FOREST STAND DEVELOPMENT ON 6-26 YEAR-OLD CLEARCUTS IN SOUTHEASTERN OHIO[1]

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Abstract: Clearcutting, a commonly-used cutting practice in southeastern Ohio, often results in a forest stand with a different species composition than the parent stand. The time frame during which species shifts occur is unclear. While some studies have documented species composition at specific points in time, none have attempted to examine changes throughout the first decades of stand development. This study focused on examining the early-successional dynamics of young, mixed-species forests of southeastern Ohio. Species compositions were examined across a chronosequence of sixteen stands that developed 6-26 years following clearcutting. The sample was limited to dry-mesic hardwood forest ecosystems found on southerly aspects and on soils derived from residuum or colluvium. Over the 20-year period, stand density decreased from 17,636 stems/ha at age 6 to 2,759 stems/ha at age 26. During the same period, basal area increased from 8.2 m^2/ha to 22.1 m^2/ha. Oaks (*Quercus* spp.) declined from 3,386 stems/ha to 581 stems/ha. When considered as a proportion of the total stand, however, their proportion was relatively stable, averaging 21.3%. Oak importance value (IV=[relative density + relative basal area]/2) in the upper canopy (dominant and codominant crown classes) increased from 33.9 to 77.4% over the 20-year chronosequence. Chestnut oak (*Quercus prinus* L.) was the major species throughout the chronosequence. White oak (*Quercus alba* L.) and black oak (*Quercus velutina* Lam.) were minor components by age 26 years, although they dominated a comparison sample of six mature stands of the same ecosystem type. Yellow-poplar (*Liriodendron tulipifera* L.) was abundant 6-8 years after clearcutting, but nearly absent by age 26 years. Red maple (*Acer rubrum* L.) was the major species in both the intermediate and overtopped crown classes throughout the chronosequence. Predictive models were developed for stand density and basal area. A multiple logit model predicted increasing proportions of shade-tolerant species, although the predicted trends differed between crown classes. Models based on data from a chronosequence of forest stands can be used by resource managers to predict future composition and structure of an individual stand during its early decades of development. By anticipating what a stand may look like 20 years hence, management practices can be prescribed when it is desirable to alter the course of natural development.

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