

Successional trends in the energetics of forest bird communities

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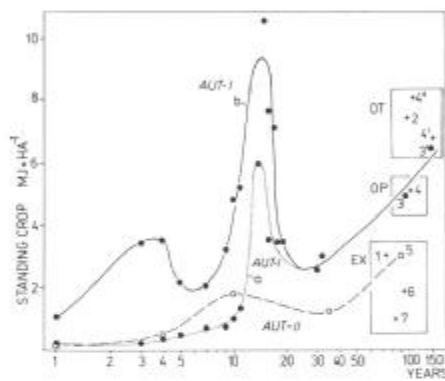


Fig. 4. Changes in bird community standing crop (SC) during succession. AUT-I (solid circles, a - dotted line: excluding pheasant; b - solid line: including pheasant), and AUT-II (open circles, broken line). OT - bird communities of mature and transitory forest associations; OP - bird communities of optimal forest stands; EX - bird communities of the forests with the extreme soil and water conditions. Logarithmic time scale.

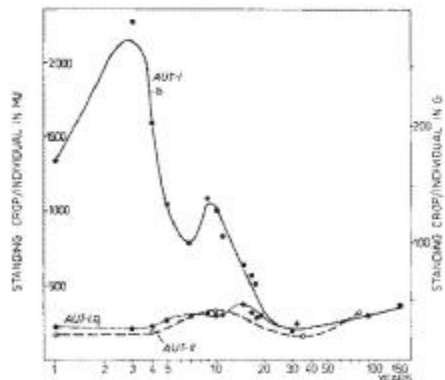


Fig. 5. Changes in average bird size (standing crop per individual) in bird communities during succession. Symbols as on Fig. 4.

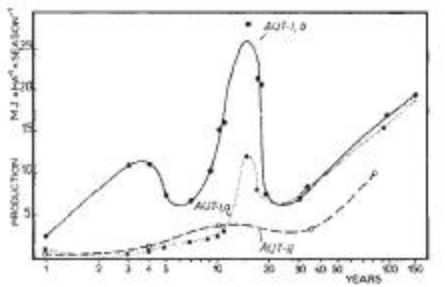


Fig. 7. Production (P) of the bird communities during succession. Symbol as on Fig. 4.

Głowaciński, Z. and Weiner, J. 1983. Successional trends in energetics of forest bird communities. - *Holarct. Ecol.* 6: 305–314.

Thirty forest bird communities were studied with regard to the changes in structural indices (number of species, density, biomass, species diversity H') and in energetics (energy flow A , production P , ecological efficiency P/A) in temporal and spatial gradients. All these characteristics increase during temporal succession; in natural deciduous forest there is a two-peak pattern of the increase, with the maximum in 15–20 yr old forest ("time ecotone"; $A = 692.9$ Megajoules ha^{-1} season $^{-1}$, $H' = 4.2$ bits). In artificially managed pine forest these indices rise monotonically, reaching a maximum in sub-climax ($A = 426.2$ MJ ha^{-1} season $^{-1}$, $H' = 4.2$ bits). In a deciduous forest a tendency exists to decrease the ecological efficiency (from 8% to 2%), while in a coniferous stand this variable remains low (2%) and almost constant during succession. In a spatial gradient, the highest values of energy flow and species diversity occur in forest stands with moderate soil/water regime and of ecotonal character ($A = 851.2$ MJ ha^{-1} season $^{-1}$, $H' = 4.5$ bits). All mature forest bird communities show similar values of diversity (4.2–4.5 bits) and ecological efficiency (appr. 2%), though they differ in the rate of energy flow. The relation of these findings to the current concepts of ecological succession are discussed.

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Fig. 12. Three-dimensional diagram of energy flow through various bird communities in the Niepołomice Forest. Communities 1–7 constitute a gradient series ALL. E - communities of ecotonal character.

