WIND SPEED AFFECTS WEED AND CORN GROWTH PARAMETERS. Michael J. Moechnig*, David E. Stoltenberg, Chris M. Boerboom, and John M. Norman, Graduate Research Assistant, Associate Professors, Department of Agronomy, and Professor, Department of Soil Science, University of Wisconsin, Madison, WI 53706.

Plant shoot height and leaf area development is an important aspect of competition for light in multiple weed species-corn communities. Previous research has indicated that the plasticity of weed shoot growth may be due primarily to the quality and quantity of intercepted light, but other factors can also affect carbon allocation to leaves and stems. Our objective was to determine the effect of wind speed on shoot growth of common lambsquarters, giant foxtail, and corn.

Greenhouse experiments were conducted in which common lambsquarters, giant foxtail, or corn plants were grown in either a high-wind speed tunnel (2.8 m s^{-1}) or a low-wind speed tunnel (0.5 m s^{-1}). Wind speeds were maintained for 18 h d^{-1} from 1 h before until 1 h after exposure to light. The daily photoperiod was 16 h at a quantum flux density of approximately 400 μmols m^{-2} s^{-1}. Ambient air temperature and humidity were similar between wind environments. In each experiment, 24 plants of one species were grown individually in containers placed in close proximity within each wind tunnel. Shoot height of each plant was measured weekly. Four plants per tunnel were selected randomly each week for destructive measurement of leaf area, leaf biomass, and stem biomass. Experiments were terminated when plants were between 40 and 50 cm in height. Data were used to develop a growth model for each species based on functions that described leaf partitioning coefficients, specific leaf area, stem partitioning coefficients, specific stem length (i.e. shoot height per unit of stem biomass), and light use efficiency.

Common lambsquarters specific stem length was greater at low wind than high wind speed. However, wind speed did not affect common lambsquarters total shoot biomass or other measured parameters. In contrast, giant foxtail and corn specific stem lengths were not affected by wind speed, but total shoot biomass and light use efficiency of each species was greater at low wind than high wind speed. Therefore, exposure to high wind speed differentially affected shoot growth of these species, suggesting that exposure to higher wind speeds in a corn community may confer a competitive advantage to common lambsquarters relative to giant foxtail.