

Supplementary data:

Male-biased recombination in odonates: insights from a linkage map of the damselfly *Ischnura elegans*

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Table 1. Descriptive data for microsatellite loci that were used in the present linkage mapping study.

Locus	GenBank accession number	Repeat motif	Primer sequences (5'–3')	Expected product size	Actual size range (bp)	Number of informative meioses
I002 ¹	GU434344	(GT) ₇	F: CCCGAAATATCTCGTCGAT R: GGCTGAGGGTAATGCAGGAG	179	173–181	199
I011 ²	JX905319	(GA) ₈	F: TTCACGGAGGACGTGAAGAA R: GGCATCTCAATGACGCACTC	198	188–191	37
I015 ¹	GU434347	(CA) ₇	F: AATCCCAAGGCCCCAGTATC R: GTGCCTTTCCGTGTTGTGA	311	304–321	147
I016 ²	JX905320	(GT) ₆	F: TTCTGGACTCGGCGAATTTT R: GTGGACCCAGAGCTCCAAAG	105	100–110	200
I041 ¹	GU434348	(T) ₈	F: GCAGGAGTGGTGGTGGTACA R: ATGTCACCCATCGCAACAAA	267	259–268	279
I053 ¹	GU434345	(T) ₁₃	F: TTGAAAAGACGGGAGAAGTGC R: CACACAAGCCAGTCCACCAT	344	347–371	185
I058 ¹	GU434352	(AC) ₈	F: TCCAGGGTTTGCTCTCGACT R: TAAGGGGTTGAAGCGGAGTG	160	152–162	171
I090 ¹	GU434353	((GA) ₃ (A) ₆) ₃	F: CGGAATGCATGTACGAGGAA R: TCCGCCCCATCTAAATCA	200	171–196	226
I136 ²	JX905321	(CA) ₁₀	F: AGGCCGTTCCAGTTCACATT R: AGCAAAAACACGTCCGCTCT	134	124–140	211
I137 ²	JX905322	(GA) ₇	F: GGAGGAGGAGGTAGGCAGGT R: TTTGGAGCGAGAGCATTTGA	232	225–239	179
I139 ²	JX905323	(CT) ₉	F: TTAGCCCCAGCTCTTTACGC R: GCGGCTGGTCTCCACTAACT	247	242–248	289
I142 ²	JX905324	(CT) ₁₄	F: CGTTCATGTCAACGCGACTT R: GAAATTCGGGCCACTAACCA	378	361–387	248
I148 ²	JX905325	(CT) ₆	F: CACACTCTCGCCCTCTGTTG R: CAGGCTCGACCCAGAGAAAAG	162	160–162	135
I177 ¹	GU434351	(CT) ₈	F: TGAATGGGTCGTAGTGGCTTT R: GGGAGGAACAGGCTTTGTTG	228	216–233	72
I199 ²	JX905326	(CT) ₆	F: GCACAGCATCCGTTTGAGAG R: GGCGAGGGTGAAGAGAGAGA	195	183–214	227
I216 ¹	GU434355	(GA) ₁₀	F: GCGTTCATAGGTTTGGAGTGG R: TGAGCCACACGGACTATTGG	170	166–196	97
I271 ²	JX905327	(GA) ₄ AA(GA) ₆	F: AGGCAAGGCTGCATGAAAAT R: TTAGCTCAGGTGCGCGTTTA	261	251–261	180

Table 1 (contd.)

Locus	GenBank accession number	Repeat motif	Primer sequences (5'–3')	Expected product size	Actual size range (bp)	Number of informative meioses
GIM4 ³		(AG) ₉	F: AGCCAAAGGCGCGTTATAGCTG R: GGATCCGATCCTAAGGCACTCATAG	249–269	253–275	130
GIM6 ³		(AG) ₁₀	F: ACTTTACAGAGCAGGAATGAGG R: AGAGGGTCTCTGAGATCCCACG	159–171	186–198	161

¹Wellenreuther *et al.* 2010, ²This paper, ³Cooper *et al.* 1994.

GenBank accession number, microsatellite repeat motif in the original microsatellite clone sequence, primer sequences, expected product size based on the original microsatellite clone sequence, actual allele size range of genotypes in the pedigree and number of informative meioses in the pedigree. PCR reactions were done using 10 ng of DNA, 3 μ L Qiagen multiplex PCR master mix (Qiagen, Valencia, USA) and 0.1 μ L of each primer. Touchdown PCR's were used for all reactions: initial denaturation step of 95°C for 15 min, then 10 cycles at 94°C for 30 s, touch down from 62–58°C (–0.5°C per cycle) for 90 s, 72°C for 60 s, then 35 cycles at 94°C for 30 s, 55°C for 30 s, 72°C for 30 s, followed by 72°C for 10 min. Multiplex PCR reactions were performed for combinations of primers with different size ranges and dye labels.

Table 2. Species sex specific recombination ratios used in figure 2. Male r stands for male recombination rate and female r for female recombination rate (either in map lengths (cM) or in chiasma frequencies).

Species	Order	Sex chromosomes	Female r	Male r	Female r/ Male r	Reference
<i>Schmidtea polychroa</i>	Platyhelminthes	Hermaphrodites	0.23	0.07	3.29	Pongratz <i>et al.</i> (2001)
<i>Dendrocoelum lacteum</i>	Platyhelminthes	Hermaphrodites	20.4	11.8	1.73	Lenormand and Dutheil (2005)
<i>Tigriopus californicus</i>	Crustacea	No	Achiasmatic		Achiasmatic	Burton <i>et al.</i> (1981)
<i>Penaeus vannamei</i>	Crustacea	M:WZ, F:ZZ	2771	2116	1.31	Pérez <i>et al.</i> (2004)
<i>Gammarus chevreuxi</i>	Crustacea	M: XY, F:XX	50.6	25.4	1.99	Huxley (1928)
<i>Ischnura elegans</i>	Odonata	M:XO, F:XX	179	332	0.54	This paper
<i>Eyprepocnemis plorans</i>	Orthoptera	M:XO, F:XX	12	14.1	0.85	Burt <i>et al.</i> (1991)
<i>Melanoplus femur-rubrum</i>	Orthoptera	M:XO, F:XX	14	13.5	1.04	Burt <i>et al.</i> (1991)
<i>Chorthippus brunneus</i>	Orthoptera	M:XO, F:XX	13.1	13.6	0.96	Burt <i>et al.</i> (1991)
<i>Chrysochraon dispar</i>	Orthoptera	M:XO, F:XX	12.1	12.6	0.96	Burt <i>et al.</i> (1991)
<i>Myrmeleotettix maculatus</i>	Orthoptera	M:XO, F:XX	13.2	14.4	0.92	Burt <i>et al.</i> (1991)
<i>Chortoicetes terminifera</i>	Orthoptera	M:XO, F:XX	11.6	13.1	0.89	Burt <i>et al.</i> (1991)
<i>Parapleurus alliaceus</i>	Orthoptera	M:XO, F:XX	12.9	12.3	1.05	Burt <i>et al.</i> (1991)
<i>Stethophyma grossum</i>	Orthoptera	M:XO, F:XX	13.7	11.3	1.21	Burt <i>et al.</i> (1991)
<i>Thericles whitei</i>	Orthoptera	M:XO, F:XX	8.2	Achiasmatic	Achiasmatic	Burt <i>et al.</i> (1991)
All <i>Iridopteryginae</i>	Mantodea	M: XY, F:XX		Achiasmatic	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Blattella germanica</i>	Blattellidae	M:XO, F:XX	1	1	1.00	White (1975)
<i>Tenagobia fuscata</i>	Hemiptera	M: XY, F:XX		Achiasmatic	Achiasmatic	Ituarte and Papeschi (2004)
<i>Myzus persicae</i>	Hemiptera	M:XO, F:XX		Achiasmatic	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Saldula sultatoriu</i>	Hemiptera	M:XY F:XX		Achiasmatic	Achiasmatic	Nokkala and Nokkala (1983)
<i>Saldula orthochila</i>	Hemiptera	M:XY F:XX		Achiasmatic	Achiasmatic	Nokkala and Nokkala (1983)
<i>Aphytis mytilaspidis</i>	Hymenoptera	Haplodiploid	5.5	Achiasmatic	Achiasmatic	Keil and Ross (1983)
<i>Alogamus auricollis</i>	Trichoptera	M:ZW, F:ZZ	Achiasmatic	60	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Glyptotaeliu spellucides</i>	Trichoptera	M:ZW, F:ZZ	Achiasmatic	35	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Antheraea assamenis</i>	Lepidoptera	M:ZZ, F:ZW	Achiasmatic	20	Achiasmatic	Sloane <i>et al.</i> (2001)
<i>Byblia ilithyia</i>	Lepidoptera	M:ZZ, F:ZW	Achiasmatic	17.4	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Ephistia kuehniella</i>	Lepidoptera	M:ZZ, F:ZW	Achiasmatic	30	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Philosamia ricini</i>	Lepidoptera	M:ZZ, F:ZW	Achiasmatic	22	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Bombyx mori</i>	Lepidoptera	M:ZZ, F:ZW	Achiasmatic		Achiasmatic	Tanaka (1914)
<i>Phryne fenestralis</i>	Diptera	M:XO, F:XX		Achiasmatic	Achiasmatic	Burt <i>et al.</i> (1991)
<i>Drosophila melanogaster</i>	Diptera	M:XO, F:XX		Achiasmatic	Achiasmatic	Morgan (1914)
<i>Anopheles gambiae</i>	Diptera	M:XO, F:XX	12.5	13.6	0.92	Zheng <i>et al.</i> (1996)

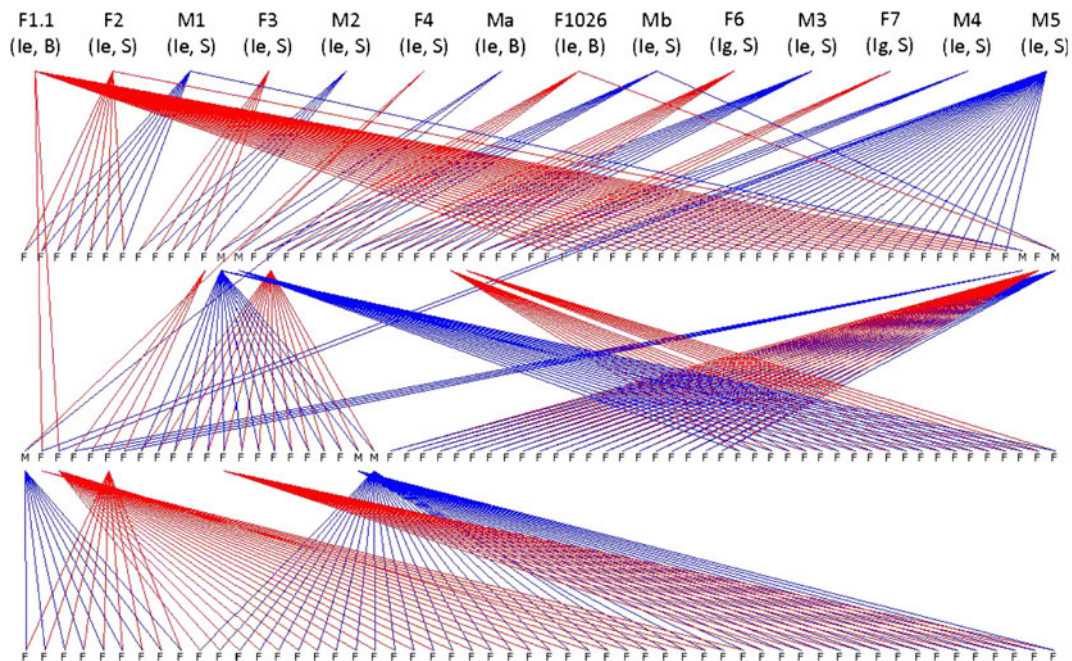


Figure 1. *Ischnura elegans* pedigree used for the linkage map. Blue colour denotes male and red colour female parents.

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