

Microsatellite Sequences

- Short regions of tandemly repeated DNA

Microsatellite Sequences

---CGATTGTGTTGTGTGTGTGTGTGTGTGTGTGTGTGATGT---

- Microsatellite sequence A215 from *Calephelis mutica*
- The repeat motif is GT
- Repeats are in tandem array
- This particular motif is (GT)₁₂

Examples of microsatellite motifs

GT

GA

CAT

TAGA

- In most useful microsatellite sequences, the motif will be repeated from about a dozen to about fifty times
- In practice, most motifs are imperfect repeats

Why microsatellites are important

- Microsatellites have poorly known function
- Excellent reflection of genetic diversity
- Within populations, many microsatellite regions vary in length
- Each different length is called an allele
- Butterflies have 2 copies of most loci
- Each copy may be the same or a different length

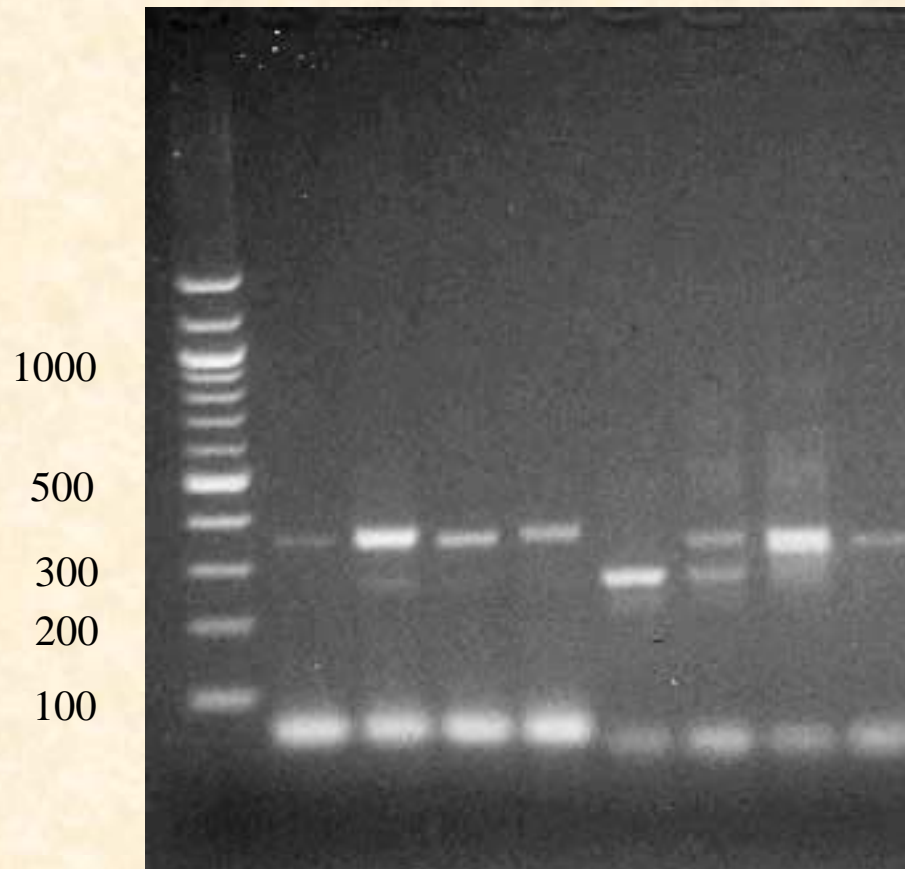
How microsatellites are used

1. Identify primer sequences

ACAGGCTAATTCCTCTCTGCAATGGCAGAAATTTATTCGGTGT
CAAATTATTTACTTGTATCTGTCCCCGTAAATTAGTTACTTCT
ATTCATATGGGTGTTAATATTAAGAAATAACAATTTGTTAATTAT
GTATGTGTGTGCGCACGTGTGTGTGCACACGTGTGTGTGTGT
GTGTGTGTGTGTGTATGCGTGCGTTTGTGCGTGCGTGTACGC
GTGCGCGTGTGCTTGTTTCGAGTTTGTGTGCGTGAGTGTGTAG
CAGTGGGCACTCACGTGTGAGCAGAAATAGGCGTCCGCTGAA

2. Use primers to perform PCR on a sample of your population

What the results look like



Using the Results

Alleles found at 3 loci in 12 butterflies

Individual	A215	B112	D6
D5	230 / 230	293 / 301	269 / 327
D6	230 / 234	299 / 301	254 / 327
D7	230 / 234	297 / 297	254 / 269
D8	234 / 234	299 / 301	269 / 269
D9	232 / 234	297 / 301	269 / 269
D10	234 / 234	297 / 299	269 / 327
D11	230 / 230	297 / 301	269 / 269
K1	230 / 230	299 / 299	208 / 269
K3	232 / 232	297 / 299	269 / 269
K4	234 / 234	297 / 297	269 / 269
K10	230 / 230	301 / 301	254 / 254
K11	230 / 234	299 / 301	254 / 269
K12	234 / 234	293 / 299	254 / 269
K13	232 / 234	297 / 297	254 / 269
K15	230 / 230	293 / 301	254 / 269
K16	228 / 232	293 / 299	254 / 327
K18	232 / 232	301 / 301	269 / 269
K19	230 / 230	297 / 301	269 / 269
K20	234 / 234	293 / 301	269 / 269
R1	232 / 232	297 / 297	269 / 327
R2	230 / 230	297 / 297	269 / 327
R3	232 / 236	301 / 301	269 / 269

Microsatellite analysis isn't for everyone

So what can you do if you aren't going to do a full blown population genetic analysis?

Use precautions to minimize inbreeding - Lab

- Keep careful records of lineage
- Do not allow sib-sib matings
- Limit the number of generations that you rear in the lab
- Plan for multiple rounds of collecting fresh females, breeding, and release

Use precautions to minimize inbreeding - Field

- Where appropriate, link sub-populations that are separated by invasive brush
- Keep expanding habitat for species of concern
- Burn, but do it carefully
- Be aware of genetic considerations when doing a species introduction