Because of the vast differences in production between the major row crops (corn, soybean, wheat, and cotton) and peanut, minimal effort and resources are devoted to research and development for potential new peanut herbicides. Warrant, a new microencapsulated formulation of the active ingredient acetochlor, is currently labeled for use in cotton, soybean, field corn, and grain sorghum. The tolerance of peanut to this formulation of acetochlor is unknown. Four field trials (Ty Ty and Plains, GA; Rocky Mount and Lewiston, NC) were conducted in 2011 to evaluate the tolerance of peanut to various applications of Warrant. Traditional small-plot techniques were utilized at all locations. Treatments included PPI, PRE, EPOST (18-24 days after planting [DAP]), and POST (25-42 DAP) applications of Warrant 3CS (3 or 6 pt/A) and Dual Magnum 7.62EC (1.33 pt/A); EPOST applications of Gramoxone Inteon 2SL (12 oz/A) + Storm 4SL (16 oz/A) + Warrant (3 pt/A) or Dual Magnum (1.33 pt/A); and POST applications of Cadre 2AS (4 oz/A) + Warrant (3 pt/A) or Dual Magnum (1.33 pt/A). Treatments were replicated four times and the plot areas were maintained weed-free. All data were subjected to ANOVA and means separated by Fisher’s Protected LSD Test (p < 0.05) when appropriate. No peanut yield loss was observed from any treatment at the Plains, Rocky Mount, or Lewiston locations. At the Ty Ty location, the following treatments caused a significant peanut yield loss: PRE and POST Warrant at 6 pt/A (7.2%-7.4% yield loss); POST Dual Magnum (8.1% yield loss); EPOST Gramoxone + Storm + Dual Magnum (9.6% yield loss); and POST Cadre + Warrant (9.7% yield loss).