

INFLUENCE OF DISTURBANCE ON INGROWTH IN HARDWOOD FORESTS: THE OLD-SERIES PLOTS – 1927-1997

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The four Old-Series plots track 70 years of succession in unmanaged central Connecticut hardwood forests (Ward and others 1999). These plots have experienced three distinct disturbance regimes. Thus, the long-term impact of different disturbance regimes on ingrowth (forest regeneration) could be examined. Three plots had several episodes of moderate to severe defoliation (>25%): 1961-63, 1971-1972, and 1981. By contrast, moderate to severe defoliations at the fourth plot were limited to single year episodes: 1964, 1972, and 1981. A summer wildfire burned approximately 40% of the fourth plot in 1932. The burned area was inventoried in 1934. Areas adjacent to roads, trails, and other human disturbance were excluded from this analysis.

Study plots were established in 1926-27. All trees with a diameter of at least 0.5 inch have been mapped and measured at 10-year intervals, except during the 1940s, using 16.5-foot-wide strips through the forests. We now have records on 43,357 stems distributed on nearly 60 tree and shrub species. Soil drainage classes were classified according to the Soil Survey Manual. This analysis examined trees on very poorly soils and poorly drained soils (1.8 acres). Ingrowth is reported as stems/acre/decade (SA^{10}). Only the ingrowth of species capable of reaching the upper canopy in a mature forest is reported.

Ingrowth on the plot that had minor disturbance (single-year defoliations) has steadily decreased from 99 SA^{10} between 1927-37 to only 26 SA^{10} between 1987-97. Maple has been the predominant ingrowth species – accounting for 38% of stems. Oak ingrowth (<3 SA^{10}) has been negligible since 1957. By contrast, ingrowth increased markedly on the plots that experienced multi-year defoliation episodes. Ingrowth rose from 52 SA^{10} between 1957-67 to 240 SA^{10} between 1967-87. Birch has accounted for 59% of stems during this twenty-year period. The wildfire on these moist sites was not as hot as on adjacent drier soils. Nevertheless, one third of all stems were top-killed by the fire. A dramatic increase of ingrowth, 288 SA^{10} , was noted during the 1957 inventory. Nearly 30% of the new stems were oak. The pulse of ingrowth has subsequently subsided and only 26 SA^{10} were observed between 1987-97.

These distinct disturbance regimes have resulted in real differences in species composition. In 1997, maple accounted for 50% of all stems on the lightly defoliated plots. Birch was the most common species on the multi-year defoliation plots, 52% of all stems, while oak accounted for <4% of stems. More than 14% of stems on the burned plot were oak.

Literature Cited

Ward, J.S., Anagnostakis, S.L.; Ferrandino, F.J. 1999. **Seventy years of stand dynamics in Connecticut hardwood forests - the Old-Series plots (1927-1997)**. The Connecticut Agricultural Experiment Station Bulletin 959. 68p. <http://www.caes.state.ct.us/Bulletins/1990s/1999/b959.pdf>