Weed management is a significantly limiting factor in developing commercial organic peanut (Arachis hypogaea L.) production in the southeastern U.S. However, previous research indicates that cultivation can be an effective method of weed control and subsequent yield improvement in organic peanut systems. The objective of this study was to assess the effects of various frequencies and durations of cultivation with a flexible tine (“flex-tine”) cultivator on peanuts grown under organic management. Two cultivars (‘Georganic’ and ‘Tifguard’) were planted in Tifton, GA in 2008 and 2009. Flex-tine cultivations were initiated 7-10 days after planting and were conducted at two frequencies (weekly or twice weekly) for three durations (3 wks, 4 wks, or 5 wks). All cultivated plots received cultivation with flat sweeps at least once and were hand weeded during the growing season. An uncultivated, unweeded control treatment was also included for comparison. Yields varied among cultivated treatments (3523 kg ha-1 to 4335 kg ha-1 in 2008 and 3418 kg ha-1 to 3698 kg ha-1 in 2009) but differences were not significant (p < 0.05). However, all cultivated treatments displayed significantly higher yields (p < 0.05) than the uncultivated controls both years (1139 kg ha-1 in 2008 and 2215 kg ha-1 in 2009). Final plant stand was also greater in all cultivated treatments (3.6 plants ft-1 to 4 plants ft-1) than in the uncultivated treatment (1.8 plants ft-1) in 2008 (p < 0.05). In 2009, the once weekly/4 wks, twice weekly/4 wks, and once weekly/5 wks treatments resulted in significantly higher plant stands than the uncultivated treatment (2.4 plants ft-1) at p < 0.05. There were no significant differences in hand weeding times among treatments (p < 0.05). These results indicate that a combination of flex-tine cultivation, flat sweep cultivation, and hand weeding can significantly improve yield potential of peanuts grown in an organic management scenario.