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Sergiy Koshkin, Cameron Spiess and Zachary Zalles* (z1z3@rice.edu), 3401 Southhill Circle, Austin, TX 78703. *Optimal allocation in annual plants with non-linear utility functions.*

Optimal allocation strategies for annual plants in unpredictable environments depend on a choice of utility function, which represents risk/reward preferences. We study two-compartment (vegetative and reproductive) allocation models with non-linear utility, and show that optimal strategies for linear utilities (the most commonly used) are dramatically different from those for concave ones, which are associated with risk aversion. In particular, while the former are typically bang-bang, the latter include a period of graded allocation (mixed growth). Concave utilities reflect bet-hedging behavior, and are more realistic than linear ones used for their technical convenience. Although the most complete results are obtained for the power utility functions, our results are robust over a range of modeling choices, and raise questions about applicability of linear utility models. (Received September 15, 2019)