ABSTRACT

Support Host Selection of *Lonicera japonica* and its Interaction with
Different Environmental and Biotic Factors in Cameron Park, Waco, Texas

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Japanese honeysuckle (*Lonicera japonica*), an exotic woody vine, has naturalized in riparian forests in central Texas. The objective of this study was to quantify its existence pattern associated with different environmental and biotic factors in Cameron Park, Waco, Texas. Eighty-eight 8 × 4 meter plots were established along twelve trails in the area and treatment experiments were taken during May to August 2007. Through cumulative ordinal regression analysis, I found that cover of *L. japonica* was only significantly related to native vine cover and only the treatment of clearing both native and exotic vines showed a significant effect. As for the support host, its height class is strongly correlated with the climbing behavior of *L. japonica*. These results suggested that biotic factors play a more important role in its invasion and support hosts with low to medium height contribute to its spread from understory to canopy layer of the forest, whereas high tree hosts carry more stems to a longer distance in the canopy.

Support Host Selection of *Lonicera Japonica* and its Interaction with Different Environmental and Biotic Factors in Cameron Park, Waco, Texas

by

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DEDICATION

To my parents who have given me support, encouragement, and love in my life.

To my friends, who stand behind me when I struggle and always
lift me up with their smile, caring, and inspiring words.

And, to the Lord, my savior, who instills strength in my soul to get by
all kinds of difficulties throughout the process of this project.

CHAPTER ONE

Introduction

Native plants worldwide are susceptible to and will continue to suffer from invasion of exotic vegetation. With more human encroachment, global trade and volatile climate change, environmental scientists and biologists have identified the invasion as one of the biggest threats and challenges to be faced in natural ecosystems. Most studies so far have recognized its influences on native ecosystems at different scales, i.e. altering community structure and composition, change of disturbance regimes, and interspecific interactions (Yurkonis and Meiners 2004, 764). However, few researchers have examined the physical process behind that phenomenon. Both local and regional factors can determine the success of invasion of exotic species, and their relative importance is site and species specific according to different experimental studies (Ohlemüller et al. 2006, 493; Bartuszevige et al. 2006, 222). Nonetheless, these field observations have revealed little general conclusion and predictive power with respect to the mechanism of biological invasion.

Variables influencing invasion are not only affected by the capacity of the alien to invade (invasiveness), but also the susceptibility of the system to be invaded (invasibility). While species traits may largely determine the extent of an invasion event, the establishment success is determined by both species and habitat characteristics (Milbau et al. 2003, 657; Davis et al. 2000, 696). However, there is not enough evidence to suggest a correlation between invasiveness and invisibility (Milbau et al. 2003, 665).

Invasion biology defines "invasibility" as the susceptibility of a site to the colonization and establishment of individuals from species not native to the local ecosystem. Although it can be quantified as the probability of establishment per arriving propagule, it is also an integration of physical and biological processes at the local scale depending on times and species (Davis et al. 2000, 696 - 697). Whether species-rich communities are more resistant to exotic invasion than species-poor communities remains unclear. Some ecologists believe that direct associations between native and invasive species may not suggest real invasion impacts (Yurkonis and Meiners 2004, 768; Renofalt et al. 2005, 166), but the habitat conditions supporting plant species diversity are related to spatial patterns of plant invasion (Renofalt et al. 2005, 174). A recent view about the invasibility-diversity relation is that diversity emerges from invasibility, which is a more fundamental part of a community affected by resource levels and access restriction imposed by physical environment (Davis et al. 2005, 697 - 698).

Vines are an important part of the forest system in the southern United States. Their seedlings coexist with herbs and woody plant species in the understory and are often associated with edge and gaps in temperate forests (Muoghalu and Okeesan 2005, 259). Seedling-to-seedling competition with tree hosts is not, however, a significant impact of their invasion (Brudvig and Evans 2006, 266). Their chances of reaching the canopy depend on the availability of support hosts, microenvironment condition, and understory competition (Collins and Wrin 1993, 38 - 39), as well as girth sizes of hosts, bark structure, and tree host density (Muoghalu and Okeesan 2005, 264 - 265). Vines compete for resources with their tree hosts through the reduction of available light, water, and nutrients (Dillenburg et al. 1993, 250 - 251). They are known to affect the leaf allocation patterns of tree species, by which to suppress the growth of tree seedlings and alter community structure (Dillenburg et al. 1995, 460). On the other hand, they also contribute considerably to ecosystem-level processes, such as whole-forest transpiration and carbon sequestration (Schnitzer and Bongers 2002, 228). In addition, Granados and Korner (2002, 1115 - 1116) found that climbing vines was more competitive and vigorous in response to atmospheric carbon dioxide enrichment, especially at very low light conditions when light was still a significant constraint.

Ground-based surveys also discovered that vine occurrences did not increase with tree size, but rather individual species showed preferences for particular host tree species (Burns and Dawson 2005, 896 - 898). Surrounding land uses and landscape features can also influence invasion by exotic vines (Borgmann and Rodewald 2005, 337). Interactions between multiple invasive species are not necessarily facilitative and thus intensify the impact of biological invasion, but could be amensalistic or competitive. The competition may limit the performance of each invasive species, the invasion by other non-native species, and the establishment of indigenous species (Belote and Weltzin 2006, 1639). Nevertheless, removal of vines only temporarily enhanced tree growth and had little impact on long-term community-level tree recruitment, though some early-successional trees benefited from reduced competition (Duncan and Chapman 2003, 204 - 205).

Japanese honeysuckle (*Lonicera japonica*) as invader was introduced to North America in the early 19th century for horticultural collection and escaped from cultivation in the late 1880s (Schierenbeck 2004, 391). Once established, it would spread quickly through increased ability of lateral shoots to root by growing close to the ground, as well as long distance of horizontal dispersion, which is caused by reduced circumnutation (a movement of rotating slightly about a central axis) of prostrate shoots (Larson 2000, 535 - 536). The control of Japanese honeysuckle requires a combination fire or manual removal, chemical treatment and a large amount of perseverance. The most effective treatments for the control of this species should be applied during periods of active growth with repeated efforts of removing aboveground materials (Schierenbeck 2004, 397). Early season herbicide application can substantially reduce the biomass of Japanese honeysuckle (Gardiner and Yeiser 2005, 114). Hand-pulling only works with sapling plants while discing or burning combined with herbicide treatment is the best strategy for controlling of more mature plants in open fields. Aboveground mowing has shown little control effect and even contributes to the its regrowth (Schierenbeck 2004, 397).

This invasive species is a high-twining or tailing woody vine that may reach the forest canopy or densely cover the ground surface. It is evergreen in most of its range but facultatively deciduous in response to cold or drought. Fruit and seed dispersal is mainly performed by birds (turkeys, passerines, and blackbirds) and mammals (possums, rodents, and ungulates). Pollination is facilitated by attractive and fragrant flowers and a long flowering period of eight months under ideal conditions, although it is limited to the services of more generalized pollinators and lack of xenogamous pollen exchange (Larson et al. 2002, 57 - 59). It has been identified as a successful competitor and aggressively exploits light gaps created by disturbances in the deciduous forests and riparian corridors. With high leaf areas, a high degree of shade tolerance, morphological plasticity, rapid and persistent growth, and positive response to increased atmospheric carbon dioxide levels, it is a highly invasive species and played a major role in the suppression of late successional species (Schierenbeck 2004, 394 - 396). However, with a similar function role in the forest ecosystem, sprawling woody vine species appear to be more tolerant of its suppression effect (Yurkonis and Meiners 2004, 767). Retention of old leaves during new leaf formation and high photosynthetic rates in new leaves also contribute to the invasive ability of *Lonicera japonica* (Schierenbeck and Marshall 1993, 1298).

Riparian corridors are very sensitive to plant invasion and studies have shown that species invasiveness is the highest in the middle reaches of a river. The hydrological connectivity is a major dispersal vector for exotic invasive species among different landscapes and river corridors often have a high frequency of open ground for colonization (Renofalt et al. 2005, 165 - 166). Bottomland sites with productive soils provide suitable growth conditions for invasive woody vines which can quickly overtake the space and delay seedling development of native species (Gardiner and Yeiser 2006, 106). In many riparian forests in the southern U.S., previously open understories are now almost completely taken over by vines and exotic lianas (Woods 1993, 63).

Most research on vines has been descriptive, emphasizing the competitive effects on tree hosts, but neglecting the mechanisms involved in these interactions. Little information is available to analyze and predict their occurrence and distribution patterns on landscapes. The exotic shrub Japanese honeysuckle (*Lonicera japonica*) has naturalized in many forests in central Texas. However, ecologists still lack understanding of why this alien invasive species exists here and has been so much more aggressive than native or other introduced species. It is also unclear whether it is correlated to other native vines in the habitat. *L. japonica* might also be filling a vacant resource niche in the area, since riparian forests in the southern U.S. with closed canopies do not naturally have strongly developed understories.

Purpose of this thesis research was to quantify the pattern of *L. japonica* associated with support host characteristics, as well as aspect, canopy closure, soil depth, and native vine coverage. The research tested the hypothesis that *L. japonica* has a higher cover and probability of occurrence with the presence of certain native vine species. In addition, I assumed that climbing of *L. japonica* is reinforced by a specified range of DBH (diameter at breast height) and height of carriers. Last but not least, different clearing methods were supposed to have treatment effects of different significance on the cover of *L. japonica* and the number of support hosts. The following questions were studied in this project:

1. How do quantifiable factors (aspect, canopy opening, soil water holding capacity) impact the occurrence of *L. japonica* in the study area?

2. How does the co-existence with other native vines affect its invasion within a 32 m^2 area around central plants?

3. Are support hosts of certain species with a specified range of DBH (diameter at breast height) and height class more susceptible to the climbing of *L. japonica*?

4. How does the coverage of *L. japonica* respond to different treatment approaches?

I conducted plot studies associated with ecological treatments to examine these questions. Multiple quantifiable variables were measured to perform further statistical analyses. The research was undertaken in Cameron Park West, Waco, Texas from early March to early October, 2007.

CHAPTER TWO

Methods

Site Description

Cameron Park is a municipal park located at the confluence of the Brazos and Bosque Rivers near downtown Waco, Texas. According to a 1975 article in the Waco Tribune-Herald, Cameron Park is one of the largest civic parks in the United States with an area of 416 acres. The study site is located at the middle reaches of the Brazos River, and a main trail extends through a riparian hardwood forest along the river.

Soils

According to the “General Soil Map of McLennan County, Texas” (1974), the soils of Cameron Park are part of the Austin-Stephen-Eddy, Trinity-Frio and Asa-Yahola associations and are chiefly Austin Chalk (type *Kau*) with lesser amounts of Alluvium and Fluviatile terrace deposits (types *Qal* and *Qtc*). The chalk is “a massive stratified limestone with white and blue layers of different thicknesses,” and it weathers easily so “often the whole surface of a hill is covered with loose pieces, some very finely divided” (Poage 1981, 8). The soils in the area have an average pH of 6.6, which are moderately permeable and have a texture range from clay to loam; the chalk underlying these soils is 150 to 300 feet deep and is microgranular calcite (Francaviglia 1998, 21). The Cretaceous limestone with weather deposits is the main rock type along the Brazos River at the study site (Kibler and Gibbs 2004, 1).

Climate and Hydrology

The Brazos and Bosque Rivers flooded regularly before the construction of Lake Waco Dam, but now the river just flows downstream and does not rise to cover the terrace. The climate in the area is a subtropical, humid climate which averages thirty to forty inches of rain each year and with May being the average wettest month (The Weather Channel Interactives, Inc., Average weather for Waco, TX). Though the highest temperature usually occurs in July, it can get close to 110°F from May through September (Kibler and Gibbs 2004). January is the average coolest month (33°F monthly average) in Waco area, and the lowest recorded temperature was -4°F in December 1989 (The Weather Channel Interactives, Inc., Average weather for Waco, TX).

Vegetation

The interaction of geomorphic variables determines the composition of canopy tree species in Cameron Park West. For example, pecan (*Carya illinoensis*), bur oak (*Quercus macrocarpa*), eastern cottonwood (*Populus deltoids*), shumard's oak (*Quercus shumaandi*) and american elm (*Ulmus americana*) dominate the Brazos River floodplains; sugar hackberry (*Celtis laevigata*), Texas ash (*Fraxinus texensis*), and escarpment live oak (*Quercus fusiformis*) occupy stream valleys, and ash juniper (*Juniperus ashei*) and eastern red cedar (*Juniper virginianus*) prevail the chalk outcrops (Blair 1965, 16–17, 45). Vegetation composition changes from predominantly deciduous to mainly evergreen along the topography gradient between floodplain, stream valley, and cliff tops. Due to the lack of soil on limestone escarpment, few woody plants get established in this habitat as they cannot obtain enough nutrients for survival and growth. In addition, some researchers believe the cliff-tops in Cameron Park West once were part of the Blackland

Prairie ecosystem, though their exact boundary has never been confirmed (Lang 2007, 33). In summary, the type of tree species is influenced by the combination of topography, soils, hydrology, climate, and vegetation zones (Francaviglia 1998, 24).

Through interviews with informants, Lang (2007, 56) found that Cameron Park was covered by forest along the river historically and tree species composition have been relatively consistent in the park over the last century. However, forest cover appeared to have increased slightly in Cameron Park in the last 60 years based on supervised classification of aerial photographs. In addition, about eighty to ninety years ago, *Juniperus* species started to take over the ridge-top area after the pastures were released and the land abandoned, while broadleaf species displayed delayed succession, regenerating first along borders of deserted land and then moving into the interior (Lang 2007, 90-92).

Vines also exist in both canopy and understory layer of the area. Walk-throughs of the park showed that the main liana species are Japanese honeysuckle (*Lonicera japonica*), cat briar (*Smilax bona*), grape (*Vitis rotundifolia*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and English ivy (*Hedera helix*). Although widely recognized as a prevalent invasive species in the southeaster United States, kudzu vine (*Pueraria lobata*) has not been discovered in Cameron Park West either during my field surveys or in any historical record. My study subject, *L. japonica*, is present along the river trails as well as in the mesic valley, but rarely found on the ridge-top. The understory cover is mainly continuous and co-dominated by *L. japonica*, *Cornus drummondii*, *Smilax rotundifolia*, *Toxicodendron radicans*, and *Frangula caroliniana*. All common and Latin names of identified species were derived from Shinners and Mahler's *Flora of North Central Texas* (1999) and species identification in the study site conducted using the smaller Stahl and McElvaney's *Trees of Texas: An Easy Guide to Leaf Identification* (2003).

Plot Studies

Plot Location

In order to focus on my study object in the area, I first conducted a preliminary survey for the distribution of *L. japonica* from June to August, 2005. Since exotic species are more likely to establish near constructed roads due to a combination of soil disturbance and nutrient addition (Larson 2003, 326), I targeted the survey mainly on the trail system. Twelve trails (*River Trail*, *Dead River, Rio Perdido, Johnie*, *Rhino, Outback*, *California*, *Shyst*, *MCC*, *Kite*, *Act of Faith*, *Drain pipe*) in Cameron Park were investigated to identify rough coverage of the species by visual observation. The trails were chosen based on existing knowledge about the occurrence of *L. japonica* in Cameron Park West. Ten 8 × 4 meter plots were established randomly along each trail, with the length side overlapping the trail edge and the width side perpendicular to the trail. Canopy type of each plot was also recorded to the species level. The plots were resurveyed during June and July in 2006 and no significant change in distribution was discovered.

Considering topographical differences, the whole study site was divided into two regions: floodplain and valley. Floodplain region included the relatively flat area along the river, while valley region incorporated both the slopes above the river and the ridge-top above the cliffs. Forty-four non-overlapping plots were positioned by choosing random distances with a random table along trails in each topographical category. I chose trails *River* and *MCC* for the floodplain region and trails *Dead River*, *Rhino*, *Johnie*, *Outback*, *Drain Pipe*, and *California* for the valley region due to the wide distribution of *L. japonica* along those trails revealed by my preliminary survey during the summer of 2005 and 2006. Cover of *L. japonica* was estimated at a 0-6 scale (0, no vines; 1, 1-5% coverage; 2, 5-10%; 3, 10-25%; 4, 25-50%; 5, 50-75%; 6, 75-100%) based on visual observation within each plot (Figure 2.1). The geographical coordinates of the starting point of each plot were recorded with a Trimble GeoXT GPS receiver.

Due to the restricted area of floodplain by cliffs, experiment plots were constrained to the size of 8 × 4 meters, instead of 20 × 20 meters for a typical tree sampling plot. Given that trail use tended to encourage the growth of exotic species along the disturbed trailside but this pattern did not exist away from the trail edge even after long time periods (Potito and Beatty 2005, 234 – 235), I placed all of the plots along the immediate trailside. These plots were set up with the outside longer side overlapping with the trail edge, and at an interval of at least eight meters away from adjacent ones to. Ideally, plots would have been established further apart and further away from the trail to minimize edge effects and spatial autocorrelation, but that would compromise the number of available plots. It was also hard to implement that in Cameron Park because of the density of trails, the probability of intersection and the variability of the terrain. Furthermore, from my preliminary survey during the summer of 2005 and 2006, *L. japonica* was rarely found more than 4 meters away from the trail edge, so the overlap with the trailside would have little influence on its coverage of each plot.

a. Class 1 (1-5%)

b. Class 2 (5-10%)

c. Class 3 (10-25%)

d. Class 4 (25-50%)

e. Class 5 (50-75%)

f. Class 6 (75-100%)

Figure 2.1. Cover of *L. japonica* from class 1 to class 6

Compilation of Environmental Variables

To address the first question, I obtained a dataset of quantitative environmental variables related to abiotic factors from the sample plots. In each plot, I measured the aspect (degree) with a Brunton compass. Canopy opening was gauged with a spherical densiometer at the centre of each plot. I also measured the soil depth at two random spots within each plot using a size 4 sledge hammer and a 72 centimeter iron pipe. I tapped the pipe into the soil until its tip hit the top of limestone layer, and measured the distance between the tip and ground level with a Metric Biltomore Stick to determine the soil depth at that plot. Soil texture at each plot was also identified as clay, clay-loam, or non-clay type by squeezing moistened soil sample. According to Cosby and others (1984, 690), this physical property of soils is a robust predictor for the soil moisture parameter. I used the regression equation developed by Saxton and others (1986, 1034) to obtain the water holding capacity value.

$$\theta_s = 0.332 - 7.251 \times 10^{-4} (\%sand) + 0.1276 \log_{10} (\%clay)$$

Compilation of Biological Variables

To investigate potential interactions between *L. japonica* and other native vines, I initiated a treatment experiment in spring 2007. Coverage of native vine species was visually estimated at the same scale as *L. japonica* in each plot. I also recorded the number of stems of *L. japonica* and that of native vines on each support host. As some support hosts carry both *L. japonica* and native vines, the co-existing native vine was identified to the species level for further comparison of the coexistence likelihood among different native vines.

Support Host Features

To look into the susceptibility of certain species to *L. japonica*, I investigated the characteristics of support hosts. Within each plot, the support host for *L. japonica* as well as native vines was identified to the species level. DBH (diameter at breast height) and height class of support hosts onto which *L. japonica* and other vines twine were also recorded both before and after the treatment. The height classes were divided as: 1, <30 cm; 2, 30-50 cm; 3, 50-100 cm; 4, 100-150 cm; 5, 150-200 cm; 6, >200 cm.

Since the invasion of *L. japonica* has been attributed to its climbing behavior (Larson 2000), I also took into account the importance of support hosts to the growth of *L. japonica*. To this end, I counted the number of vine species and the number of vertical climbing stems of each vine on every support host both before and after the treatment was applied.

Treatment Design

One of four treatment methods was randomly assigned to each patch between late May and early July in 2007. Vegetation treatments include: (1) general reduction (pulling or clipping shoots with secateurs or by hand) of *L. japonica* and native vines, (2) general reduction of *L. japonica* but not the native vines, (3) spot clearing (hand weeding and clipping vines threatening existing native herb and tree seedling populations) of *L. japonica* and native vines, and (4) spot clearing of *L. japonica* but not the native vines. For each spot clearing method (treatment category 3 and 4), there are four subcategories regarding the height class of support hosts (all vines only on all height classes, and on class 1 and 2, class 3 and 4, class 5 and 6 respectively). Four replicate 8 × 4 meter plots were set up for each subcategory towards treatment method 3 and 4. Additionally, a set of four control plots were also established in the floodplain as well as the valley area. Overall forty-four plots were established in either topographic region (eighty-eight plots in total).

Sixty days after applying the treatment, I rechecked the presence and cover of *L. japonica* and other native vines at each plot between late July and early September in 2007. Given the fact well-rooted *L. japonica* stems can extend 105 to 226 cm within five months (Leatherman 1955), the time interval of sixty days would allow for a moderate response of the species while not offering a protracted gap to offset the treatment impact by a large measure. I did not estimate the density of *L. japonica* by counting the number of the stems in each plot because to do so would require too much time and labor, while remaining inaccurate for plots with high stem density.

Data Analysis

Environmental Variables

Since the cover values were in ordinal categories, the association of *L. japonica* and native vines with multiple environmental and biological variables was determined by cumulative logistic ordinal regression. Both the cover of *L. japonica* and that of native vines were modeled as a function of soil depth, aspect, and canopy closure respectively. Probabilities modeled were cumulated over the lower cover, and predictor significance was obtained through Wald test assuming a chi-square distribution with a degree of freedom of 3 (Guisan and Harrell 2000; Harrell, 2001). The analysis was performed using the software package SAS 9.1 and a significance level of 0.05 was selected.

Biotic Variables

A cumulative logistic ordinal regression analysis of variance was performed in SAS 9.1 to analyze the response of the cover *L. japonica* as a function of the cover of native vine species. The statistical values demonstrated whether the presence and abundance of various native vine species could affect *L. japonica* at a significant level. Probabilities of its coexistence with different native vines on support hosts were identified via exact binomial test utilizing JMP 6. As certain vines (poison ivy, Virginia creeper) were only found to co-exist with *L. japonica* on rare occasions, I collapsed those species into a single category named “other”.

Support Host Analysis

Using SAS 9.1, correlations of the height class of carriers and that of vines were analyzed by Fisher’s exact test. The same test was also utilized to examine the relationship between the height class of carriers and the number of vine stems on them, on the purpose of studying the fixed effects of support hosts on the spread of *L. japonica*. To meet the sample size requirement for this test, I collapsed the height class data into three new categories (1, original height class 1 and 2; 2, original height class of 3 and 4; 3, original height class of 5 and 6) as well as divided the number of stems into 5 classes (1, 0-1 stem; 2, 2-3 stems; 3, 4-5 stems; 4, 6-7 stems; 5, more than 8 stems). The level of significance was set at 0.05.

Due to different sample size for the DBH data, I compared frequency and percent between before treatment and after treatment dataset. Moreover, average, maximum, and minimum DBH of support host in each plot were calculated in Microsoft Excel 2003. Considering treatment (before and after) and topography (floodplain and valley plots) contrast, I divided all the plots into four categories and conducted a pooled t-test to compare the mean value of average, maximum, and minimum DBH for all the plots among the four groups. Frequency of different support host species for *L. japonica* was also counted in the four categories mentioned above.

Treatment

Frequency contingency tables with Fisher's exact test were used to determine whether there is a significant change in the cover of *L. japonica* and native vines respectively before and after treatment for each clearing method. I ran the statistical test in SAS 9.1 for each treatment independently. *P*-value of the Fisher's exact tests indicated which treatment methods were significant in suppressing *L. japonica* ($p < 0.05$).

In addition, the treatment effects on the number of support hosts for *L. japonica*, native vines and both were verified by Kruskal-Wallis one-way analysis of variance by ranks in the software R 2.6.0, utilizing normal approximation for a one-tailed test. This non-parametric method was used for testing differences in medians of treatment plots versus control plots. The significant level was adjusted to $p = 0.005$ through a Bonferroni correction for experiment-wise error rate (Harrell 2001).

CHAPTER THREE

Results

Environmental Variables

It is important to take into account several factors during the data collection before analyzing the statistical results. First, because the terrain in the park is exceptionally variable and because there are more than thirty-two kilometers of trails in the park, plots did not always follow a standard 8 × 4 meter rectangle shape.

Secondly, because the data was collected during a summer season with extremely heavy rainfall, five plots on the floodplain were completely flooded and were no longer possible for the treatment experiment. Therefore, I set up another five plots in late August of 2007 as substitutes. Treatment and data collection for those five back-up plots were executed between Aug 20 and Sept 25, 2007.

Based on the ordinal coverage data for all the eighty-eight plots, I performed a cumulative logistic regression to model the cover of *L. japonica* and native vine before treatment as a function of soil depth, aspect, and canopy opening respectively (table 3.1). There is not enough evidence to suggest that any environmental variables are significant predictors for the cover of *L. japonica* or native vine. This rejected my hypothesis that the pattern of *L. japonica* is related to those three variables describing physical condition.

Table 3.1. Cumulative logistic ordinal regression modeling the cover of *L. japonica* and native vine before treatment as a function of soil depth, aspect, and canopy opening

Response variable	Chi-square	Df	Pr > Chi-square
Cover of *L. japonica* before treatment	2.2510	3	0.5220
Cover of native vine before treatment	4.3017	3	0.2307

Biological Variables

The relationship of *L. japonica* to native vines was also examined by the cumulative logistic ordinal regression, showing that the cover of native vine is a predictor for the cover of *L. japonica* at the 0.0837 significance level before treatment (table 3.2). Considering the sample size is relatively small for similar plot studies as well as the restriction of terrain on plot area, the 0.0837 significance level might indicate a potential relationship between *L. japonica* and native vines, although further investigation with a large sample pool is needed to test the hypothesis.

Regarding the exact vine species coexisting with *L. japonica* on support hosts, the exact binomial test shows very strong statistical significance (table 3.3). The result confirms that *L. japonica* and cat briar (*Smilax bona*) are most commonly found together on support hosts.

Support Host

As to the influence of support host on the invasion of *L. japonica*, I performed a Fisher's exact test to examine the possible relationship between height class of the carriers and the number of stems of *L. japonica* on them (table 3.4). The data show a strong relationship between these two variables, with more number of stems towards the support hosts at height class 5 (150–200 cm) and 6 (>200 cm). There is also a significant difference in independence between the height class of support host and that of vines (table 3.5). The two variables are highly dependent, which supports the idea that carriers contribute to the growth of *L. japonica*.

Table 3.2. Cumulative logistic ordinal regression modeling the cover of *L. japonica* as a function of the cover of native vine before treatment

Response variable	Chi-square	Df	*p*-value
Cover of *L. japonica* before treatment	2.9919	1	0.0837

Table 3.3. Exact binomial test for the coexistence of *L. japonica* and cat briar

Binomial test	Hypoth prob (p1)	*p*-value
Ha: Prob (p < p1)	0.5000	0.0001

DBH data were not uniformly distributed in the four categories based on treatment and topography (figure 3.1). The average, maximum, and minimum DBH values were found to be higher in the plots before treatment, regardless of where the plots were established. In regard to topography effect, plots on the floodplain had higher values for the three types of DBH data, which indicates a spatial pattern of vegetation compatible with Lang’s findings and historical reviews (Lang 2007, 78 - 80).

Table 3.4. Fisher's exact test for the relationship between height class of the carriers and the number of stems of *L. japonica*

Sample size	Table probability	*p*-value
1222	3.252E-23	<0.0001

Table 3.5. Fisher's exact test for the relationship between height class of the carriers and the height class of vines on them

Sample size	Table probability	*p*-value
1222	3.724E-240	<0.0001

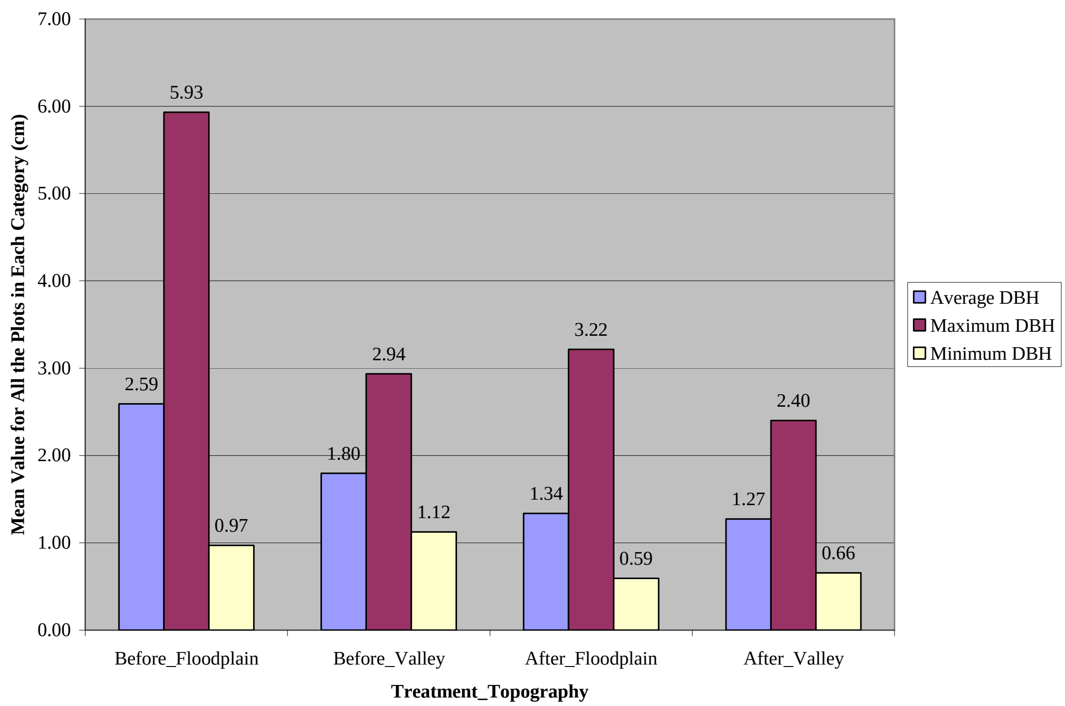

Figure 3.1. Comparison of average, maximum, and minimum DBH in each plot

The one-tailed pooled t-test revealed that the average, maximum, and minimum DBH of support host in each plot are significantly larger before the treatment was implemented (table 3.6) except that the maximum DBH value for the plots on the floodplain showed a difference at a significance level of 0.0867. There is also a significant difference in average and maximum DBH between the plots on the floodplain and those in the valley before I started the treatment process. However, the same contrast pattern related to topography was not supported by the DBH data collected after the treatment.

Table 3.6. One-tailed pooled t-test for the DBH between different treatment and topographical groups

Comparison Group	*p*-value for Average DBH	*p*-value for Maximum DBH	*p*-value for Minimum DBH
Before_Floodplain VS Before_Valley	0.0060	0.0002	0.2340
Afert_Floodplain VS After_Valley	0.6625	0.0779	0.1807
Before_Floodplain VS After_Floodplain	< 0.0001	0.0867	0.0022
Before_Valley VS After_Valley	0.0076	0.0017	0.0069

When taking all the DBH data for comparison between before treatment and after treatment period, before treatment dataset had higher values of mean DBH and standard deviation (table 3.7). Another noticeable finding was that there were more support hosts climbed upon by *L. japonica* after the treatment process. It is possible that the extreme high precipitation in May 2007 enhanced the growth and climbing behavior of *L. japonica*. The treatment process might also have released *L. japonica* from bigger support hosts in certain plots and thus increase the potential of selecting smaller trees or shrubs for support by the exotic species.

Table 3.7. Descriptive statistics for DBH (cm) of all support hosts before and after treatment

Group	Number	Minimum	Maximum	Mean	Standard Deviation
After treatment	568	0.2	16.6	1.52	1.55
Before treatment	413	0.2	20.9	2.16	2.47

I also checked the selection of particular support host species by *L. japonica* in the two topographical regions both before and after the treatment. I compared the frequency of three most prevailing support host species for *L. japonica* among those four categories (figure 3.2). Regardless of whether the measurements were before or after the treatment, the composition of preferred tree host species remained relatively stable in each topographical region. However, the composition of the three most frequently used carriers by *L. japonica* was completely different between the plots on the floodplain and those in the valley. While dogwood (*Cronus drummondii*) and Carolina buckthorn (*Frangula caroliniana*) were clearly favored along the river trail, coralberry (*Ilex verticillata*) and privet (*Ligustrum lucidum*) appeard to be the most suitable targets for *L. japonica* in the valley area. It is important to note that two invasive shrub species, both privet (*Ligustrum lucidum*) and nandina (*nandina domestica*), showed susceptibility to the climbing of *L. japonica*. This result might indicate a mutually beneficial relationship between invasive vines and shrubs.

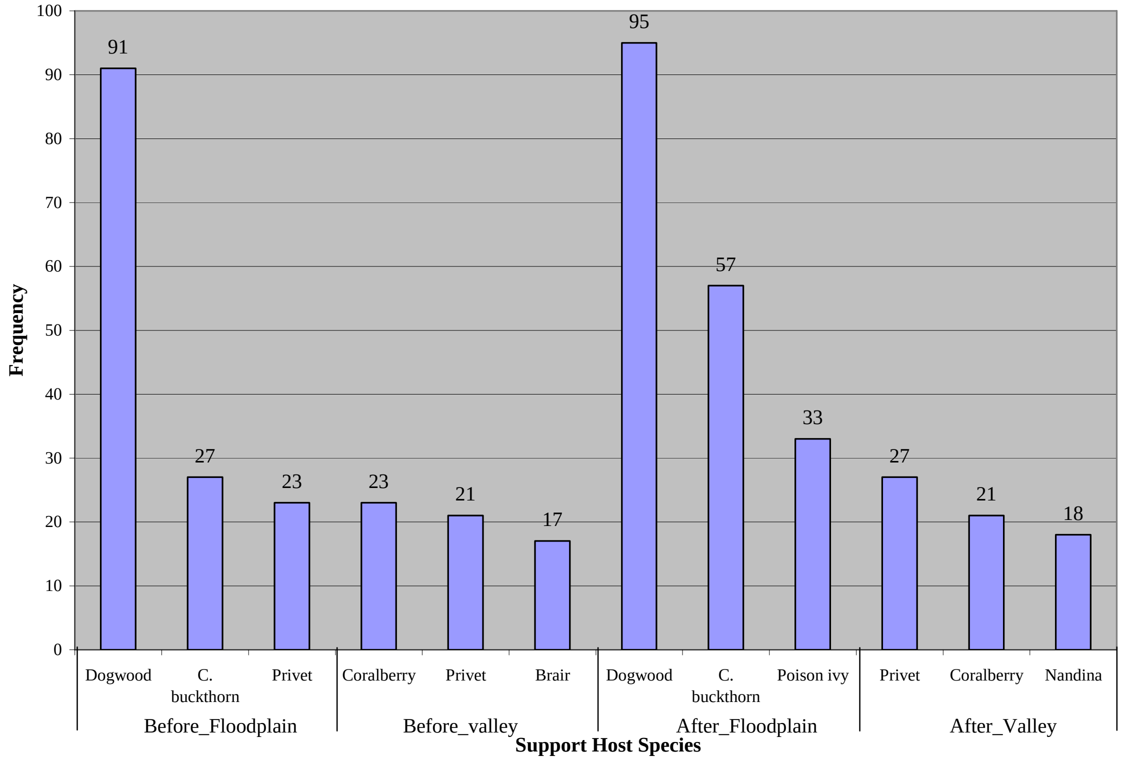

Figure 3.2. Frequency of the three most favorable support host species by *L. japonica*

Treatment Study

With respect to the treatment effect, I used Fisher's exact test to examine whether there is a significant change on the cover of *L. japonica* before and after each treatment approach (table 3.8). The *p*-value indicates that the only treatment method had a significant control effect ($p < 0.05$) is the clearing of both native and exotic vines on the ground and support hosts (approach 1), although the exact direction of correlation could not be determined by that test. As for the treatments just targeting on the vines on carriers, clearing of both *L. japonica* and native vines displayed a higher significance level compared with just removing *L. japonica*. However, there is not enough evidence to suggest that the height class of support host made a difference in the treatment process.

Table 3.8. Fisher's exact test (*p*-value) for the treatment effect on the cover of *L. japonica*

	Ground + Support host		Support host	
Height (cm)	*L. japonica* + Native vines	*L. japonica*	*L. japonica* + Native vines	*L. japonica*
All	0.0464	0.7429	0.0952	0.6571
0-50			0.1786	0.8571
50–150			0.7429	0.3286
>150			0.7714	0.2429
Control	0.1929			

The data also show that the treatment had a significant impact on the number of support hosts for *L. japonica* (table 3.9). The *p*-value of treatment method 2, 4, 5, 6, 8, 9, 10 is less than the alpha level of 0.05 chosen with a Bonferoni correction ($p = 0.005$ after correction), thus the null hypothesis that the control and the treatment have no difference is rejected. Using normal approximation for this one-tailed test, there is enough evidence to suggest that treatment 2, 4, 5, 6, 8, 9, 10 did significantly reduce the number of support hosts for *L. japonica*. Surprisingly, clearing both native and exotic vines on the ground and support hosts, as well as clearing vines on support hosts of all height classes did not show a significant impact in the Kruskal-Wallis rank test. This is probably for two reasons. First of all, these plots might have a very limited number of support hosts which could lead to a biased result. Secondly, disturbances such as animal activity, falling branches or trunks, and human recreation did occur in the study area and these factors were not accounted for statistically.

Table 3.9. Kruskal-Wallis Rank Test (*p*-value) for the treatment effect on the number of support hosts for *L. japonica*

	Ground + Support host		Support host	
Height (cm)	*L. japonica* + Native vines	*L. japonica*	*L. japonica* + Native vines	*L. japonica*
All	1.0000	0.0000	0.0105	0.6523
0-50			0.0000	0.0000
50–150			0.0000	0.0000
>150			0.0000	0.0027
Control	0.5000			

On the other hand, the treatment did not show a significant impact on the number of support hosts with either native vines or both native vines and *L. japonica* on them (table 3.10 and table 3.11). This means the clearing of *L. japonica* had little influence on the growth of native vines, which have established in the area for a long time.

Table 3.10. Kruskal-Wallis Rank Test (*p*-value) for the treatment effect on the number of support hosts for native vines

	Ground + Support host		Support host	
Height (cm)	*L. japonica* + Native vines	*L. japonica*	*L. japonica* + Native vines	*L. japonica*
All	1.0000	1.0000	1.0000	1.0000
0-50			1.0000	0.1946
50–150			1.0000	1.0000
>150			0.9999	1.0000
Control	0.5000			

Table 3.11. Kruskal-Wallis Rank Test (*p*-value) for the treatment effect on the number of support hosts for both *L. japonica* and native vines

	Ground + Support host		Support host	
Height (cm)	*L. japonica* + Native vines	*L. japonica*	*L. japonica* + Native vines	*L. japonica*
All	1.0000	1.0000	1.0000	1.0000
0-50			1.0000	0.0000
50–150			1.0000	1.0000
>150			1.0000	1.0000
Control		0.5000		

CHAPTER FOUR

Discussion

Review of Research Purpose

An important purpose of this project was to analyze the correlation of *L. japonica* and native vines in central Texas, as well as identifying how *L. japonica* selects the support hosts during its invasion process. No comparable studies have been conducted in the central Texas region, though Belote and Weltzin (2006) conducted a study on the interaction between *L. japonica* and the other invasive plants as well as the influence of the number of support hosts in the eastern United States.

Discussion of Results

L. japonica and Environmental Factors

Previous researchers have tried to answer the first question but they have not found a consistent pattern explaining the correlation between those physical factors and the competition success of *L. japonica*. My original hypothesis was that quantifiable factors (aspect, canopy closure, soil water holding capacity) are significant predictors for the coverage of *L. japonica*. The cumulative logistic regression showed that the relationship was not statistically significant, suggesting environmental factors might not be critical for the invasion success of *L. japonica* in Cameron Park, at least within preferred habitats along the flood plain and in valleys. Therefore, I did not have enough evidence to support what I assumed. However, it is important to notice that sample size was relatively small for the study on this type of question. Furthermore, many plots were established along the floodplain trail, which subject to terrain limitations, water erosion, and human use disturbance. More importantly, Waco recorded historically the second highest May monthly precipitation of 13.99 inches in 2007 (National Weather Service, Fort Worth Weather Forecast Office. Waco climatology), flooding several plots in the area. All these factors were not taken into account during the project and could produce aberrant results.

Co-occurrence with Native Vines

The second question focused on the influence of the native vines on *L. japonica*. Despite the fact that *L. japonica* is often associated with declines in species diversity and abundance (Yurkonis and Meiners 2004, 765 - 766), I found that the coverage of native vines was a predictor for the cover of *L. japonica* at a significance level of 0.0837. Although it does not meet the typical 0.05 significant level to suggest a statistically significant relationship, the result is able to give a clue or research direction in future studies. And considering the terrain complexity, small sample size, and restricted plot area, the result might indicate a practical significance on the role of native vines determining the establishment and invasion of *L. japonica*. This suggests while *L. japonica* has an impact on local species turnover, interactions between native vines and *L. japonica* might not necessarily be negative. This finding is consistent with previous studies of spatial patterns of plant invasion in a riparian corridor (Jansson and Nilsson 2005, 165). Vines rely on other plants for support, and coexistence with exotic vines could be beneficial for both of them, or at least develop a commensalism relationship.

Among the co-existing native vine species in the presence of support hosts, cat briar (*Smilax bona-nox*) came out to be the main partner with *L. japonica*. Their difference in climbing strategy might be crucial for this particular pattern. While *L. japonica* reveals a stem twining adaptation for finding hosts, *Smilax bona-nox* uses thorns and spines for attaching to the carrier (Schnitzer and Bongers 2002, 224). Therefore, *L. japonica* does not have to compete for circumnutation rate and room, and can even potentially twine up *Smilax bona-nox* to get better support or extend to more distant locations.

Susceptibility of Support Hosts

The third question was about the selection of support hosts by *L. japonica*. The results strongly supported the idea that *L. japonica* has a better growth on support hosts with a specified range of height. Height class 5 (150 – 200 cm) and 6 (>200) demonstrated highest correlation with both the height class and the number of stems of *L. japonica*. These findings support previous research which revealed that the climber characteristics are positively correlated with the support host characteristics (Muoghalu and Okeesan 2005, 258). This study indicates that taller support hosts not only provide longer distance of support to *L. japonica*, but also has the strength to carry multiple stems of the exotic vine.

The data also related DBH and particular species to the preference of *L. japonica* for exploiting supports. Support stems of 1 to 3 cm diameter were found to be mostly susceptible to the climbing of *L. japonica*. Though native shrubs (*Cronus drummondii* and *Frangula caroliniana*) were the most favored species for support, invasive host species like nandina (*Nandina domestica*) and privet (*Ligustrum lucidum*) were still accountable for a significant portion of the climbing of *L. japonica*. The exotic vine tends to target on saplings and young trees as its exaggerated circumnutaion mechanism requires a solid support stem, yet not so big that it could not successfully twine around and climb up to the canopy.

DBH of support hosts were significantly larger on the floodplain than in the valley when measurements were taken before the treatment. This is compatible with the difference in the original composition of tree species between the two regions. Pre-treatment DBH readings also had significantly higher values than post-treatment ones. The result indicates a trend of selecting small supports hosts by regrowing *L. japonica* after above-ground clearance.

Treatment Impacts

Last but not least, the fourth question examined the treatment effect on *L. japonica*. With respect to the coverage of *L. japonica*, only the most thorough clearing method displayed a significant impact. However, during the two months before the post-treatment data was collected, there was unexpected heavy rainfall in the central Texas region. This disturbance event possibly negated the influence of my treatments to some degree, since *L. japonica* normally responds positively to disturbance with moisture (Schierenbeck 2004, 396). Relating to the impact on the number of support hosts used by *L. japonica*, most treatments demonstrated a significant effect. What this tells us is that manual removal is most effective in reducing the availability of support hosts, but complete clearing of *L. japonica* from the area would require much more persistent and frequent labor work, as well as a combination of chemical treatment.

Native vines coexisted with *L. japonica* in the area, and even shared the same support hosts in some plots. In concurrence with the Belote and Weltzin research (2005, 1637 - 1638), the treatment study indicates that although *L. japonica* showed resilience to the control, support hosts were still vulnerable to the effects. To this end, further study on how *L. japonica* climbs onto carriers along with native vines and the pattern of their interaction would be of great importance for the control of *L. japonica*.

Conclusion

Based on the explanation of results above, I came to the conclusion that the invasion of *L. japonica* is correlated with a range of factors in the area, especially from the biological side. Native vines coexisted well with *L. japonica*, and shared the carriers in the park. Contrary to previous studies about the invasion impacts of *L. japonica* on native species, *L. japonica* did not develop a competitive displacement of established vines. Additionally, *L. japonica* grew well on tall support hosts in terms of both climbing height and stems. It is also important to note that treatment of manual removal was effective pertaining to decreasing the support host availability. However, total clearing of *L. japonica* would require a more comprehensive work as well as a combination of herbicide or fire behavior over a long period of time.

APPENDICES

APPENDIX A

Location of Plots

Table A.1 – Starting GPS Coordinates of the Plots

Plot	Topography	Latitude (degree/minute/second)	Longitude (degree/minute/second)
1	Floodplain	31/34/45.12	97/9/1.044
2	Floodplain	31/34/47	97/9/2.06
3	Floodplain	31/34/48	97/9/3.096
4	Floodplain	31/34/49.116	97/9/3.816
5	Floodplain	31/34/50.952	97/9/5.076
6	Floodplain	31/34/51.96	97/9/5.832
17	Floodplain	31/35/3.012	97/9/13.428
20	Floodplain	31/35/5.208	97/9/15.048
21	Floodplain	31/35/6.144	97/9/15.768
22	Floodplain	31/35/7.368	97/9/16.632
26	Floodplain	31/35/10.356	97/9/18.432
28	Floodplain	31/35/13.848	97/9/19.944
30	Floodplain	31/35/15.936	97/9/20.952
32	Floodplain	31/35/31.524	97/10/6.168
33	Floodplain	31/35/30.84	97/10/4.872
34	Floodplain	31/35/29.832	97/10/3.072
35	Floodplain	31/35/28.68	97/10/1.56
36	Floodplain	31/35/28.248	97/10/1.128
37	Floodplain	31/35/27.744	97/10/1.092
38	Floodplain	31/35/27.024	97/9/59.76
39	Floodplain	31/35/26.952	97/9/58.68
41	Floodplain	31/35/25.96	97/9/55.836

Table A.1 - Continued

Plot	Topography	Latitude (degree/minute/second)	Longitude (degree/minute/second)
42	Floodplain	31/35/25.584	97/9/54.144
43	Floodplain	31/35/25.18	97/9/52.812
44	Floodplain	34/35/24.828	97/9/51.66
45	Floodplain	31/35/23.784	97/9/49.176
52	Floodplain	31/35/22.064	97/9/39.6
55	Floodplain	31/35/22.2	97/9/36.288
57	Floodplain	31/35/22.072	97/9/33.768
58	Floodplain	31/35/21.86	97/9/31.968
59	Floodplain	31/35/21.913	97/9/30.6
60	Floodplain	31/35/21.624	97/9/28.8
77	Floodplain	31/35/30.624	97/9/5.556
78	Floodplain	31/35/31.776	97/9/6.672
401	Floodplain	31/35/29.883	97/10/4.635
402	Floodplain	31/35/29.188	97/10/2.997
403	Floodplain	31/35/27.25	97/10/1.350
404	Floodplain	31/35/28.6	97/10/2.276
405	Floodplain	31/35/30.94	97/10/5.545
406	Floodplain	31/34/49.408	97/9/14.635
407	Floodplain	31/35/2.109	97/9/12.678
408	Floodplain	31/35/3.782	97/9/13.402
409	Floodplain	31/34/59.820	97/9/11.18
410	Floodplain	31/34/58.310	97/9/10.680
80	Valley	31/34/55.848	97/9/11.484
81	Valley	31/34/54.732	97/9/12.78
82	Valley	31/34/54.048	97/9/13.608
84	Valley	31/34/54.924	97/9/14.04
92	Valley	31/34/50.196	97/9/9.576

Table A.1 - Continued

Plot	Topography	Latitude (degree/minute/second)	Longitude (degree/minute/second)
96	Valley	31/34/49.8	97/9/6.012
108	Valley	31/34/45.66	97/9/10.944
109	Valley	31/34/45.3	97/9/10.584
138	Valley	31/35/20.076	97/10/2.8
139	Valley	31/35/18.924	97/10/4.764
140	Valley	31/35/17.34	97/10/5.376
142	Valley	31/35/18.672	97/10/5.988
143	Valley	31/35/19.248	97/10/4.4
145	Valley	31/35/20.976	97/10/3.216
148	Valley	31/35/24.936	97/10/2.28
150	Valley	31/35/26.844	97/10/1.02
152	Valley	31/35/20.148	97/9/41.904
153	Valley	31/35/19.248	97/9/4.24
155	Valley	31/35/17.304	97/9/25.272
164	Valley	31/35/15.828	97/9/27.432
166	Valley	31/35/13.416	97/9/27.432
167	Valley	31/35/12.3	97/9/27.936
169	Valley	31/35/11.868	97/9/28.296
170	Valley	31/35/11.796	97/9/29.448
171	Valley	31/35/11.94	97/9/30.384
173	Valley	31/35/12.768	97/9/33.084
174	Valley	31/35/12.336	97/9/33.444
175	Valley	31/35/11.868	97/9/33.624
182	Valley	31/35/9.168	97/9/28.944
184	Valley	31/35/12.912	97/9/54.072
185	Valley	31/35/9.62	97/9/57.516
187	Valley	31/35/7.44	97/9/59.96

Table A.1 - Continued

Plot	Topography	Latitude (degree/minute/second)	Longitude (degree/minute/second)
188	Valley	31/35/7.106	97/910/0.336
189	Valley	31/35/6.792	97/10/1.104
194	Valley	31/35/1.924	97/10/2.172
198	Valley	31/35/6	97/10/0.336
199	Valley	31/35/6.324	97/10/0.48
202	Valley	31/35/8.386	97/9/57.42
203	Valley	31/35/8.745	97/9/57.204
213	Valley	31/35/16.512	97/9/49.068
300	Valley	31/35/12.313	97/9/53.469
301	Valley	31/35/13.087	97/9/52.313
302	Valley	31/35/24.521	97/10/2.099
303	Valley	31/35/20.566	97/10/3.58

APPENDIX B

Results of the Plot Studies

Table B.1 - Raw Data – Environmental Variables

Plot	Aspect (degree)	Soil depth (cm)	Canopy cover (%)
1	238	13.5	100
2	242	24.3	100
3	237	22.5	95.32
4	238	15.0	98.7
5	242	18.0	100
6	240	14.8	99.74
17	240	16.8	100
20	241	12.5	98.44
21	230	7.8	99.74
22	242	9.5	87.52
26	240	10.8	98.44
28	251	9.8	99.74
30	244	10.3	100
32	230	57.0	98.44
33	222	45.5	85.70
34	251	43.5	90.64
35	254	43.8	98.18
36	230	34.0	98.70
37	260	35.0	98.18
38	195	19.8	100
39	194	17.5	100
41	185	13.5	94.02

Table B.1 - Continued

Plot	Aspect (degree)	Soil depth (cm)	Canopy cover (%)
42	191	11.0	69.06
43	197	18.8	96.1
44	195	15.5	85.18
45	195	40.5	83.88
52	151	15.0	96.62
55	178	21.5	83.62
57	178	30.0	92.2
58	186	34.3	98.96
59	182	23.0	100
60	185	37.0	100
77	180	40.5	98.18
78	9	46.5	98.96
401	204	42.8	99.74
402	36	22.5	99.74
403	205	46.3	98.44
404	217	23.0	98.18
405	2	35.0	98.7
406	228	25.0	100
407	227	17.0	99.22
408	233	11.3	100
409	239	23.5	100
410	253	25.8	99.74
80	296	54.0	96.36
81	310	61.0	93.24
82	260	65.0	95.84
84	300	45.0	95.84
92	260	16.8	96.88

Table B.1 - Continued

Plot	Aspect (degree)	Soil depth (cm)	Canopy cover (%)
96	10	43.5	91.94
108	207	33.3	98.7
109	15	21.0	95.06
138	10	29.8	95.84
139	145	29.0	97.66
140	75	42.0	94.54
142	128	36.5	98.44
143	312	26.5	96.36
145	134	37.0	97.4
148	271	52.5	96.36
150	274	38.8	98.96
152	114	65.0	87
153	273	65.0	97.4
155	207	21.3	82.32
164	278	22.5	98.44
166	170	15.3	81.02
167	305	16.5	85.96
169	142	25.0	92.46
170	225	23.0	98.96
171	304	25.8	82.58
173	305	26.3	97.66
174	275	28.3	92.98
175	265	27.8	97.92
182	218	63.5	95.84
184	144	34.0	89.34
185	160	43.0	98.96
187	153	31.3	97.92

Table B.1 - Continued

Plot	Aspect (degree)	Soil depth (cm)	Canopy cover (%)
188	128	33.0	89.34
189	320	45.0	99.48
194	0	22.5	98.96
198	217	20.0	98.96
199	288	44.0	100
202	86	23.8	98.7
203	112	45.0	95.58
213	312	13.5	90.38
300	4	22.8	97.4
301	177	32.5	94.02
302	275	54.0	97.66
303	106	38.3	89.6

Table B.2 - Raw Data – Biotic Variables

Plot	Treatment	*L. japonica* cover (before treatment)	Native vine cover (before treatment)	*L. japonica* cover (after treatment)	Native vine cover (after treatment)
1	1	4	1	3	1
2	2	5	1	3	1
3	2	3	1	4	1
4	4	5	1	6	1
5	2	4	1	4	1
6	3	3	1	4	1
17	10	1	1	1	1
20	9	4	1	4	2
21	10	2	1	3	1
22	2	3	3	5	1
26	9	1	1	1	1
28	4	4	1	4	2
30	C	1	1	1	0
32	5	6	1	5	2
33	10	5	1	4	2
34	9	6	1	3	3
35	10	3	1	1	2
36	1	2	0	3	1
37	4	4	1	1	5
38	3	3	1	4	0
39	8	2	1	2	1
41	8	2	1	3	0
42	8	2	1	2	1
43	5	3	1	2	1
44	7	4	1	5	1
45	1	4	1	4	1

Table B.2 – Continued

Plot	Treatment	*L. japonica* cover (before treatment)	Native vine cover (before treatment)	*L. japonica* cover (after treatment)	Native vine cover (after treatment)
52	6	4	1	3	1
55	4	2	0	3	1
57	6	4	1	3	1
58	3	2	1	5	1
59	7	5	1	3	2
60	8	3	1	0	4
77	5	3	1	4	2
78	6	3	1	3	1
401	C	1	2	4	3
402	1	3	1	2	1
403	C	5	1	2	1
404	7	4	1	4	0
405	7	4	2	4	1
406	3	2	2	1	1
407	6	1	1	2	1
408	5	3	1	4	1
409	C	1	2	1	2
410	9	2	1	3	1
80	5	4	2	4	1
81	4	1	3	1	3
82	3	1	1	1	1
84	6	3	1	2	1
92	C	2	1	2	1
96	C	2	0	2	1
108	5	4	0	5	1
109	8	4	0	4	1

Table B.2 - Continued

Plot	Treatment	*L. japonica* cover (before treatment)	Native vine cover (before treatment)	*L. japonica* cover (after treatment)	Native vine cover (after treatment)
138	4	1	2	1	1
139	4	2	1	2	1
140	2	3	1	3	1
142	9	3	1	2	1
143	3	1	2	1	1
145	10	1	1	1	1
148	7	2	1	3	1
150	1	1	1	1	1
152	6	4	1	3	3
153	1	1	1	1	0
155	7	3	1	5	1
164	4	1	1	1	1
166	2	2	1	3	1
167	6	1	2	1	2
169	8	1	1	2	2
170	8	1	1	1	1
171	5	1	1	1	1
173	1	1	2	1	1
174	9	4	1	3	1
175	9	4	1	3	1
182	5	3	1	3	1
184	10	4	1	4	1
185	10	1	1	2	1
187	3	2	1	1	1
188	9	4	1	4	1
189	7	3	1	1	1

Table B.2 - Continued

Plot	Treatment	*L. japonica* cover (before treatment)	Native vine cover (before treatment)	*L. japonica* cover (after treatment)	Native vine cover (after treatment)
194	6	2	1	2	2
198	10	1	1	1	2
199	8	2	1	1	3
202	7	1	1	1	1
203	3	2	1	3	1
213	2	2	1	1	1
300	2	2	1	1	1
301	C	4	1	4	1
302	C	4	1	3	1
303	1	4	1	3	1

Table B.3 – Average, Maximum, and Minimum DBH of Support Hosts

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
1	before	5.13	8.50	2.90
2	before	4.68	8.00	1.10
3	before	6.08	10.10	2.20
4	before	3.50	7.50	1.00
5	before	2.65	3.80	1.70
6	before	5.62	9.60	3.30
17	before	4.40	13.80	0.90
20	before	5.60	12.60	0.70
21	before	2.35	5.50	0.90
22	before	2.14	4.00	0.70
26	before	1.10	2.10	0.30
28	before	5.13	20.90	0.90
30	before	1.40	1.40	1.40
32	before	1.70	3.80	0.60
33	before	3.20	7.30	0.70
34	before	1.50	1.50	1.50
35	before	0.83	1.30	0.50
36	before	4.90	6.50	3.30
37	before	5.35	17.00	1.00
38	before	1.83	2.50	1.00
39	before	2.38	4.50	1.30
41	before	2.33	3.00	1.80
42	before	1.19	5.70	0.30
43	before	1.30	2.00	0.50
45	before	1.15	3.60	0.30
52	before	2.73	9.30	0.25

Table B.3 - Continued

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
55	before	4.40	17.00	0.90
57	before	2.31	6.00	0.30
58	before	2.67	10.10	0.40
59	before	1.65	4.60	0.40
77	before	1.06	1.30	0.80
78	before	1.25	1.60	0.60
401	before	2.87	7.00	0.80
402	before	1.15	2.00	0.50
403	before	1.36	4.40	0.60
404	before	1.23	2.50	0.40
405	before	2.70	6.90	0.90
406	before	2.27	3.50	1.30
407	before	1.25	2.20	0.30
408	before	1.15	1.30	1.00
409	before	0.30	0.30	0.30
410	before	1.13	2.70	0.20
80	before	1.08	1.30	0.90
81	before	4.30	4.30	4.30
82	before	5.50	5.50	5.50
84	before	3.17	6.80	1.10
92	before	1.35	2.86	0.64
96	before	2.64	5.41	0.80
108	before	1.86	4.00	0.80
109	before	1.53	2.20	1.20
138	before	1.60	1.90	1.30
139	before	1.75	2.20	1.30

Table B.3 - Continued

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
140	before	1.12	2.30	0.20
142	before	1.41	3.40	0.40
143	before	1.35	2.71	0.80
145	before	0.30	0.30	0.30
148	before	2.69	6.30	0.50
150	before	0.76	4.30	0.30
152	before	0.50	0.50	0.50
153	before	1.90	2.50	1.30
155	before	0.40	0.50	0.30
164	before	4.80	4.80	4.80
166	before	1.36	1.60	1.30
167	before	1.80	3.00	1.00
169	before	1.40	1.40	1.40
170	before	1.89	4.00	1.00
171	before	1.00	2.20	0.50
173	before	0.76	3.50	0.20
174	before	1.15	3.50	0.30
175	before	1.31	2.10	0.70
182	before	1.40	3.00	0.60
184	before	3.05	4.30	1.80
187	before	1.30	1.50	0.90
188	before	0.90	0.90	0.90
189	before	1.20	2.00	0.50
194	before	1.75	1.90	1.60
198	before	1.50	1.50	1.50
202	before	1.00	1.60	0.60

Table B.3 - Continued

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
203	before	1.40	1.40	1.40
213	before	5.10	9.30	0.90
300	before	1.93	4.14	0.80
301	before	1.33	2.23	0.48
302	before	1.88	2.23	0.80
303	before	1.06	1.91	0.80
1	after	0.94	1.59	0.48
2	after	1.49	3.18	0.48
3	after	1.13	3.18	0.48
4	after	1.43	2.55	1.11
5	after	3.60	16.55	0.48
6	after	1.71	4.46	0.48
17	after	0.56	0.64	0.48
20	after	1.62	3.18	0.48
21	after	1.88	3.82	1.27
22	after	2.06	6.68	0.64
26	after	0.60	0.60	0.60
28	after	2.79	16.23	0.64
30	after	1.40	1.40	1.40
32	after	1.67	2.00	1.30
33	after	1.17	2.00	0.70
34	after	2.58	4.90	1.00
35	after	1.13	1.80	0.70
36	after	0.50	0.80	0.20
37	after	1.33	2.80	0.40
38	after	1.28	4.00	0.40

Table B.3 - Continued

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
39	after	1.92	6.70	0.40
41	after	0.89	2.60	0.40
42	after	1.60	2.60	0.60
43	after	1.86	3.20	0.60
44	after	0.97	3.80	0.40
45	after	0.76	1.40	0.30
52	after	1.21	2.80	0.40
55	after	1.72	3.00	0.40
57	after	1.54	2.00	1.10
58	after	2.30	4.50	0.70
59	after	1.36	3.50	0.30
77	after	1.74	5.00	0.60
78	after	1.09	1.50	0.60
401	after	0.95	2.40	0.50
402	after	1.48	2.10	0.90
403	after	0.50	0.60	0.40
404	after	0.95	2.60	0.40
405	after	0.52	1.20	0.30
406	after	0.57	0.60	0.50
407	after	0.63	0.90	0.40
408	after	0.70	1.40	0.40
409	after	0.80	0.80	0.80
410	after	0.55	0.70	0.40
80	after	0.87	2.10	0.30
81	after	1.55	5.50	0.30
84	after	2.50	4.80	1.30

Table B.3 - Continued

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
92	after	1.95	3.30	1.00
96	after	2.16	5.10	1.00
108	after	1.80	3.90	0.70
109	after	0.97	1.40	0.50
138	after	1.00	1.00	1.00
139	after	1.34	2.30	0.80
140	after	0.87	2.10	0.40
142	after	1.53	3.80	0.60
148	after	0.70	0.70	0.70
152	after	1.23	2.30	0.70
153	after	0.45	0.50	0.40
155	after	0.95	1.00	0.90
164	after	1.85	1.90	1.80
166	after	0.90	1.00	0.70
169	after	1.46	2.10	0.40
171	after	0.80	1.00	0.60
173	after	0.62	1.10	0.40
174	after	1.90	3.50	1.00
175	after	1.11	2.00	0.40
182	after	2.08	4.00	0.80
184	after	1.46	3.50	0.70
185	after	0.80	1.90	0.30
187	after	0.67	1.00	0.50
188	after	0.84	1.20	0.50
189	after	1.20	1.90	0.50
194	after	1.02	1.90	0.60

Table B.3 - Continued

Plot	Treatment order	Average DBH (cm)	Maximum DBH (cm)	Minimum DBH (cm)
199	after	0.50	0.80	0.20
203	after	1.52	4.00	0.50
213	after	1.08	1.50	0.50
301	after	1.68	3.00	0.80
302	after	2.60	6.00	0.78
303	after	0.64	1.00	0.40

Table B.4 - Raw Data – Support Host and Vine Species

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
1	Before	American elm	4	6	Honeysuckle	1	6
	Before	Cottonwood	21.4	6	Cat briar	5	6
	Before	Mountain laurel	8.5	6	Honeysuckle	2	6
	Before	Texas ash	2.9	6	Honeysuckle	2	6
	After	Texas walnut	1.1	5	Cat briar	1	5
	After				Honeysuckle	1	5
	After	Sugarberry	0.6	6	Honeysuckle	1	3
	After	Osage orange	0.5	4	Honeysuckle	1	3
	After	Osage orange	1.4	6	Honeysuckle	1	5
	After	Sassafra	1.6	6	Honeysuckle	1	6
	After				Cat briar	1	5
	After	Osage orange	0.6	5	Honeysuckle	1	3
	After	Privet	0.6	6	Honeysuckle	1	6
	After	Privet	1.0	6	Honeysuckle	1	5
	After				Cat briar	1	6
2	Before	Sugarberry	7	6	Honeysuckle	3	6
	Before	Dogwood	1.1	6	Honeysuckle	1	6
	Before	Mountain laurel	8	6	Honeysuckle	2	6
	Before				Grape	1	6
	Before	Cottonwood	30.4	6	Grape	4	6
	Before	Cottonwood	25.1	6	Grape	7	6
	Before				Cat briar	1	6
	Before	American elm	2.6	6	Honeysuckle	1	6
	After	Sugarberry	2.9	6	Honeysuckle	1	6
	After				Cat briar	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
2	After	Separated branch	2.5	6	Honeysuckle	2	6
	After	Shumard oak	1.1	4	Honeysuckle	1	4
	After	Carolina buckthorn	1.1	6	Honeysuckle	1	5
	After	Grape	0.7	6	Honeysuckle	2	6
	After	Mountain laurel	0.8	3	Honeysuckle	1	3
	After	Texas ash	0.8	6	Honeysuckle	1	6
	After	Bur oak	2.5	6	Honeysuckle	1	5
	After	Separated branch	3.2	2	Honeysuckle	1	2
	After	Shumard oak	1.0	4	Honeysuckle	1	4
	After	Shumard oak	1.0	4	Honeysuckle	1	4
	After	Bur oak	1.3	6	Honeysuckle	1	5
	After	Sugarberry	0.5	2	Honeysuckle	1	2
3	Before	Texas ash	10.1	6	Grape	5	6
	Before				Honeysuckle	5	6
	Before	American elm	2.2	6	Honeysuckle	4	6
	Before				Grape	1	6
	Before	Cottonwood	23.2	6	Grape	2	6
	Before	Cottonwood	17.8	6	Grape	2	6
	Before	Privet	6.9	6	Cat briar	1	6
	Before				Honeysuckle	8	6
	Before	Privet	4.4	6	Honeysuckle	3	6
	Before	Cottonwood	13.1	6	Grape	2	6
	Before	Cottonwood	6.8	6	Cat briar	2	6
	Before				Honeysuckle	3	6
	After	Dogwood	0.5	2	Honeysuckle	1	1

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
3	After	Separated branch	1.3	4	Honeysuckle	1	4
	After				Cat briar	1	4
	After	Sugarberry	3.2	6	Honeysuckle	2	6
	After				Cat briar	2	6
	After	Texas walnut	0.6	2	Honeysuckle	1	2
	After	Texas ash	0.8	2	Honeysuckle	1	2
	After	Texas ash	1.1	1	Honeysuckle	1	1
	After	Texas walnut	0.8	4	Honeysuckle	1	4
	After	Texas ash	1.1	3	Honeysuckle	3	3
	After	Texas ash	1.3	3	Honeysuckle	3	3
	After	Osage orange	0.6	3	Honeysuckle	1	3
4	Before	Dogwood	1.8	6	Honeysuckle	4	6
	Before	Cottonwood	4.8	6	Honeysuckle	3	6
	Before	Privet	7.5	6	Honeysuckle	4	6
	Before	Cottonwood	27.4	6	Grape	2	6
	Before	Cottonwood	4.1	6	Honeysuckle	4	6
	Before	Dogwood	1	6	Honeysuckle	4	6
	Before	Cottonwood	46.1	6	Grape	3	6
	Before	Cottonwood	34.6	6	Grape	2	6
	Before	Dogwood	1.8	6	Honeysuckle	3	6
	After	Texas ash	2.5	6	Honeysuckle	1	6
	After	Dogwood	1.3	6	Honeysuckle	1	6
	After	Dogwood	1.3	6	Honeysuckle	1	6
	After	Dogwood	1.1	6	Honeysuckle	1	6
	After	Post oak	1.8	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
4	After	Dogwood	1.3	6	Honeysuckle	1	6
	After	Shumard oak	1.3	6	Honeysuckle	1	6
	After				Cat briar	1	6
	After	Dogwood	1.3	5	Honeysuckle	1	5
	After	Dogwood	1.3	6	Honeysuckle	2	6
	After	Dogwood	1.3	6	Honeysuckle	2	6
5	Before	Dogwood	3.4	6	Honeysuckle	2	6
	Before	Dogwood	3.1	6	Honeysuckle	3	6
	Before	Dogwood	2.1	6	Honeysuckle	5	6
	Before	Cottonwood	3.8	6	Honeysuckle	2	6
	Before	Cottonwood	1.8	6	Honeysuckle	1	6
	Before	Cottonwood	30.5	6	Grape	2	6
	Before	Cottonwood	33.8	6	Cat briar	2	6
	Before				Grape	2	6
	Before	Dogwood	1.7	6	Honeysuckle	2	6
	After	Dogwood	1.0	2	Honeysuckle	1	2
	After	Carolina buckthorn	1.3	6	Honeysuckle	2	4
	After	Carolina buckthorn	11.5	6	Honeysuckle	4	6
	After	Carolina buckthorn	2.2	6	Honeysuckle	2	6
	After	Cedar elm	16.6	6	Honeysuckle	1	6
	After	Carolina buckthorn	1.0	6	Honeysuckle	5	6
	After	Carolina buckthorn	1.0	6	Honeysuckle	1	6
	After	Carolina buckthorn	1.3	5	Honeysuckle	2	5
	After	Dogwood	0.6	3	Honeysuckle	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
5	After	Carolina buckthorn	1.0	3	Honeysuckle	1	3
	After	Carolina buckthorn	1.3	6	Honeysuckle	4	6
	After	Carolina buckthorn	0.8	2	Honeysuckle	1	2
	After	Shumard oak	0.5	1	Honeysuckle	1	1
	After	Shumard oak	0.8	2	Honeysuckle	1	2
	After	Shumard oak	1.0	5	Honeysuckle	2	5
	After	Carolina buckthorn	2.2	6	Honeysuckle	1	6
	After	American elm	9.2	6	Honeysuckle	1	6
	After	Cedar elm	11.8	6	Grape	1	6
	After				Honeysuckle	3	6
6	Before	Privet	9.6	6	Honeysuckle	12	6
	Before	Cottonwood	30.1	6	Cat briar	12	6
	Before	Dogwood	6	3	Honeysuckle	4	3
	Before	Dogwood	5	3	Honeysuckle	2	3
	Before	Privet	4.2	6	Honeysuckle	3	6
	Before	Carolina buckthorn	3.3	6	Honeysuckle	3	6
	Before				Grape	1	6
	After	Shumard oak	1.1	4	Honeysuckle	1	4
	After				Grape	1	4
	After	Texas walnut	2.5	6	Honeysuckle	2	6
	After	Texas ash	0.8	2	Honeysuckle	1	2
	After	Shumard oak	0.8	4	Honeysuckle	1	4
	After	Carolina buckthorn	4.5	6	Honeysuckle	2	6
	After	Dogwood	2.2	5	Honeysuckle	2	5

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
6	After	Sugarberry	0.8	5	Honeysuckle	1	5
	After	Dogwood	2.5	6	Honeysuckle	3	6
	After	Texas walnut	3.2	6	Honeysuckle	5	6
	After	Texas walnut	1.3	5	Honeysuckle	1	5
	After	Dogwood	1.6	6	Honeysuckle	1	6
	After	Carolina buckthorn	0.6	2	Honeysuckle	1	2
17	Before	Black hickory	5.4	6	Honeysuckle	4	6
	Before	Black hickory	5.6	6	Honeysuckle	3	6
	Before	Black hickory	3.8	6	Honeysuckle	3	6
	Before	Black hickory	2.4	6	Honeysuckle	5	6
	Before	Black hickory	0.9	4	Honeysuckle	2	3
	Before	Cedar elm	13.8	6	Honeysuckle	5	5
	Before	Dogwood	0.9	5	Honeysuckle	2	5
	Before	Texas Ash	2.4	6	Honeysuckle	4	6
	After	Grape	0.6	6	Cat briar	1	4
	After	Privet	0.5	4	Honeysuckle	1	4
	After	Briar	0.6	6	Honeysuckle	1	6
20	Before	Dogwood	0.7	4	Honeysuckle		4
	Before	Cedar elm	12.6	6	Grape	1	6
	Before				Cat briar	1	6
	Before				Honeysuckle	10	6
	Before	Grape	4	6	Honeysuckle	1	6
	Before	Coralberry	2.4	6	Grape	2	6
	Before				Honeysuckle	3	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
20	Before	Cottonwood	10.4	6	Grape	1	6
	Before				Honeysuckle	2	6
	Before	Cottonwood	3.5	6	Grape	1	5
	Before				Honeysuckle	2	5
	After	Dogwood	0.6	5	Cat briar	1	5
	After	Dogwood	2.1	3	Honeysuckle	1	3
	After	Dogwood	0.5	2	Honeysuckle	1	2
	After	Grape	2.5	6	Honeysuckle	2	6
	After	Grape	2.5	6	Honeysuckle	1	6
	After	Dogwood	1.0	5	Honeysuckle	1	5
	After	Dogwood	1.0	5	Honeysuckle	1	5
	After	Dogwood	1.0	5	Honeysuckle	1	5
	After	Dogwood	1.3	6	Honeysuckle	1	6
	After				Cat briar	1	6
	After	Dogwood	1.3	6	Honeysuckle	1	6
	After				Cat briar	1	6
	After	Carolina buckthorn	3.2	6	Honeysuckle	2	6
21	Before	Mexican buckeye	2.5	6	Cat briar	2	6
	Before				Honeysuckle	1	6
	Before	Cedar elm	8.5	6	Grape	3	6
	Before	Dogwood	1.4	6	Honeysuckle	1	6
	Before	Grape	2	6	Cat briar	1	6
	Before	Dogwood	4.1	6	Grape	1	6
	Before				Honeysuckle	1	6
	Before	Dogwood	1.3	5	Honeysuckle	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
21	Before	Dogwood	1.1	6	Honeysuckle	1	6
	Before	Dogwood	0.9	5	Honeysuckle	1	5
	Before	Dogwood	2	6	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Dogwood	5.5	6	Grape	1	6
	Before				Honeysuckle	3	6
	After	Dogwood	1.4	5	Honeysuckle	1	5
	After	Dogwood	1.3	4	Honeysuckle	1	4
	After	Separated branch	1.6	3	Honeysuckle	1	6
	After	Bur oak	3.8	6	Mustang grape	1	6
	After				Honeysuckle	1	6
	After	Dogwood	1.3	6	Honeysuckle	1	6
22	Before	Dogwood	1.8	5	Honeysuckle	1	4
	Before	Dogwood	2.5	6	Honeysuckle	3	6
	Before	Dogwood	0.7	3	Honeysuckle	1	2
	Before	Dogwood	0.9	4	Honeysuckle	1	4
	Before	Dogwood	2	6	Honeysuckle	2	5
	Before	Dogwood	3.5	6	Honeysuckle	1	6
	Before	American elm	4	6	Honeysuckle	1	6
	Before	Dogwood	1.7	6	Honeysuckle	1	6
	After	Carolina buckthorn	0.6	4	Honeysuckle	1	4
	After	Mexican buckeye	1.9	6	Honeysuckle	1	4
	After	Mexican buckeye	1.4	5	Honeysuckle	1	5
	After	Dogwood	1.3	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
22	After	Coralberry	1.6	6	Honeysuckle	3	6
	After	Coralberry	1.6	6	Honeysuckle	3	6
	After	Coralberry	1.6	6	Honeysuckle	3	6
	After	Coralberry	1.6	6	Honeysuckle	3	6
	After	Coralberry	1.6	6	Honeysuckle	3	6
	After	Coralberry	1.6	6	Honeysuckle	3	6
	After	Coralberry	1.0	2	Honeysuckle	1	3
	After	Carolina buckthorn	0.6	2	Honeysuckle	1	2
	After	Dogwood	3.2	6	Honeysuckle	1	6
	After	Dogwood	2.5	6	Honeysuckle	2	6
	After	Dogwood	2.5	6	Honeysuckle	2	6
	After	Dogwood	2.5	6	Honeysuckle	2	6
	After	Dogwood	1.1	3	Honeysuckle	1	3
	After	Carolina buckthorn	1.0	3	Honeysuckle	1	3
	After	Carolina buckthorn	1.0	3	Honeysuckle	1	3
	After	Grape	3.2	6	Honeysuckle	1	6
	After	American elm	6.7	6	Honeysuckle	1	6
	After				Grape	1	6
	After	Dogwood	2.2	6	Honeysuckle	2	6
	After	Dogwood	5.1	6	Honeysuckle	2	6
26	Before	Privet	0.9	6	Honeysuckle	1	6
	Before	Grape	2.1	6	Honeysuckle	1	6
	Before	Cat briar	0.3	6	Honeysuckle	1	6
	After	Dogwood	0.6	6	Cat briar	3	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
26	After	Dogwood	1.6	6	Grape	1	6
	After	Dogwood	0.6	2	Honeysuckle	1	2
28	Before	Bur oak	3.1	6	Cat briar	1	6
	Before				Honeysuckle	2	6
	Before	Cedar elm	20.9	6	Grape	2	6
	Before				Honeysuckle	1	6
	Before	Grape	4.8	6	Honeysuckle	1	6
	Before				Cat briar	1	6
	Before	Grape	1.8	6	Honeysuckle	1	6
	Before				Cat briar	1	6
	Before	Dogwood	1	6	Cat briar	2	6
	Before				Honeysuckle	2	6
	Before	Shumard oak	7.4	6	Cat briar	2	6
	Before				Honeysuckle	2	6
	Before	Bur oak	3.5	6	Honeysuckle	2	6
	Before				Cat briar	1	6
	Before	Grape	2.8	6	Cat briar	2	6
	Before				Honeysuckle	4	6
	Before	Grape	0.9	6	Honeysuckle	1	6
	After	Grape	1.6	6	Honeysuckle	1	6
	After				Cat briar	1	6
	After	Grape	1.6	6	Honeysuckle	1	6
	After				Cat briar	1	6
	After	Grape	1.6	6	Honeysuckle	1	6
	After				Cat briar	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
28	After	American elm	2.2	6	Honeysuckle	1	6
	After	Cat briar	0.8	6	Honeysuckle	1	6
	After	American elm	16.2	6	Honeysuckle	1	6
	After	Dogwood	1.3	6	Honeysuckle	1	6
	After	Cat briar	0.8	6	Honeysuckle	1	6
	After	Cat briar	0.6	5	Honeysuckle	1	5
	After	Grape	1.9	6	Honeysuckle	2	6
	After	Mustang grape	2.9	6	Honeysuckle	1	6
	After	Dogwood	2.2	6	Honeysuckle	2	6
	After	Separated branch	2.5	2	Honeysuckle	1	6
30	Before	Ash juniper	2.5	6	Grape	1	6
	Before	Grape	1.4	6	Honeysuckle	1	6
	After	Ash juniper	2.5	6	Grape	1	6
	After	Grape	1.4	6	Honeysuckle	1	6
32	Before	Privet	2.3	6	Honeysuckle	1	6
	Before	Carolina buckthorn	3.8	6	Cat briar	1	6
	Before				Honeysuckle	2	6
	Before	Coralberry	1	3	Honeysuckle	2	3
	Before	Poison ivy	0.6	3	Honeysuckle	1	3
	Before	Privet	0.8	4	Honeysuckle	1	4
	After	Separated branch	1.3	6	Honeysuckle	3	6
	After	Privet	1.7	6	Honeysuckle	3	6
	After	Grape	2.0	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
33	Before	Privet	7.3	6	Honeysuckle	2	6
	Before	Grape	1.7	6	Honeysuckle	1	6
	Before	Grape	1.4	6	Honeysuckle	2	6
	Before	Sugarberry	4.9	6	Honeysuckle	4	6
	Before				Grape	1	6
	Before				Virginia creeper	1	6
	Before	Dogwood	0.7	4	Honeysuckle	1	4
	After	Cat briar	0.8	6	Honeysuckle	2	6
	After	Cat briar	0.7	6	Honeysuckle	1	6
	After	Grape	2.0	6	Honeysuckle	1	6
34	Before	Grape	1.5	4	Honeysuckle	2	4
	Before	Cottonwood	68.7	6	Grape	2	6
	Before				Virginia creeper	2	6
	Before				Poison ivy	4	6
	Before	Privet	1.5	6	Honeysuckle	5	6
	After	Sugarberry	1.0	3	Honeysuckle	1	3
	After	Grape	2.0	6	Honeysuckle	2	6
	After	Grape	2.0	6	Honeysuckle	2	6
	After	Chinaberry	3.0	6	Honeysuckle	5	6
	After	Chinaberry	4.9	6	Honeysuckle	2	6
35	Before	Privet	0.6	5	Honeysuckle	1	4
	Before	Privet	1.3	6	Honeysuckle	2	6
	Before	Cottonwood	17	6	Grape	1	6
	Before	Cat briar	0.5	5	Honeysuckle	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
35	Before	Privet	0.9	6	Honeysuckle	1	3
	Before				Cat briar	1	3
	After	Cat briar	0.9	6	Honeysuckle	1	4
	After	Dogwood	1.8	5	Honeysuckle	2	5
	After	Dogwood	0.7	5	Honeysuckle	2	5
36	Before	Privet	3.3	6	Honeysuckle	1	4
	Before	Privet	6.5	6	Honeysuckle	1	1
	Before				Virginia creeper	1	1
	After	Poison ivy	0.2	2	Honeysuckle	1	2
	After	Separated branch	0.8	1	Honeysuckle	1	1
37	Before	Privet	1.7	6	Honeysuckle	1	5
	Before	Box elder	3.7	6	Honeysuckle	1	6
	Before				Virginia creeper	1	6
	Before	Box elder	13.3	6	Virginia creeper	5	6
	Before	Dogwood	1	6	Honeysuckle	1	6
	Before	Coralberry	1.4	4	Honeysuckle	1	4
	Before	Box elder	10.9	6	Honeysuckle	1	5
	Before	Box elder	4.4	6	Honeysuckle	4	6
	Before	Privet	2.7	6	Honeysuckle	1	6
	Before	Separated branch	17	6	Honeysuckle	2	6
	After	Privet	1.8	6	Honeysuckle	2	6
	After	Privet	2.0	6	Honeysuckle	1	6
	After	Poison ivy	0.4	1	Honeysuckle	1	1

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
37	After	Poison ivy	1.4	2	Honeysuckle	1	2
	After	Poison ivy	0.6	2	Honeysuckle	1	2
	After	Cat briar	0.6	6	Honeysuckle	1	6
	After	Poison ivy	0.4	1	Honeysuckle	1	1
	After	Carolina buckthorn	0.6	3	Honeysuckle	1	3
	After	Privet	2.8	6	Honeysuckle	2	6
	After	Separated branch	1.8	6	Honeysuckle	2	6
	After	Separated branch	1.8	6	Honeysuckle	2	6
	After	Separated branch	1.8	6	Honeysuckle	2	6
38	Before	Carolina buckthorn	1	5	Honeysuckle	2	4
	Before	Carolina buckthorn	1.8	6	Honeysuckle	2	6
	Before	Carolina buckthorn	2.5	6	Honeysuckle	1	6
	Before	Dogwood	2.4	6	Honeysuckle	3	6
	Before	Carolina buckthorn	1.5	5	Honeysuckle	2	4
	Before	Dogwood	1.7	5	Honeysuckle	3	5
	Before	Carolina buckthorn	1.9	6	Honeysuckle	1	6
	Before	Carolina buckthorn	1.1	6	Honeysuckle	1	4
	After	Carolina buckthorn	0.7	4	Honeysuckle	1	3
	After	Carolina buckthorn	0.7	5	Honeysuckle	1	5
	After	Carolina buckthorn	1.5	5	Honeysuckle	3	5
	After	Shumard oak	0.9	5	Honeysuckle	2	5
	After	Carolina buckthorn	4.0	6	Honeysuckle	3	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
38	After	Carolina buckthorn	3.3	6	Honeysuckle	1	6
	After	Carolina buckthorn	0.6	3	Honeysuckle	1	3
	After	Carolina buckthorn	0.5	2	Honeysuckle	1	2
	After	Carolina buckthorn	0.6	3	Honeysuckle	1	3
	After	Carolina buckthorn	0.6	3	Honeysuckle	1	3
	After	Carolina buckthorn	1.0	5	Honeysuckle	2	5
	After	Poison ivy	0.6	2	Honeysuckle	1	2
	After	Privet	2.5	6	Honeysuckle	2	6
	After	Poison ivy	0.4	2	Honeysuckle	1	2
39	Before	Dogwood	1.9	6	Honeysuckle	3	6
	Before				Cat briar	3	6
	Before	Dogwood	4.5	6	Honeysuckle	2	6
	Before	Dogwood	1.3	3	Honeysuckle	2	3
	Before	Carolina buckthorn	1.8	6	Honeysuckle	1	5
	After	Sugarberry	6.7	6	Honeysuckle	2	6
	After	Poison ivy	1.2	5	Honeysuckle	1	5
	After	Carolina buckthorn	0.7	4	Honeysuckle	1	4
	After	Poison ivy	0.4	2	Honeysuckle	1	2
	After	Sugarberry	0.4	4	Honeysuckle	2	4
	After	Box elder	2.1	6	Honeysuckle	1	6
41	Before	Dogwood	3	6	Honeysuckle	1	5
	Before	Dogwood	2.2	6	Honeysuckle	3	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
41	Before	American elm	1.8	6	Honeysuckle	2	5
	After	Carolina buckthorn	0.4	2	Honeysuckle	2	3
	After	Carolina buckthorn	0.5	4	Honeysuckle	1	4
	After	Carolina buckthorn	0.5	4	Honeysuckle	1	4
	After	Carolina buckthorn	0.5	4	Honeysuckle	1	4
	After	Carolina buckthorn	0.6	4	Honeysuckle	1	4
	After	Carolina buckthorn	2.6	6	Honeysuckle	2	6
	After	Carolina buckthorn	1.4	5	Honeysuckle	2	5
	After	Carolina buckthorn	0.9	6	Honeysuckle	1	6
	After	Carolina buckthorn	0.6	5	Honeysuckle	2	5
42	Before	Dogwood	0.7	5	Honeysuckle	1	4
	Before	Dogwood	0.3	4	Honeysuckle	1	2
	Before	Privet	0.3	5	Honeysuckle	1	3
	Before	Carolina buckthorn	0.4	3	Honeysuckle	1	2
	Before	American elm	5.7	6	Honeysuckle	3	6
	Before	Dogwood	0.4	4	Honeysuckle	1	3
	Before	Coralberry	0.5	4	Honeysuckle	2	4
	After	Dogwood	2.6	6	Honeysuckle	2	6
	After	Privet	0.6	5	Honeysuckle	1	5
43	Before	Dogwood	0.5	4	Honeysuckle	1	3
	Before	Dogwood	2	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plo t	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
43	Before	Dogwood	1	4	Honeysuckle	1	4
	Before	Dogwood	1.2	5	Honeysuckle	2	5
	Before	Dogwood	1.8	6	Honeysuckle	1	5
	After	Dogwood	2.0	6	Honeysuckle	1	6
	After	dogwood	3.2	6	Honeysuckle	2	6
	After	Separated branch	1.5	6	Honeysuckle	2	6
	After	Grape	0.6	6	Honeysuckle	2	6
	After	Dogwood	2.0	6	Honeysuckle	1	6
44	Before	Carolina buckthorn	2.1	6	Honeysuckle	1	6
	Before	Carolina buckthorn	4.3	6	Honeysuckle	2	4
	After	Carolina buckthorn	0.6	2	Honeysuckle	1	2
	After	Chinaberry	0.4	2	Honeysuckle	1	2
	After	Poison ivy	0.4	3	Honeysuckle	1	3
	After	Poison ivy	0.4	3	Honeysuckle	1	3
	After	Chinaberry	0.5	3	Honeysuckle	1	3
	After	Coralberry	0.7	5	Honeysuckle	1	5
	After	Dogwood	3.8	6	Honeysuckle	4	6
45	Before	Dogwood	3.6	6	Honeysuckle	2	6
	Before	Dogwood	0.8	6	Honeysuckle	2	4
	Before	White ash	0.3	3	Honeysuckle	1	3
	Before	White ash	0.4	3	Cat briar	1	3
	Before				Honeysuckle	1	5
	Before	Dogwood	0.6	5	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
45	Before	Mustang grape	1.9	6	Honeysuckle	2	6
	Before	Dogwood	1.3	6	Honeysuckle	2	6
	Before	Mustang grape	1	6	Honeysuckle	1	6
	Before	Mustang grape	2.3	6	Honeysuckle	1	6
	Before	Dogwood	0.9	4	Honeysuckle	1	4
	Before	Privet	1.5	6	Honeysuckle	1	4
	Before	Dogwood	0.5	4	Honeysuckle	1	3
	Before	Privet	1.2	6	Honeysuckle	2	4
	Before	Dogwood	0.5	5	Honeysuckle	2	5
	Before	Dogwood	0.6	5	Honeysuckle	3	5
	Before	Dogwood	1	5	Honeysuckle	1	4
	After	Bur oak	0.5	4	Honeysuckle	1	4
	After	Texas ash	1.4	6	Honeysuckle	2	4
	After	Privet	0.3	3	Honeysuckle	1	3
	After	Poison ivy	0.6	3	Honeysuckle	1	3
	After	Poison ivy	0.5	3	Honeysuckle	1	3
	After	Texas walnut	0.8	3	Honeysuckle	1	3
	After				Cat briar	1	3
	After	Mustang grape	1.2	6	Honeysuckle	2	6
52	Before	Grape	0.8	6	Honeysuckle	1	6
	Before	Dogwood	2.2	4	Honeysuckle	2	5
	Before				Cat briar	1	6
	Before	Grape	1.1	6	Honeysuckle	1	6
	Before	Carolina buckthorn	5.9	6	Honeysuckle	8	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
52	Before	Carolina buckthorn	2	6	Honeysuckle	7	6
	Before	Poison ivy	0.3	2	Honeysuckle	1	2
	Before	Dogwood	1.1	6	Honeysuckle	1	6
	Before	American elm	2	6	Honeysuckle	2	6
	Before	Poison ivy	0.3	2	Honeysuckle	1	2
	Before	Cat briar	0.25	3	Honeysuckle	1	3
	Before	Eve's necklace	1	4	Honeysuckle	1	3
	Before	Box elder	9.3	6	Honeysuckle	1	6
	Before	Box elder	9.3	6	Honeysuckle	1	6
	After	Dogwood	0.9	3	Honeysuckle	1	3
	After	Dogwood	1.0	5	Honeysuckle	1	5
	After	Dogwood	0.9	5	Honeysuckle	1	3
	After	Separated branch	1.7	3	Honeysuckle	1	3
	After	Dogwood	0.9	5	Honeysuckle	2	5
	After	Dogwood	1.4	6	Honeysuckle	1	3
	After	Dogwood	1.9	6	Honeysuckle	1	6
	After	Poison ivy	0.8	3	Honeysuckle	1	3
	After	Dogwood	1.0	6	Honeysuckle	1	3
	After	Poison ivy	0.9	3	Honeysuckle	1	3
	After	Dogwood	2.8	6	Honeysuckle	1	6
	After	Ragweed	0.6	4	Honeysuckle	1	4
	After	Dogwood	0.4	5	Honeysuckle	1	5
	After	Dogwood	1.2	5	Honeysuckle	2	5
	After	Poison ivy	1.0	5	Honeysuckle	1	5
	After	Dogwood	2.0	6	Honeysuckle	1	6
	After	Dogwood	1.2	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
55	Before	Dogwood	2.8	6	Honeysuckle	2	4
	Before	Dogwood	1.4	5	Honeysuckle	1	5
	Before	Dogwood	0.9	6	Honeysuckle	1	6
	Before	Grape	1.6	6	Honeysuckle	1	5
	Before	Chinaberry	2.7	6	Honeysuckle	3	5
	Before	White ash	17	6	Honeysuckle	5	6
	After	Dogwood	2.5	6	Honeysuckle	1	6
	After	Dogwood	3.0	6	Honeysuckle	2	6
	After	Dogwood	1.5	6	Honeysuckle	1	2
	After	Dogwood	1.5	6	Honeysuckle	1	2
	After	Dogwood	1.0	4	Honeysuckle	1	4
	After	Dogwood	1.6	4	Honeysuckle	1	4
	After	Dogwood	1.8	6	Honeysuckle	1	4
	After	Dogwood	1.4	5	Honeysuckle	1	3
	After	Dogwood	2.5	6	Honeysuckle	2	6
	After	Dogwood	0.4	4	Honeysuckle	1	3
	After	Dogwood	2.4	6	Honeysuckle	2	6
	After	Dogwood	2.4	6	Honeysuckle	2	6
	After	Dogwood	2.4	6	Honeysuckle	2	6
	After	Grape	1.2	6	Honeysuckle	1	6
	After	Dogwood	1.9	6	Honeysuckle	1	4
	After	Texas walnut	0.7	4	Honeysuckle	1	3
	After	Dogwood	1.1	3	Honeysuckle	2	3
57	Before	Dogwood	1.8	6	Honeysuckle	2	5
	Before	Dogwood	2.5	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
57	Before	Dogwood	0.3	3	Honeysuckle	1	3
	Before	Carolina buckthorn	6	6	Honeysuckle	1	5
	Before	Carolina buckthorn	1.4	5	Honeysuckle	1	5
	Before	Carolina buckthorn	0.9	4	Honeysuckle	1	3
	Before	American elm	2.8	6	Honeysuckle	1	6
	Before	Dogwood	1.5	6	Honeysuckle	1	6
	Before	Dogwood	1.4	5	Honeysuckle	3	5
	Before	Cedar elm	5.9	6	Honeysuckle	2	5
	Before	Cedar elm	1.2	4	Honeysuckle	1	4
	Before	Dogwood	4.9	4	Honeysuckle	1	4
	Before	Dogwood	1.7	6	Honeysuckle	1	6
	Before	Grape	1.7	6	Honeysuckle	1	6
	Before	Grape	0.7	6	Honeysuckle	2	6
	After	Carolina buckthorn	1.4	5	Honeysuckle	1	5
	After	Separated branch	2.0	3	Honeysuckle	3	3
	After	Carolina buckthorn	1.3	6	Honeysuckle	1	5
	After	Dogwood	1.1	6	Honeysuckle	1	6
	After	Shumard oak	1.6	6	Honeysuckle	1	6
	After	Dogwood	1.9	6	Honeysuckle	1	6
	After	Dogwood	1.6	5	Honeysuckle	1	5
	After	Carolina buckthorn	2.0	5	Honeysuckle	1	5
	After	Carolina buckthorn	1.5	3	Honeysuckle	2	3
	After	Dogwood	1.3	4	Honeysuckle	1	4
	After	Dogwood	1.2	5	Honeysuckle	1	5

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
58	Before	Dogwood	1.2	6	Honeysuckle	1	6
	Before	Carolina buckthorn	10.1	6	Honeysuckle	3	6
	Before	Dogwood	3.9	6	Honeysuckle	3	6
	Before	Mustang Grape	1.1	6	Honeysuckle	2	6
	Before	Dogwood	0.9	4	Honeysuckle	2	4
	Before	Carolina buckthorn	1.1	5	Honeysuckle	1	4
	Before	Sugar hackberry	0.4	4	Honeysuckle	1	4
	After	Post oak	1.9	6	Honeysuckle	1	6
	After	Post oak	2.5	6	Honeysuckle	3	6
	After	Texas walnut	3.5	6	Honeysuckle	6	6
	After	Texas walnut	2.5	6	Honeysuckle	2	6
	After	Texas walnut	3.3	6	Honeysuckle	1	6
	After	Dogwood	2.7	6	Honeysuckle	3	6
	After	Dogwood	0.9	4	Honeysuckle	2	4
	After	Poison ivy	0.8	3	Honeysuckle	1	3
	After	Dogwood	4.5	6	Honeysuckle	3	6
	After	Mustang grape	0.7	6	Honeysuckle	1	6
	After	Texas walnut	2.0	4	Honeysuckle	1	4
59	Before	Privet	1.4	6	Honeysuckle	1	6
	Before	Carolina buckthorn	4.6	6	Honeysuckle	2	6
	Before	Dogwood	1.2	4	Honeysuckle	2	6
	Before	Dogwood	0.9	5	Honeysuckle	1	3
	Before	Dogwood	1.4	6	Honeysuckle	2	4
	Before	Dogwood	0.4	4	Honeysuckle	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
59	After	Dogwood	1.2	6	Honeysuckle	1	6
	After	Carolina buckthorn	1.0	6	Honeysuckle	1	6
	After	Poison ivy	0.4	2	Honeysuckle	1	2
	After	Mustang grape	0.3	6	Honeysuckle	1	6
	After	Carolina buckthorn	3.5	6	Honeysuckle	2	6
	After	Carolina buckthorn	1.8	6	Honeysuckle	2	6
	After	Dogwood	0.9	5	Honeysuckle	1	5
	After	Dogwood	1.2	5	Honeysuckle	1	5
	After	Carolina buckthorn	1.0	2	Honeysuckle	1	2
	After	Dogwood	1.2	5	Honeysuckle	1	5
	After	Ash juniper	2.4	6	Honeysuckle	1	6
60	Before	Cedar Elm	4.9	6	Cat briar	6	6
	Before	Cottonwood	7.4	6	Cat briar	2	6
	Before	Privet	3.1	6	Cat briar	2	6
	After	Poison ivy	1.0	4	Cat briar	1	4
77	Before	Winged elm	8.5	6	Cat briar	1	6
	Before				Virginia creeper	2	6
	Before	Separated branch	1.2	5	Cat briar	2	5
	Before	Grape	1.3	6	Honeysuckle	1	6
	Before				Cat briar	2	6
	Before	Separated branch	1.2	6	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Separated branch	1.2	2	Honeysuckle	1	2

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
77	Before	Dogwood	0.8	5	Cat briar	1	5
	Before				Honeysuckle	1	5
	Before	Dogwood	0.8	5	Cat briar	1	5
	Before				Honeysuckle	1	5
	Before	Dogwood	0.8	5	Cat briar	1	5
	Before				Honeysuckle	1	5
	Before	Mexican buckeye	1.3	4	Honeysuckle	2	5
	After	Separated branch	0.6	2	Honeysuckle	1	2
	After	Barbed wire	0.7	6	Honeysuckle	3	6
	After	Grape	1.8	6	Honeysuckle	2	6
	After	Separated branch	1.5	5	Grape	1	6
	After				Honeysuckle	2	6
	After	Grape	0.8	6	Honeysuckle	1	6
	After	Separated branch	0.9	5	Honeysuckle	1	4
	After	Cedar elm	1.5	6	Honeysuckle	1	6
	After	Carolina buckthorn	0.8	4	Cat briar	2	4
	After				Honeysuckle	2	4
	After	Sugar hackberry	0.6	3	Honeysuckle	1	4
	After	Privet	2.5	6	Honeysuckle	2	6
	After	Coralberry	2.8	6	Virginia creeper	1	6
	After				Honeysuckle	1	6
	After	Privet	2.1	6	Honeysuckle	2	6
	After	Cedar elm	5.0	6	Grape	1	6
	After				Honeysuckle	1	6
	After	Cedar elm	3.5	6	Honeysuckle	1	6
	After	Briar	0.6	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
77	After	Separated branch	2.1	5	Honeysuckle	2	5
78	Before	Dogwood	1.6	5	Honeysuckle	2	5
	Before	Carolina buckthorn	1.5	4	Honeysuckle	1	4
	Before	Separated branch	1.3	4	Honeysuckle	1	4
	Before	Carolina buckthorn	0.6	2	Honeysuckle	1	2
	After	Grape vine	1.5	6	Honeysuckle	1	6
	After	Dogwood	1.2	4	Honeysuckle	3	5
	After	Carolina buckthorn	0.8	4	Honeysuckle	2	4
	After	Cedar elm	1.5	6	Honeysuckle	1	3
	After	Cedar elm	1.0	4	Honeysuckle	1	4
	After	Carolina buckthorn	0.6	3	Honeysuckle	1	2
	After	Separated branch	1.4	4	Honeysuckle	1	4
	After	Carolina buckthorn	0.7	3	Honeysuckle	1	2
401	Before	Cat brair	0.8	6	Honeysuckle	2	6
	Before	Cat brair	0.8	6	Honeysuckle	2	6
	Before	Cedar elm	7	6	Honeysuckle	2	6
	After	Dogwood	1.0	5	Cat briar	1	6
	After	Dogwood	0.7	5	Honeysuckle	1	5
	After	Dogwood	0.6	5	Honeysuckle	1	5
	After	Dogwood	0.9	5	Honeysuckle	1	5
	After	Dogwood	0.9	3	Honeysuckle	1	4
	After	Dogwood	0.6	4	Honeysuckle	1	4
	After	Dogwood	1.2	4	Honeysuckle	2	4

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
401	After	Cat briar	0.8	4	Honeysuckle	1	4
	After	Mexican buckeye	1.1	6	Cat briar	2	6
	After	Dogwood	2.4	4	Honeysuckle	1	4
	After	Poison ivy	0.9	3	Honeysuckle	1	3
	After	Grape vine	0.7	6	Cat briar	2	6
	After	Dogwood	0.5	4	Honeysuckle	1	4
	After	Dogwood	0.9	5	Honeysuckle	1	5
	After				Cat briar	2	5
	After	Cedar elm	8.0	6	Grape	2	6
	After				Virginia creeper	1	6
402	Before	Separated branch	1.4	3	Honeysuckle	3	5
	Before	Separated branch	2	3	Honeysuckle	2	6
	Before	Poison ivy	0.5	3	Honeysuckle	1	3
	Before	Mexican buckeye	0.7	2	Honeysuckle	1	2
	After	Separated branch	0.9	4	Honeysuckle	2	4
	After	Grape	1.6	6	Honeysuckle	1	6
	After	Separated branch	1.3	5	Honeysuckle	1	6
	After				Grape	1	6
	After	Sugar hackberry	2.1	6	Honeysuckle	1	6
403	Before	Poison ivy	0.6	2	Honeysuckle	1	2
	Before	Privet	0.6	3	Honeysuckle	1	3
	Before	Privet	0.6	3	Honeysuckle	1	3
	Before	Poison ivy	0.6	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
403	Before	Carolina buckthorn	4.4	6	Honeysuckle	2	6
	After	Ragweed	0.6	2	Honeysuckle	1	2
	After	Black hickory	0.4	2	Honeysuckle	1	2
404	Before	Cedar elm	2.4	6	Honeysuckle	1	6
	Before	Texas walnut	0.9	3	Honeysuckle	2	3
	Before	Texas walnut	0.9	3	Honeysuckle	2	3
	Before	Texas walnut	0.9	3	Honeysuckle	2	3
	Before	Texas walnut	0.9	3	Honeysuckle	2	3
	Before	Poison ivy	0.4	2	Honeysuckle	2	2
	Before	Cedar elm	2.5	6	Honeysuckle	3	6
	Before	Coralberry	0.9	4	Honeysuckle	1	4
	After	Osage orange	0.4	3	Honeysuckle	1	3
	After	Black hickory	0.4	2	Honeysuckle	1	2
	After	Cedar elm	2.6	5	Honeysuckle	1	2
	After	Black hickory	0.4	3	Honeysuckle	1	2
405	Before	Sugarberry	6.9	6	Honeysuckle	5	6
	Before	Cedar elm	4.2	6	Cat briar	1	6
	Before				Honeysuckle	4	6
	Before	Cedar elm	2.3	6	Honeysuckle	3	6
	Before	Cedar elm	2.4	6	Honeysuckle	2	6
	Before	Separated branch	1.4	4	Honeysuckle	1	4
	Before	Separated branch	1.4	4	Honeysuckle	1	4
	Before	Separated branch	1	4	Cat briar	1	4
	Before	Carolina buckthorn	0.9	3	Honeysuckle	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
405	Before	Mexican buckeye	2.4	6	Honeysuckle	2	6
	Before	Mexican buckeye	2.4	6	Honeysuckle	2	6
	After	Poison ivy	0.4	2	Honeysuckle	1	2
	After	Poison ivy	0.5	3	Honeysuckle	1	3
	After	Poison ivy	0.4	2	Honeysuckle	1	2
	After	Poison ivy	0.5	2	Honeysuckle	1	2
	After	Carolina buckthorn	0.8	4	Honeysuckle	1	4
	After	Poison ivy	0.3	2	Honeysuckle	1	2
	After	Poison ivy	0.3	2	Honeysuckle	1	2
	After	Poison ivy	0.5	2	Honeysuckle	1	2
	After	Poison ivy	0.6	3	Honeysuckle	1	2
	After	Poison ivy	0.3	2	Honeysuckle	1	2
	After	Poison ivy	0.3	2	Honeysuckle	1	2
	After	Privet	0.5	4	Honeysuckle	1	4
	After	Privet	0.5	4	Honeysuckle	2	4
	After	Privet	0.4	4	Honeysuckle	1	4
	After	Poison ivy	0.4	3	Honeysuckle	1	3
	After	Separated branch	0.9	3	Honeysuckle	1	3
	After	Poison ivy	0.5	3	Honeysuckle	1	3
	After	Poison ivy	0.6	3	Honeysuckle	2	3
	After	Separated branch	1.2	3	Honeysuckle	2	3
406	Before	Dogwood	1.6	6	Cat briar	1	6
	Before	Dogwood	1.7	5	Honeysuckle	2	5
	Before	Dogwood	3	6	Honeysuckle	2	6
	Before	Dogwood	3	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
406	Before	Poison ivy	1.4	4	Honeysuckle	1	4
	Before	Dogwood	2.6	6	Honeysuckle	2	6
	Before	Dogwood	3.5	6	Honeysuckle	1	6
	Before	Sugarberry	1.7	6	Honeysuckle	2	6
	Before	Dogwood	2.4	6	Honeysuckle	2	6
	Before	Dogwood	1.3	2	Honeysuckle	1	2
	Before	Dogwood	2.1	6	Honeysuckle	4	6
	After	Dogwood	0.6	2	Honeysuckle	1	2
	After	Poison ivy	0.5	2	Honeysuckle	1	2
	After	Dogwood	0.6	2	Honeysuckle	1	2
407	Before	Coralberry	0.3	4	Honeysuckle	1	4
	Before	Carolina buckthorn	2.2	6	Honeysuckle	1	6
	After	Osage orange	0.7	4	Honeysuckle	1	4
	After	Carolina buckthorn	0.5	3	Honeysuckle	1	3
	After	Carolina buckthorn	0.4	2	Honeysuckle	1	2
	After	Carolina buckthorn	0.9	3	Honeysuckle	1	3
408	Before	Separated branch	1	2	Honeysuckle	1	2
	Before	Mustang grape	1.3	4	Honeysuckle	1	6
	Before	Sugarberry	12	6	Cat briar	1	6
	Before				Mustang grape	1	6
	After	Carolina buckthorn	0.6	5	Cat briar	1	5
	After				Honeysuckle	2	5
	After	Dogwood	1.2	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
408	After	Privet	0.4	5	Honeysuckle	1	5
	After	Privet	0.5	4	Honeysuckle	1	4
	After	Privet	0.4	3	Honeysuckle	1	3
	After	Privet	0.4	3	Honeysuckle	1	3
	After	Carolina buckthorn	0.7	4	Honeysuckle	1	4
	After	Separated branch	0.8	3	Honeysuckle	1	3
	After	Texas walnut	0.6	2	Honeysuckle	1	2
	After	Privet	1.4	2	Honeysuckle	1	3
409	Before	Carolina buckthorn	0.3	1	Honeysuckle	1	1
	Before	Carolina buckthorn	0.3	1	Honeysuckle	1	1
	After	Dogwood	0.8	4	Honeysuckle	1	4
	After	Dogwood	3.0	6	Poison ivy	2	6
	After	Poison ivy	0.3	3	Cat briar	1	3
410	Before	Dogwood	2.7	6	Honeysuckle	2	6
	Before	Nandina	1.3	6	Cat briar	1	6
	Before	Dogwood	1.1	6	Honeysuckle	1	6
	Before	Dogwood	1.1	6	Honeysuckle	1	6
	Before	Dogwood	1.2	6	Honeysuckle	2	6
	Before	Sugar hackberry	0.4	2	Honeysuckle	1	2
	Before	Sugar hackberry	0.4	2	Honeysuckle	1	2
	Before	Dogwood	2.1	4	Honeysuckle	1	4
	Before	Dogwood	0.9	4	Honeysuckle	1	4
	Before	Dogwood	1.2	4	Honeysuckle	2	4

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
410	Before	Nandina	0.2	3	Honeysuckle	1	3
	After	Sugar hackberry	0.4	3	Honeysuckle	1	3
	After	Dogwood	0.7	4	Honeysuckle	1	4
80	Before	Nandina	1	6	Honeysuckle	1	6
	Before	Nandina	0.9	5	Honeysuckle	1	5
	Before	Nandina	1.1	5	Honeysuckle	1	5
	Before	Nandina	1.3	5	Honeysuckle	1	5
	Before				Cat briar	1	5
	After	Nandina	0.8	4	Honeysuckle	2	5
	After	Cat briar	0.3	5	Honeysuckle	1	5
	After	Nandina	0.8	4	Honeysuckle	2	4
	After	Privet	0.4	3	Honeysuckle	1	3
	After	Nandina	0.9	2	Honeysuckle	1	2
	After	Separated branch	2.1	5	Honeysuckle	3	5
	After	Nandina	0.8	4	Honeysuckle	2	4
81	Before	Privet	1.6	6	Cat briar	1	6
	Before	Cedar elm	4.3	6	Cat briar	3	6
	Before				Honeysuckle	1	6
	Before	Cedar elm	3.9	6	Cat briar	1	6
	Before	Cedar elm	4.8	6	Cat briar	1	6
	Before	Privet	5.3	6	Cat briar	3	6
	After	Separated branch	1.2	4	Cat briar	3	6
	After	Grape	0.5	6	Honeysuckle	1	6
	After	Cat briar	0.8	6	Grape	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
81	After	Cat briar	0.4	6	Grape	1	6
	After	Sassafra	5.5	6	Grape	1	6
	After				Honeysuckle	1	6
	After	Cat briar	1.2	6	Honeysuckle	1	6
	After	Cat briar	1.0	6	Honeysuckle	1	6
	After	Cat briar	0.3	5	Honeysuckle	1	5
	After	Separated branch	0.8	4	Honeysuckle	1	4
82	Before	Bur oak	3.3	6	Cat briar	1	6
	Before	Coralberry	2.1	6	Cat briar	2	6
	Before	Privet	5.5	6	Cat briar	3	6
	Before				Honeysuckle	2	6
84	Before	Coralberry	4.8	6	Honeysuckle	1	6
	Before	Grape	1.1	6	Honeysuckle	1	6
	Before	Grape	1.6	6	Honeysuckle	1	6
	Before	Grape	3.5	6	Honeysuckle	1	6
	Before	Nandina	1.2	6	Honeysuckle	1	6
	Before	Ash juniper	6.8	6	Honeysuckle	3	6
	After	Nandina	1.4	5	Honeysuckle	1	5
	After	Sugarberry	4.8	6	Honeysuckle	2	6
	After	Sugarberry	1.3	5	Honeysuckle	2	6
92	Before	Separated branch	0.6	6	Honeysuckle	1	6
	Before	Privet	1.3	5	Honeysuckle	2	5
	Before	Shumard oak	2.9	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
92	Before	Separated branch	0.6	3	Honeysuckle	1	3
	After	Shumard oak	1.2	6	Honeysuckle	2	5
	After	Shumard oak	2.6	6	Honeysuckle	1	6
	After	Privet	1.3	6	Honeysuckle	3	6
	After	Shumard oak	2.3	6	Honeysuckle	1	6
	After	Nandina	1.0	5	Honeysuckle	1	2
	After	Separated branch	3.3	6	Honeysuckle	1	6
	After				Cat briar	2	6
96	Before	Carolina buckthorn	5.4	6	Honeysuckle	1	6
	Before	Carolina buckthorn	3.2	6	Honeysuckle	2	6
	Before	Ash juniper	3.8	6	Honeysuckle	3	6
	Before	Separated branch	1.0	2	Honeysuckle	1	6
	Before	Ash juniper	3.5	6	Honeysuckle	1	6
	Before	Privet	0.8	6	Honeysuckle	1	6
	Before	Carolina buckthorn	0.8	6	Honeysuckle	1	6
	After	Red mulberry	1.0	5	Honeysuckle	2	5
	After	Red mulberry	1.5	5	Honeysuckle	4	5
	After	Separated branch	1.9	6	Honeysuckle	3	6
	After	Separated branch	3.9	6	Honeysuckle	1	6
	After	Ash juniper	4.0	6	Honeysuckle	3	6
	After	Carolina buckthorn	1.9	6	Honeysuckle	2	6
	After	Nandina	1.2	4	Honeysuckle	2	4
	After	Ash juniper	1.7	5	Honeysuckle	1	5
	After	Privet	1.3	6	Honeysuckle	3	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
96	After	Privet	1.4	6	Honeysuckle	4	6
	After	Privet	1.0	5	Honeysuckle	2	5
	After	Carolina buckthorn	5.1	6	Honeysuckle	1	6
108	Before	Sugarberry	4	6	Honeysuckle	2	6
	Before	Privet	3.4	6	Honeysuckle	1	6
	Before	Texas ash	0.9	3	Honeysuckle	1	3
	Before	Nandina	1.2	6	Honeysuckle	2	6
	Before	Black hickory	1.2	6	Honeysuckle	1	4
	Before	Black hickory	1.2	6	Honeysuckle	1	4
	Before	Coralberry	0.8	3	Honeysuckle	1	3
	Before	Black hickory	2.2	6	Honeysuckle	1	4
	After	Cedar elm	3.9	6	Honeysuckle	2	6
	After	Privet	2.9	6	Honeysuckle	1	6
	After	Privet	1.2	6	Cat briar	1	6
	After	Sugarberry	0.7	6	Honeysuckle	1	6
	After	Nandina	1.8	5	Honeysuckle	1	5
	After	Black hickory	1.2	6	Honeysuckle	1	4
	After	Osage orange	0.8	5	Cat briar	2	5
	After	Nandina	1.8	6	Honeysuckle	1	5
	After	Coralberry	0.7	2	Honeysuckle	2	2
	After	Black hickory	1.4	6	Honeysuckle	1	4
109	Before	Separated branch	2.2	4	Honeysuckle	1	4
	Before	Privet	1.2	5	Honeysuckle	2	5
	Before	Privet	1.2	5	Honeysuckle	2	5

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
109	After	Osage orange	0.5	5	Honeysuckle	2	5
	After	Sugarberry	1.4	2	Honeysuckle	1	2
	After	Nandina	1.2	5	Honeysuckle	1	5
	After	Black hickory	0.8	2	Honeysuckle	1	2
	After	Privet	0.7	5	Honeysuckle	1	5
	After	Privet	1.2	5	Honeysuckle	2	5
138	Before	Texas ash	0.3	1	Cat briar	1	1
	Before	Carolina buckthorn	1.0	6	Cat briar	2	6
	Before	Texas ash	0.6	2	Cat briar	2	2
	Before	Carolina buckthorn	1.9	6	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Separated branch	1.3	4	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Shumard oak	1.0	5	Cat briar	2	5
	After	Texas ash	1.0	4	Honeysuckle	1	3
	After	Carolina buckthorn	1.0	6	Cat briar	2	6
	After	Texas ash	0.7	3	Cat briar	1	3
	After	Texas ash	1.7	6	Cat briar	1	6
139	Before	Red mulberry	2.2	6	Honeysuckle	2	6
	Before	Red mulberry	1.3	6	Honeysuckle	2	6
	Before				Cat briar	1	6
	Before	Coralberry	1.6	2	Honeysuckle	1	2
	Before	Coralberry	1.6	2	Honeysuckle	1	2

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
139	After	Red mulberry	0.8	4	Honeysuckle	1	4
	After	Red mulberry	2.3	6	Honeysuckle	2	6
	After	Red mulberry	1.1	5	Honeysuckle	1	5
	After	Nandina	1.3	5	Honeysuckle	1	5
	After	Privet	1.2	6	Honeysuckle	1	6
	After				Cat briar	1	3
140	Before	Black locust	2.3	6	Honeysuckle	2	6
	Before	Texas ash	0.6	5	Honeysuckle	3	5
	Before	Texas ash	1.6	5	Honeysuckle	2	5
	Before	Texas ash	1.5	6	Honeysuckle	1	6
	Before	Shumard oak	0.5	3	Honeysuckle	1	3
	Before	Shumard oak	1	5	Honeysuckle	2	5
	Before	Texas ash	0.8	4	Cat briar	1	4
	Before				Honeysuckle	2	4
	Before	Texas ash	1.5	5	Honeysuckle	1	5
	Before				Cat briar	2	5
	Before	White ash	0.3	2	Honeysuckle	1	1
	Before	Shumard oak	0.2	2	Honeysuckle	1	1
	Before	Texas ash	2	6	Honeysuckle	2	2
	Before				Cat briar	1	1
	After	Texas ash	0.7	4	Honeysuckle	1	4
	After	Cat briar	0.4	6	Honeysuckle	1	4
	After	Cat briar	0.4	6	Honeysuckle	1	4
	After	Nandina	0.9	4	Honeysuckle	1	4
	After	Eve's necklace	0.5	6	Honeysuckle	1	5

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
140	After	Shumard oak	1.1	6	Honeysuckle	1	6
	After	Sugarberry	2.1	6	Honeysuckle	1	6
	After				Cat briar	2	6
142	Before	Black locust	1.8	6	Honeysuckle	2	6
	Before	Chinaberry	2	6	Honeysuckle	2	6
	Before	Chinaberry	3.4	6	Honeysuckle	1	6
	Before				Cat briar	1	6
	Before	Cat briar	0.6	6	Honeysuckle	1	6
	Before	Nandina	1	6	Honeysuckle	1	6
	Before	Nandina	0.7	6	Honeysuckle	1	6
	Before	Cat briar	0.4	6	Honeysuckle	2	6
	After	Carolina buckthorn	1.0	5	Honeysuckle	1	5
	After	Nandina	1.1	5	Honeysuckle	1	5
	After	Nandina	0.9	6	Honeysuckle	1	6
	After	Cat briar	0.6	6	Honeysuckle	1	6
	After	Sugarberry	1.9	6	Honeysuckle	2	6
	After	Chinaberry	2.2	6	Honeysuckle	1	4
	After	Chinaberry	3.8	6	Honeysuckle	1	6
	After	Nandina	1.2	6	Honeysuckle	1	3
	After	Nandina	1.1	6	Honeysuckle	1	5
143	Before	Separated branch	2.5	6	Cat briar	3	6
	Before	Shumard oak	0.8	3	Honeysuckle	1	3
	Before	Shumard oak	0.8	3	Honeysuckle	1	3
	Before	Cat briar	1.1	3	Honeysuckle	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
143	Before	Carolina buckthorn	2.7	6	Honeysuckle	2	6
	Before				Cat briar	1	6
145	Before	Poison ivy	0.3	1	Honeysuckle	1	1
148	Before	Carolina buckthorn	4.8	6	Honeysuckle	1	6
	Before	Sugar hackberry	1.8	5	Honeysuckle	2	5
	Before	Sugar hackberry	0.9	4	Honeysuckle	1	4
	Before	Cedar elm	2.6	6	Honeysuckle	2	6
	Before	Cedar elm	6.3	6	Honeysuckle	2	6
	Before	Cedar elm	1.9	6	Cat briar	1	6
	Before				Honeysuckle	2	6
	Before	Nandina	0.5	4	Honeysuckle	2	4
	After	Cat briar	0.7	6	Honeysuckle	1	4
150	Before	Poison ivy	0.4	4	Honeysuckle	2	3
	Before	Poison ivy	0.3	3	Honeysuckle	1	2
	Before	Cedar elm	1.6	5	Cat briar	1	5
	Before	Cedar elm	0.6	4	Honeysuckle	1	3
	Before	Cat briar	0.7	6	Honeysuckle	1	4
	Before	Poison ivy	0.3	4	Honeysuckle	1	4
	Before	Poison ivy	0.7	5	Honeysuckle	1	4
	Before	Poison ivy	0.4	5	Honeysuckle	2	5
	Before	Poison ivy	0.3	5	Honeysuckle	1	5
	Before	Poison ivy	0.3	5	Honeysuckle	1	3
	Before	Poison ivy	0.3	4	Honeysuckle	2	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
150	Before	Dogwood	0.5	3	Honeysuckle	1	3
	Before	Carolina buckthorn	4.3	5	Cat briar	2	6
	Before				Honeysuckle	10	6
	After	Texas walnut	0.5	5	Cat briar	1	5
152	Before	Poison ivy	0.5	3	Honeysuckle	2	3
	Before	Poison ivy	0.5	4	Honeysuckle	2	3
	After	Sugar hackberry	0.7	4	Honeysuckle	1	4
	After	Sugar hackberry	0.9	4	Honeysuckle	1	4
	After	Separated branch	1.0	4	Honeysuckle	1	4
	After	Bur oak	2.3	5	Honeysuckle	2	5
153	Before	Sugarberry	1.3	5	Honeysuckle	1	5
	Before	Bur oak	2.5	5	Honeysuckle	2	5
	After	Poison ivy	0.5	3	Honeysuckle	1	2
	After	Poison ivy	0.4	3	Honeysuckle	2	3
155	Before	Cat briar	0.5	6	Honeysuckle	1	6
	Before	Cat briar	0.4	6	Honeysuckle	1	6
	Before	Cat briar	0.3	6	Honeysuckle	1	6
	After	Privet	0.9	5	Honeysuckle	1	4
	After	Separated branch	1.0	4	Honeysuckle	1	4
	After	Privet	0.9	5	Honeysuckle	1	4
	After	Separated branch	1.0	4	Honeysuckle	1	4
164	Before	Privet	4.8	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
164	After	Privet	4.6	6	Cat briar	1	6
	After	Privet	1.0	5	Cat briar	1	5
	After	Coralberry	1.9	6	Honeysuckle	1	6
	After	Privet	1.8	6	Honeysuckle	1	6
166	Before	Coralberry	1.3	5	Honeysuckle	1	4
	Before	Coralberry	1.3	5	Honeysuckle	1	4
	Before	Coralberry	1.3	5	Honeysuckle	1	4
	Before	Coralberry	1.3	5	Honeysuckle	1	4
	Before	Texas ash	1.6	5	Honeysuckle	2	5
	After	Coralberry	1.0	5	Honeysuckle	1	4
	After	Coralberry	1.0	5	Honeysuckle	1	4
	After	Coralberry	0.9	5	Cat briar	1	4
	After	Coralberry	0.7	4	Honeysuckle	1	4
167	Before	Separated branch	1.5	6	Honeysuckle	1	6
	Before	Coralberry	1.4	5	Honeysuckle	1	6
	Before	Coralberry	2.1	6	Honeysuckle	1	6
	Before	Coralberry	1	6	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Coralberry	3	6	Honeysuckle	2	6
	After	Carolina buckthorn	1.0	5	Cat briar	1	3
169	Before	Privet	1.4	5	Honeysuckle	2	5
	After	Privet	0.6	4	Cat briar	1	4
	After	Sugarberry	1.9	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
169	After	Sugarberry	1.0	6	Honeysuckle	2	6
	After				Cat briar	1	6
	After	Coralberry	0.4	3	Honeysuckle	1	3
	After	Privet	1.9	6	Honeysuckle	1	6
	After	Sugarberry	2.1	6	Honeysuckle	2	6
170	Before	Sugarberry	1	4	Cat briar	1	5
	Before				Honeysuckle	1	5
	Before	Carolina buckthorn	2	6	Honeysuckle	2	6
	Before	Coral berry	2	6	Honeysuckle	1	6
	Before	Sugarberry	4	6	Honeysuckle	2	6
	Before	Coral berry	1.1	4	Honeysuckle	1	4
	Before	Sugarberry	1.4	6	Honeysuckle	1	6
	Before				Cat briar	1	6
	Before	Sugarberry	2	6	Honeysuckle	1	6
	Before	Sugarberry	1.6	6	Honeysuckle	2	6
	After	Privet	0.6	4	Cat briar	1	6
171	Before	Coralberry	0.5	3	Honeysuckle	1	3
	Before	Coralberry	0.5	3	Honeysuckle	1	3
	Before	Separated branch	0.9	3	Honeysuckle	1	3
	Before	Eve's necklace	2.2	6	Honeysuckle	1	6
	Before	Eve's necklace	0.9	5	Honeysuckle	1	5
	Before	Coralberry	1	5	Honeysuckle	1	5
	After	Coralberry	1.0	5	Honeysuckle	1	5
	After	Privet	0.6	4	Honeysuckle	1	4

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
173	Before	Separated Branch	0.4	6	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Cat briar	0.25	6	Honeysuckle	1	6
	Before	Cat briar	0.4	6	Honeysuckle	1	6
	Before	Cat briar	0.3	6	Honeysuckle	1	6
	Before	Cat briar	0.6	6	Honeysuckle	1	6
	Before	Cat briar	0.4	6	Honeysuckle	1	6
	Before	Grape	3.5	6	Cat briar	1	6
	Before				Honeysuckle	1	6
	Before	Cat briar	0.2	6	Honeysuckle	1	6
	After	Cedar elm	0.4	2	Honeysuckle	1	2
	After	Poison ivy	0.4	2	Honeysuckle	1	2
	After	Cat briar	0.5	6	Honeysuckle	2	6
	After	Privet	0.8	6	Cat briar	1	6
	After	Chinaberry	1.1	6	Honeysuckle	1	5
	After	Chinaberry	0.7	5	Honeysuckle	1	5
174	Before	Dogwood	3.5	6	Honeysuckle	2	6
	Before	Separated branch	0.4	6	Honeysuckle	1	6
	Before	Cat briar	0.3	6	Honeysuckle	1	6
	Before	Dogwood	0.4	4	Honeysuckle	1	4
	After	Shumard oak	1.1	6	Honeysuckle	2	6
	After	Coralberry	1.0	6	Honeysuckle	1	4
	After	Coralberry	1.3	6	Honeysuckle	2	6
	After	Grape	3.5	6	Honeysuckle	1	6
	After	Coralberry	1.2	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
174	After	Sugarberry	3.3	6	Honeysuckle	2	6
175	Before	Cat briar	0.5	6	Honeysuckle	1	6
	Before	Separated branch	2.1	6	Honeysuckle	1	6
	Before	Cat briar	0.6	6	Honeysuckle	1	6
	Before	Privet	1.9	6	Honeysuckle	1	6
	Before				Cat briar	1	6
	Before	Privet	1.9	6	Honeysuckle	1	6
	Before	Privet	1.6	6	Honeysuckle	2	6
	Before	Separated branch	0.7	3	Honeysuckle	1	6
	Before	Separated branch	1.2	4	Honeysuckle	2	6
	After	Coralberry	2.0	6	Honeysuckle	1	6
	After	Cat briar	0.5	6	Honeysuckle	1	6
	After	Cat briar	0.5	6	Honeysuckle	1	6
	After	Privet	0.4	4	Honeysuckle	1	4
	After	Grape	2.0	6	Honeysuckle	1	6
	After	Privet	1.2	6	Honeysuckle	2	6
	After	Privet	1.2	6	Honeysuckle	1	2
182	Before	Texas ash	3	6	Honeysuckle	2	6
	Before				Cat briar	1	6
	Before	Black hickory	1.2	6	Honeysuckle	1	5
	Before				Cat briar	1	5
	Before				Grape	1	5
	Before	Cat briar	0.6	4	Honeysuckle	1	4
	Before	Privet	1.2	6	Honeysuckle	1	5

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
182	Before	Privet	1	5	Honeysuckle	1	5
	Before				Cat briar	1	5
	After	Coralberry	0.8	5	Cat briar	1	2
	After	Privet	4.0	6	Honeysuckle	1	6
	After	Privet	1.4	6	Honeysuckle	1	6
	After	Privet	0.8	5	Honeysuckle	3	5
	After	Texas ash	3.0	6	Honeysuckle	1	4
	After				Cat briar	1	6
	After	Privet	1.2	5	Honeysuckle	1	5
184	Before	Grape	1.8	6	Honeysuckle	1	5
	Before	Privet	4.3	5	Honeysuckle	2	5
	After	Chinaberry	1.0	5	Honeysuckle	1	5
	After	Cedar elm	1.6	5	Honeysuckle	1	5
	After	Cedar elm	0.7	5	Honeysuckle	1	5
	After	Shumard oak	3.5	6	Honeysuckle	3	6
	After	Coralberry	2.7	6	Honeysuckle	2	6
	After	Carolina buckthorn	1.4	6	Honeysuckle	2	6
	After	Carolina buckthorn	0.9	5	Honeysuckle	3	5
	After	Red bud	1.4	5	Honeysuckle	1	5
	After	Dogwood	1.0	4	Honeysuckle	2	4
	After	Dogwood	1.0	4	Honeysuckle	1	4
	After	Texas walnut	1.4	4	Honeysuckle	1	4
	After	Eve's necklace	0.9	3	Honeysuckle	1	3
185	Before	Privet	1.1	6	Grape	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
185	Before	Privet	2.1	6	Cat briar	2	6
	Before				Grape	1	6
	Before	Privet	0.7	5	Grape	2	4
	Before	Privet	1.7	5	Grape	1	5
	Before				Cat briar	1	5
	After	Poison ivy	0.5	3	Honeysuckle	1	3
	After	Poison ivy	0.4	3	Honeysuckle	1	3
	After	Dogwood	0.6	3	Honeysuckle	1	2
	After	Dogwood	0.8	4	Honeysuckle	1	3
	After	Dogwood	1.6	5	Honeysuckle	1	4
	After				Cat briar	1	4
	After	Cat briar	0.4	5	Honeysuckle	1	5
	After	Cat briar	0.3	6	Honeysuckle	2	6
	After	Sugarberry	1.9	6	Honeysuckle	2	6
	After	Sugarberry	0.8	5	Honeysuckle	1	5
	After	Sugarberry	0.7	5	Honeysuckle	2	5
	After				Cat briar	1	5
187	Before	Chinaberry	1.5	6	Honeysuckle	2	6
	Before	Chinaberry	0.9	5	Honeysuckle	1	6
	Before	Chinaberry	1.5	6	Honeysuckle	1	6
	After	Coralberry	1.0	6	Honeysuckle	1	3
	After	Coralberry	0.5	3	Honeysuckle	2	3
	After	Coralberry	0.5	4	Honeysuckle	2	3
188	Before	Grape	0.9	6	Honeysuckle	2	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
188	Before	Privet	0.7	6	Grape	1	6
	After	Texas ash	1.2	6	Honeysuckle	1	3
	After	Texas ash	0.7	5	Honeysuckle	1	5
	After	Sugarberry	0.5	2	Honeysuckle	1	2
	After	Privet	1.1	5	Honeysuckle	1	5
	After	Coralberry	0.7	3	Honeysuckle	1	3
189	Before	Chinaberry	2	6	Honeysuckle	2	6
	Before				Cat briar	1	6
	Before	Grape	1.1	6	Honeysuckle	2	6
	Before	Grape	0.5	6	Honeysuckle	2	6
	After	Privet	4.0	6	Cat briar	1	6
	After	Chinaberry	1.9	6	Cat briar	1	6
	After				Honeysuckle	2	6
	After	Shumard oak	0.5	2	Honeysuckle	1	2
	After				Cat briar	1	2
194	Before	Separated branch	1.6	6	Honeysuckle	1	6
	Before	Live oak	1.9	6	Honeysuckle	1	6
	After	Privet	0.9	5	Honeysuckle	1	3
	After	Coralberry	1.9	6	Honeysuckle	2	6
	After	Coralberry	0.7	4	Honeysuckle	1	4
	After	Texas ash	0.6	2	Honeysuckle	1	2
	After	Coralberry	1.0	5	Honeysuckle	2	3
198	Before	Privet	1.5	4	Honeysuckle	1	4

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
198	Before				Cat briar	1	4
	After	Privet	3.0	6	Cat briar	1	6
	After	Privet	1.7	6	Cat briar	1	6
	After				Mustang grape	2	6
	After	Coralberry	1.0	6	Mustang grape	2	6
	After	Coralberry	0.8	4	Cat briar	1	4
199	Before	Grape	2.8	6	Cat briar	1	6
	After	Cat briar	0.5	6	Honeysuckle	2	6
	After	Dogwood	0.8	6	Honeysuckle	1	3
	After	Privet	2.7	6	Cat briar	2	6
	After	Privet	0.2	6	Cat briar	2	6
	After				Honeysuckle	1	6
	After	Privet	1.0	6	Cat briar	2	6
202	Before	Texas ash	0.6	1	Honeysuckle	1	1
	Before	Coralberry	1.1	4	Honeysuckle	1	4
	Before	Texas ash	1.2	5	Honeysuckle	1	5
	Before	Shumard oak	0.6	3	Honeysuckle	1	3
	Before	Coralberry	0.7	4	Honeysuckle	1	4
	Before	Coralberry	0.7	4	Honeysuckle	1	6
	Before	Coralberry	1.6	6	Honeysuckle	1	6
	Before	Privet	1.5	6	Honeysuckle	1	6
	Before				Cat briar	1	6
	After	Coralberry	0.8	4	Cat briar	2	3
	After	Coralberry	0.5	3	Cat briar	1	3

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
202	After	Texas ash	0.4	3	Cat briar	2	3
	After	Post oak	0.4	2	Cat briar	1	2
	After	Post oak	0.5	3	Cat briar	1	3
	After	Texas ash	0.3	2	Cat briar	1	2
	After	Coralberry	0.6	5	Cat briar	1	2
203	Before	Privet	1.4	5	Honeysuckle	1	5
	After	Privet	4.0	6	Honeysuckle	1	3
	After	Privet	0.9	4	Honeysuckle	1	4
	After	Texas ash	1.0	3	Honeysuckle	1	3
	After	Coralberry	0.7	4	Honeysuckle	1	4
	After	Cedar elm	2.0	5	Honeysuckle	2	4
	After	Coralberry	0.8	6	Cat briar	1	6
	After	Coralberry	0.5	4	Honeysuckle	1	4
213	Before	Box elder	9.3	6	Honeysuckle	1	6
	Before	Box elder	0.9	6	Honeysuckle	1	6
	After	Shumard oak	0.5	4	Honeysuckle	1	3
	After	Shumard oak	0.9	5	Honeysuckle	1	5
	After	Live oak	1.2	5	Honeysuckle	1	5
	After	Texas ash	1.3	6	Honeysuckle	1	6
	After	Texas ash	1.5	5	Honeysuckle	1	5
300	Before	Coralberry	4.1	6	Honeysuckle	2	6
	Before	Separated branch	0.8	2	Honeysuckle	1	6
	Before	Privet	1.9	6	Honeysuckle	1	6

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
300	Before	Privet	1.9	6	Honeysuckle	1	6
	Before	Privet	1.9	6	Honeysuckle	1	6
	Before	Privet	1.6	6	Honeysuckle	2	6
	Before	Separated branch	1.6	2	Honeysuckle	3	6
	Before	Texas walnut	1.6	6	Honeysuckle	2	6
	After	Texas ash	0.9	4	Cat briar	1	4
	After	Texas ash	1.2	5	Cat briar	1	5
	After				Mustang grape	1	5
	After	Privet	1.4	6	Cat briar	1	6
301	Before	Dogwood	0.8	3	Honeysuckle	1	3
	Before	Post oak	2.2	5	Honeysuckle	1	5
	Before	Grape	2.2	6	Honeysuckle	1	6
	Before	Dogwood	0.9	6	Honeysuckle	1	6
	Before	Texas ash	0.5	2	Honeysuckle	1	2
	Before	Texas ash	0.5	2	Honeysuckle	1	2
	Before	Dogwood	2.2	3	Honeysuckle	1	6
	After	Sugarberry	0.8	4	Honeysuckle	1	4
	After	Separated branch	1.4	2	Honeysuckle	2	6
	After	Separated branch	3.0	4	Honeysuckle	2	6
	After	Post oak	0.9	6	Honeysuckle	1	6
	After	Post oak	2.0	5	Honeysuckle	2	5
	After	Grape	2.0	6	Honeysuckle	1	6
302	Before	Coralberry	2.2	6	Honeysuckle	2	4
	Before				Virginia creeper	1	4

Table B.4 - Raw Data – Continued

Plot	Time	Support host	DBH (cm)	Height class of tree	Vine species	No. of stems	Height class of vine
302	Before	Coralberry	2.2	6	Honeysuckle	2	4
	Before				Virginia creeper	1	4
	Before	Coralberry	2.2	6	Honeysuckle	3	6
	Before	Separated branch	0.8	3	Honeysuckle	2	6
	Before	Sugar hackberry	1.6	5	Honeysuckle	1	6
	Before	Separated branch	2.2	4	Honeysuckle	2	6
	After	Ragweed	6.0	5	Honeysuckle	1	4
	After	Eve's necklace	1.9	6	Honeysuckle	2	5
	After	Privet	1.7	6	Honeysuckle	2	6
	After				Virginia creeper	2	6
	After	Separated branch	0.8	5	Honeysuckle	2	6
303	Before	Texas ash	1.3	5	Honeysuckle	3	5
	Before	Carolina buckthorn	0.8	2	Honeysuckle	1	2
	Before	Poison ivy	0.8	2	Cat briar	1	2
	Before				Honeysuckle	1	2
	Before	Poison ivy	0.8	2	Cat briar	1	2
	Before				Honeysuckle	1	2
	Before	Texas ash	0.8	2	Honeysuckle	1	2
	Before	Nandina	1.9	6	Honeysuckle	1	6
	After	Texas ash	0.8	2	Honeysuckle	1	2
	After	Poison ivy	0.4	1	Honeysuckle	1	1
	After	Nandina	1.0	3	Honeysuckle	1	3
	After	Nandina	0.4	1	Honeysuckle	1	1
	After	Poison ivy	0.6	3	Honeysuckle	2	3

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