

BIOMASS ALLOCATION PATTERNS OF FIELD-GROWN COMMON LAMBSQUARTERS AND GIANT FOXTAIL AS AFFECTED BY EARLY-SEASON VARIATION IN LIGHT QUALITY. Greta G. Gramig and David E. Stoltenberg, Graduate Research Assistant and Professor, Department of Agronomy, University of Wisconsin, Madison, WI, 53706.

Field experiments were conducted in 2004 and 2005 to determine if early-season exposure of common lambsquarters (CHEAL) and giant foxtail (SETFA) to reduced R:FR ratios, mediated by neighboring corn plants and without shading, are associated with either early- or mid-season changes in biomass allocation. CHEAL and SETFA were grown in 11.4-L pots and exposed to reduced (0.2-0.4) or ambient (0.8-1.0) R:FR ratios by placing pots between rows of corn or on bare soil. Within these treatment areas, R:FR ratios and light quantity were maintained by removing and trimming corn and controlling weeds. About 4 wk after emergence (WAE), a subset of target plants was harvested from each treatment area to determine early-season light quality effects. Remaining plants were placed either in partial shade or in full sunlight. About 3 wk after pots were moved (7 WAE), a subset of plants was sampled as above. Analysis of variance and specific contrasts were used to assess treatment effects on biomass allocation to leaves, main-stems, tillers or branches, reproductive organs, and roots. For CHEAL and SETFA exposed to reduced early-season R:FR ratios (without shade), specific stem length (SSL), specific leaf area (SLA), and main-stem:branch or tiller biomass allocation (SETFA 2005 only) were greater than for plants exposed to ambient R:FR ratios. When exposed to full sunlight during mid-season (4-7 WAE), main-stem:branch biomass allocation was greater for CHEAL exposed to reduced than ambient early-season R:FR ratios. However, when exposed to partial shade during mid-season, biomass allocation patterns did not differ between CHEAL exposed to reduced or ambient early-season R:FR ratios. For SETFA exposed to full sunlight during mid-season, reduced early-season R:FR ratios were associated with less root:shoot biomass allocation compared to plants exposed to ambient early-season ratios. SETFA exposed to reduced early-season R:FR ratios and mid-season partial shade had greater main-stem:tiller biomass allocation than SETFA exposed to ambient early-season ratios and mid-season partial shade. These results suggest that, while early-season exposure to reduced R:FR ratios may increase the short-term competitive ability of these species, such exposure does not appreciably alter responses to later changes in the light environment.