be found at http://mipn.org/Conference_Presentations.html, listed as “Reducing Seed Output and Seed Viability of Cultivars: How Much Is Enough to Create a Plant That Will Not Be Invasive?” (This information is also part of a publication she co-authored with Ramula et al. 2008). It turns out that for short-lived plants like perennials and biennials, a decrease in seed production and seed germination rates will generally result in population decline. However, for long-lived plants like perennials and shrubs, reductions in seed production and germination were often inadequate to considerably curb population growth, unless the reductions were extreme (i.e., a cultivar that is reproductively sterile). This is because the adult plants have high survival and are able to keep putting out new seeds or other reproductive plant parts year after year, resulting in continued population increase. Given these results, it is possible that the reduced seed production and germination rates observed in Fine Line Buckthorn will not result in it being significantly less aggressive to natural areas.
Another concern is the possibility that Fine Line® and other cultivars of *R. frangula* will mate and produce viable and aggressive offspring. What happens when the Fine Line cultivar seeds escape your backyard and come in contact with the aggressive buckthorn that is invading our natural areas? Will these cultivars breed with each other and produce aggressive offspring? Such a scenario is possible, and a cultivar should not be considered safe until this possibility is ruled out. Buckthorn fruits are eaten by a variety of birds, including European Starlings, Grosbeaks, Cedar Waxwings, and American Robins (Carling and Porebski 1994), and as a result, seeds can be dispersed far away from their parent plant. Species within the genus *Rhamnus* are capable of outcrossing, and have been shown to hybridize with each other (Gil-ad and Reznicek 1997, Calley and Stewart 2010). If different species of *Rhamnus* can inter-mate, then it is possible that different cultivars within the *R. frangula* species can also produce viable offspring.

What does this mean for *R. frangula* “Ron Williams” trademark Fine Line? It means we really don’t know if it is any less invasive than the parent species, and we won’t until more data are collected and the necessary population modeling and breeding experiments are conducted. So until then, the safe thing to do is to just not use this plant and choose a known non-invasive plant instead.

**About the Authors**

Ellen Jacquart is the Director of Stewardship for the Indiana Chapter of The Nature Conservancy, coordinating management of Conservancy lands in Indiana. Dr. Tiffany Knight is an Associate Professor in the Biology Department at Washington University in St. Louis, Missouri.

**References**


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**Response from Dale Deppe, President, Spring Meadow Nursery**

“Thank you for the opportunity to respond.

We appreciate the inclusion of Fine Line® buckthorn as the “Indiana Plant Pick” in the November/December 2009 issue.

Studies by Dr. Mark Starrett at University of Vermont and Dr. Robert Schurzki of Michigan State University have shown that Fine Line® buckthorn has very low seed germination rates. These factual studies prove that *Rhamnus frangula* “Ron Williams” trade name Fine Line® buckthorn does not exhibit the invasive characteristics cited by Ellen M. Jacquart and Dr. Tiffany M. Knight in regards to *Rhamnus cathartica*. We continue to welcome additional scientific studies to verify these results.

We believe Fine Line® buckthorn is a responsible replacement for weedy, older varieties. This is exciting news in the fight against invasive plants, and given the information available today, we are doing our best to educate the consumer about the facts of this great plant.”

**Rick Haggard, Past President of the INLA and a potential appointee to the Invasive Species Council, expresses his viewpoint on this topic on behalf of the INLA.**

“I am very encouraged by the dialogue regarding the Fine Line® Buckthorn referenced in our November/December issue. It demonstrates how both parties have researchers backing up their respective viewpoints regarding this plant. Only time will tell if this particular plant will or will not become invasive, however, many of us in the horticulture industry, in general, love plants, particularly new introductions. I do not know of one person that wants to be responsible for introducing an invasive plant. Regarding the Invasive Species Council, the key objective is to create communication between all sectors of the industry. Will there be disagreements? Most assuredly, but the fact is that all involved within the Council will have the opportunity to produce not only scientific data, but also fiscal impact of placing plants onto an invasive plant list.

I am fairly certain that the current proposed structure of the Council and the respect between all parties, as diverse as they may be, will fulfill its obligation to the state of Indiana regarding invasive species.”

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**Rhamnus frangula ‘Ron Williams’ Fine Line® Buckthorn (Photo by Melissa Benoit)**

To read the November/December 2009 “Indiana Plant Pick” article which wrote about Fine Line® Buckthorn, please visit the INLA website: [www.inla1.org](http://www.inla1.org).