HARDWOOD FOREST INVASION BY A NON-INDIGENOUS SHRUB (AMUR HONEYSUCKLE) NEGATIVELY AFFECTS OVERSTORY PRODUCTIVITY. Brian C. McCarthy, Professor, Department of Environmental and Plant Biology, Ohio University, Athens, OH 45701-2979.

Despite the fact that hardwood forests throughout the eastern United States are under considerable pressure from invasive species, few studies have explicitly examined whether or not the non-native invader has truly had an impact on the system. Numerous studies in the forestry literature document interference from lower vegetation layers on the overstory. With this in mind, we chose to examine whether or not stand invasion by Amur honeysuckle had an effect on overstory productivity. We chose 16 replicate hardwood stands from southwestern Ohio such that four were uninfected (controls) and twelve had Amur honeysuckle as the dominant component of the understory. All infected stands had noticeably lower species diversity and vegetation cover below the shrubs (a pattern that has been well documented by various investigators), but the impact to the overstory was less clear. A minimum of twelve trees (N = 196) were sampled from each stand via increment coring. Standard dendrochronological protocols were applied, cores were prepared and cross-dated, and then radial growth and basal area increments were calculated for each tree. Within each stand, Amur honeysuckle shrubs were cut and dated to determine maximum age (time of invasion). Intervention analysis was then applied to detect growth changes 25 years prior to and 25 years following invasion. The rate of radial and basal area growth of overstory trees was reduced significantly in eleven out of twelve invaded sites. Non-invaded sites did not exhibit this consistent pattern of reduced growth. For invaded versus non-invaded sites, the mean basal area growth was reduced by 15.8%, and the overall rate of basal area growth was reduced by 53.1%. Intervention analysis revealed that the first significant growth reductions were 6.25 ± 1.24 (mean ± SE) yrs after invasion with the greatest frequency of negative growth changes occurring 20 yrs after invasion. In invaded stands, 41% of trees experienced negative growth changes. In terms of invasive load estimates per 1000 honeysuckle individuals, radial tree growth was reduced by 0.56 $mm \cdot yr^{-1}$, and basal area growth was reduced by 0.74 $cm^2 \cdot yr^{-1}$. Given these findings, significant economic losses could occur in hardwood forests invaded by Amur honeysuckle.