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Facilitating recovery: how bottom-up processes can minimise further insectivore declines

Key words: facilitation; insectivores; mistletoe

Abstract:

Woodland-dependent birds have undergone dramatic declines in southern Australia, with previously abundant, widespread species becoming increasingly scarce. Rather than solely an Australian phenomenon, similar declines in ground-foraging insectivores have been noted world-wide, consistent with pervasive changes to productivity mediated by production agriculture and overabundant herbivores (both exotic and native, large and small). I developed the productivity-based hypothesis for woodland-dependent bird declines which explains why ground-foraging insectivores are disproportionately susceptible (altered nutrient and litter inputs driving diminished litter-dwelling prey), why southern Australian woodlands are more sensitive (winter-dominant rainfall regions experience regular periods of food limitation in hot dry summers), and why Eucalypt-dominant woodlands experienced more pronounced declines (more sensitive to altered nutrient inputs than woodlands dominated by Acacias and other N-fixing trees). Having clarified the patterns and underlying processes, what can we do about it? Here, I synthesise recent findings demonstrating the disproportionate influence of parasitic plants on ground-foraging insectivores via litter-fall and suggest leaf litter represents a useful 'common currency' to quantify how land management practices influence food webs, nutrient inputs, and ecosystem-scale processes. By increasing the quantity, quality and heterogeneity of nutrient returns in low productivity systems, boosting litter-fall in woodlands via strategic plantings of N-fixing shrubs, inoculating trees with mistletoes and fencing off remnants to retain litter for longer, we can facilitate food webs from the bottom up. In addition to safeguarding populations of insectivores, this intervention may dramatically increase availability of pasture grasses for livestock in adjacent grazing lands, giving primary producers meaningful incentives to retain and enhance native vegetation as part of best practice pastoral management.