

We analysed genetic variability in *Anopheles arabiensis* and *Anopheles gambiae* populations using micro-satellite loci to determine whether the Rift Valley restricts the flow of genes. Deviations from Hardy–Weinberg expectations were significant, and were most likely to be due to the high frequency of null alleles observed. *An. arabiensis* populations occurring between 40 and 700 km apart across the Eastern arm of the Rift Valley were not differentiated (pair-wise  $F_{st}$  range: 0.0033–0.0265,  $P > 0.05$ ). Neither were *An. gambiae* populations from Asembo Bay and Ghana ( $F_{st}$ : 0.0063,  $P > 0.05$ ) despite a geographical separation of about 5000 km. In contrast, significant differentiation was observed between *An. gambiae* populations from Asembo Bay and Kilifi (about 700 km apart;  $F_{ST}$ = 0.1249,  $P < 0.01$ ), suggesting the presence of a barrier to gene flow.