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Babylon, NY 11704. *The Role of Utility in the Optimal Allocation Strategy of Annual Plants.*

Annual plants must allocate resources to growth of vegetative mass (roots and shoots) or reproductive mass (flowers and fruits) throughout a season of unpredictable length. We modeled this allocation strategy as an optimal control problem, maximizing the average utility of the plant's reproductive yield at the end of the season as in the seminal model of King and Roughgarden (1982). To model strategies of plants with varying reproduction priorities and growth rates, we solved for optimal strategies using general power utility functions and production functions. With a combination of analytic and numerical computation, we found that a period of mixed allocation to vegetative and reproductive growth in the optimal strategy arises for a range of different utility functions. We also compared solutions of varying production functions on the end-of-season payoff and generated a complete characterization of the optimal control strategy. These models provided insights to the way plants allocate their resources in natural environments. (Received September 16, 2019)