Figure 1. Inclusion of different energy pools results in very different RA schedule shapes and magnitudes. All 4 panels plot data from the same species, but considering different energy pools: a) All vegetative materials, both new tissue investment and investment to replace shed tissues, are included in the vegetative components, while seed weight is used as a proxy for reproductive investment; b) All vegetative materials are included in the vegetative components and all tissues associated with reproduction (seed + accessory costs) are included in the reproductive investment pool; c) Investment in leaves to increase leaf mass and replacement of shed tissues is included in the vegetative component and all tissues associated with reproduction (seed + accessory costs) are included in the reproductive investment pool; d) Just investment in leaves to increase leaf mass is included in the vegetative component and all tissues associated with reproduction (seed + accessory costs) are included in the reproductive investment pool.

Figure 2. Panels a-d show RA schedules, calculated as a proportion of surplus energy, for four species with divergent life histories, ranging from shorter to longer-lived from top (a) to bottom (b). Panels e-h show RA schedules that include shed leaf replacement for these same species. The black lines indicate species where investment in leaf replacement (dark green shading) is lower than the mass of shed leaves (the proportion of energy that would need to be invested in leaf replacement to maintain a constant leaf area year-upon-year). That is, the proportion of reproductive investment that falls above the black line is being invested at the expense of maintaining the pre-existing leaf canopy. (*I would then put variants of these with all 14 species in the Supplementary Material).*



Figure 3. RA schedules showing values for all study individuals. Open circles indicate where RA is calculated as a proportion of surplus energy, while closed circles indicate RA calculated as a proportion of total net leaf production. Both calculations exclude stem investment since it cannot be divided into “replacement” and “new growth” components.

Figure 4. Plant investment in reproduction (red), replacement of shed leaves (dark green), and growth of additional leaves (pale green). A sizable proportion of net production is investment in the replacement of shed leaves throughout a species’ lifespan, but in many species insufficient energy is invested to compensate for all shed tissue. For individuals where the weight of shed leaves is greater than the investment in replacement leaves, the straight line indicates the magnitude of the deficit; to fully replenish shed leaves the plant would have to exhibit the investment indicated by the top of the line, but instead invests the amount represented by the dark green dot. Investment in reproduction continues to increase with increasing plant weight. Investment in additional leaves declines quickly after reproductive maturity is reached, dropping to zero in many species.

*(Need to track down negative leaf weight values for Hemigenia)*



Figure 5. Standing leaf biomass plateaus and even declines with increasing plant age. This trend is stronger in shorter lived species. (Color indicates age, shading from pale blue in the youngest plants, through darker blues to grey and black.)



Figure 6. Maximum RA, assessed, for each study species, as the average RA of the age-class with the highest RA, correlated with a number of life history strategy dimensions, including (a) lifespan, (b) age at maturity and (c) maximum height. For functional traits, there is a (d) strong negative correlation with LMA, such that higher RA species have thinner leaves, (e) a strong positive collection with wood density, such that higher RA species have denser wood, and (f) a non-significant relationship with seed size.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| species | | maximum RA (based on leaf area) | | lifespan (years) | | age at maturity (years) | | embryo + endosperm weight (mg) | | maximum height (mm) | | LMA | | wood density | |
| BAER | | 0.66 | | 40 | | 7.0 | | 24.06 | | 2790 | | 0.0224 | | 0.59 | |
| BOLE | | 1.52 | | 9 | | 1.4 | | 2.10 | | 770 | | 0.0159 | | 0.86 | |
| COER | | 0.79 | | 12 | | 2.4 | | 0.69 | | 990 | | 0.0206 | | 0.79 | |
| EPMI | | 0.91 | | 40 | | 2.4 | | 0.02 | | 1370 | | 0.0122 | | 0.73 | |
| GRBU | | 1.23 | | 30 | | 5.0 | | 26.70 | | 1365 | | 0.0146 | | 0.73 | |
| GRSP | | 1.37 | | 20 | | 2.4 | | 13.48 | | 1000 | | 0.0169 | | 0.74 | |
| HATE | | 0.62 | | 40 | | 7.0 | | 8.18 | | 3005 | | 0.0516 | | 0.57 | |
| HEPU | | 1.06 | | 20 | | 1.4 | | 0.30 | | 703 | | 0.0205 | | 0.83 | |
| LEES | | 0.98 | | 40 | | 2.4 | | 0.81 | | 985 | | 0.0129 | | 0.79 | |
| PELA | | 0.62 | | 40 | | 9.0 | | 14.39 | | 2140 | | 0.0203 | | 0.67 | |
| PEPU | | 0.30 | | 40 | | 7.0 | | 2.21 | | 2010 | | 0.0297 | | 0.66 | |
| PHPH | | 1.00 | | 30 | | 2.4 | | 1.71 | | 1630 | | 0.0174 | | 0.85 | |
| PILI | | 1.26 | | 7 | | 1.4 | | 0.72 | | 542 | | 0.0086 | | 0.84 | |
| PUTU | | 1.29 | | 30 | | 2.4 | | 1.27 | | 1420 | | 0.0101 | | 0.89 | |

**Table 1.** Species means for maximum RA and a collection of demographic and functional traits. Lifespan is the approximate age at which each species disappears from the community through mortality. 40 years is indicated as the maximum age of climax species, due to the high probability that are killed by fire by this age. Age at maturity is the site age at which the majority of individuals of a species begin reproducing. Embryo-endosperm weight, LMA, and wood density are all measured on a collection of other individuals at nearby locations. Maximum height is the height of the tallest individual in this study. *(Will change RA to use different metric.)*