In this study, the possibility of using Ceratitis capitata (medfly)-derived microsatellites both for developing an SSR-based species-diagnostic peR assay and studying the genetic structures of a range of congeneric, economically important African fruit fly species has been investigated. The medfly SSR primers used were based on published sequences obtained from the GenBank database. Twenty-four medfly SSR were screened for amplification on the genomic DNA of C rosa, Cjasciventris and C cosyra. All primer pairs produced PCR products in at least one of the three species examined. Amplification success ranged from 79.2% (C cosyra) to 91.3% (in both C rosa and C jasciventris). Specifically, a number of loci differentially amplified in the four species examined: of the 24 loci screened, 17 were common to all, five were PCR-negative in C cosyra, two were negative in C rosa and in C jasciventris, while one locus amplified only in C capitata. The majority of the amplicons were similar, if not identical in size to those expected in the medf1y. The structures of the repeat motifs and their flanking=sequences were examined at a total of repeat units were (CA)nI(TG)". Some species-specific nucleotide differences were observed among the four species. Ten of the cross-species SSRs markers were used to survey the levels of genetic variability and analyse the genetic aspects of the population dynamics of C rosa, C fasciventris in Africa, in comparison with variability data from C capitata. The loci proved to be informative. The degree of microsatellite polymorphism in C rosa and C