# ESTABLISHMENT OF JAPANESE HONEYSUCKLE IN THE OZARK MOUNTAINS

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*Abstract*: Four cultural treatments were tested at 2 spacings (3.0 x 3.0 m and 3.0 x 1.5 m) for effects on growth and survival of planted honeysuckle (*Lonicera japonica*) and invasion by native vegetation. Treatments were: mowing, and overseedings of velvetgrass (*Holcus lanatus*), Korean lespedeza (*Lespedeza stipulacea*), or a combination of fescue (*Festuca arundinacea*) and ladino clover (*Trifolium repens*). Nurse crops and mowing reduced invasion by native vegetation but also reduced honeysuckle production. Invasion of native vegetation on control plots did not prevent eventual honeysuckle establishment.

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## INTRODUCTION

Japanese honeysuckle provides food and shelter for many species of birds and small mammals (Jackson 1974). Its evergreen foliage is one of the most desirable year-long forages for white-tailed deer (*Odocoileus virginianus*) in the southeast (Harlow and Hooper 1971), and in years of mast shortages it is an especially important food source during the critical winter period (Segelquist *et al.* 1976).

Honeysuckle grows well on fertile soils (Halls and Oefinger 1969). On infertile soils it will survive, but spreads slowly when forced to compete with native vegetation. The purpose of this study was to determine whether survival and growth of planted honeysuckle could be increased by mechanical mowing, spacing, or overseeding with nurse crops to control native vegetation.

## STUDY AREA AND PROCEDURES

The study area was located on a relatively level ridge top in the Sylamore Experimental Foest in north central Arkansas. Soil on the study area was cherty silt loam. It was highly permeable to water and low in moisture holding capacity.

In February 1971 an area about 76.2 x 137.2 m was cleared of shrubs and trees. The area was disked, tilled, and treated with 3360 kg lime, 280 kg 10-20-20 analysis fertilizer, and 112 kg 33% ammonium nitrate per ha. In August another 112 kg 33% ammonium nitrate per ha was applied.

After clearing, the most common native plants in the study area were: sassafras (*Sassafras albidum*), grape (*Vitis* spp.), sunflower (*Helianthus maximiliani*), trailing lespedeza (*Lespedeza procumbens*), three seeded mercury (*Acalypha virginica*), spurge (*Euphorbia humistrata*), yellow wood sorrel (*Oxalis dillenii*), broomsedge (*Andropogon virginicus*), crabgrass (*Digitaria ischaemum*), panicum (*Panicum* spp.), and sedges.

The area was divided into 4 blocks, each subdivided into 8-9.1 x 30.5 m experimental plots. In March 1971 honeysuckle was planted at 3.0 x 3.0 m intervals on half the plots and at 3.0 x 1.5 m intervals on remaining plots. At both spacings 3 cultural treatments and

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a control were randomly assigned within each block: mechanical mowing, overseeding with Korean lespedeza (*L. stipulacea*), and overseeding with fescue (*Festuca arundinacea*) and ladino clover (*Trifolium repens*). Designated plots were mowed to 25 to 30 cm on 20 July and 20 August 1971, and annually thereafter.

Because of the poor growth of honeysuckle planted concurrently with nurse crops, the study was modified in 1972 to test effects of overseeding established honeysuckle with a nurse crop of velvetgrass (*Holcus lanatus*). In March, 28 kg of velvetgrass per ha were applied on half of each control and mowed plot. The few dead honeysuckle plants on control and mowed plots were replaced and the plots fertilized at the same rate as in February the previous year. Designated plots were mowed in June to a height of 25 to 30 cm.

In 1973 honeysuckle yield was measured by clipping, oven-drying, and weighing 1/8 of the new growth from 10 randomly selected plants in each plot. In 1975 yield was measured by clipping the new growth from 5-0.94 x 0.94 m quadrats in each plot. Rate of growth or spread was calculated by measuring width of area occupied by each plant in a north-south and east-west direction. Native plant yield was measured on a series of 20-0.45 x 0.45 m quadrats randomly located between the outside rows of each plot.

The experimental design consisted of a randomized block 2 x 4 factorial before the velvetgrass overseeding and a 2 x 2 x 2 factorial after the velvetgrass plantings. Differences were tested at the .05 level by analysis of variance and Duncan's new multiple range test.

## RESULTS

### Cover Crops

The combination of fescue and clover restricted native vegetation yield in 1971 to a mean of 53 oven-dry kg per ha for both spacings combined, significantly lower than yield on mowed or control plots (Table 1). By 1973, however, the combination had also reduced honeysuckle survival to 77 percent. Honeysuckle never recovered sufficiently to measure yield and, by 1975, 50 percent of the original plants had died.

Lespedeza had a similar but lesser effect. Native vegetation yield was 419 kg in 1971 and 598 kg in 1975, significantly lower than on control plots. Although invasion was reduced, so was honeysuckle production. Between 1971 and 1973 the number of surviving plants dropped to 75 percent of the original, and average diameter of the area occupied was significantly lower than on control plots. By 1975 lespedeza cover was dying and honeysuckle recovery was evident.

After two growing seasons native vegetation yield was significantly lower on velvetgrass plots than on control plots. Honeysuckle yield was also significantly lower on all velvetgrass plots and diameter was significantly lower on 3.0 x 1.5 m plots. Honeysuckle yield per plant was an average of 382 oven-dry grams on velvetgrass plots and 513 grams on control plots. By 1975 native vegetation had recovered from velvetgrass suppression and yield was near that of control plots. Honeysuckle remained suppressed. Yield on velvetgrass plots was 16 percent lower than yield on control plots.

### Mowing

Mowing curtailed invasion by native vegetation but also reduced honeysuckle yield below that of control plots. Native vegetation yield was significantly lower on mowed plots than on control plots in both 1973 and 1975. In 1973 average honeysuckle yield per plant on mowed plots was significantly lower than yield per plant on control plots. In 1975 honeysuckle yield was similar on 3.0 x 3.0 m control and mowed plots, but was significantly lower on 3.0 x 1.5 m mowed plots. Differences in honeysuckle survival and plant diameter between mowed and control plots were minor.

Spacing

Spacing had little effect on either invasion by native vegetation or honeysuckle production. After the first growing season native vegetation yield was significantly lower on 3.0 x 1.5 m plots than on 3.0 x 3.0 m plots, but after the first year yield differences were insignificant for both native vegetation and honeysuckle. Honeysuckle survival was slightly lower on 3.0 x 1.5 plots for most treatments the first growing season and winter, but was relatively stable after that except for fescue and clover plots in which higher honeysuckle mortality continued on 3.0 x 1.5 plots.

Table 1. Treatment effects on survival and yield of planted honeysuckle on yield of native vegetation for combined spacings. Sylamore Experimental Forest, Arkansas.

| *Treatment and Year* | *Honeysuckle* | | *Native vegetation yield* |
|---|---|---|---|
| | *Survival Percent* | *Yield 1973--grams/plant 1975--kg/ha* | *Kg/ha* |
| Control | | | |
| 1971 | 99 | a/ | 1681 |
| 973 | 97 | 513 | 4325 |
| 1975 | b/ | 2728 | 1739 |
| Mowing | | | |
| 1971 | 98 | a/ | 1492 |
| 1973 | 96 | 426 | 1676 |
| 1975 | b/ | 2588 | 474 |
| Fescue-clover | | | |
| 1971 | 92 | a/ | 53 |
| 1973 | 77 | a/ | c/ |
| 1975 | 50 | a/ | c/ |
| Lespedeza | | | |
| 1971 | 79 | a/ | 419 |
| 1973 | 75 | a/ | c/ |
| 1975 | b/ | 3511 | 598 |
| Velvetgrass | | | |
| 1973 | -- | 382 | 1587 |
| 1975 | -- | 2304 | 1416 |
| Velvetgrass and mowed | | | |
| 1973 | -- | 186 | 790 |
| 1975 | -- | 1603 | 326 |

a/ Plants too small for yield measurements.

b/ Honeysuckle too dense to measure.

c/ Measurements not taken because nurse crops dominated the plots, excluding honeysuckle and native vegetation.

## DISCUSSION

Nurse crops and mowing reduced invasion by native vegetation but also reduced honeysuckle production. Control plots were invaded by native vegetation, but this did not prohibit honeysuckle establishment. Honeysuckle yield was generally higher on control plots than on treatment plots. By 1975, however, honeysuckle yield was high on lespedeza plots after most of the lespedeza had died out.

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