

Forcella, F. and D. Archer. 2005.  
Integrating continuous soil depth distributions  
of hydrothermal time, seeds and burial  
tolerances to improve seedling emergence models.  
Weed Sci. Soc. Am. 45:53.

of johnsongrass and three destructive sampling dates was used. Photosynthetic net assimilation rate, leaf area, leaf number, plant height, above ground fresh and dry biomass, and root dry biomass were measured 20, 30, and 40 days after planting. From these data relative growth rate and leaf area ratio were calculated. Intraspecific competitive ability was determined using a replacement series design. Each 30 cm diameter pot contained six plants for a density of 85 plants/m<sup>2</sup> in the following R:S mixtures: 6:0, 5:1, 4:2, 3:3, 2:4, 1:5, and 0:6. Under noncompetitive conditions all growth parameters (photosynthetic net assimilation rate, leaf number, leaf area, above ground biomass, and root biomass) were similar. Under competitive conditions, both biotypes were similar in height and leaf density. Replacement series and relative crowding coefficient (RCC) estimates suggest that the two biotypes were similar in leaf dry biomass production or plant height. (173)

**Integrating continuous soil depth distributions of hydrothermal time, seeds, and burial tolerances to improve seedling emergence models.** Forcella, F.<sup>1,\*</sup> and Archer, D.<sup>1</sup> <sup>1</sup>USDA-ARS, Soils Lab, Morris, MN. Improvements in seedling emergence models may arise by accounting for variable and depth-specific accumulation of hydrothermal time in seed-bearing zones of soil, as well as tolerances of seed germination and seedling emergence to burial depth and, lastly, distribution of seed densities in soil, which is determined by tillage system. We have accounted for all of these variables in a model for common lambsquarters (*Chenopodium album* L.). The new model appears to have greater universal application than previous models. (174)

**Germination ecology of Mexican whorled milkweed (*Asclepias fascicularis*).** Harmon, D.N.<sup>1</sup> and Young, J.<sup>1,\*</sup> <sup>1</sup>USDA/ARS, Reno, NV. Mexican whorled milkweed (*Asclepias fascicularis*) is one of the most important species of concern in the *Asclepias* genus. This native but poisonous species is a ruderal species, spreading to fence runs and abandoned farmlands. It is now considered a valuable component of the western landscape because of its heavy use by butterflies, bees, and other insects. Mexican whorled milkweed is a perennial species. Establishment can occur by seed dispersal or vegetative propagation. Our purpose was to investigate seed germination of Mexican whorled milkweed at a wide range of constant and alternating temperatures. Seeds were incubated at 55 constant and fluctuating temperatures and the results were used to calculate quadratic responses. Mexican whorled milkweed germinates in warm temperatures from 30 through 40 C. Very little to no germination occurred at cooler temperatures. This germination strategy favors warm season establishment possibly aiding in avoiding interference from winter annual weeds. Mexican whorled milkweeds unique pattern of warmer temperature germination with a drastic decrease as the incubating temperature decreases warrants further seed ecology research. Future efforts should include examining cold dormancy, osmotic potentials, and root propagation. (175)

**Growth and reproductive biology of *Rottboelia exaltata* in Brazil.** Christoffoleti, P.J.<sup>1,\*</sup>, Carvalho, S.J.P.<sup>1</sup>,

Moreira, M.S.<sup>1</sup>, Nicolai, M.<sup>1</sup>, Lopez-Ovejero, R.F.<sup>1</sup> and Medeiros, D.<sup>2</sup> <sup>1</sup>ESALQ - USP - LPV, Piracicaba, Sao Paulo, Brazil, <sup>2</sup>BASF, Piracicaba, Sao Paulo, Brazil. *Rottboelia exaltata* was recently introduced in the Brazilian agroecosystems, and it has been spread rapidly in several areas of the country, due to its high competitive ability, difficulty in its management and, specially its high sexual reproductive capacity. Therefore, this research had the objective of studying the growth, development and reproductive capacity of *R. exaltata*, through growth analysis. Initially, seeds were placed in plastic box filled with sand and germination and emergence were studied. Then plants were transplanted to plastic pots, 3.0L capacity, filled with sand and fertilized with 100 mL of nutritive solution containing (mg L<sup>-1</sup>): N, 210; P, 150; K, 310; Ca, 186; S, 32; Mg, 19; Zn, 0.5; B, 0.3; Fe, 5; Mn, 0.4; Cu, 0.5 and Mo, 0.05. Thirteen periodical evaluation of the growth were done, measuring: fresh and dry weight per plant (total, shoot and root), leaf area, and timing of the growth phases. After flowering the number of racemes of 28 plants, and the number of seed of 100 racemes were evaluated. The quantitative variables were analyzed through non linear regression analysis, using log-logistic model. The timing of the flowering stage started at 49 days after seeding, and the plant fresh weight, at this growth stage, was about 20g. By the end of the plant cycle, the plant fresh weight was higher, in average, than 80g and 1,500 cm<sup>2</sup> of leaf area. In average, the plant had about 62 racemes of 0.23g, with 12 seeds each. These results showed the high potential growth and sexual reproductive ability of *R. exaltata*, explaining the reasons for this weed to be a new potential problem for the Brazilian agriculture. Therefore growers should be aware about the need of preventive measures, in order to reduce the spread of *R. exaltata*, which infestation is still restricted to certain areas in the country. Data from this research could also be used in order to model the potential spread and competitive ability of the weed. (176)

**Effect of soil management and weed control intensity on the composition of soil seedbanks in a tomato-soybean rotation.** Garces, M.M.<sup>1,\*</sup> and Masiunas, J.B.<sup>1</sup> <sup>1</sup>University of Illinois, Urbana, IL. The composition and population of the weed soil seedbank is important to consider when designing weed management programs. Our objective was to determine the effect of tillage and weed management intensity on soil seedbanks in a tomato-soybean crop rotation. The management types were: cereal rye cover crop mulch, conventional tillage, stale seed bed. The two weed intensity levels: economic threshold and weed-free. Research was established in 2003 with 10 soil cores collected in each plot. To determine any differences in seed distribution in the soil. As expected, in 2003 there were no differences ( $\alpha = 0.05$ ) in the weed seed density or population among treatments. Seedbank numbers were highest in the first 5 cm and the most common weeds were: purslane, annual grasses, redroot pigweed, common lambsquarter, prickly sida and velveteaf. (177)

**Seedbank persistence of a declining giant ragweed population: initial results of a long-term study.**