

Studies of intra specific and inter specific out crossing rates were carried out for grain amaranths using two populations of *A. hypochondriacus* (populations 1008 and 1024) and two populations of *A. cruentus* (populations 1034 and 434). The studies were conducted at Kabete Campus, University of Nairobi and National Horticultural Research Station, Thika, during the months April to August 1988 and October 1988 to February 1989. The mean intra specific out crossing rate estimates for *A. hypochondriacus* and *A. cruentus* were 10.4 % and 10.9 % respectively. The mean inter specific out crossing rate involving population 1024 as the dominant marker parent and 1034 as the recessive marker was 1.2 percent. The study involving population 434 as the dominant marker parent gave the mean inter specific out crossing rate as 6.5 percent. The intra specific and inter specific out crossing rate estimates showed substantial variation. Significant differences in out crossing rate estimates were noted due to locational and seasonal variations. The factors probably contributing to the variations were believed to be locational and seasonal differences in pollinator density and differences among the populations.