Herbicide-resistant Palmer amaranth (*Amaranthus palmeri* S. Wats) has produced limited control options in cotton (*Gossypium hirsutum* L.). The objective of this study was to evaluate photosystem II-inhibiting herbicides as a preemergence herbicide to control Palmer amaranth in cotton on a silt loam and a clay soil in Arkansas. In 2011, six rates of fluometuron (*Cotoran* 4L) and prometryn (*Caparol* 4L) and five rates of diuron (*Direx* 4L) and linuron (*Linex* 4L) were evaluated. In Fayetteville, AR on a silt loam soil, 1400 and 1680 g ai/ha of diuron injured cotton from 36 to 25% at 26 days after treatment (DAT), respectively. Prometryn caused injury ranging from 4 to 40% at 897 and 3137 g ai/ha at 26 DAT. Linuron at 2790 and 3360 g ai/ha injured cotton 76 to 96% at 26 DAT on a silt loam soil while providing the highest crop injury of 76 and 93% injury on a clay soil in Keiser, AR. Diuron at 1120 to 1680 g ai/ha provided 75% control of Palmer amaranth on a clay soil at 45 DAT. Prometryn control of Palmer amaranth was less than 65% by 45 DAT. By 38 DAT, none of the herbicides controlled Palmer amaranth greater than 87%, except linuron which was the most injurious to the cotton.