

MODELING EMERGENCE OF TROPICAL WEEDS. Friday Ekeleme, David Chikoye, David Archer, and Frank Forcella, Assistant Professor, Research Scientist, Agricultural Economist, and Research Agronomist, Michael Okpara University of Agriculture, Umudike, Nigeria; International Institute of Tropical Agriculture, Ibadan, Nigeria; and USDA-ARS, Morris, MN 56267.

Weed control is a major production cost in most crops in tropical cropping systems. Due to competing demands on time during the growing season family labor is often not available when weeds are most damaging to crops. Weeds could be managed better if farmers understood their emergence patterns. Emergence models were developed for two important weeds in cropping systems of Nigeria and other tropical areas. These species were tropic ageratum (*Ageratum conyzoides*), an annual broadleaf, and cogongrass (*Imperata cylindrica*), a rhizomatous perennial. The models were developed using the soil hydrothermal time concept and five years of seedling emergence data for tropic ageratum at Ibadan, and two years of cogongrass shoot emergence data at Umudike. Hydrothermal time was calculated from soil temperature and soil water potential at 2 cm depth, which were simulated with the SHAW (Soil Heat and Water) model using required weather data collected at the two locations. Base temperature and base soil water potential were 28 C and -0.02 MPa for tropic ageratum, and 25 C and -0.01 MPa for cogongrass. For each species a Weibull function was fitted to cumulative percentage emergence and hydrothermal time. The Weibull functions that best described the emergence of tropic ageratum and cogongrass were  $Y = 100 * [1 - e^{-0.0054 * \theta HT^{1.4268}}]$  and  $Y = 100 * [1 - e^{-0.000023 * \theta HT^{2.8575}}]$ , respectively. The model for tropic ageratum not only simulated emergence adequately at Umudike ( $r^2 = 0.85$ ), but also for an independent set of data from Los Banos, Philippines ( $r^2 = 0.89$ ). The cogongrass model adequately simulated emergence in corn/cassava plots weeded twice and five times at Ibadan. The model for tropic ageratum may be most useful in tropical locations where conditions approximate those in Nigeria. Additionally, the cogongrass model has some merit and may help to set the stage for further analysis on emergence patterns and management of cogongrass.