

Supplementary information

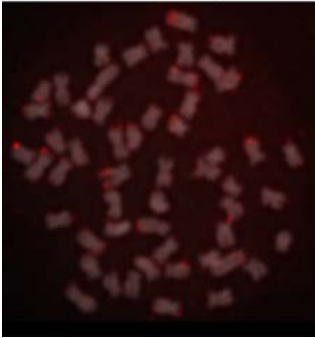
Satellitome landscape analysis of *Megaleporinus macrocephalus* (Teleostei, Anostomidae) reveals intense accumulation of satellite sequences on the heteromorphic sex chromosome

Ricardo Utsunomia¹, Duílio Mazzoni Zerbinato de Andrade Silva¹, Francisco J. Ruiz-Ruano², Caio Augusto Gomes Goes³, Silvana Melo¹, Lucas Peres Ramos¹, Claudio Oliveira¹, Fábio Porto Foresti³, Fausto Foresti¹, Diogo Teruo Hashimoto⁴

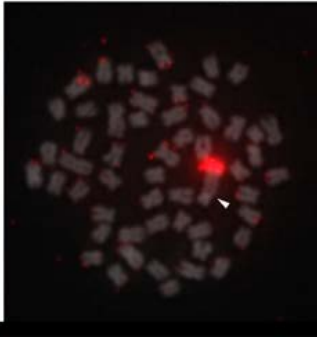
¹ Departamento de Morfologia, Instituto de Biociências, Universidade Estadual Paulista - UNESP, Distrito de Rubião Junior, s/n, 18618-970, Botucatu, SP, Brazil. ² Departamento de Genética, Universidad de Granada, 18071, Granada, Spain. ³ Departamento de Ciências Biológicas, Faculdade de Ciências, Universidade Estadual Paulista - UNESP, Campus de Bauru, 17033-360, Bauru, SP, Brazil. ⁴CAUNESP, Universidade Estadual Paulista - UNESP, Campus Jaboticabal, 14884-900, Jaboticabal, SP, Brazil. Correspondence and requests for materials should be addressed to R.U. (email: ricardo.utsunomia@unesp.br)

MmaSat9-53

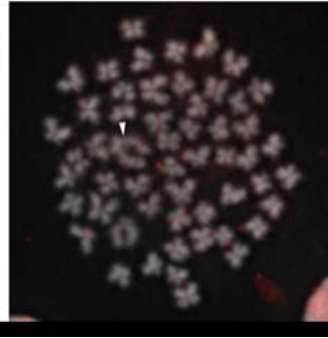
Male - *M. macrocephalus*



Female - *M. macrocephalus*

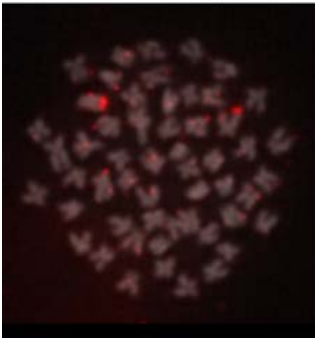


Female - *M. obtusidens*

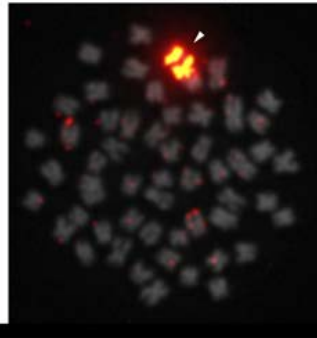


MmaSat17-72

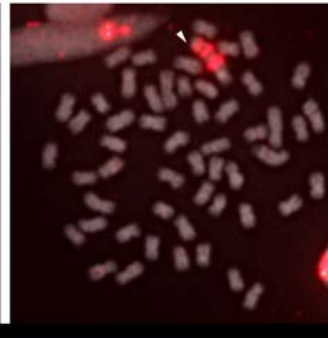
Male - *M. macrocephalus*



Female - *M. macrocephalus*

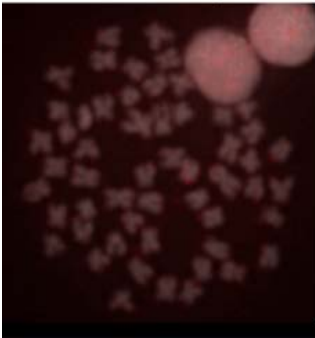


Female - *M. obtusidens*

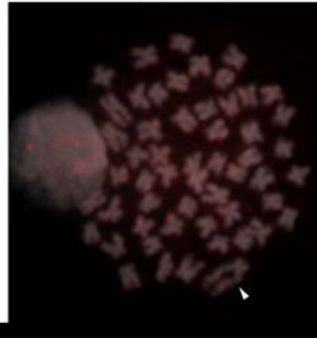


MmaSat29-32

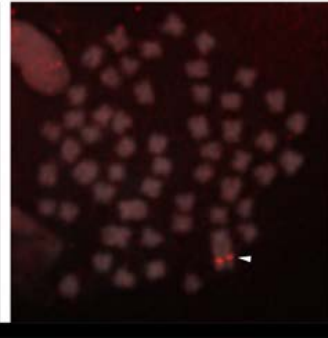
Male - *M. macrocephalus*



Female - *M. macrocephalus*

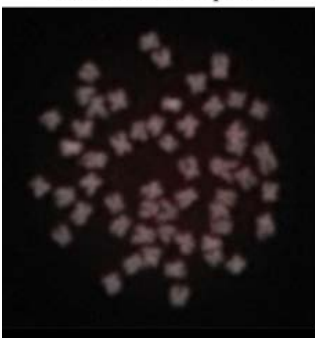


Female - *M. obtusidens*



MmaSat36-74

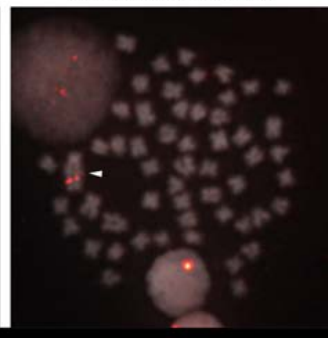
Male - *M. macrocephalus*



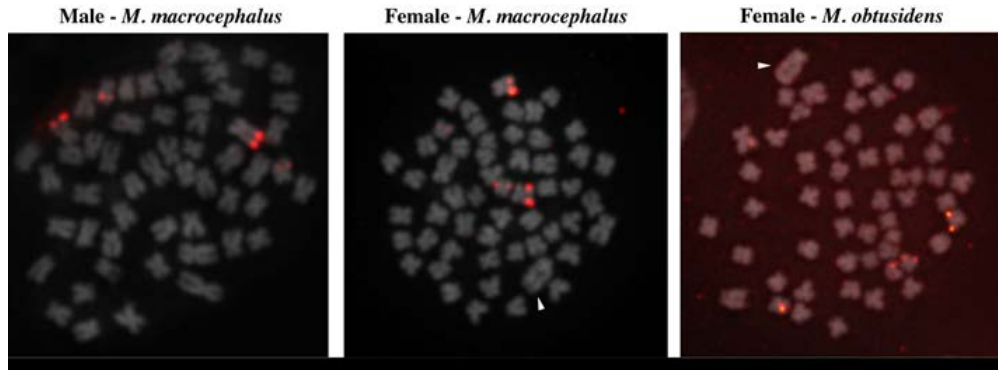
Female - *M. macrocephalus*



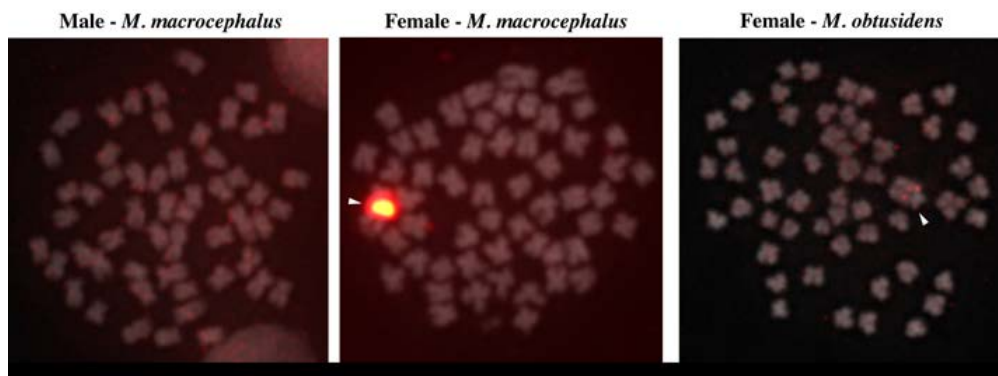
Female - *M. obtusidens*



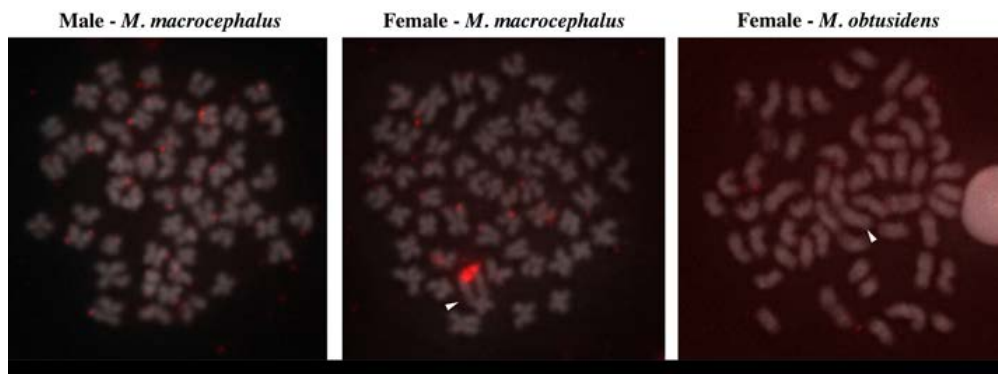
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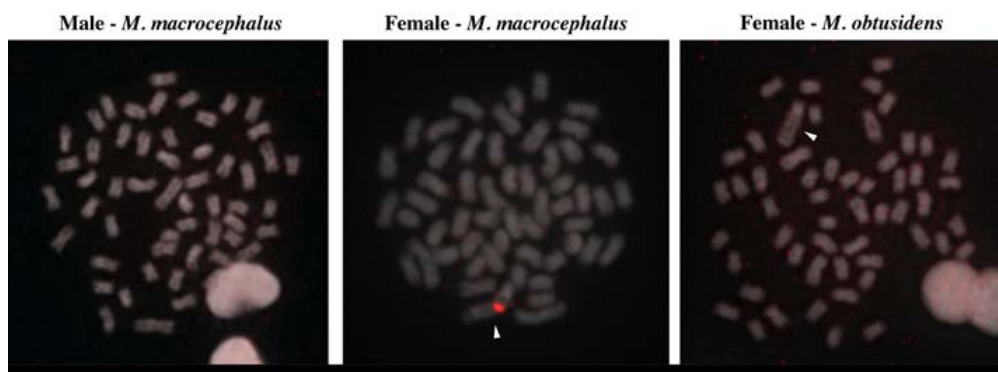
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MmaSat61-33



MmaSat63-47

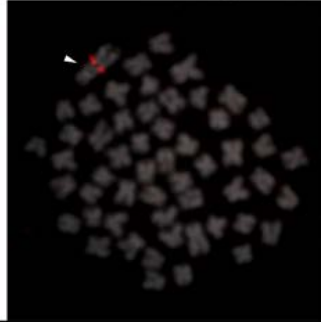


MmaSat92-46

Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

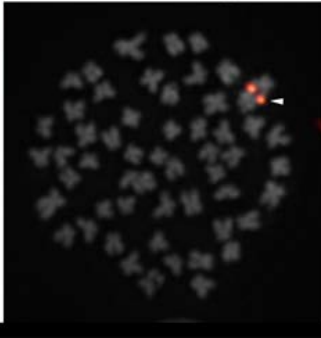


MmaSat97-39

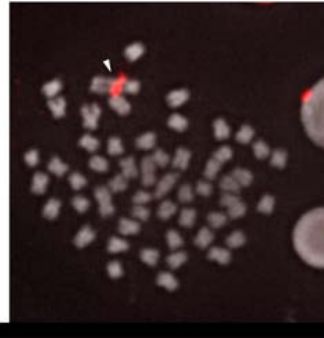
Male - *M. macrocephalus*



Female - *M. macrocephalus*

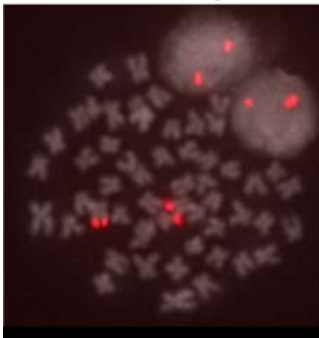


Female - *M. obtusidens*

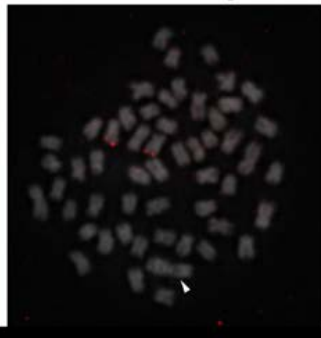


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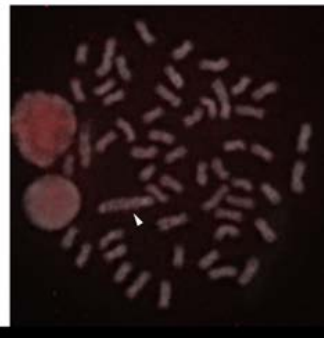
Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

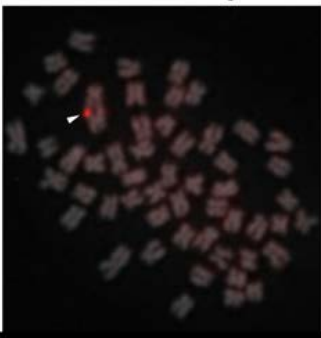


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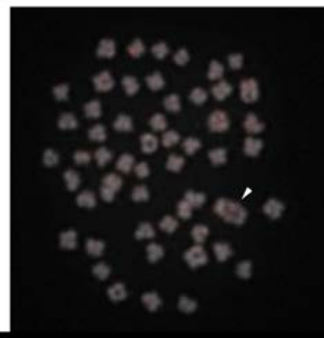
Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

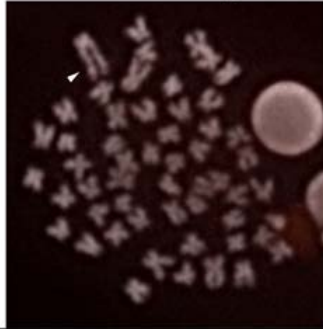


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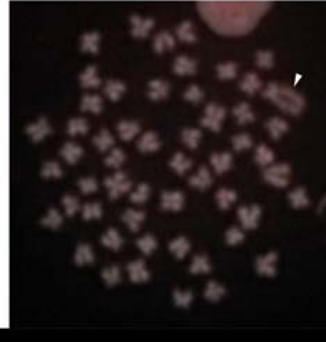
Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

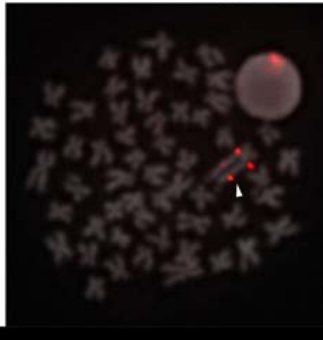


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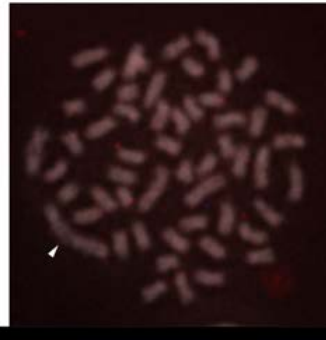
Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

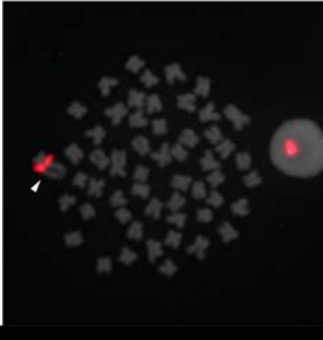


MmaSat127-42

Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

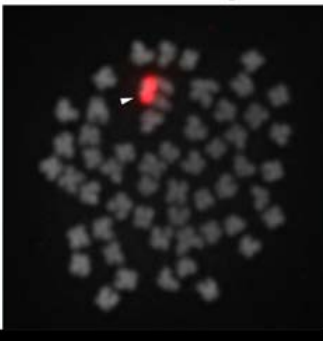


MmaSat128-38

Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

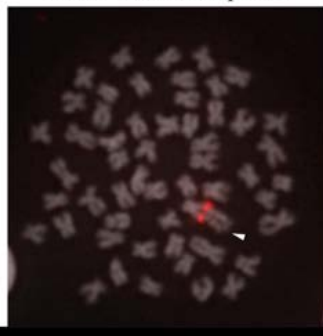


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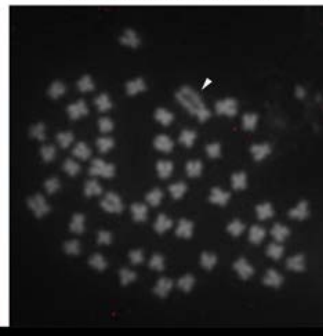
Male - *M. macrocephalus*



Female - *M. macrocephalus*

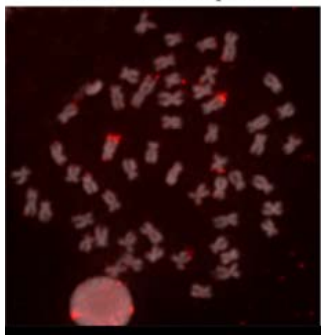


Female - *M. obtusidens*

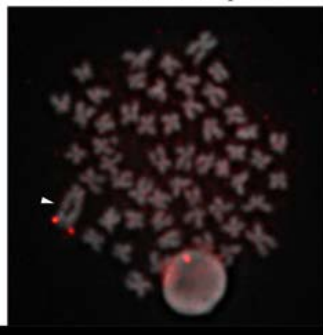


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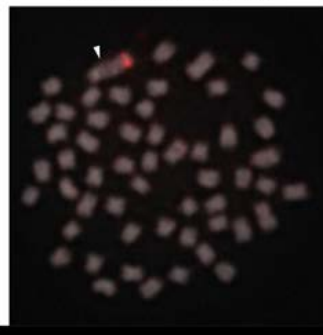
Male - *M. macrocephalus*



Female - *M. macrocephalus*

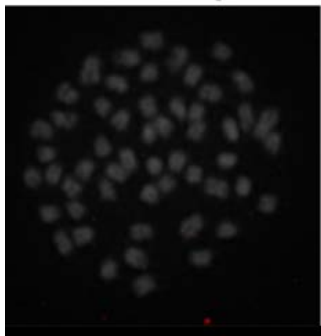


Female - *M. obtusidens*

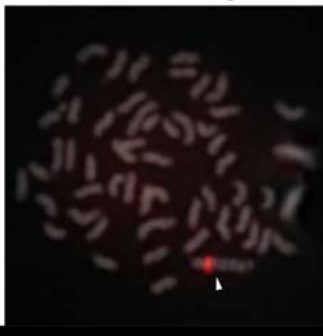


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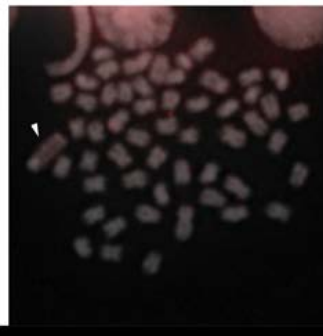
Male - *M. macrocephalus*



Female - *M. macrocephalus*



Female - *M. obtusidens*

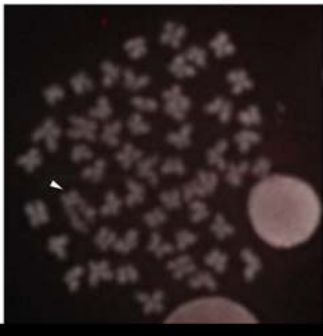


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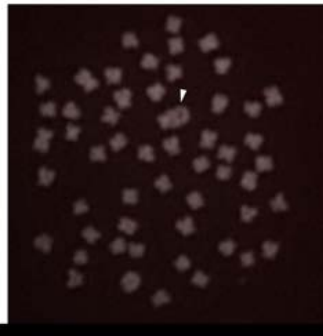
Male - *M. macrocephalus*



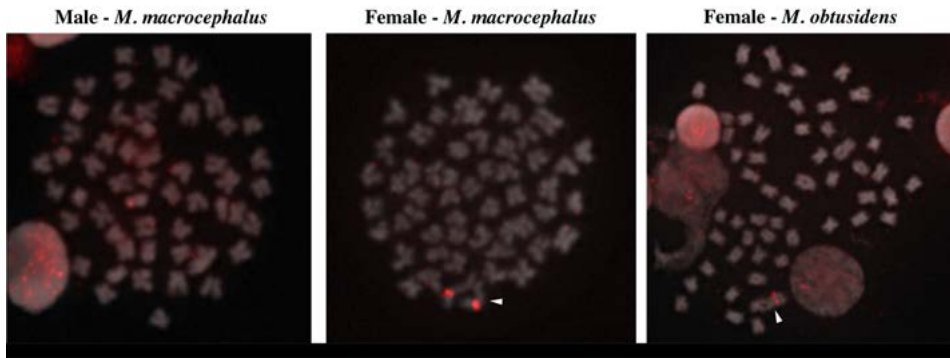
Female - *M. macrocephalus*



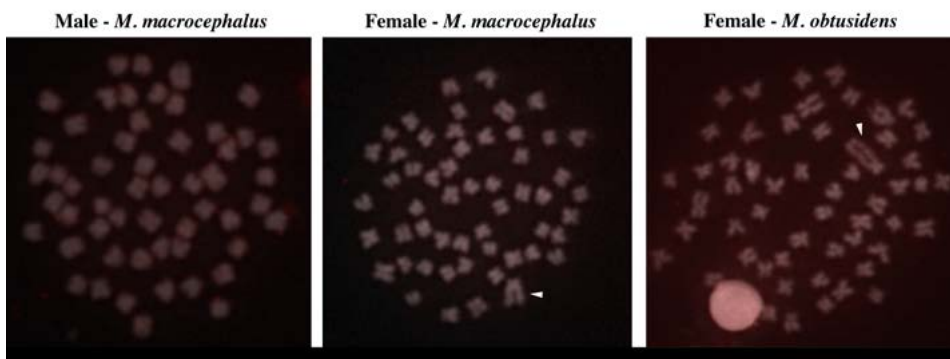
Female - *M. obtusidens*



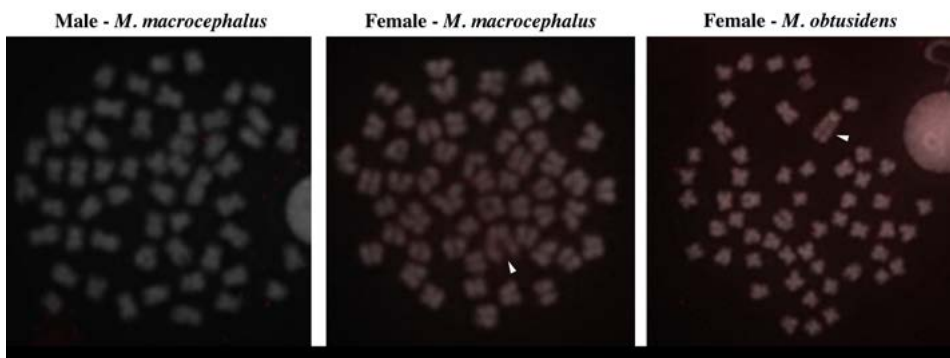
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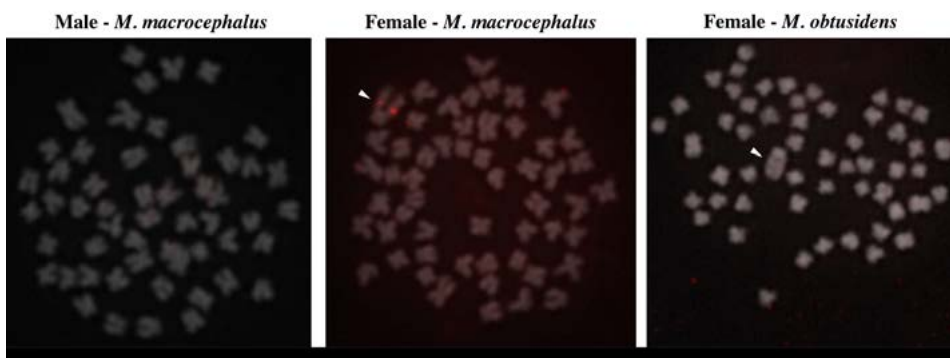
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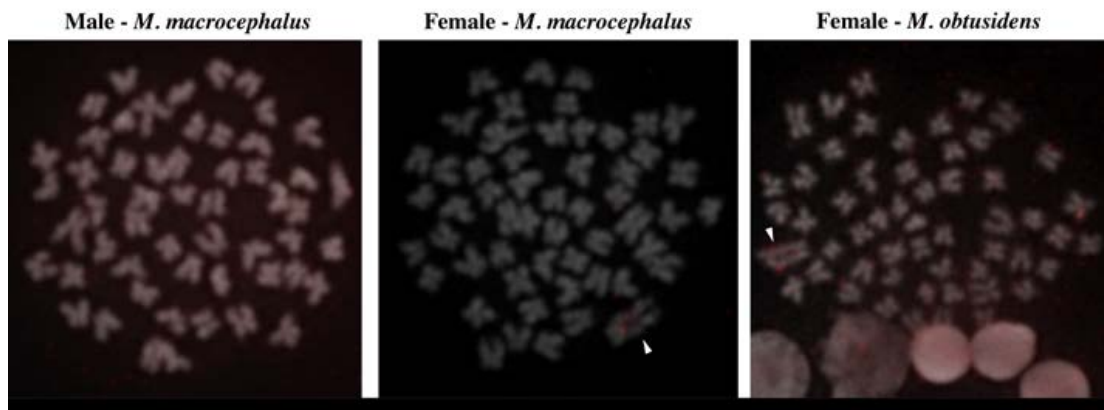
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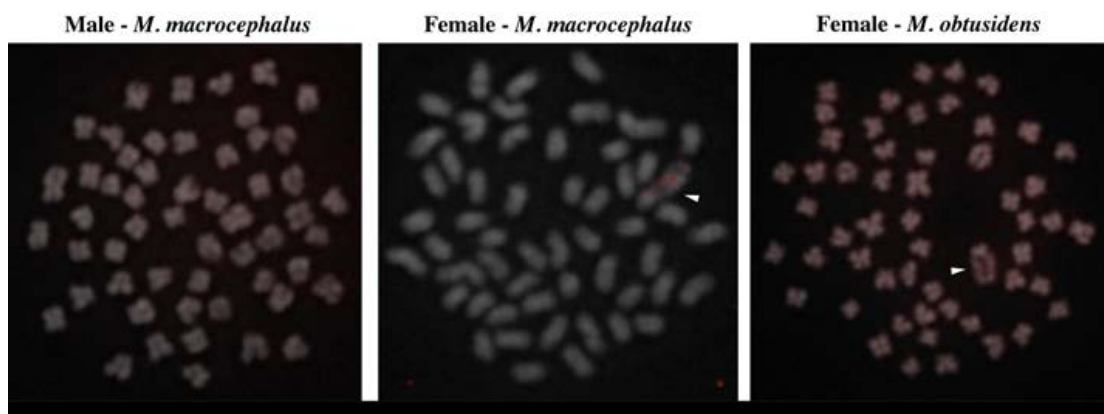
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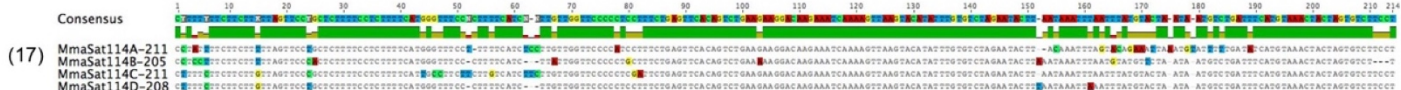
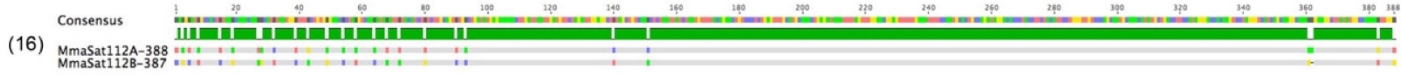
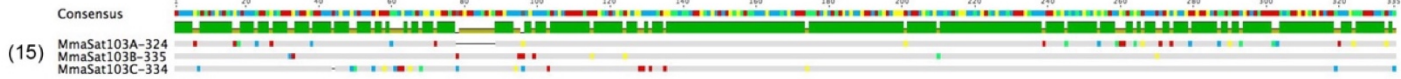
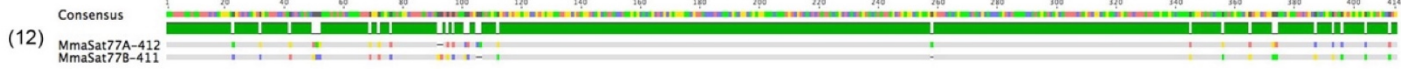
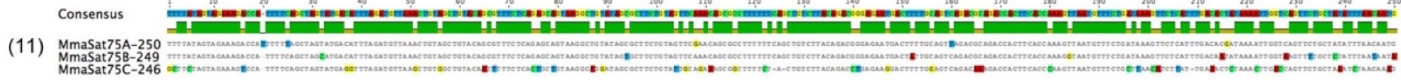
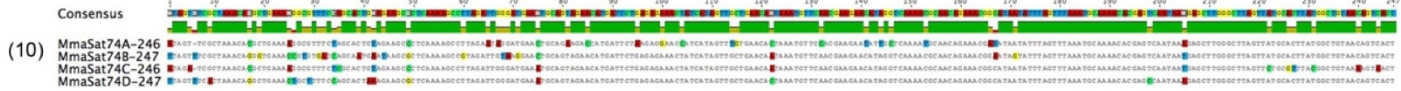
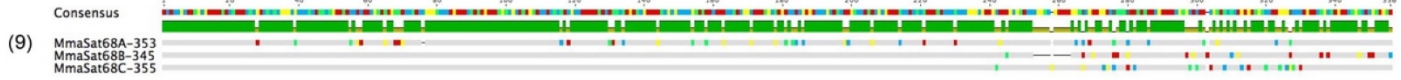
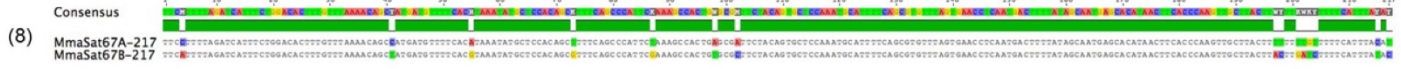
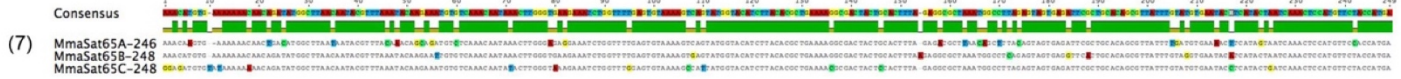
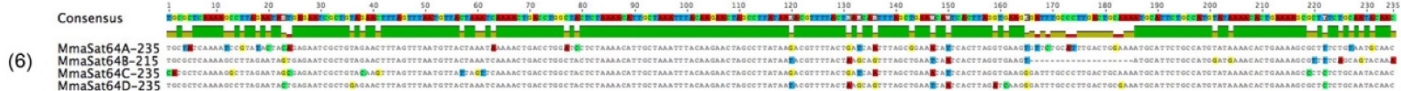
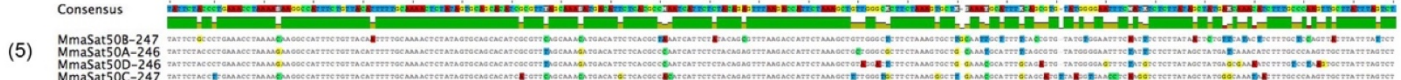
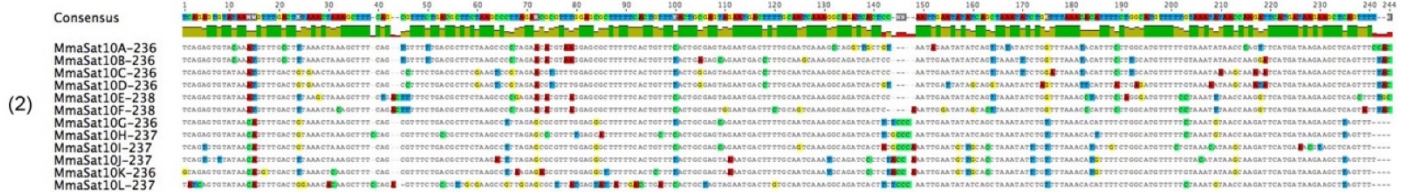
MmaSat158-39



MmaSat162-48



Supplementary Figure S1: Metaphase plates from *M. macrocephalus* (males and females) and *M. obtusidens* (females) after FISH identification of the selected satDNA families.



- (18) Consensus
MmaSat123A-152
MmaSat123B-152
MmaSat123C-152
MmaSat123D-152
MmaSat123E-152
MmaSat123F-152
MmaSat123G-152
MmaSat123H-152
MmaSat123I-152
MmaSat123J-152
MmaSat123K-152
MmaSat123L-152
MmaSat123M-152
MmaSat123N-152
MmaSat123O-152
MmaSat123P-152
MmaSat123Q-152
MmaSat123R-152
MmaSat123S-152
MmaSat123T-152
MmaSat123U-152
MmaSat123V-152
MmaSat123W-152
MmaSat123X-152
MmaSat123Y-152
MmaSat123Z-152
- (19) Consensus
MmaSat126A-178
MmaSat126B-178
MmaSat126C-178
MmaSat126D-178
MmaSat126E-178
MmaSat126F-178
MmaSat126G-178
MmaSat126H-178
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MmaSat126K-178
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MmaSat126Q-178
MmaSat126R-178
MmaSat126S-178
MmaSat126T-178
MmaSat126U-178
MmaSat126V-178
MmaSat126W-178
MmaSat126X-178
MmaSat126Y-178
MmaSat126Z-178
- (20) Consensus
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MmaSat04B-20
MmaSat04C-20
- (21) Consensus
MmaSat07A-42
MmaSat07B-42
MmaSat07C-42
- (22) Consensus
MmaSat08A-45
MmaSat08B-48
MmaSat08C-46
MmaSat08D-48
- (23) Consensus
MmaSat09A-53
MmaSat09B-53
MmaSat09C-53
MmaSat09D-53
MmaSat09E-51
- (24) Consensus
MmaSat12A-50
MmaSat12B-50
MmaSat12C-50
MmaSat12D-52
- (25) Consensus
MmaSat13A-45
MmaSat13B-45
MmaSat13C-45
MmaSat13D-45
- (26) Consensus
MmaSat15A-39
MmaSat15B-39
MmaSat15C-39
MmaSat15D-39
MmaSat15E-36
MmaSat15F-39
MmaSat15G-39
MmaSat15H-42
MmaSat15I-39
MmaSat15J-39
MmaSat15K-36
MmaSat15L-39
MmaSat15M-39
MmaSat15N-39
- (27) Consensus
MmaSat17A-72
MmaSat17B-63
MmaSat17C-74
MmaSat17D-64
MmaSat17E-72
MmaSat17F-71
- (28) Consensus
MmaSat18A-62
MmaSat18B-61
MmaSat18C-62
MmaSat18D-61
- (29) Consensus
MmaSat21A-27
MmaSat21B-27
MmaSat21C-27
MmaSat21D-27
MmaSat21E-27
MmaSat21F-27
MmaSat21G-27
MmaSat21H-27
MmaSat21I-29
MmaSat21J-27
- (30) Consensus
MmaSat22A-41
MmaSat22B-41
- (31) Consensus
MmaSat23A-17
MmaSat23B-17
- (32) Consensus
MmaSat26A-25
MmaSat26B-25
MmaSat26C-25
MmaSat26D-23

Consensus
MmaSat27A-67
MmaSat27B-66
MmaSat27C-67
MmaSat27D-67

Consensus
MmaSat29A-32
MmaSat29B-34
MmaSat29C-32
MmaSat29D-30
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MmaSat29F-30
MmaSat29G-32
MmaSat29H-32

Consensus
MmaSat30A-38
MmaSat30B-38
MmaSat30C-38
MmaSat30D-38
MmaSat30E-38
MmaSat30F-38
MmaSat30G-38
MmaSat30H-38
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MmaSat30O-36
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MmaSat30T-38
MmaSat30U-38
MmaSat30V-38
MmaSat30W-38
MmaSat30X-38
MmaSat30Y-38
MmaSat30Z-38
MmaSat30A'-38
MmaSat30B'-38

Consensus
MmaSat32A-33
MmaSat32B-33

Consensus
MmaSat33A-49
MmaSat33B-49
MmaSat33C-49
MmaSat33D-49
MmaSat33E-46

Consensus
MmaSat34A-63
MmaSat34B-61
MmaSat34C-55
MmaSat34D-65
MmaSat34E-58
MmaSat34F-65
MmaSat34G-54
MmaSat34H-61
MmaSat34I-63
MmaSat34J-63
MmaSat34K-61
MmaSat34L-62
MmaSat34M-62
MmaSat34N-54
MmaSat34O-63

Consensus
MmaSat35A-41
MmaSat35B-39
MmaSat35C-37
MmaSat35D-39
MmaSat35E-39
MmaSat35F-39
MmaSat35G-37

Consensus
MmaSat38A-54
MmaSat38B-50

Consensus
MmaSat41A-29
MmaSat41B-29

Consensus
MmaSat42A-67
MmaSat42B-67

Consensus
MmaSat46B-34
MmaSat46A-37

Consensus
MmaSat51A-30
MmaSat51B-30

Consensus
MmaSat54A-16
MmaSat54B-16
MmaSat54C-16

Consensus
MmaSat56A-35
MmaSat56B-35
MmaSat56C-35

Consensus
MmaSat57A-30
MmaSat57B-30
MmaSat57C-35

(48) Consensus 1 10 20 30 40 50 60 70 72
MmaSat58A-71 T T E G T G G C C C T T A A G T T C T G G C T G A G G A A A G G A C T C G T A G C G T A G T C G A C T C T G T T A A G C A G G C T
MmaSat58B-71 G T T G C T G G C C C T T A A G T T C G G C T G A G G A A A G G A C T C G T A G C G T A G T C G A C T C T G T T A A G C A G G C T
MmaSat58C-72 G T T G T G G C C C T T A A G T T C G G C T G A G G A A A G G A C T C T A G C G T A G T C G A C T C T G T T A A G C A G G C T

(49) Consensus 1 10 20 30 40 43
MmaSat59A-40 T T T A A T T A A G T T T G G A G G G T C C A G T T - A G A G C A G G G G T
MmaSat59B-41 T T T A A T T A G A T C A C T A G T T C C A G T T - A G A G C A G G G G T
MmaSat59C-42 T T T A A T T A G A T C C C G T A G C G T C C A G T T - A G A G C A G G G G T
MmaSat59D-40 T T T A A T T A G A T T C A G T A C G G T C C A G T T - A G A G C A G G G G T
MmaSat59E-39 T T T A A T T A G A G - T C A G T T C G T C C A G T T - A G A G C A G G G T
MmaSat59F-39 T T T A A T T A G A G - T C A G T A G C G T C C A G T T - A G A G C A G G G G T
MmaSat59G-38 T T T A A T T A G A G - T C A G T - C G G T C A G T T - A G A G C A G G G G T

(50) Consensus 1 10 20 30 40 50 60 62
MmaSat62A-61 - G T A A T A C A G T G T T C A G G T A C T T A C T G A A C C T C T G C T G A A C T C T A C A G G C T T A T T A G T
MmaSat62B-61 - G T A A T A C A G T G T T C A G G T A T G T T A C T G A A C C T C T G C T G A G A G T C T A C A G G C T T A T T A G T
MmaSat62C-61 - G T A A T A C A G T G T T C A G G T A T G T T A C T G A A C C T C T G C T G A G A G T C T A C A G G C T T A T T A G T
MmaSat62D-61 - G T A A T A C A G T G T T C A G G T A T G T T A C T G A A C C T C T G C T G A G A G T C T A C A G G C T T A T T A G T
MmaSat62E-61 - G T A A T A C A G T G T T C A G G T A T G T T A C T G A A C C T C T G A G A G T C T A C A G G C T T A T T A G T

(51) Consensus 1 10 20 30 40 43 47
MmaSat63A-47 T C C T G A T T T A G T G C C G T C C T G T G T T C C T C A G C G A T C T G A C C G G A
MmaSat63B-47 T C C T G A T T T A G T G C C G T C C T G T G T T C C T C A G C G A T C T G A C C G G A
MmaSat63C-47 T C C T G A T T T A G T G C C G T C C T G T G T T C C T C G A C T C G G A C - - -
MmaSat63D-47 T C C T G A T T T A G T G C C G T C C T G T G T T C C T C A G C G A T C T G G A C C G G A
MmaSat63E-47 T C C T G A T T T A G T G C C G T C C T G T G T T C C T C A G C G A C T C G G A C C G G A
MmaSat63F-47 T C C T G A T T T A G T G C C G T C C T G T G T T C C T C A G C G A C T C G G A C C G G A
MmaSat63G-47 T C C T G A T T T A G T G C C G T C C T G T T C C T C A G C G A C T C T G A C C G G A

(52) Consensus 1 10 20 30 40 46
MmaSat69A-42 G C T G G A G C A G T G T G T A G A G T T T A A G T G T G T G T G T C T
MmaSat69B-38 G C T G G A G C A G T G T G T A G A G T T T A A - - - G T G T G T G G T C T
MmaSat69C-38 G C T G G A G C A G T G T G T A G A G T T T A A - - - G T G T G T G G T C T
MmaSat69D-42 G C T G G A G C A G T G T G T A G A G T T T A A G T G T G T G T G T C T
MmaSat69E-38 G C T G G A G C A G T G T G T A G A G T T T A A G T G T G T G T G T C T
MmaSat69F-42 G C T G G A G C A G T G T G T A G A G T T T A A G T G T G T G T G G G G
MmaSat69G-38 G C T G G A G C A G T G T G T A G A G T T T A A - - - G T G T G T G T G T C T
MmaSat69H-46 G C T G G A G C A G T G T G T A G A G T T T A A G T G T G T G T G T C T
MmaSat69I-40 G C T G G A C A G T G T G T A G A G T T T A A G T G T G T G T G T C T
MmaSat69J-38 G C T G G A G C A G T G T G T A G A G T T T A A - - - G T G T G T G T G T C T

(53) Consensus 1 10 20 30 40 44
MmaSat70A-44 T G A C C T C T C A G A C A G T C G T G T A G T G T A A C A G G T A T A A A G A C C
MmaSat70B-44 T G A C C A C T C G A C A G T G T G T A G T G T A A C A G G T A T A A A G A C C
MmaSat70C-44 T G A C C A C T C A G A C A G T C G T G T A G T G T A A C A G G T A T A A A G A C C
MmaSat70D-44 T G A C C A C T C A C A G T C G T G T A G T G T A A C A G A A A A C C
MmaSat70E-44 T G A C C A C T C A C A G T C G T G T A G T G T A A C A G A A A A C C

(54) Consensus 1 10 20 30 37
MmaSat71A-37 A C G G A T A A A C G T G T C T G T A A C T G A T A G G G
MmaSat71B-37 T C C G A G T A T A A C A G T C T G T A G T A G C T G A T A G A G G
MmaSat71C-37 T C C G A G T A T A A C A G T C T G T A G T A G C T G A T A G A G G
MmaSat71D-35 T C T G G A T A A C - - T G T C T G T A A C T G A T A G A G G
MmaSat71E-37 T C T G A G T A T A A C A G T G T C T G T A A C T G A T A G G G

(55) Consensus 1 10 20 30 40 50 59
MmaSat76A-58 G A G - G G T G A G G G T C T G C T C T G A C T G T G A G A C T G A G C A C T G T G A G T G A T G G G T G T G
MmaSat76B-59 G A G A G G T G A G G G T C T G C T C T G A C T G T G A G A C T G A G C A C T G T G A G T G A T G G G T G T G

(56) Consensus 1 10 20 31
MmaSat78A-31 C C A C T G G A C T C T G G A G T G G T A A A G C C G
MmaSat78B-31 C C A C T G G A C T C T G G A G T G G T A A A G C C C A

(57) Consensus 1 10 20 30 40
MmaSat79A-38 A A C T A A A C A T A C A T T T A C A C A - - T T A T T A T T T A T T T A C
MmaSat79B-40 A A C T A A A C A T A C A T T T A C A C A T T A T T A T T A T T T A C

(58) Consensus 1 10 20 29
MmaSat80A-29 T A C T T A C A C A G T G A T C A G A G T C A G T G A
MmaSat80B-27 T A C T T A C A C A G T G A T C A G A G T C A G T - -
MmaSat80C-27 G A - - T A C A C A G T G A T C C A G A G T C A G T G A
MmaSat80D-28 T A C T A C A C A G T G A T C C A G A G C A - T G

(59) Consensus 1 10 20 30 40 50 58
MmaSat83A-58 T C A A T T A C A T A T A T A C A G T T A T T A C A G T T T A C A G T C T G A G T A C T G A A C T C T C
MmaSat83B-58 T C A A T T A C A T A T A T A C A G T T A T T A C A G T T T A C A G T C T G A G T A C T G A A C T C T C

(60) Consensus 1 10 20 30 40 50 60 68
MmaSat84A-65 T A A A C C C T G A G T A G A C T G A T A A A T C A A T G - - - G A T C A G T T A T A A T C T C A G G T T A C T G A G C T C T G
MmaSat84B-68 T A A A C C C T G A G T A G A C T G A T A A A T C A A T G A T A G A C A G T T A T A A T C T G C T T A C T G A G C T C T G
MmaSat84C-68 T A A A C C C T G A G T A G A C T G A T A A A T C A A T G T G A T A G A C A G T T A T A A T C T C A G T T A C T G A G C T C T G
MmaSat84D-67 T A A A C C C T G A G T A G A C T G A T A A A T C A A T G T - A T G A T C A G T T A T A A T C T C A G T T A C T G A G C T C T G

(61) Consensus 1 10 20 30 40 42
MmaSat86A-42 G T C A G T C C A T T C A G T G G T T G A G G T T C T G G A C T C T G T
MmaSat86B-42 G T C A G T C C A T T C A G T G T T G A G G T T C T G G A C T C T G G G T G
MmaSat86C-42 G T C A G T C C A T T A G T G T T A G G T T C T G G A C T C T G G G T G

(62) Consensus 1 10 20 30 40 50 60
MmaSat91A-60 T G T G C T A A A C A C A T A T T T A A A C T A G G C T G A G T C C A A A C C C C T C T G T A P C C C T C C A
MmaSat91B-60 T G T G C C T A A A C A C A T A T T T A A A C T A G G C T G A G T C C A A A C C C C T C T G T A T C T G T G A
MmaSat91C-60 T G T G C C T A A A C A C A T A T T T A A A C G G T A G T C C A A A C C C C T C T G T G T C C C C T C A
MmaSat91D-60 T G T G C C T A A A C A C A T A T T T A A A C G C A G C T G A G T C C A A A C C C C T C T G T A T C C C T C C A
MmaSat91E-60 T G T G C C T A A A C A C A T A T T T A A A C G T A G T A G T A G T A G T C C A A A C C C C T C T G T A C C C C C A
MmaSat91F-60 T G T G C C T A A A C A C A T A T T T A A A C T A G G C T G A G T C C A A A C C C C T C T G T G C C T C T C

(63) Consensus 1 10 20 30 40 46
MmaSat92A-46 G T A T A T G C A G C T C A A A C A G C C G G A T A G A A A C C A G C T A G C T A C A
MmaSat92B-46 G T A T A T G C A G C T C A A A A G C C G G A T A G A A A C C A G A T A G C T A C A
MmaSat92C-46 G T A T A T G C A C A C T C A A A C A G C C G G A T A G A A A C C A G A T A G C T A C A
MmaSat92D-46 G T A T A T G C A C A T C A A C A G C C G A C A G A A A C C A G A T A G C T A C A
MmaSat92E-46 G T A T A T G C A C A A C A G C C G G A T A G A A A C C A G A T A G C T A C A
MmaSat92F-46 G T A T A T G A C T C A A A C A G C C G G A T A G A A A C C A G A T A G C T A C A
MmaSat92G-46 G T A T A T G A C C T C A A A C A G C C G G A T A G A A A C C A G A T A G C T A C A
MmaSat92H-46 G T A T A T G A G T A A A C A G C C G G A T A G A A A C C A G C T A G C T A C A
MmaSat92I-46 G T A T A T G A A C T C A A A C A G C C G C C A G A A A C C A G A T A G C T A C A
MmaSat92J-46 G T A T A T G C A G C T C A A A C A G C C A T T A G A A A C C A G A T A G C T A C A
MmaSat92K-46 G T A A G C A G C T A A A C A G C C A T T A G A A A C C A G A T A G C T A C A

(63) Consensus 1 10 20 30 41
MmaSat95A-41 TATA TACTCTACTCTGATTTCTTTCAGATCTCTCAAT
MmaSat95B-41 TATA TACTCTACTCTGATTTCTTTCAGATCTCTCAAT

(64) Consensus 1 10 20 30 40 50 54
MmaSat96A-47 GAGTCGAGAGACCGAACATGACAGTTATGTTAGATAACA CTAGAG
MmaSat96B-50 G---CAGAGAGCTTAAACATGTTTATCTGTAGATAACA CTAGAGGCGG
MmaSat96C-47 GAGTCAGAGGCGTTAAACATGACAGTTATCTGTAGATAACA CTAGAG

(65) Consensus 1 10 20 30 39
MmaSat97A-39 GCTCACACCAACCCCTACAACATTCACCTTCAACCA
MmaSat97B-39 GCTCACAGCTCAACCCCTACAACATTCACCTTCAACCA
MmaSat97C-39 GCTCACAGCTCAACCCCTACAACATTCACCTTCAACCA

(66) Consensus 1 10 20 30 37
MmaSat98A-37 TAACTCTTCAGACTGTGGGAGTTGTGCTGCTG
MmaSat98B-37 CTAACTCTTCAGACTGTGGGAGTTGTGCTGCTG
MmaSat98C-37 CTAACTCTTCAGACTGTGGGAGTTGTGCTGCTG
MmaSat98D-37 CTAACTCTTCAGACTGTGGGAGTTGTGCTGCTG
MmaSat98E-37 CTAACTCTTCAGACTGTGGGAGTTGTGCTGCTG
MmaSat98F-37 CTAACTCTTCAGACTGTGGGAGTTGTGCTGCTG
MmaSat98G-37 CTAACTCTTCAGACTGTGGGAGTTGTGCTGCTG

(67) Consensus 1 10 20 30 33
MmaSat99A-31 AGCGGAGTATGTTAGTGTCTGTGTA-TGAA
MmaSat99B-33 AGCACAGATATGTTAGTGTCTGTGTA-TGAA
MmaSat99C-30 AGCAAGATATGTTAGTGTCTGTGTA-TGAA
MmaSat99D-31 AGCGGAGTATGTTAGTGTCTGTGTA-TGAA
MmaSat99E-30 AGCACAGATATGTTAGTGTCTGTGTA-TGAA

(68) Consensus 1 10 20 30 40 50 60 64
MmaSat100A-60 TGTGTGGGACTCAGTCTGGGTTTG---ATGTAATGTA TGTACTAAGCTGTAGGGAATGCGAGG
MmaSat100B-45 TGTGTGGGACTCAGTCTGGGTTTG---ATGTAATGTA TGTACTAAGCTGTAGGGAATGCGAGG
MmaSat100C-56 TGTGTGGGACTCAGTCTGGGTTTG---ATGTAATGTA TGTACTAAGCTGTAGGGAATGCGAGG
MmaSat100D-60 TGTGTGGGACTCAGTCTGGGTTTG---ATGTAATGTA TGTACTAAGCTGTAGGGAATGCGAGG

(69) Consensus 1 10 20 30 34
MmaSat111A-33 AATTGGC TAGTCTGATTTAGTGTGCTTAAT
MmaSat111B-33 AATTGGC TAGTCTGATTTAGTGTGCTTAAT
MmaSat111C-33 AATTGGC TAGTCTGATTTAGTGTGCTTAAT

(70) Consensus 1 10 20 30 40 50 52
MmaSat113A-52 CCTGTAACTGTTA---CTTTCTAAA CTAAGGGAAGTTTACTGTTGTTACTGAA
MmaSat113B-52 CCTGTAACTGTTA---CTTTCTAAA CTAAGGGAAGTTTACTGTTGTTACTGAA
MmaSat113C-52 CCTGTAACTGTTA---CTTTCTAAA CTAAGGGAAGTTTACTGTTGTTACTGAA
MmaSat113D-52 CCTGTAACTGTTA---CTTTCTAAA CTAAGGGAAGTTTACTGTTGTTACTGAA
MmaSat113E-52 CCTGTAACTGTTA---CTTTCTAAA CTAAGGGAAGTTTACTGTTGTTACTGAA

(71) Consensus 1 10 20 30 40 45
MmaSat115A-41 --AGTTTAGTCTGATTCAGTGAATAGGTCAGCAGG--TATA TTC
MmaSat115B-43 --AGTTTAGTCTGATTCAGTGAATAGGTCAGCAGG--TATA TTC
MmaSat115C-43 --AGTTTAGTCTGATTCAGTGAATAGGTCAGCAGG--TATA TTC

(72) Consensus 1 10 20 30 40 45
MmaSat117A-44 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117B-41 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117C-41 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117D-44 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117E-44 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117F-42 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117G-40 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117H-42 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117I-44 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117J-42 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117K-42 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA
MmaSat117L-43 GTA AAGTGA---CTGAGTTACAGAGAGATGTTTATAA---GTGTA

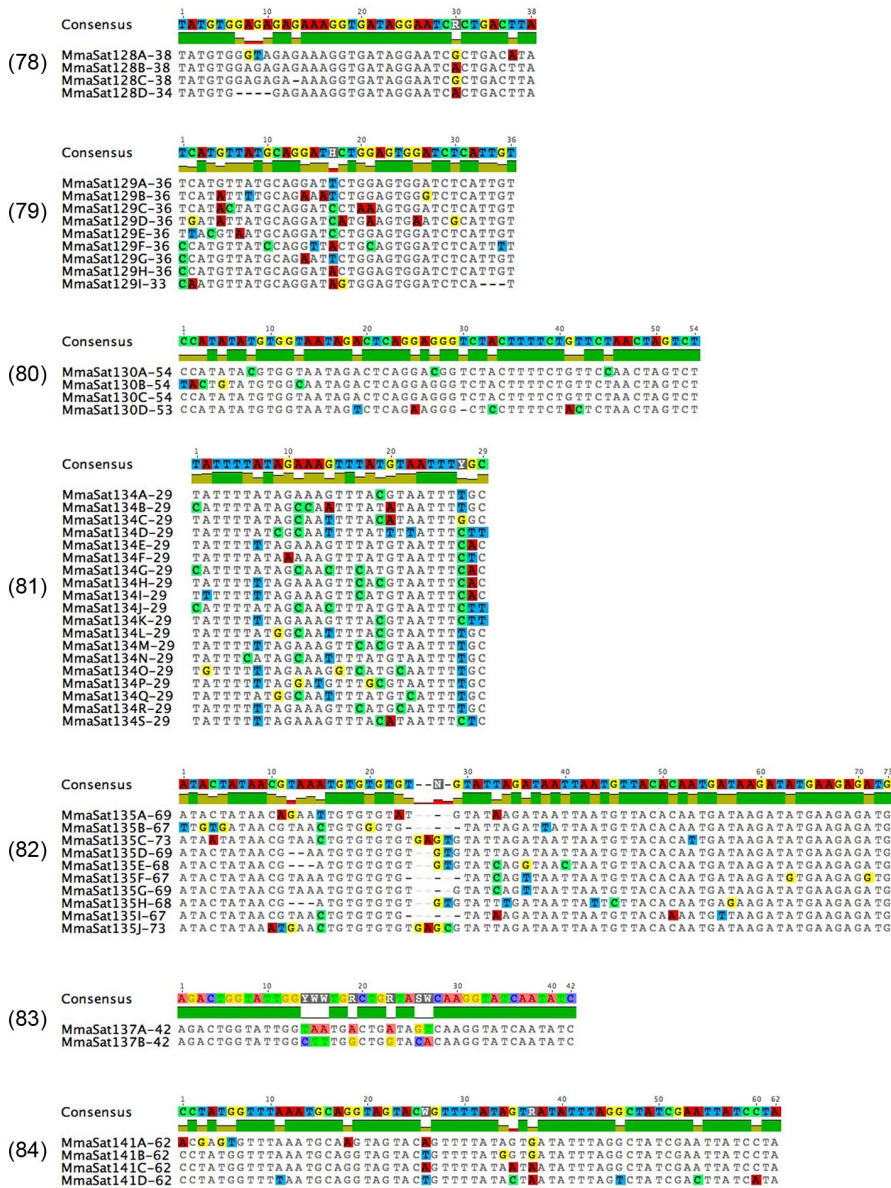
(73) Consensus 1 10 20 30 40 50 60 70
MmaSat119A-70 TGAAGGGGTACCAGAAGTAACTAAGTAGTTAGGTGAGATGTCACGATCTGAGGAGGGGGTGGTTC
MmaSat119B-70 TGAAGGGGTACCAGAAGTAACTAAGTAGTTAGGTGAGATGTCACGATCTGAGGAGGGGGTGGTTC

(74) Consensus 1 10 20 30 32
MmaSat120B-32 CACCAACACTGTTCTTCATCC-TTATCAT
MmaSat120A-31 CACCAACACTGTTCTTCATCC-TTATCAT

(75) Consensus 1 10 20 30 40 45
MmaSat121A-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121B-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121C-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121D-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121E-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121F-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121G-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121H-43 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121I-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121J-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121K-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121L-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121M-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC
MmaSat121N-45 ACCTGCTGTTTACTAGTGAATAACAGTCAAGGGATTATTTTAC

(76) Consensus 1 10 20 30 40 50 54
MmaSat122A-54 CTA CAGAAATAAC CAGAGTACAGAGAAAGCAGAGACCGCTTACCACCA
MmaSat122B-54 CTA CAGAAATAAC CAGAGTACAGAGAAAGCAGAGACCGCTTACCACCA
MmaSat122C-54 CTA CAGAAATAAC CAGAGTACAGAGAAAGCAGAGACCGCTTACCACCA
MmaSat122D-54 CTA CAGAAATAAC CAGAGTACAGAGAAAGCAGAGACCGCTTACCACCA
MmaSat122E-54 CTA CAGAAATAAC CAGAGTACAGAGAAAGCAGAGACCGCTTACCACCA
MmaSat122F-52 CTA CAGAAATAAC CAGAGTACAGAGAAAGCAGAGACCGCTTACCACCA

(77) Consensus 1 10 20 30 40 42
MmaSat127A-42 A---CTGCTCAGAGGTTAGTATTAACCTTTTCTGAGTCTGCTC
MmaSat127B-42 A---CTGCTCAGAGGTTAGTATTAACCTTTTCTGAGTCTGCTC
MmaSat127C-42 ACCCTGCTCAGAGGTTAGTATTAACCTTTTCTGAGTCTGCTC
MmaSat127D-42 ACCCTGCTCAGAGGTTAGTATTAACCTTTTCTGAGTCTGCTC
MmaSat127E-42 ACCCTGCTCAGAGGTTAGTATTAACCTTTTCTGAGTCTGCTC
MmaSat127F-42 ACCCTGCTCAGAGGTTAGTATTAACCTTTTCTGAGTCTGCTC



Supplementary Figure S2: Alignments of the different variants that represented several long (1-19) and short (20-84) satDNA families.

Consensus 1 10 20 30 40 50 53
MmaSat156-53
MmaSat09A-53
MmaSat09B-53
MmaSat09C-53
MmaSat09D-53
MmaSat09E-51

(SF1)

Consensus 1 50 100 150 200 250 300 350 400 450 500 550 600 649
MmaSat10-236
MmaSat064-235
MmaSat043-247
MmaSat109-210
MmaSat075-250
MmaSat124-237
MmaSat065-246
MmaSat067-217
MmaSat087-248
MmaSat055-196
MmaSat136-245
MmaSat050-246
MmaSat089-234
MmaSat074-246
MmaSat108-235
MmaSat106-282
MmaSat103-324
MmaSat068-353
MmaSat030-482
MmaSat020-482
MmaSat019-435
MmaSat066-611
MmaSat090-620

(SF2)

Consensus 1 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 401
MmaSat28-220
MmaSat112A-388
MmaSat112B-387

(SF3)

Consensus 1 10 20 30 40 50 52
MmaSat139-47
MmaSat113A-52
MmaSat113B-52
MmaSat113C-52
MmaSat113D-52
MmaSat113E-52

(SF4)

Consensus 1 10 20 30 40 50 60 67
MmaSat164-67
MmaSat118A-66

(SF5)

Consensus 1 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 412
MmaSat140-330
MmaSat77A-412
MmaSat77B-411

(SF6)

Consensus 1 10 20 30 40 50 56
MmaSat52-47
MmaSat149-49
MmaSat153-40
MmaSat115A-41
MmaSat115B-43
MmaSat115C-43

(SF7)

Consensus 1 10 20 30 40 43
MmaSat61-33
MmaSat151-33
MmaSat144-38
MmaSat150-31
MmaSat15A-39
MmaSat15B-36
MmaSat15C-39
MmaSat15D-39
MmaSat15E-36
MmaSat15F-39
MmaSat15G-39
MmaSat15H-42
MmaSat15I-39
MmaSat15J-39
MmaSat15K-36
MmaSat15L-39
MmaSat15M-39
MmaSat15N-39
MmaSat120B-32
MmaSat120A-31

(SF8)

Consensus 1 10 20 30 40 50 54
MmaSat131-45
MmaSat38A-50
MmaSat38B-54

(SF9)

Consensus 1 10 20 30 40 50 60 70 80 90 100 110 120 130 136
MmaSat132-121
MmaSat81-135

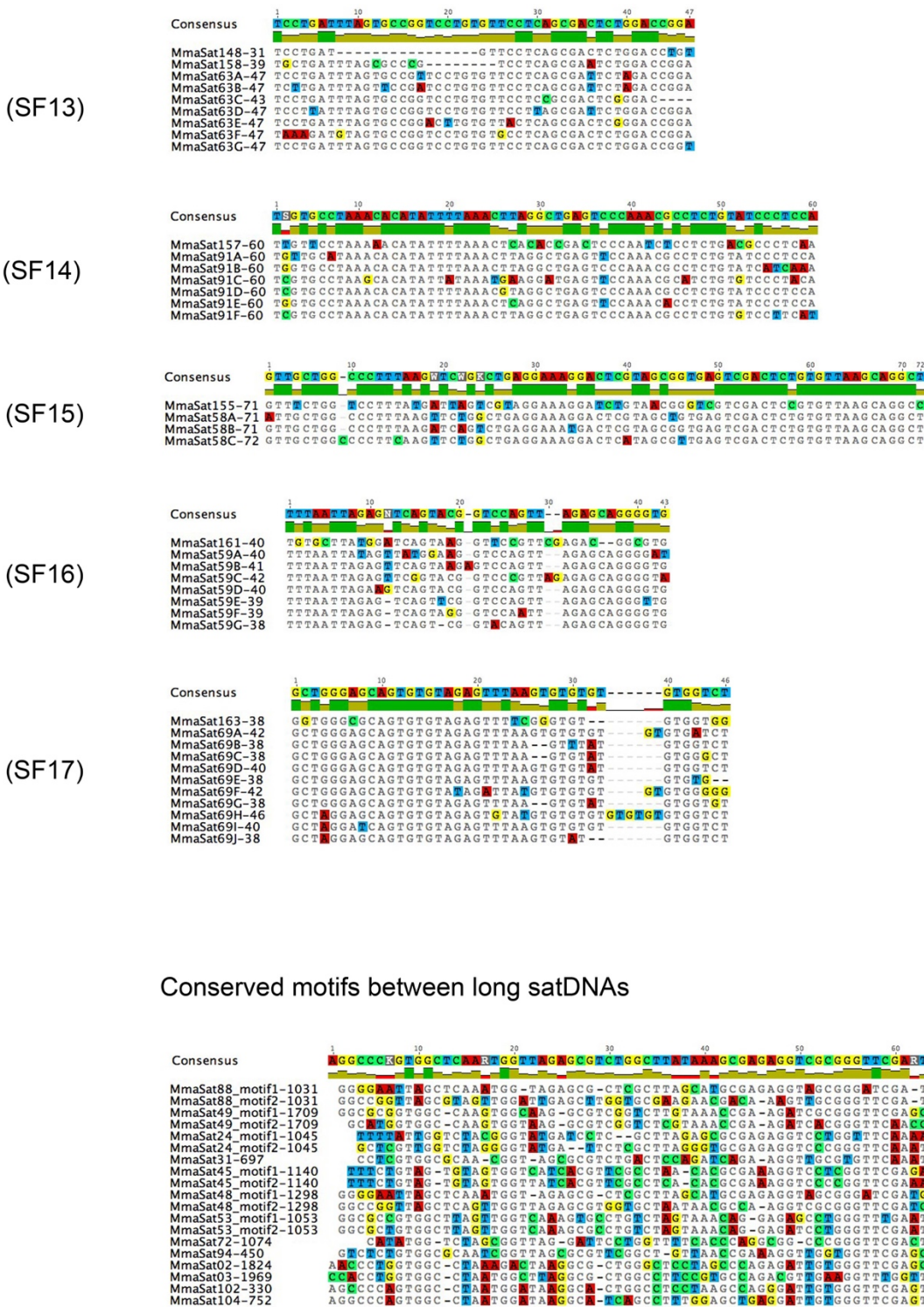
(SF10)

Consensus 1 10 20 30 33
MmaSat146-33
MmaSat143-27
MmaSat32A-33
MmaSat32B-33

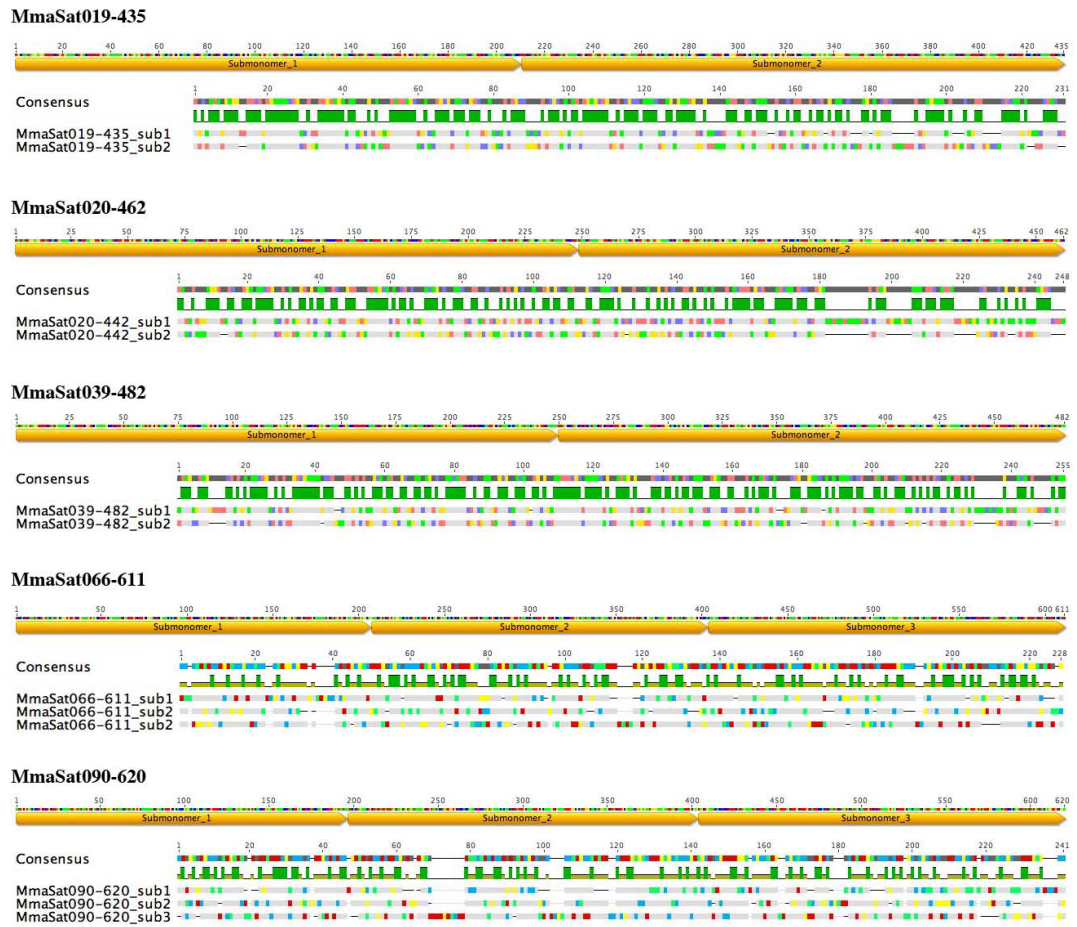
(SF11)

Consensus 1 10 20 30 40 50 60 70 72
MmaSat141A-62
MmaSat141B-62
MmaSat141C-62
MmaSat141D-62
MmaSat43A-67
MmaSat43B-67
MmaSat145-67

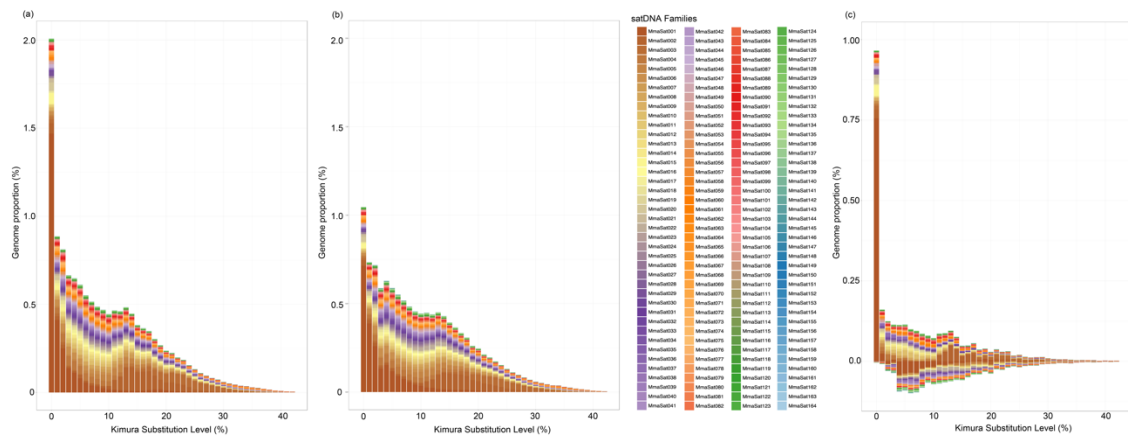
(SF12)



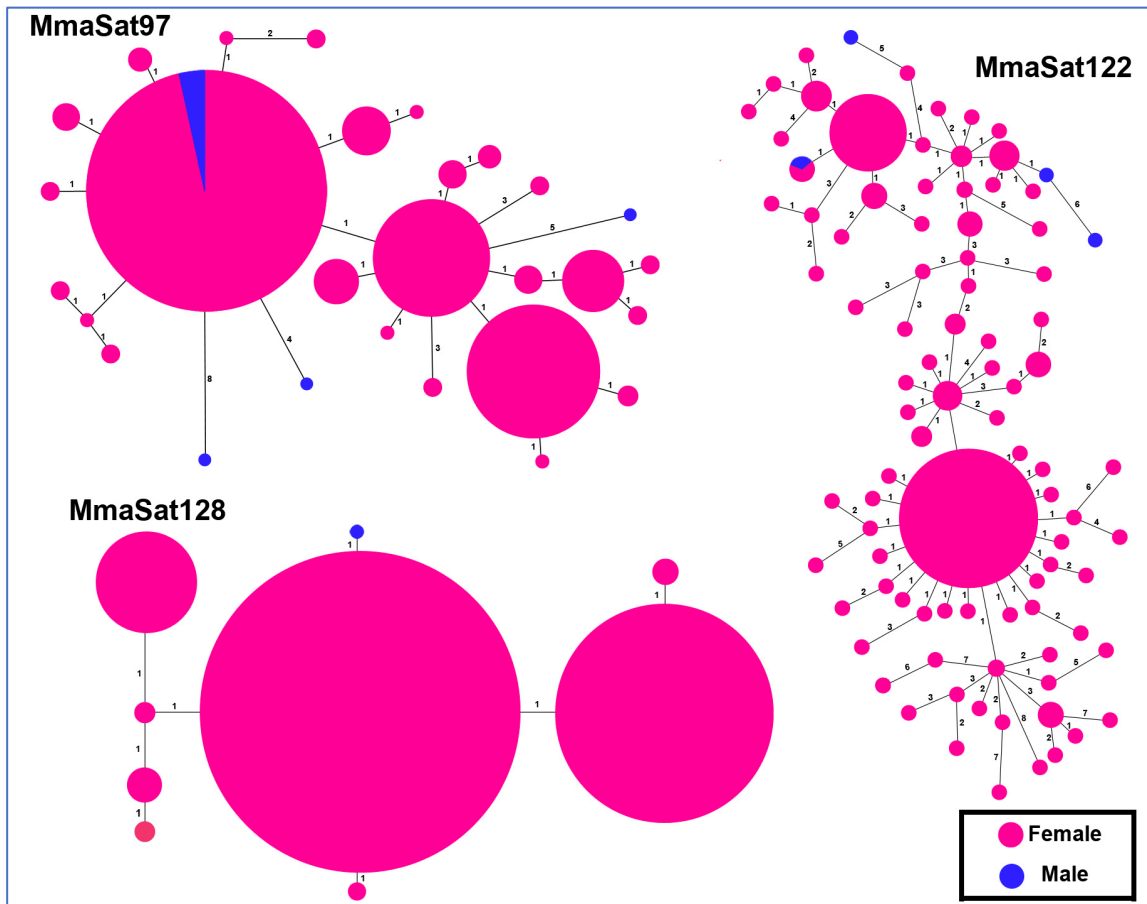
Supplementary Figure S3: Alignments between sequences from the characterized superfamilies.



Supplementary Figure S4: Alignment of the five satDNA families included in MmaSF4. Yellow arrows indicate subrepeats.



Supplementary Figure S5: Repeat landscapes showing the abundance and divergence profiles for all satDNAs identified in the *M. macrocephalus* female (a) and male (b) specimens, and a subtractive repeat landscape that was obtained by calculating the differences between the male and female counts, which indicates the enrichment of several satDNAs in the female sample that are putatively located on the W chromosome (c).



Supplementary Figure S6: Minimum spanning trees (MSTs) showing the relationships between the different haplotypes of MmaSat97, MmaSat122 and MmaSat128 obtained from Illumina reads from males (blue) and females (pink). The diameter of the circles is proportional to their abundance and the numbers represent the number of mutational steps.

	1	10	20	30	40	50	52																																												
MmaSat85-52	T	A	T	T	G	A	G	G	T	G	T	T	T	A	T	A	G	A	C	T	C	C	T	A	T	T	C	T	A	G	T	G	T	A	T	A	G	G	A	G	T	G	T								
ApaSat29-52	T	A	T	T	G	A	G	G	T	T	G	T	T	T	A	T	G	G	A	C	T	A	A	T	A	T	C	T	C	C	T	A	T	T	C	T	A	G	T	G	T	A	T	A	G	G	A	G	T	G	T
CgomSat02-52	T	A	T	T	G	A	G	G	T	T	G	T	T	T	A	T	G	G	A	C	T	A	A	T	A	T	C	T	C	C	T	A	T	T	C	T	A	G	T	G	A	T	A	T	A	G	T	G	T		

Supplementary Figure S7: Nucleotide alignment between MmaSat85-52 and its respective homologues in *Characidium gomesi* (CgoSat02-52) and *Astyanax paranae* (ApaSat29-52).

Table S1: Repeat unit length (RUL, in nt), A + T content (%), number of variants (V), abundance (% of the genome) in females (F) and males (M) and divergence (%) in females (F) and males (M) of all satDNA families and superfamilies (SF), each showing its own quotient between female and male abundance values (F/M). Asterisks indicate the satDNA families mapped through FISH.

SF	satDNA	RUL	A + T	V	Abundance (%)		Divergence		F/M
					Female	Male	Female	Male	
	MmaSat001-566	566	56.9	2	2.7828955	2.2219752	2.33	3.57	1.25
	MmaSat002-1824	1824	54.6	1	1.2957467	1.0811764	15.2	15.89	1.20
	MmaSat003-1969	1969	54.2	1	0.7739933	0.6412589	21.83	22.36	1.21
	MmaSat004-20	20	50	3	0.5449692	0.5126925	7.77	8.84	1.06
	MmaSat005-1201	1201	59.7	1	0.4234171	0.4233456	11.75	12.6	1.00
	MmaSat006-36	36	66.7	1	0.3554307	0.3698559	6.17	6.6	0.96
	MmaSat007-42	42	54.8	3	0.2955625	0.3100578	15.72	16.5	0.95
	MmaSat008-45	45	53.3	4	0.2940894	0.2094737	10.25	10.48	1.40
1	MmaSat009-53*	53	58.5	5	0.2515902	0.1372152	9.15	10.23	1.83
2	MmaSat010-236	236	63.6	12	0.2355172	0.2686966	8.13	10	0.88
	MmaSat011-37	37	56.8	1	0.2251984	0.1653774	7.08	7.41	1.36
	MmaSat012-50	50	54	4	0.2065817	0.1813352	13.11	14	1.14
	MmaSat013-45	45	44.4	4	0.1870465	0.1380625	9.96	10.85	1.35
	MmaSat014-1878	1878	60.8	1	0.1741413	0.1456353	7.91	10.11	1.20
8	MmaSat015-39	39	56.4	14	0.1672695	0.1719599	12.55	13.33	0.97
	MmaSat016-51	51	80.4	2	0.1323421	0.1258244	5.31	5.86	1.05
	MmaSat017-72	72	57.9	6	0.1280005	0.0563025	9.01	9.7	2.27
	MmaSat018-62	62	71	4	0.126233	0.1323584	5.89	6.93	0.95
2	MmaSat019-435	435	60.9	1	0.1192614	0.1018148	-0.65	0.01	1.17
2	MmaSat020-442	442	61.1	2	0.1155918	0.1091648	12.41	12.32	1.06
	MmaSat021-27	27	44.4	10	0.1129086	0.2035064	12.83	13.58	0.55
	MmaSat022-41	41	58.5	2	0.1117997	0.085009	9.22	10.26	1.32
	MmaSat023-17	17	58.8	2	0.1067554	0.1024796	17.37	15.66	1.04
	MmaSat024-1045	1045	58.2	1	0.1047098	0.1285669	8.16	8.9	0.81
	MmaSat025-22	22	59.1	1	0.1037866	0.0757158	9.6	10.6	1.37
	MmaSat026-25	25	60	4	0.0948755	0.129752	9.92	10.2	0.73
	MmaSat027-67	67	62.7	4	0.0900267	0.0879088	13.32	13.94	1.02
3	MmaSat028-220	220	51.4	1	0.0893837	0.0699632	5.49	6.48	1.28
	MmaSat029-32*	32	46.9	8	0.0846975	0.0503739	14.12	15.34	1.68
	MmaSat030-38	38	47.4	28	0.082197	0.0612807	16.11	16.8	1.34
	MmaSat031-697	697	54.2	1	0.0792113	0.1005833	6.18	7.15	0.79
11	MmaSat032-33	33	57.6	2	0.0791761	0.093751	8.93	9.89	0.84
	MmaSat033-49	49	55.1	5	0.0777897	0.0793178	10.81	11.45	0.98
	MmaSat034-63	63	60.3	15	0.0708584	0.0662731	8.82	9.71	1.07
	MmaSat035-41	41	53.8	7	0.0685827	0.0609549	14.48	15.09	1.13
	MmaSat036-74*	74	62.2	1	0.0683419	0.000202	6.42	26.04	338.55
	MmaSat037-85	85	64.7	1	0.0672261	0.1102712	6.07	7.01	0.61

9	MmaSat038-54	54	63	2	0.0670939	0.0823434	10.49	11.6	0.81
2	MmaSat039-482	482	62.4	1	0.0650824	0.0925934	7.76	7.36	0.70
	MmaSat040-34	34	67.6	1	0.0637776	0.0865696	8.77	8.82	0.74
	MmaSat041-29	29	51.7	1	0.0634877	0.0502377	15.58	17.62	1.26
12	MmaSat042-67	67	55.2	2	0.0631669	0.058297	12.46	12.8	1.08
2	MmaSat043-247	247	62.3	1	0.0614941	0.0673189	10.7	9.83	0.91
	MmaSat044-5	5	50	1	0.0612175	0.0571754	20.61	22.76	1.07
	MmaSat045-1140	1140	49.6	1	0.0599637	0.0618178	3.93	5.21	0.97
	MmaSat046-37	37	64.9	2	0.0595762	0.0509323	10.48	10.86	1.17
	MmaSat047-177	177	66.1	9	0.0584642	0.0705339	12.19	12.7	0.83
	MmaSat048-1298*	1298	49.2	1	0.0583764	0.0365778	6.3	7.51	1.60
	MmaSat049-1709	1709	52.8	1	0.0582143	0.0536612	4.87	6.48	1.08
2	MmaSat050-246	246	61	4	0.0503393	0.0542129	9.86	10.35	0.93
	MmaSat051-30	30	46.7	2	0.0493721	0.0466131	10.41	11.6	1.06
7	MmaSat052-47	47	46.8	1	0.0478542	0.0415941	11.36	12.78	1.15
	MmaSat053-1053	1053	54.6	1	0.0478078	0.0458397	4.29	5.04	1.04
	MmaSat054-16	16	62.5	3	0.047304	0.032146	10.7	11.91	1.47
2	MmaSat055-196	196	65.3	1	0.0472614	0.0433075	22.59	24.01	1.09
	MmaSat056-35	35	51.4	3	0.0465856	0.0575559	12.49	14.15	0.81
	MmaSat057-30	30	53.3	3	0.0462878	0.0559884	18.03	18.04	0.83
15	MmaSat058-71*	71	49.3	3	0.0444104	0.00608	9.57	9.95	7.30
16	MmaSat059-40	40	55	7	0.0440792	0.045836	13.3	13.89	0.96
	MmaSat060-1683	1683	46.7	1	0.0429138	0.046064	4.34	4.77	0.93
8	MmaSat061-33*	33	45.5	1	0.0428973	0.00878	10.86	12.19	4.89
	MmaSat062-61	61	60.7	5	0.0418853	0.04072	10.75	11.75	1.03
13	MmaSat063-47*	47	42.6	7	0.0413418	0.000943	12.26	20.11	43.82
2	MmaSat064-235	235	63	4	0.0412768	0.0565465	19.94	17.26	0.73
2	MmaSat065-246	246	62.2	3	0.0404248	0.0333543	8.64	10.62	1.21
2	MmaSat066-611	611	61.2	1	0.0400215	0.035666	8.54	8.71	1.12
2	MmaSat067-217	217	61.2	2	0.0398557	0.038925	14.22	15.93	1.02
2	MmaSat068-353	353	62	3	0.038825	0.041121	12.17	13.4	0.94
17	MmaSat069-42	42	52.4	10	0.0385085	0.036769	10.9	10.89	1.05
	MmaSat070-44	44	52.3	5	0.038417	0.0267182	12.37	12.95	1.44
	MmaSat071-37	37	59.5	5	0.0382826	0.0337228	10.59	11.56	1.14
	MmaSat072-1074	1074	48	1	0.0378197	0.0423626	3.8	5.21	0.89
	MmaSat073-90	90	70	1	0.0370268	0.0452805	7.16	8.07	0.82
2	MmaSat074-246	246	61.4	4	0.0367916	0.0456733	5.8	5.49	0.81
2	MmaSat075-250	250	62.4	3	0.0354559	0.0377101	16.87	19.45	0.94
	MmaSat076-58	58	43.1	2	0.0347111	0.0293241	9.2	9.53	1.18
6	MmaSat077-412	412	58.3	2	0.0346631	0.0306705	5.85	7.32	1.13
	MmaSat078-31	31	45.2	2	0.033754	0.0269558	12.67	13.73	1.25
	MmaSat079-38	38	84.2	2	0.0332361	0.0375719	6.06	6.46	0.88
	MmaSat080-29	29	58.6	4	0.0332255	0.027907	13.83	14.74	1.19

10	MmaSat081-135	135	40.7	1	0.0329628	0.0208064	14.8	15.53	1.50
	MmaSat082-626	626	53.2	1	0.0319518	0.0455395	7.08	8.24	0.70
	MmaSat083-58	58	67.2	2	0.031846	0.0223408	6.89	6.9	1.43
	MmaSat084-65	65	64.6	4	0.0309865	0.0300537	11.14	12.25	1.03
	MmaSat085-52	52	67.3	1	0.0309718	0.0352903	15.26	17.01	0.88
	MmaSat086-42	42	47.6	3	0.0308068	0.0228899	12.83	12.93	1.35
2	MmaSat087-248	248	64.5	1	0.0306532	0.0378751	13.38	13.23	0.81
	MmaSat088-1031	1031	44.7	1	0.030538	0.0236998	5.72	7.52	1.29
2	MmaSat089-234	234	64.1	2	0.0302708	0.023811	8.68	10.29	1.27
2	MmaSat090-620	620	64.4	1	0.0298446	0.027355	10.66	9.94	1.09
14	MmaSat091-60	60	56.7	6	0.0292001	0.019625	13.01	14.76	1.49
	MmaSat092-46*	46	54.3	11	0.0289438	0.00369	14.74	33.82	7.85
	MmaSat093-953	953	64.2	1	0.0287561	0.0343241	2.67	3.73	0.84
	MmaSat094-450	450	47.3	2	0.028475	0.0286817	6.65	8.03	0.99
	MmaSat095-41	41	68.3	2	0.0259822	0.0246235	8.61	11.26	1.06
	MmaSat096-47	47	57.4	3	0.0250987	0.0174162	13.27	9.89	1.44
	MmaSat097-39*	39	53.8	3	0.0243614	0.000274	10.39	14.26	88.87
	MmaSat098-37*	37	45.9	7	0.024099	0.0149463	13.69	15.41	1.61
	MmaSat099-31*	31	61.3	5	0.0234336	0.0131652	10.89	11.75	1.78
	MmaSat100-60	60	58.3	4	0.0230059	0.0226877	11.29	10.99	1.01
	MmaSat101-454	454	55.3	1	0.0217928	0.025184	6.49	8.16	0.87
	MmaSat102-330	330	53.6	1	0.0196101	0.0304302	7.87	8.68	0.64
2	MmaSat103-324	324	63	3	0.0185744	0.0139772	1.13	-0.01	1.33
	MmaSat104-752	752	57.2	1	0.0183448	0.019529	7.22	7.37	0.94
	MmaSat105-564	564	60.8	1	0.0178615	0.0222973	12.36	13.57	0.80
2	MmaSat106-282	282	63.1	1	0.0178213	0.0151652	6.4	10.5	1.18
	MmaSat107-44*	44	54.6	1	0.0177503	0.0108991	5.84	7.03	1.63
2	MmaSat108-295*	295	60.3	1	0.0176559	0.0117116	6.92	9.63	1.51
2	MmaSat109-210	210	61.4	1	0.0171549	0.0174661	9.02	12.69	0.98
	MmaSat110-1126	1126	55.8	1	0.0171146	0.0159967	11.92	12.23	1.07
	MmaSat111-33*	33	57.6	3	0.0170218	0.00486	16.72	30.69	3.50
3	MmaSat112-387	387	59.4	2	0.0166205	0.0227629	7.49	7.11	0.73
4	MmaSat113-52*	52	61.5	5	0.0166109	0.00126	12.05	18.25	13.18
	MmaSat114-211	211	67.3	4	0.0157794	0.0287923	15.04	15.94	0.55
7	MmaSat115-41	41	58.5	3	0.0154695	0.0227717	13.31	13.07	0.68
	MmaSat116-1310	1310	62.7	1	0.0154613	0.0175173	11.98	12.13	0.88
	MmaSat117-44	44	61.4	12	0.0151687	0.0219488	10.07	9.55	0.69
5	MmaSat118-66*	66	68.2	1	0.0150426	0.00952	9.16	10.05	1.58
	MmaSat119-70	70	54.3	2	0.0144711	0.0123729	8.85	9.93	1.17
8	MmaSat120-31	31	61.3	2	0.014454	0.0119471	11.49	11.77	1.21
	MmaSat121-45	45	64.4	14	0.0131588	0.00893	11.81	12.63	1.47
	MmaSat122-54*	54	57.4	6	0.0130871	0.000266	9.96	16.68	49.17
	MmaSat123-152	152	55.9	7	0.0130834	0.0143146	8.6	9.5	0.91

2	MmaSat124-237	237	62	1	0.0123884	0.0174618	-3.59	-2.53	0.71
	MmaSat125-1261	1261	54.9	1	0.0119073	0.0086	4.46	5.56	1.38
	MmaSat126-178	178	68	4	0.011842	0.0282457	11.86	11.97	0.42
	MmaSat127-42*	42	64.3	6	0.0114881	0.000682	10.8	25.76	16.85
	MmaSat128-38*	38	57.9	4	0.0110087	0.000373	9.47	15.14	29.53
	MmaSat129-36	36	58.3	9	0.0106561	0.0129946	12.47	14.28	0.82
	MmaSat130-54	54	61.1	4	0.0104615	0.00749	9.79	12.52	1.40
9	MmaSat131-49	49	73.5	1	0.00978	0.00996	19.73	19.08	0.98
10	MmaSat132-121	121	52.9	1	0.00943	0.00654	6.97	7.18	1.44
	MmaSat133-69	69	66.7	1	0.00935	0.0156122	12.41	12.13	0.60
	MmaSat134-29	29	79.3	19	0.00894	0.0256614	16.66	16.28	0.35
	MmaSat135-69	69	72.5	10	0.00856	0.0295993	10.6	9.65	0.29
2	MmaSat136-245	245	62	1	0.00797	0.00895	-0.28	0.01	0.89
	MmaSat137-42	42	64.3	2	0.00776	0.0122588	9.54	8.64	0.63
	MmaSat138-17	17	58.8	1	0.00547	0.0211971	9.62	6.16	0.26
4	MmaSat139-47*	47	70.2	1	0.00503	0.000126	20.27	20.93	39.95
6	MmaSat140-330	330	56.1	1	0.00479	0.00467	5.26	7.04	1.03
12	MmaSat141-62	62	66.1	4	0.00442	0.0145375	12.77	9.96	0.30
	MmaSat142-16	16	56.2	1	0.00405	0.00334	12.8	13.13	1.21
11	MmaSat143-27	27	63	1	0.00404	0.00325	16.05	13.79	1.24
8	MmaSat144-16	16	50	1	0.0026	0.00218	25.1	23.12	1.20
12	MmaSat145-67*	67	55.2	1	0.00111	0.00037	10.57	10.84	2.99
11	MmaSat146-33	33	60.6	1	0.00103	0.000813	28.95	28.66	1.26
	MmaSat147-26	26	53.8	1	0.000857	0.00121	23.16	21.7	0.71
13	MmaSat148-31	31	45.2	1	0.000812	0.000329	18.17	35.72	2.47
7	MmaSat149-48	48	50	1	0.000774	0.00083	22.11	23.89	0.93
8	MmaSat150-31*	31	58.1	1	0.000685	0.000319	15.86	21.31	2.15
8	MmaSat151-33*	33	48.5	1	0.000646	0.000158	26.07	32.66	4.09
	MmaSat152-31*	31	61.3	1	0.000413	0.000211	29.91	31.53	1.96
7	MmaSat153-40*	40	65	1	0.000377	0.0000733	26.6	15.54	5.14
	MmaSat154-30*	30	43.3	1	0.000305	0.000181	25.44	32.57	1.69
15	MmaSat155-71*	71	50.7	1	0.000152		15.94	-	-
1	MmaSat156-53	53	50.9	1	0.000128	0.000175	23.78	27.19	0.73
14	MmaSat157-60	60	58.3	1	0.000124	0.000103	24.55	26.31	1.20
13	MmaSat158-39*	39	41	1	0.0000928		26.05	-	-
	MmaSat159-37	37	29.7	1	0.0000437	0.000138	24.8	20.57	0.32
	MmaSat160-29	29	48.3	1	0.000032	0.0000909	13.52	28.1	0.35
16	MmaSat161-40	40	47.5	1	0.00000693	0.0000821	37.05	28.83	0.08
	MmaSat162-48*	48	47.9	1	0.0000032		35.77	-	-
17	MmaSat163-38	38	39.5	1	0.0000024	0.000132	18.39	22.22	0.02
5	MmaSat164-67	67	68.7	1	0.00000187	0.0000221	22.84	29.11	0.08

Table S2: List of designed primers in this study

satDNA	Primer F (5'-3')	Primer R (5'-3')
MmaSat009-53	CAACACCAGTACCTGACCT	CATTGCTGTGAGGATTTGAT
MmaSat017-72	CTTACTGAGTTAATACAGCGC	TGGTGTAAATGATCAGATTA
MmaSat029-32	GGTCTGATGGAACAACCTGCC	ACCACACAGGATGGGCAGTT
MmaSat036-74	ACCTTGAAAGTGTCTGTCCA	CAATAGTCCCCAAATACAGTTT
MmaSat048-1298	AAACCCACCCAGACGTGTTT	TCGGCCTGCTTCGTTTAAAGT
MmaSat058-71	TCACCGCTACGAGTCCTTTC	GACTCTGTGTAAAGCAGGCT
MmaSat061-33	TCCTCACTACCAACACACG	CAGGTATGCTGAGCGTGTG
MmaSat063-47	TGTTCCCTCAGCGACTCTGGA	AGGACCGGCACTAAATCAGG
MmaSat097-39	AACATTCACTCTTACAACCA	GTAGGGTTGAGCTGTGAGC
MmaSat098-37	AGCCTCCAGGACACTCAG	TTGGGACTCTGTGCTGATG
MmaSat099-31	CAACAGCAACTACACATATC	TTGATGAAAACACAGATAT
MmaSat092-46	CGGAATAGAAAACCAGCTA	TGTTTGAGCTGCATTATAC
MmaSat107-44	ACACTAGAGCAGTTAGCTTT	ATACACACATTAGCTCCGG
MmaSat108-295	TAGAACCGTCAGAACCGCTG	GCCCGTCTGCTGCATAGTAA
MmaSat111-33	CTGAGTTGAGTTGTGAGTCA	CAGACTAGCCAATTATTGAC
MmaSat113-52	GGAAGTTTACTGTGGTTACT	TAGTTTAGGAAGGGTAACAG
MmaSat118-66	CAGTTACTCAGTACATGTAC	AGTTACTACTCACCTCTGTA
MmaSat122-54	GTAATCTGGTTTATTTCTGTAG	GAAAAGCAGAGACGCTATGT
MmaSat127-42	TCATATCTCTGAACAGGAGG	TTTACCTATTTGGAGTTATGC
MmaSat128-38	CCTTTCTCTCTCCACATA	GATAGGAATCACTGACTTA
MmaSat139-47	GGAAGTTTACTGTGGTTACT	TAGTTTAGGAAGGGTAACAG
MmaSat145-67	GTCAGAACTGTACGTCCACC	AGAACAGCTTTTAGAGGTGG
MmaSat150-31	CATTCCTTTATCATCCGG	ATGAAGGAACACTGTTCCG
MmaSat151-33	TGTCCACACTCATCAAAGA	GGACAGGTATGCTGCTGGC
MmaSat152-31	GGTCTGATGGAACAACCTGCC	ACCACACAGGATGGGCAGTT
MmaSat153-40	CATGACAATCAGACTAAACT	TAAAGCTCAGGAGATATATC
MmaSat154-30	CTCGCTCAAACCAACTCCAG	AGATGGTGTGTGGGCTGGA
MmaSat155-71	GCGAATCTGGACCGGATG	GATTCGCTGAGGACGGGCG
MmaSat158-39	CCTTTCCTACGACTAATCA	CCTTTCCTACGACTAATCA
MmaSat162-48	CCCTTCGCTCCCTACACA	CTAACATAATGGCATACCCC