Coralberry (*Symphoricarpos orbiculatus*): a native landscaping and wildlife habitat alternative to Amur honeysuckle (*Lonicera maackii*)

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Abstract

Until the late 1980's, the ornamental shrub Amur honeysuckle (*Lonicera maackii*) was promoted by the USDA Soil Conservation Service to control erosion and to provide food and habitat for wildlife (Luken and Thieret 1996). Amur honeysuckle is no longer favored by many conservation organizations since its negative effects on native forest plant species have been recognized (Collier and Vankat 2002, Gould 2000). Coralberry (*Symphoricarpos orbiculatus*), a native species, could be used in place of Amur honeysuckle for erosion control, wildlife conservation/restoration, and ornamental landscaping. The objectives of this study were to compare coralberry and Amur honeysuckle and determine if coralberry has similar negative effects on forest communities. In spring of 2000, coralberry was removed from three 100 m^2 plots in Burgner Acres Natural Area, Loxa, IL. Control plots were established and twenty 1 m^2 quadrats were surveyed in each plot. Four transects were established, three at Burgner Acres and one at Hidden Springs State Forest, Strasburg, IL. Thirty quadrats were sampled along each. All vascular plants species and percent cover of coralberry and Amur honeysuckle were recorded. ANOVA test results showed an increase in mean herbaceous species richness (6.4 control, 7.3 removal, $P < 0.001$) and mean woody species richness (1.3 control, 1.5 removal, $P < 0.001$) in coralberry removal plots. Regression analysis of transect data showed a negative association between percent cover of coralberry and herbaceous species richness (standardized coefficient = -0.25, P = 0.016). There was a highly significant (P=0.001) association between percent cover of Amur honeysuckle and herbaceous species richness (standardized coefficient = -0.42). There was no significant association between percent cover of either shrub and woody species richness. Although both species show a negative effect on forest herbs, coralberry lacks sufficient size to achieve the high level of cover or form the dense thickets characteristic of Amur honeysuckle.

Left: *Symphoricarpos orbiculatus* Right: *Lonicera maackii*

Right: *Lonicera maacki* with 45 cm soil probe for scale.

Left: *Symphoricarpos orbiculatus* with the same 45 cm soil probe.

Table 1: Means Species Richness for Coralberry Removal and Control Plots.

	Herb Species/m^2	Woody Species/m^2
Removal	7.3	1.5
Control	6.4	1.3
Significance	P < 0.001	P < 0.001

Table 2: Linear Regression Results for Transects.

Pairing	Coefficient	Significance
S. orbiculatus-herb spp./m^2	-0.25	0.016
S. orbiculatus-woody spp./m^2	-0.05	0.633 (Fail)
L. maackii-herb spp./m^2	-0.42	0.001
L. maackii-woody spp./m^2	-0.11	0.415 (Fail)

Introduction

Lonicera maackii (Rupr.) Herder (Amur honeysuckle) is an invasive shrub native to China. Since its first introduction to the United States as an ornamental in 1898, it has become naturalized in at least 24 states and one province of Canada (Deering and Vankat 1999). Collier and Vankat (2002) determined that species richness for all species was reduced by 53% below the crowns of *L. maackii* shrubs. Gould and Gorchov (2000) found fitness and fecundity of three native herbs reduced by the presence of *L. maackii* in disturbed woodlands. *L. maackii* and other highly invasive bush honeysuckle species are still being promoted and sold as landscape plants throughout the United States. It is important to find suitable native alternatives for ornamental and wildlife conservation uses to discourage planting of Amur honeysuckle in areas vulnerable to invasion.

S. orbiculatus is a native shrub in the Caprifoliaceae that grows up to 1.5 m in height. It is an attractive plant bearing "clusters of pink to wine-colored fruit" that is increasing in popularity as a native landscaping alternative (Schiell 1992). Like Amur honeysuckle, coralberry provides a winter food source for wildlife; its twigs are browsed by deer (Soper et al., 1993) and its fruits, which often remain on the stem through January, are eaten by birds and small mammals.

This study compared the effects of *L. maackii* and *Symphoricarpos orbiculatus* Moench (coralberry) on the forest plant community to assess its suitability as a native alternative to bush honeysuckles for ornamental landscaping, wildlife habitat, and conservation plantings. It was hypothesized that the native *S. orbiculatus* would not be associated with a significant reduction in species richness, and the exotic *L. maackii* would be associated with a significant reduction in species richness. An additional objective was to highlight the qualities of *L. maackii* that make it detrimental to the forest plant community.

Methods

Burgner Acres is a 10 acre wooded plot owned by EIU located approximately 11 km northeast of Mattoon, IL. In Spring 2000, *S. orbiculatus* was removed by pulling roots from a series of 100 m^2 (10m X 10m) plots. Adjacent control plots of the same size were established. Twenty 1m^2 quadrats were randomly chosen from each experimental and each control plot using a random number table. All vascular plants were identified and their presence recorded in one of two categories, herbaceous and woody plants. An ANOVA test was performed to determine if removal of *S. orbiculatus* resulted in changes in the mean number of woody and herbaceous species present (species richness) in each plot. Additionally, two 30 m transects and one 60 m transect were established at Burgner Acres. Thirty 1 m^2 quadrats were sampled along every transect. Transects were placed in order to sample areas with both high and low shrub densities; one transect was extended to 60m to cross the largest stand of coralberry in Burgner Acres. Presence/absence of herbaceous and woody species was recorded. The percent cover of *S. orbiculatus* was calculated for each quadrat and a linear regression was performed between percent cover of *S. orbiculatus* and both woody and herbaceous species richness. For comparison, the same analysis was conducted on *L. maackii* over one transect in Burgner Acres. It was necessary to perform an additional transect for *L. maackii* at another site because of the current limited extent of the invasion of *L. maackii* at Burgner Acres.

Results

ANOVA testing of removal and control plots showed mean herbaceous species richness was 0.9 species/ m^2 higher and mean woody species richness was 0.2 species/ m^2 higher in plots where *S. orbiculatus* was removed (Table 1). Regression analysis of transect data showed a significant negative association between percent cover of *S. orbiculatus* and herbaceous species richness (Fig. 1). Analysis of transect data showed a highly significant negative association between percent cover of *L. maackii* and herbaceous species richness (Fig. 2). Transect data showed no significant relationship between percent cover of *L. maackii* or *S. orbiculatus* and woody species richness. Regression analysis between percent cover and species richness for *S. orbiculatus* and *L. maackii* showed stronger negative effects associated with *L. maackii* (Table 2). In addition, percent cover of *L. maackii* in plots where it was present was notably higher than that of *S. orbiculatus* (mean cover of *L. maackii* was 41.0%; mean cover of *S. orbiculatus* was 25.5%).

Fig.1 - Herbaceous Species Richness vs. Percent Cover of *S. orbiculatus*

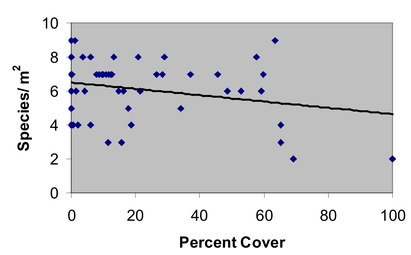
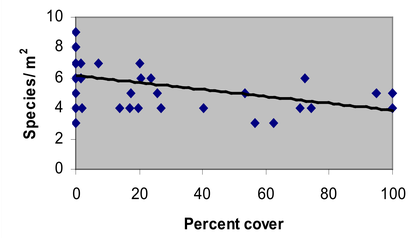


Fig.2 - Herbaceous Species Richness vs. Percent Cover of *L. maackii*



Discussion

Comparison of removal and control plots indicated a small increase in both herbaceous and woody species richness when *S. orbiculatus* was removed. While much of the increase in mean species richness can be attributed to increased availability of light and nutrients (competitive release), part may be due to invasion of ruderal (disturbance-adapted) species. Results of transect analysis show that 100% cover of *L. maackii* would result in a 42% reduction in herbaceous species richness (Table 2), which is comparable to the 53% reduction in species richness reported by Collier and Vankat (2002). Coralberry had less severe effects; 100% cover of coralberry would result in a 25% reduction in herbaceous species richness; also, coralberry rarely reaches the same densities as Amur honeysuckle. Some factors contributing to Amur honeysuckle's negative effect on species richness are (1) its size, up 5m in height in North America (Dirr 1990), (2) its dense shade, and (3) its early leaf emergence and leaf longevity, which give it a competitive advantage over native species (Harrington et al., 1989). *Lonicera* species may also contain allelopathic compounds (Gould and Gorchov 2000). The populations of *L. maackii* in this study consisted of immature plants rarely more than 2m tall. The same study performed in an area where *L. maackii* had formed larger stands could reveal more pronounced negative effects.

Current data suggests that coralberry shows little invasive potential in woodlands. Coralberry's size is limited by light availability in wooded areas. Coralberry fruits show greater dormancy requirements than Amur honeysuckle, but lack the potential to form a lasting seed bank, further reducing its invasive potential (Hidayati et al., 2001). Although *S. orbiculatus* is native, it is often regarded as a weed in western states because it can spread into and limit the forage value of grasslands and pastures (Defelice 1991), and may have some inhibitory effects on the germination of grasses (Smith 1977). Due to its negative effects on grasses and ability to tolerate seasonal fires (Soper et al., 1993), coralberry's possible invasive potential in grasslands should be considered before it is planted near sensitive prairie fragments or restorations.

Acknowledgements:

The authors wish to thank the NSF-REU program at EIU for funding, and Kathryn Yurkonis, Tiffany Bone, and Dr. Scott Meiners for their assistance.

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