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Floral traits limit pollinator assemblages and determine the visiting behavior of nectar specialist passerines

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Hummingbird pollinators have long been believed to drive selection for floral traits that favor visitation by hovering and not perching. Recent discoveries in central Africa showed that sunbirds also perform hovering pollination, and identified the potential importance of plant traits, particularly the lengths of pedicels and peduncles, to this syndrome. To explore the generality of this phenomenon, we investigated the putatively sunbird-pollinated species, *Aeschynanthus moningeriae* (Gesneriaceae), endemic to Hainan Island, southern China. The species differs from its generalist-pollinated sister species, *A. acuminatus*, primarily in having longer corolla tubes, consistently red corollas, and longer peduncles. We tested two specific hypotheses: (1) The longer corolla tubes of *A. moningeriae* limit the pollinators to birds with longer beaks, predominantly sunbirds. (2) Longer peduncles extend the hanging distance of pendant flowers and reduce the opportunity for perching; pollinators can only reach nectar by hovering. By camera traps and direct observations, we revealed that *A. moningeriae* is almost exclusively visited by a single species of nectar specialist passerines, the Fork-tailed Sunbird (*Aethopyga christinae*). Shorter-beaked generalist passerines can only rob its nectar on rare occasions. The majority of visits by any bird species were made by hovering, perfectly matching the prediction based on the long peduncles. These results corroborate the notion that sunbirds act similarly to hummingbirds as hovering pollinators. Our research also highlights the value of pollination studies in currently understudied regions for understanding the generality of patterns in plant-pollinator interactions.

Keywords: Pollination; Ornithophily; Hovering; Sunbirds; Floral traits