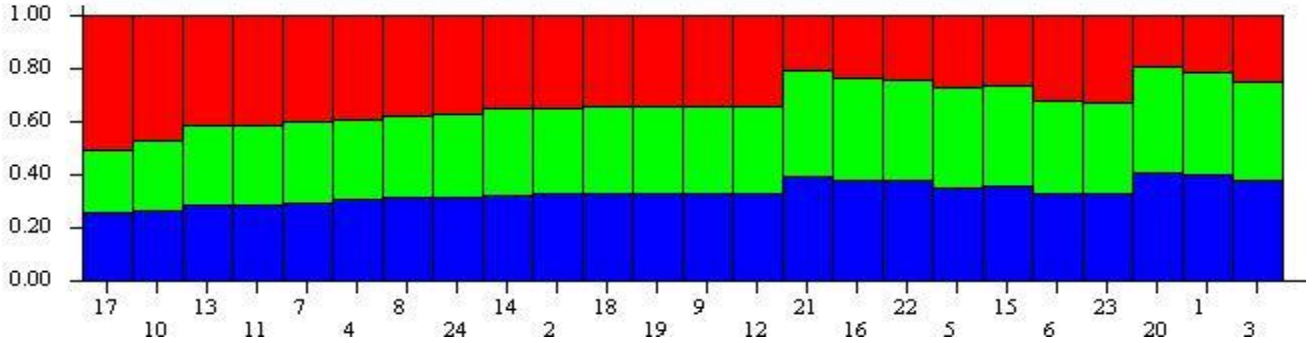


**Figure S1a** Structure analysis of *S. schwerinii* when K = 3 clusters are assumed.

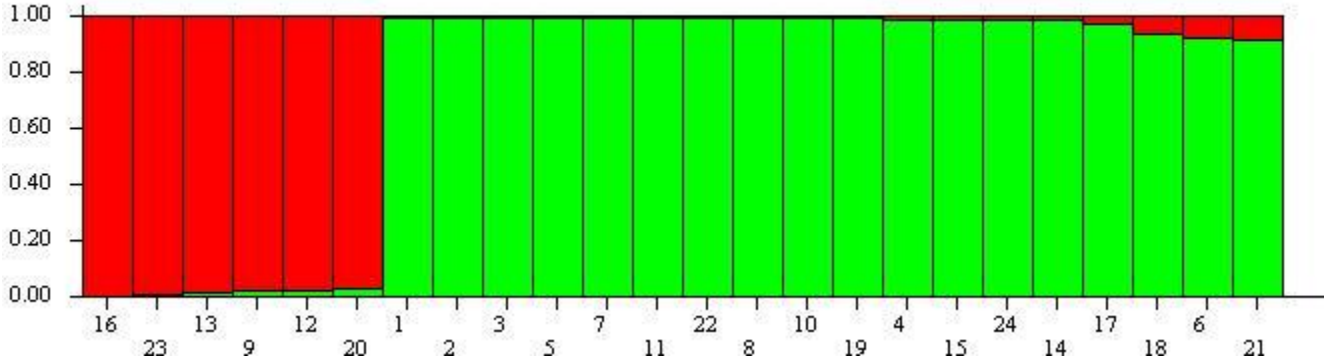


**Figure S1b** Structure analysis of *S. viminalis* when K = 2 clusters are assumed.

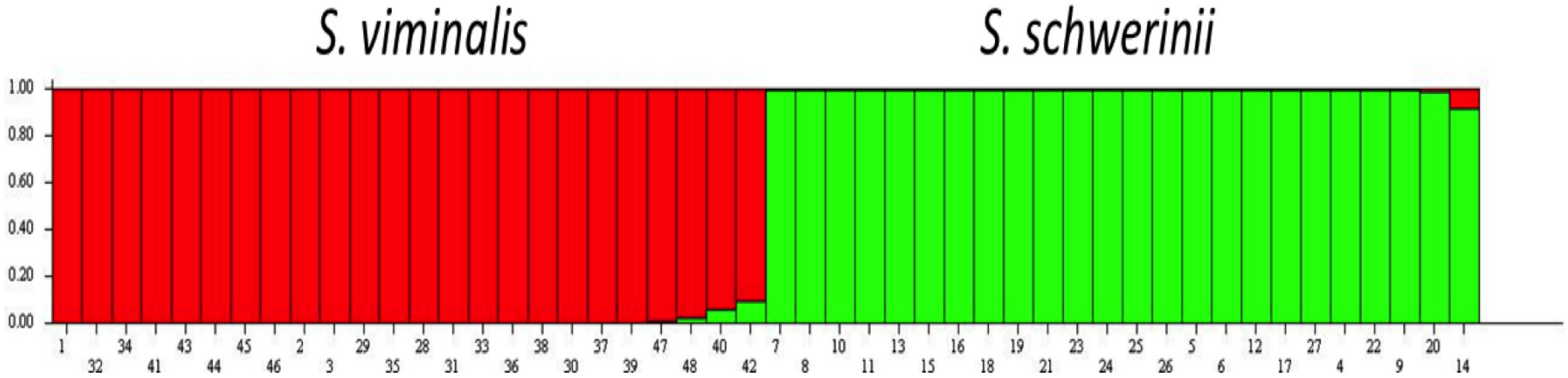


**Figure S1c** Structure analysis of *S. viminalis* and *S. schwerinii* when K = 2 clusters are assumed.

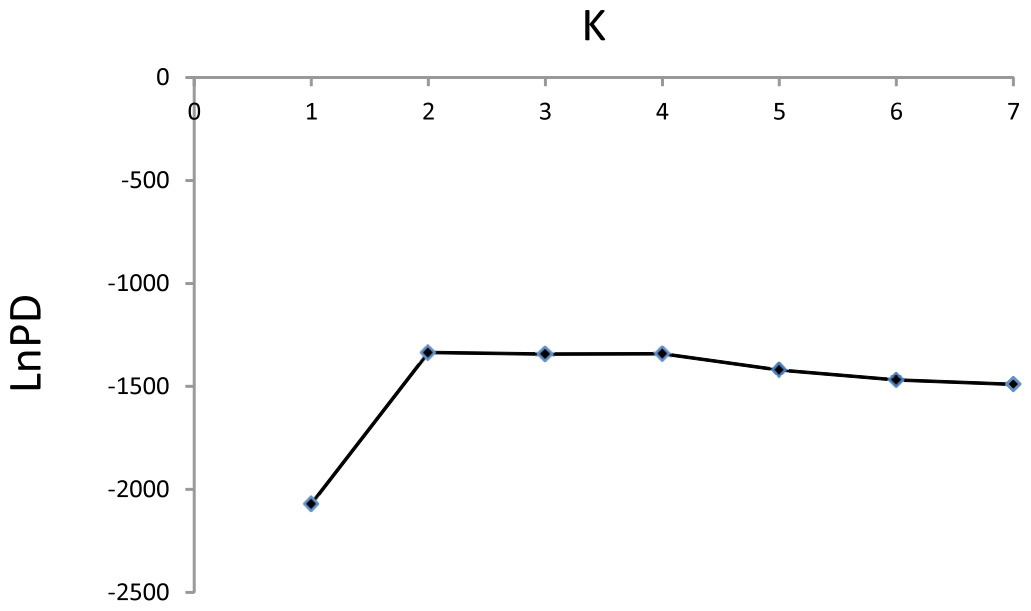


**Figure S2a** Estimated number of clusters (K) obtained with Structure when *S. schwerinii* and *S. viminalis* were run together. The mean LnPD is plotted over K (1-7).

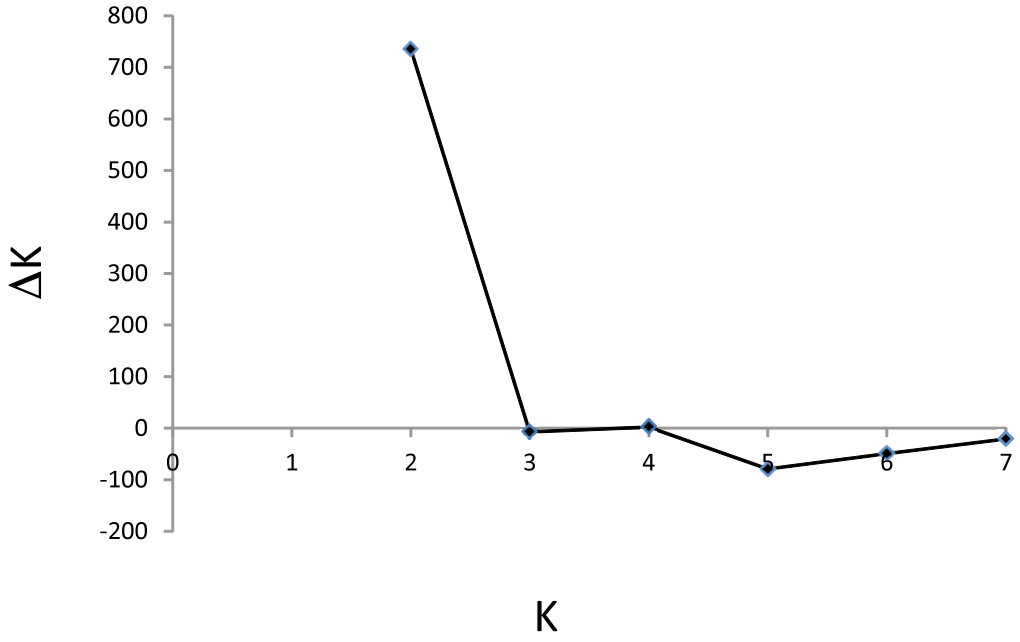


**Figure S2b** Estimated number of clusters (K) obtained with Structure when *S. schwerinii* and *S. viminalis* were run together. The mean ΔK is plotted over K (1-7).

**Table S1 Sample origins and clone names**

| Species | Lab name | Sample name | Origin | Note |
|---|---|---|---|---|
| *S. viminalis* | V18 | 78183 | Skåne, Sweden | |
| *S. viminalis* | V19 | 78195 | Western Sweden | |
| *S. viminalis* | V52 | 81084 | Southeast Sweden | |
| *S. viminalis* | V8 | 78054 | Western Sweden | |
| *S. viminalis* | V14 | 78115 | Southeast Sweden | |
| *S. viminalis* | V32 | 80019 | North of malardalen Sweden | |
| *S. viminalis* | V40 | 80069 | Denmark | |
| *S. viminalis* | V56 | 81102 | Netherland | |
| *S. viminalis* | V59 | 82008 | Skåne, Sweden | |
| *S. viminalis* | V69 | 82046 | Ireland | |
| *S. viminalis* | V76 | Bel34 | Belgium | |
| *S. viminalis* | V85 | Bel74 | Belgium | |
| *S. viminalis* | V94 | D161 | Germany | |
| *S. viminalis* | V100 | D252 | Germany | |
| *S. viminalis* | V117 | Linköp2A | Sweden | |
| *S. viminalis* | V119 | P63 | Poland | |
| *S. viminalis* | V121 | P106 | Poland | |
| *S. viminalis* | V126 | P182 | Poland | |
| *S. viminalis* | V136 | skarp4 | Sweden | |
| *S. viminalis* | V140 | T19 | Germany | |
| *S. viminalis* | V142 | T76 | Germany | |
| *S. viminalis* | V145 | T114 | Germany | |
| *S. viminalis* | V147 | Öland7 | Öland, Sweden | |
| *S. viminalis* | V208 | 90040 | Sweden | |
| *S. schwerinii* | S1 | 96-1-40 | parents: SW910260 + SW910259 collected at river Ingoda at the bridge Tchita | F1 cross |
| *S. schwerinii* | S2 | 96-2-18 | parents: SW910261 + SW910267 collected at river Ingoda at the bridge Tchita | F1 cross |

| | | | | |
|---|---|---|---|---|
| *S. schwerinii* | S3 | 96-5-6 | parents: SW910282 + SW910284 collected at river Mongoi, village Mohov-Kondin | F1 cross |
| *S. schwerinii* | S4 | 96-6-15 | parents: SW910287 + SW910285 collected at river Mongoi, village Mohov Kondin | F1 cross |
| *S. schwerinii* | S5 | 96-10-37 | parents: SW910301+ SW910300 collected at river Vitim village Romanovka | F1 cross |
| *S. schwerinii* | S6 | 96-11-16 | parents: SW910312 + SW910317 collected at the rivers Vitim & Bisjaga, village Bodaibo | F1 cross |
| *S. schwerinii* | S7 | 96-12-3 | parents: SW910314 + SW910316 collected at the rivers Vitim & Bisjaga, village Bodaibo | F1 cross |
| *S. schwerinii* | S8 | 96-13-31 | parents: SW910323 + SW910324 collected at the rivers Vitim & Bisjaga, village Bodaibo | F1 cross |
| *S. schwerinii* | S9 | 96-14-40 | parents: SW910326 + SW910327 collected at river Tchitinka, village Tchita | F1 cross |
| *S. schwerinii* | S10 | 96-16-31 | parents: SW910335 + SW910334 collected at river Tchitinka, village Tchita | F1 cross |
| *S. schwerinii* | S11 | 96-19-14 | parents: SW910340 + SW910341 collected at rivers Shilka & Nertcha near to Nerchinsk | F1 cross |
| *S. schwerinii* | S12 | 96-20-23 | parents: SW910343 + SW910344 collected at rivers Shilka & Nertcha near to Nerchinsk | F1 cross |
| *S. schwerinii* | S13 | 96-21-20 | parents: SW910345 + SW910348 collected at rivers Shilka & Nertcha near to Nerchinsk | F1 cross |
| *S. schwerinii* | S14 | 96-22-24 | parents: SW910349 + SW910350 collected at rivers Shilka & Nertcha near to Nerchinsk | F1 cross |
| *S. schwerinii* | S15 | 96-24-11 | parents: SW910356 + SW910352 collected at rivers Shilka & Nertcha near to Nerchinsk | F1 cross |
| *S. schwerinii* | S16 | 96-25-31 | parents: SW910368 + SW910369 collected at river Amur near Pokrova | F1 cross |
| *S. schwerinii* | S17 | 96-26-19 | parents: SW910371+ SW910372 collected at river Amur near Pokrova | F1 cross |
| *S. schwerinii* | S18 | SW911310 | collected at Vitim o Bisjaga | |
| *S. schwerinii* | S19 | SW911295 | collected at river Vitim | |
| *S. schwerinii* | S20 | SW911273 | collected at river Mongoi | |
| *S. schwerinii* | S21 | SW911329 | collected at river Tchitinka | |
| *S. schwerinii* | S22 | SW911283 | collected at river Mongoi | |
| *S. schwerinii* | S23 | SW911347 | collected at rivers Shilka o Nertcha | |
| *S. schwerinii* | S24 | SW911358 | collected at river Amur | |

**Table S2 Primer sequences**

| Gene | Segment | Forward PCR primer 5´ to 3' | Reverse PCR primer 5´ to 3' |
|---|---|---|---|
| I-1 | I-1A | TGATGGAAGACCTTTGTCTGG | GTCCAGCACAGCCTTTTTGT |
| | I-1B | CTTGGTTCGCAATCCAACACC | GGTTTGCTTGTTTCCACTGTC |
| I-53 | I-53B* | CAGGTTTTGTGTGAGCTGGA | AGCAGGGCTCAGTGAATTGT |
| II-33 | II-33A | AGGCTTTGCTTCTTTGGTCA | GCTGGACTTCCCAACATTAG |
| | II-33B | TAAGCATGTTTTCACCTGTGC | GCAGCATCCCTCAAATCAAT |
| II-36 | II-36A | TGCTGTTTATTTGTTGTATGCAC | TCAGCAAATTGTAGCAAATGAA |
| | II-36B | TGAAGCAACAGTTCCAGGTG | GGGTGAGGAAAAGTCAACCA |
| III-4 | III-4A | TTGTCTTCATGGTCGTGCAT | CAGCTTCCCATAAAGCGTTC |
| | III-4B | ACTGGAGCTGTTGTGCCTTT | CCACCAAGAGAGTGCCCTAC |
| III-24 | III-24A | CCTGAATTGATGGCTGCATT | CACTTAGGCCCGGCAAATT |
| | III-24B | ATGATGGACGCAACAAAACT | TAGCCTTGGCCTCTTGAGAAG |
| IV-11 | IV-11A | TGGTCACCACAAATTCGTCT | CATCTGCTGAGGACATGATTG |
| | IV-11B | CATGCCTCTCTCGGTTTCTC | AGTGCAAGCATGGGAAGTTG |
| IV-18 | IV-18A | GTACAAGGCCGTGTTCCTGT | GCCATCGTCAGCTCAAACTC |
| | IV-18B | GAGTATCAGGAAATTGCAAGGC | CTGCTGAAGCTGCTCTAGCTG |
| V-18 | V-18A | TGCTATCATGTTGCCCATGTG | TGGGCAAGTTTCCATCATAAG |
| | V-18B | GATTTCTGGAATAGTCGATTC | CAAGTTTCCATCATAAGTGC |
| V-20 | V-20A | CCAAGGCTTTTATGGTGCAT | GAACTCCATCACCAAATTCCA |
| | V-20B | GCATGCAAGAAACAGGGTTTAC | AAGGATTGCATCCATTGCAG |
| VI-4 | VI-4A | CAAGGATTGCTTGCCATGT | TGGCACAACAAATTCAGCTC |
| | VI-4B | GTGCTTCCACTTCGTGACTG | ATTGCAAATGGGACAGAACA |
| VII-1 | VII-1A | GGCAGCAGAACCAAAGAAGA | TTCCTGGTGGCTAAAGTGGT |
| | VII-1B | CGATCCTGATGCTGCTGATA | GACAACAGTGGGAGCATCAA |
| VII-11 | VII-11A | TTGGGAGAAGCTTTGCAACT | GGTGCAAAAGCATTTGTTGA |
| | VII-11B | ATTTTGGGCTTGGATTGTGA | TTGAGGTACATTGGCAGCAA |
| VIII-5 | VIII-5A | TGGATTTCTGGACCAGGCTAC | GACAGGAGAATAGGAGCTTCG |

| | | | |
|---|---|---|---|
| | VIII-5B | TGCCATTCTACACCGAGTTG | AACCTGAAACCAGAGCACAG |
| VIII-14 | VIII-14A | AAACTCCTGGAGAGGCAGG | CTGCACAAAGTCCATGTAGTC |
| | VIII-14B | TGCTTGGTGCTGACTTTTATG | ATGACCGTAACACCAGATCG |
| VIII-22 | VIII-22B* | TCATGTCATTGAGGGTCGAA | TCCTGGTCTCCATCTGCATC |
| X-27 | X-27A | TGTCAATGCCAAACCTTGAA | TTCAGTGGCTGGAACCTTCT |
| | X-27B | ACAGCCAAAACCAACACTCCG | ATCTCTCGTGGCACCTATGGA |
| XII-8 | XII-8A | GGCATATTCTCTCCCTTGATG | GGGAGCCAGTTACCACCATA |
| | XII-8B | TGGTGACGATGAAGGCATTA | GGGTTCAGTCTTTGGAAGCA |

*Only one segment per gene.

**Table S3 P-values of obtaining multilocus summary statistic of the data under the individual species models. P-values are not corrected for multiple tests**

| Statistic | *S. schwerinii* | | | *S. viminalis* | | |
|---|---|---|---|---|---|---|
| | Bottleneck | Growth | Neutral | Bottleneck | Growth | Neutral |
| Mean(S) | 0,85 | 0,33 | 0,65 | 0,30 | 0,61 | 0,60 |
| Mean(num_singleton) | 0,46 | 0,08 | 0,20 | 0,08 | 0,13 | 0,13 |
| Mean(πw) | 0,76 | 0,23 | 0,47 | 0,24 | 0,48 | 0,46 |
| Mean(TajD) | 0,99 | 0,99 | 1 | 0,93 | 0,91 | 0,90 |
| Mean(FuLiF*) | 0,99 | 0,99 | 0,99 | 0,97 | 0,96 | 0,96 |
| Mean(FuLiD*) | 0,95 | 0,97 | 0,95 | 0,97 | 0,96 | 0,96 |
| Mean(num_haplotypes) | 0,76 | 0,23 | 0,70 | 0,30 | 0,58 | 0,55 |
| Mean(DandVH) | 0,68 | 0,16 | 0,52 | 0,11 | 0,21 | 0,15 |
| Mean(WallsB) | 0,61 | 0,71 | 0,50 | 0,94 | 0,91 | 0,91 |
| Mean(WallsQ) | 0,60 | 0,64 | 0,46 | 0,95 | 0,94 | 0,94 |
| Var(S) | 0,98 | 0,94 | 0,97 | 0,82 | 0,88 | 0,88 |
| Var(num_singleton) | 0,71 | 0,41 | 0,54 | 0,35 | 0,50 | 0,49 |
| Var(πw) | 0,60 | 0,25 | 0,38 | 0,32 | 0,46 | 0,44 |
| Var(TajD) | 0,88 | 0,96 | 0,88 | 0,98 | 0,98 | 0,97 |
| Var(FuLiF*) | 0,39 | 0,53 | 0,41 | 0,77 | 0,74 | 0,75 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Var(FuLiD*) | 0,13 | 0,20 | 0,14 | 0,66 | 0,64 | 0,66 |
| Var(num_haplotypes) | 0,92 | 0,92 | 0,95 | 0,91 | 0,90 | 0,90 |
| Var(DandVH) | 0,23 | 0,60 | 0,37 | 0,88 | 0,80 | 0,82 |
| Var(WallsB) | 0,50 | 0,76 | 0,48 | 0,69 | 0,57 | 0,55 |
| Var(WallsQ) | 0,46 | 0,70 | 0,42 | 0,60 | 0,48 | 0,45 |

**TABLE S4 Number of outlier loci in the validation of the per species ABC models. Loci were considered outlier when two-sided P-value < 0.05. P values are not corrected for multiple tests.**

| Statistic | S. schwerinii | | | S. viminalis | | |
|---|---|---|---|---|---|---|
| | Bottleneck | Growth | Neutral | Bottleneck | Growth | Neutral |
| Segregating sites | 2 | 1 | 2 | 1 | 1 | 1 |
| Singletons | 0 | 0 | 0 | 0 | 0 | 0 |
| Wattersons theta | 2 | 1 | 2 | 1 | 1 | 1 |
| Tajimas D | 4 | 4 | 4 | 2 | 2 | 2 |
| Fu & Li F* | 3 | 3 | 3 | 2 | 2 | 2 |
| Fu & Li D* | 1 | 1 | 1 | 2 | 2 | 2 |
| Number of haplotypes | 1 | 1 | 1 | 2 | 2 | 3 |

**Table S5 Outlier loci in the validation of ABC models. Number of statistics for which the loci were considered to be outlier at $\alpha$=0.05 level, without correction for multiple tests.**

| Locus | S. schwerinii | | | S. viminalis | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Bottleneck | Growth | Neutral | Bottleneck | Growth | Neutral | Split | Split without migration | No split |
| I-1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 6 |
| I-53b | | | | | | | | | 3 |
| II-33 | | | | | | | | | 3 |
| II-36 | | | | 2 | 2 | 2 | | | 4 |
| III-4c | | | | | | | 3 | 2 | 3 |
| IV-11 | | | | | | | | | 3 |
| IV-18 | 5 | 4 | 5 | | | | | 1 | 7 |
| V-18b | | | | | | | | | 2 |
| VI-4 | 2 | 2 | 2 | 3 | 3 | 3 | | | 5 |
| VII-11 | 3 | 3 | 3 | | | 1 | 3 | 1 | 2 |
| VII-1 | | | | 2 | 2 | 2 | | | 3 |
| VIII-14 | | | | | | | | 1 | 2 |
| VIII-5 | | | | | | | | | 2 |
| X-27 | 2 | 2 | 2 | | | | | | 4 |

**Table S6 Number of outlier loci in the validation of the population split ABC models. Loci were considered outlier when two-sided P-value < 0.05. P values are not corrected for multiple tests.**

| Statistic | Split | Split without migration | No split |
|---|---|---|---|
| Segregating sites *S. schwerinii* | | | |
| Singletons *S. schwerinii* | | | |
| Wattersons theta *S. schwerinii* | | | |
| Tajimas D *S. schwerinii* | | | 4 |
| Fu & Li F* *S. schwerinii* | | | 3 |
| Fu & Li D* *S. schwerinii* | | 1 | 1 |
| Number of haplotypes *S. schwerinii* | 1 | 1 | |
| Segregating sites *S. viminalis* | | | |
| Singleton *S. viminalis* | | | |
| Wattersons theta *S. viminalis* | | | |
| Tajimas D *S. viminalis* | 1 | 1 | 4 |
| Fu & Li F* *S. viminalis* | 1 | 1 | 3 |
| Fu & Li D* *S. viminalis* | 1 | 1 | 2 |
| Number of haplotypes *S. viminalis* | | | |
| Segregating sites *S. schwerinii + S. viminalis* | | | |
| Singletons *S. schwerinii + S. viminalis* | 2 | | |
| Wattersons theta *S. schwerinii + S. viminalis* | | | |
| Tajimas D *S. schwerinii + S. viminalis* | 1 | 1 | 2 |
| Fu & Li F* *S. schwerinii + S. viminalis* | 1 | 1 | 1 |
| Fu& Li D* *S. schwerinii + S. viminalis* | | | 1 |
| Number of haplotypes *S. schwerinii + S. viminalis* | 1 | | |
| Fst | | 1 | 14 |
| Number of shared polymorphisms | | | |
| Number of fixed polymorphisms | | | 14 |
| Number of private polymorphisms *S. schwerinii* | | | |
| Number of private polymorphisms *S. viminalis* | | | |

**Table S7 P-values of obtaining multilocus summary statistic of the data under three different models. P values are not corrected for multiple tests.**

| Stat | Split | Split no migration | No split |
|---|---|---|---|
| Mean($S_{S.\ schwerinii}$) | 0.72 | 0.43 | 0.87 |
| Mean($singleton_{S.\ schwerinii}$) | 0.71 | 0.47 | 0.86 |
| Mean($\pi w_{S.\ schwerinii}$) | 0.67 | 0.36 | 0.87 |
| Mean($TajD_{S.\ schwerinii}$) | 0.85 | 0.80 | 0.93 |
| Mean($FuLiF^*_{S.\ schwerinii}$) | 0.72 | 0.57 | 0.88 |
| Mean($FuLiD^*_{S.\ schwerinii}$) | 0.61 | 0.42 | 0.74 |
| Mean($num\_haplo_{S.\ schwerinii}$) | 0.72 | 0.40 | 0.89 |
| Mean($DandVH_{S.\ schwerinii}$) | 0.64 | 0.31 | 0.88 |
| Mean($WallsB_{S.\ schwerinii}$) | 0.38 | 0.23 | 0.52 |
| Mean($WallsQ_{S.\ schwerinii}$) | 0.39 | 0.22 | 0.54 |
| Mean($S_{S.\ viminalis}$) | 0.68 | 0.52 | 0.87 |
| Mean($singleton_{S.\ viminalis}$) | 0.63 | 0.57 | 0.85 |
| Mean($\pi w_{S.\ viminalis}$) | 0.65 | 0.48 | 0.86 |
| Mean($TajD_{S.\ viminalis}$) | 0.46 | 0.25 | 0.79 |
| Mean($FuLiF^*_{S.\ viminalis}$) | 0.59 | 0.38 | 0.80 |
| Mean($FuLiD^*_{S.\ viminalis}$) | 0.64 | 0.46 | 0.75 |
| Mean($num\_haplo_{S.\ viminalis}$) | 0.59 | 0.49 | 0.87 |
| Mean($DandVH_{S.\ viminalis}$) | 0.45 | 0.32 | 0.86 |
| Mean($WallsB_{S.\ viminalis}$) | 0.66 | 0.43 | 0.81 |
| Mean($WallsQ_{S.\ viminalis}$) | 0.69 | 0.45 | 0.85 |
| Mean($S_{combined}$) | 0.61 | 0.44 | 0.88 |
| Mean($singleton_{combined}$) | 0.73 | 0.53 | 0.87 |
| Mean($\pi w_{combined}$) | 0.55 | 0.35 | 0.88 |
| Mean($TajD_{combined}$) | 0.56 | 0.68 | 0.92 |
| Mean($FuLiF^*_{combined}$) | 0.52 | 0.56 | 0.89 |
| Mean($FuLiD^*_{combined}$) | 0.49 | 0.47 | 0.73 |
| Mean($num\_haplo_{combined}$) | 0.68 | 0.42 | 0.91 |
| Mean($DandVH_{combined}$) | 0.52 | 0.29 | 0.90 |

| | | | |
|---|---|---|---|
| Mean($WallsB_{combined}$) | 0.23 | 0.18 | 0.54 |
| Mean($WallsQ_{combined}$) | 0.24 | 0.19 | 0.55 |
| Mean(Fst) | 0.44 | 0.57 | 1.00 |
| Mean(shared) | 0.68 | 0.49 | 0.81 |
| Mean(fixed) | 0.30 | 0.26 | 1.00 |
| Mean($private_{S.\ schwerinii}$) | 0.76 | 0.46 | 0.90 |
| Mean($private_{S.\ viminalis}$) | 0.70 | 0.58 | 0.90 |
| Var($S_{S.\ schwerinii}$) | 0.86 | 0.78 | 0.89 |
| Var($singleton_{S.\ schwerinii}$) | 0.73 | 0.58 | 0.87 |
| Var($\pi w_{S.\ schwerinii}$) | 0.58 | 0.32 | 0.87 |
| Var($TajD_{S.\ schwerinii}$) | 0.77 | 0.86 | 0.81 |
| Var($FuLiF^*_{S.\ schwerinii}$) | 0.44 | 0.57 | 0.52 |
| Var($FuLiD^*_{S.\ schwerinii}$) | 0.24 | 0.35 | 0.46 |
| Var($num\_haplo_{S.\ schwerinii}$) | 0.97 | 0.93 | 0.91 |
| Var($DandVH_{S.\ schwerinii}$) | 0.26 | 0.52 | 0.45 |
| Var($WallsB_{S.\ schwerinii}$) | 0.34 | 0.40 | 0.69 |
| Var($WallsQ_{S.\ schwerinii}$) | 0.34 | 0.41 | 0.69 |
| Var($S_{S.\ viminalis}$) | 0.78 | 0.65 | 0.88 |
| Var($singleton_{S.\ viminalis}$) | 0.70 | 0.64 | 0.86 |
| Var($\pi w_{S.\ viminalis}$) | 0.60 | 0.42 | 0.86 |
| Var($TajD_{S.\ viminalis}$) | 0.91 | 0.87 | 0.95 |
| Var($FuLiF^*_{S.\ viminalis}$) | 0.74 | 0.76 | 0.77 |
| Var($FuLiD^*_{S.\ viminalis}$) | 0.71 | 0.76 | 0.66 |
| Var($num\_haplo_{S.\ viminalis}$) | 0.66 | 0.62 | 0.90 |
| Var($DandVH_{S.\ viminalis}$) | 0.54 | 0.65 | 0.82 |
| Var($WallsB_{S.\ viminalis}$) | 0.48 | 0.36 | 0.74 |
| Var($WallsQ_{S.\ viminalis}$) | 0.43 | 0.34 | 0.74 |
| Var($S_{combined}$) | 0.90 | 0.87 | 0.89 |
| Var($singleton_{combined}$) | 0.93 | 0.89 | 0.89 |
| Var($\pi w_{combined}$) | 0.39 | 0.23 | 0.87 |
| Var($TajD_{combined}$) | 0.85 | 0.91 | 0.72 |

| | | | |
|---|---|---|---|
| Var(FuLiF*$_{combined}$) | 0.85 | 0.88 | 0.62 |
| Var(FuLiD*$_{combined}$) | 0.71 | 0.74 | 0.52 |
| Var(num_haplo$_{combined}$) | 0.98 | 0.95 | 0.92 |
| Var(DandVH$_{combined}$) | 0.60 | 0.73 | 0.42 |
| Var(WallsB$_{combined}$) | 0.31 | 0.40 | 0.69 |
| Var(WallsQ$_{combined}$) | 0.37 | 0.46 | 0.70 |
| Var(Fst) | 0.75 | 0.80 | 1.00 |
| Var(shared) | 0.76 | 0.61 | 0.86 |
| Var(fixed) | 0.28 | 0.24 | 1.00 |
| Var(private$_{S.\ schwerinii}$) | 0.89 | 0.81 | 0.90 |
| Var(private$_{S.\ viminalis}$) | 0.77 | 0.69 | 0.90 |