

IS-4: Beyond the Binary (Part 2): Quantifying differences in reproductive effort among life history strategies in Bromeliaceae

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Quantifying reproductive effort (RE), the trade-off between devoting resources to reproduction versus individual growth, in plants presents a number of challenges. Of particular interest is comparing RE between reproductive strategies, such as those in Bromeliaceae: semelparous, where individuals undergo a one-time and subsequently lethal sexual reproductive event, versus iteroparous, where individuals reproduce sexually multiple times by producing clonal offshoots called pups. We introduce a dynamic model of vegetative and reproductive growth in long-lived Bromeliaceae rosettes accounting for the allocation of resources over developmental time. We compare multiple definitions of RE in semelparous and iteroparous Bromeliaceae at critical times during development and over the entire reproductive life of the individual. While others have posited that semelparous taxa exhibit higher RE than comparable iteroparous taxa, our results indicate this will only occur in limited circumstances: when RE is calculated over the lifespan of a rosette started from seed, semelparous RE is greater when pup mass is accounted for as if it were purely vegetative; or when RE is calculated over the lifespan of the genetic individual, semelparous RE is greater when the ratio of vegetative to inflorescence mass in each pup is greater than that of the originating rosette started from seed.