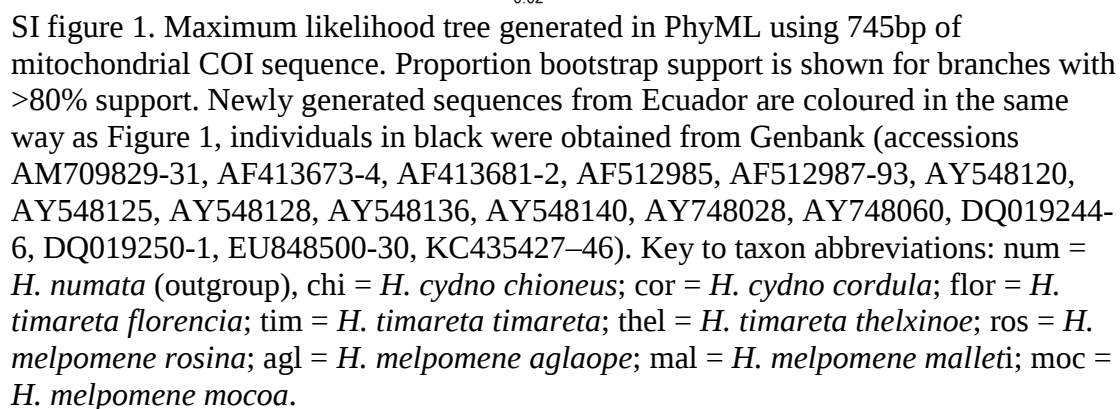
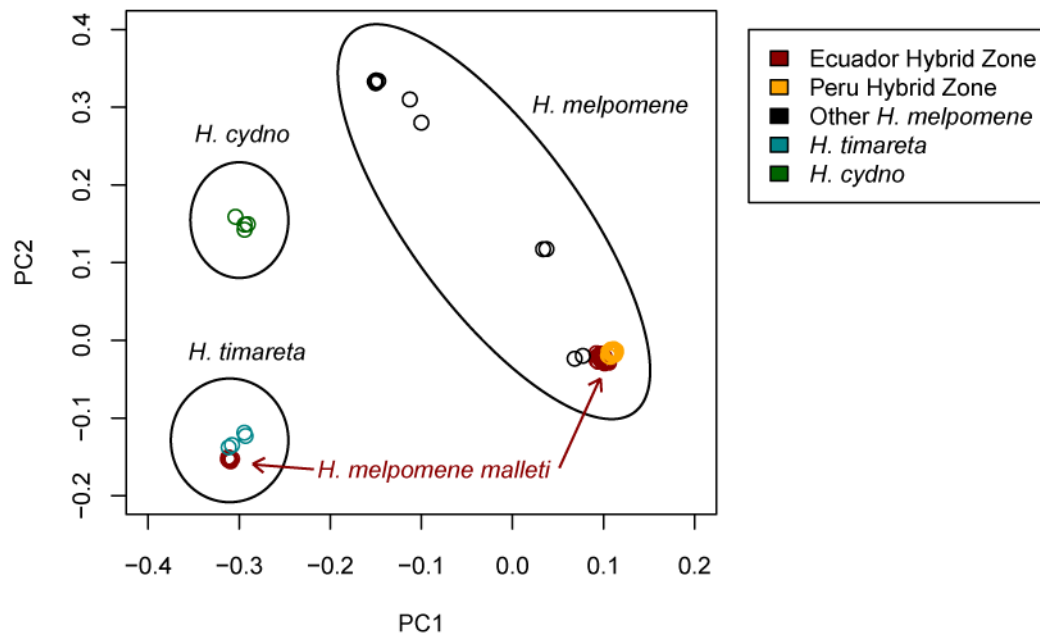
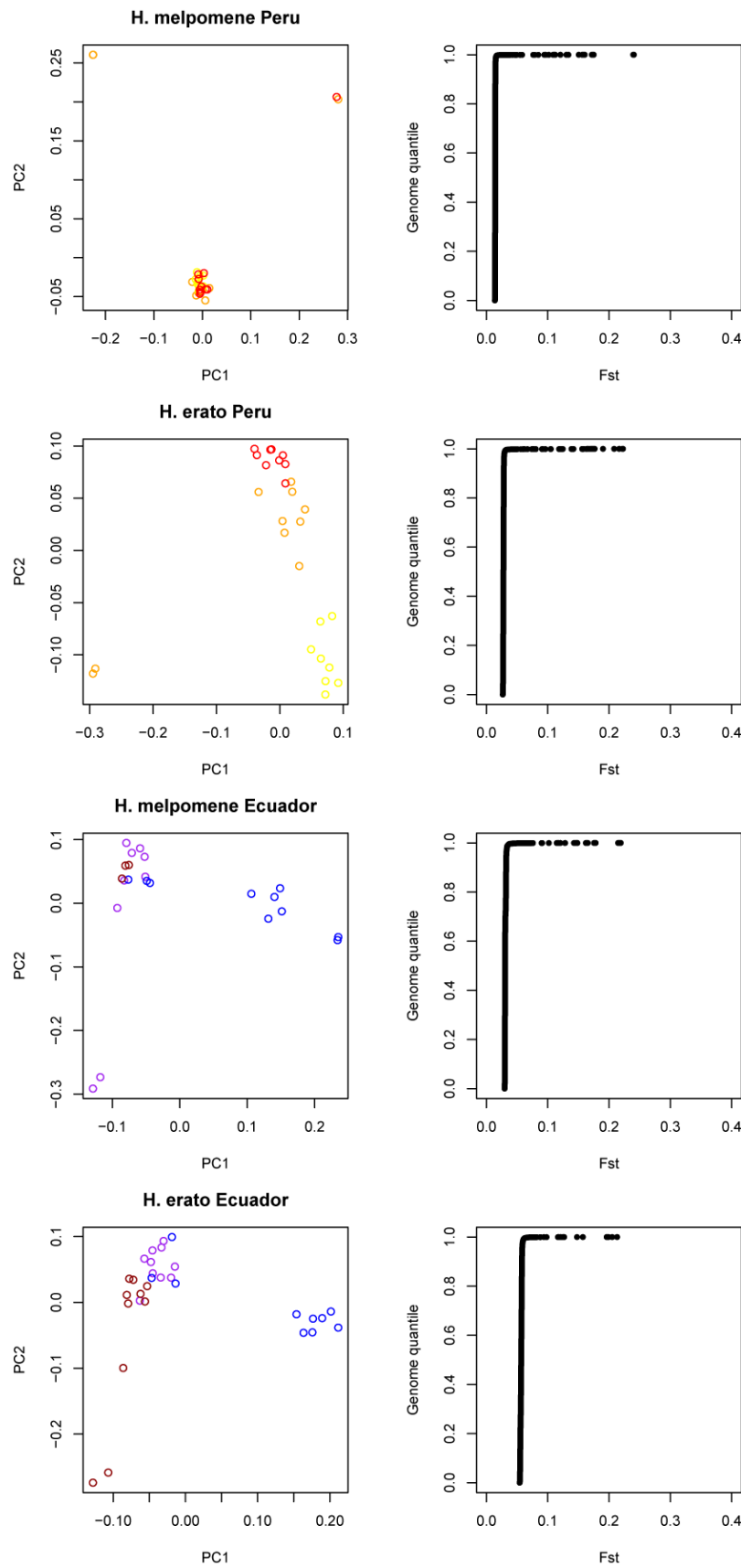


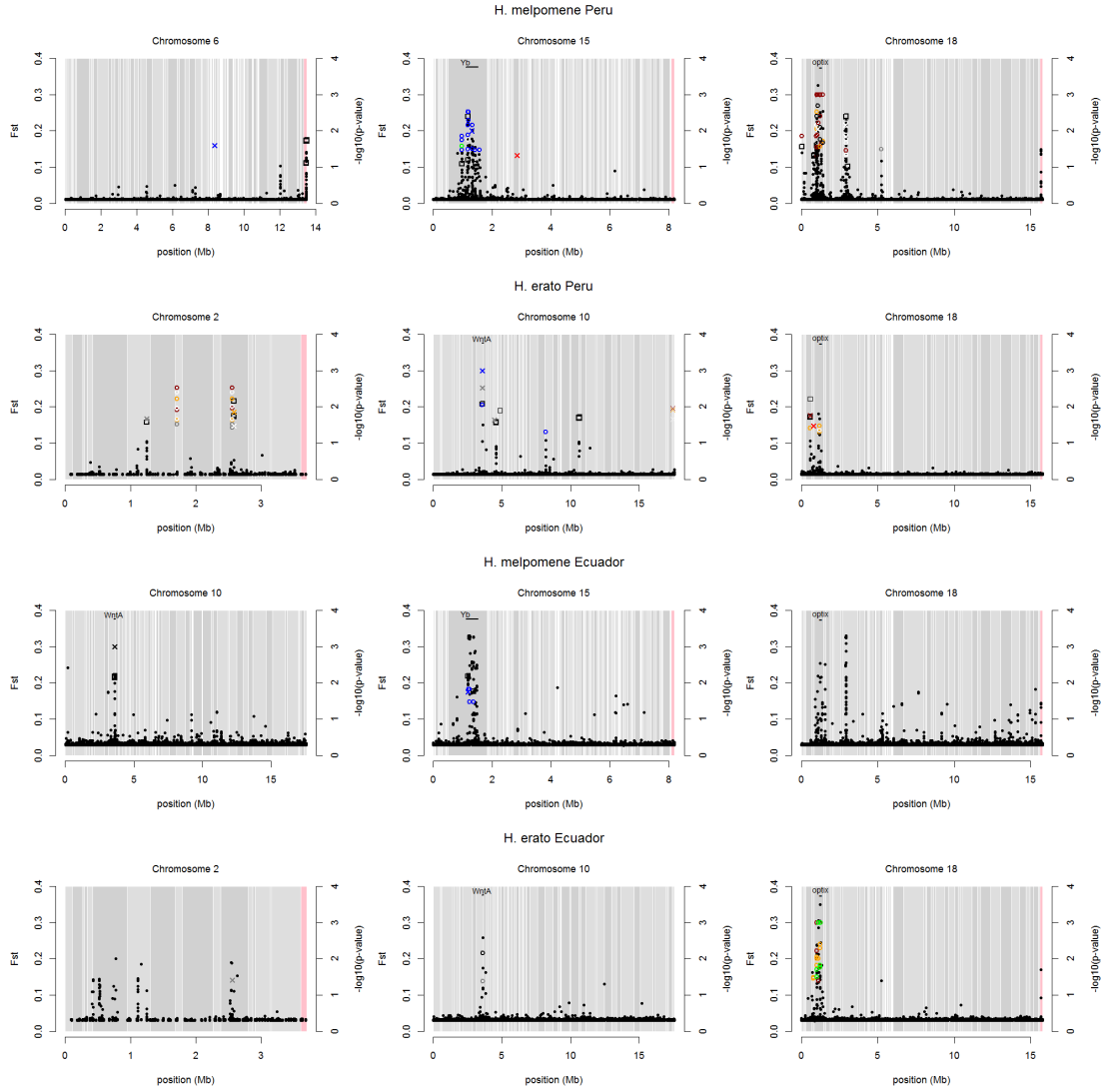




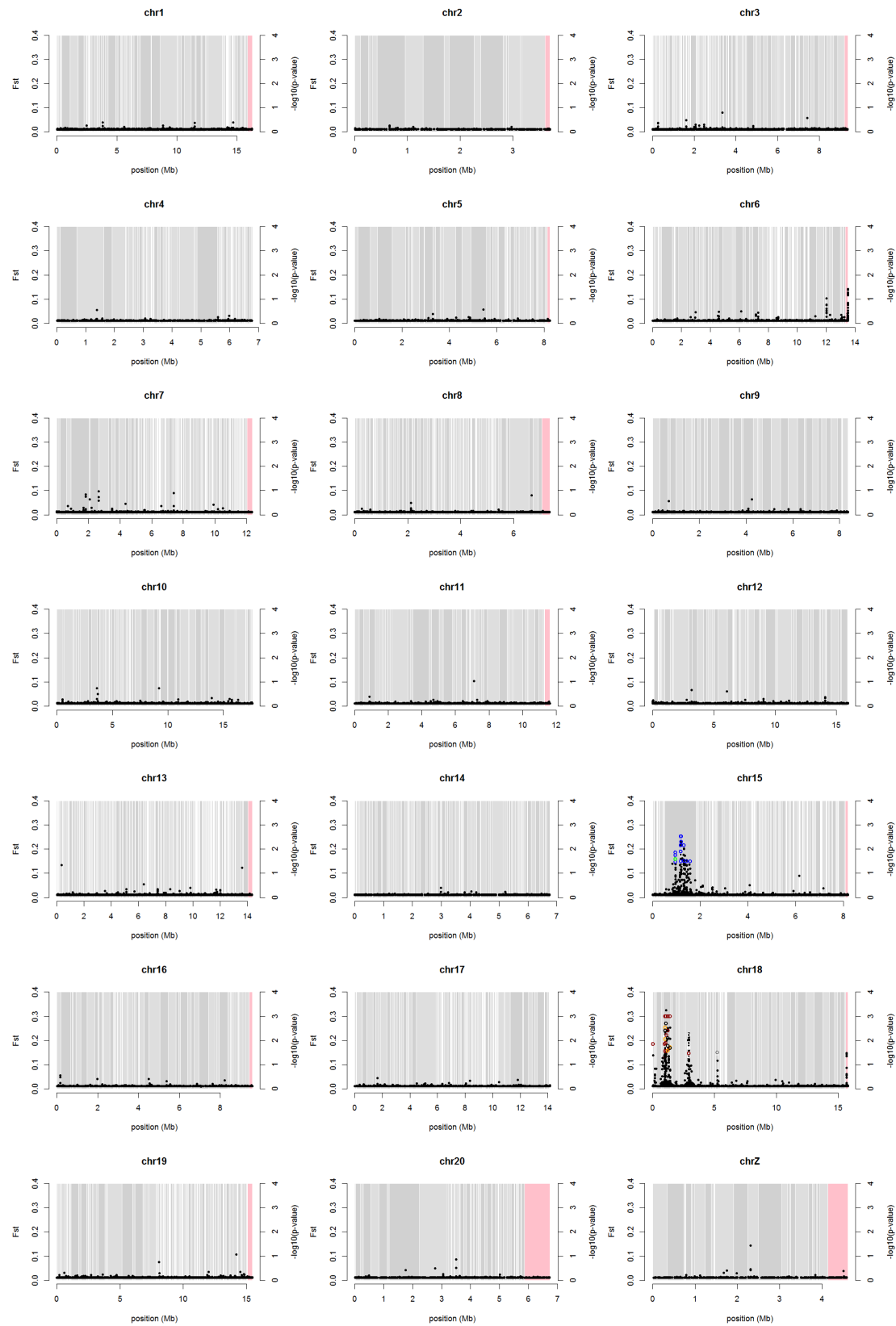
SI figure 2. Principal components analysis of the genetic variation in *H. melpomene* (samples from the hybrid zone populations in Peru and Ecuador as well as individuals from additional populations, as shown in Figure 1), *H. cydno* and *H. timareta*. Some of the *H. melpomene malleti* (dark red) individuals from Ecuador cluster with *H. timareta* (turquoise).



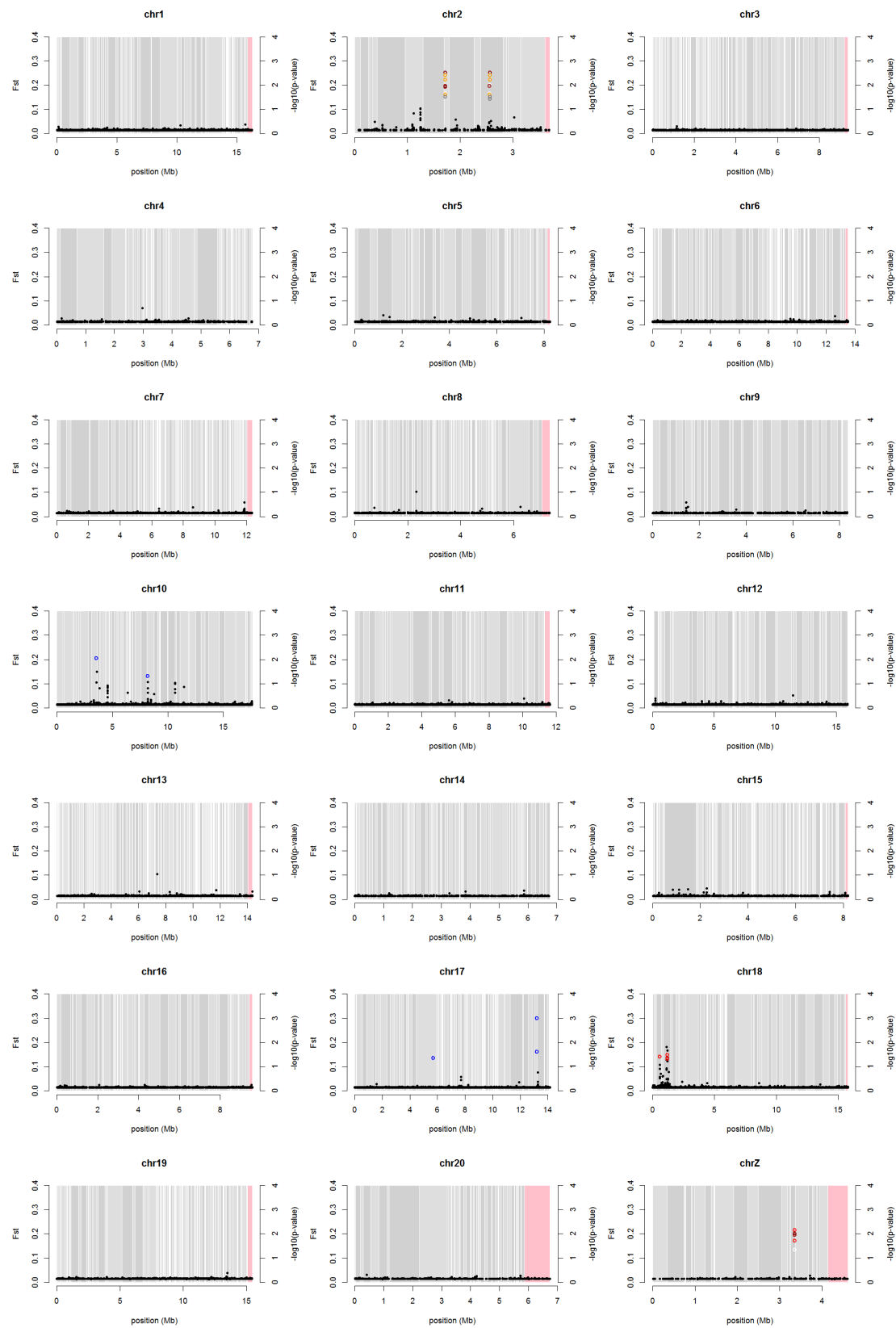
SI figure 3. Principal components analysis and F_{ST} distributions (from BayeScan) for each of the populations calculated from the de novo assembled data.



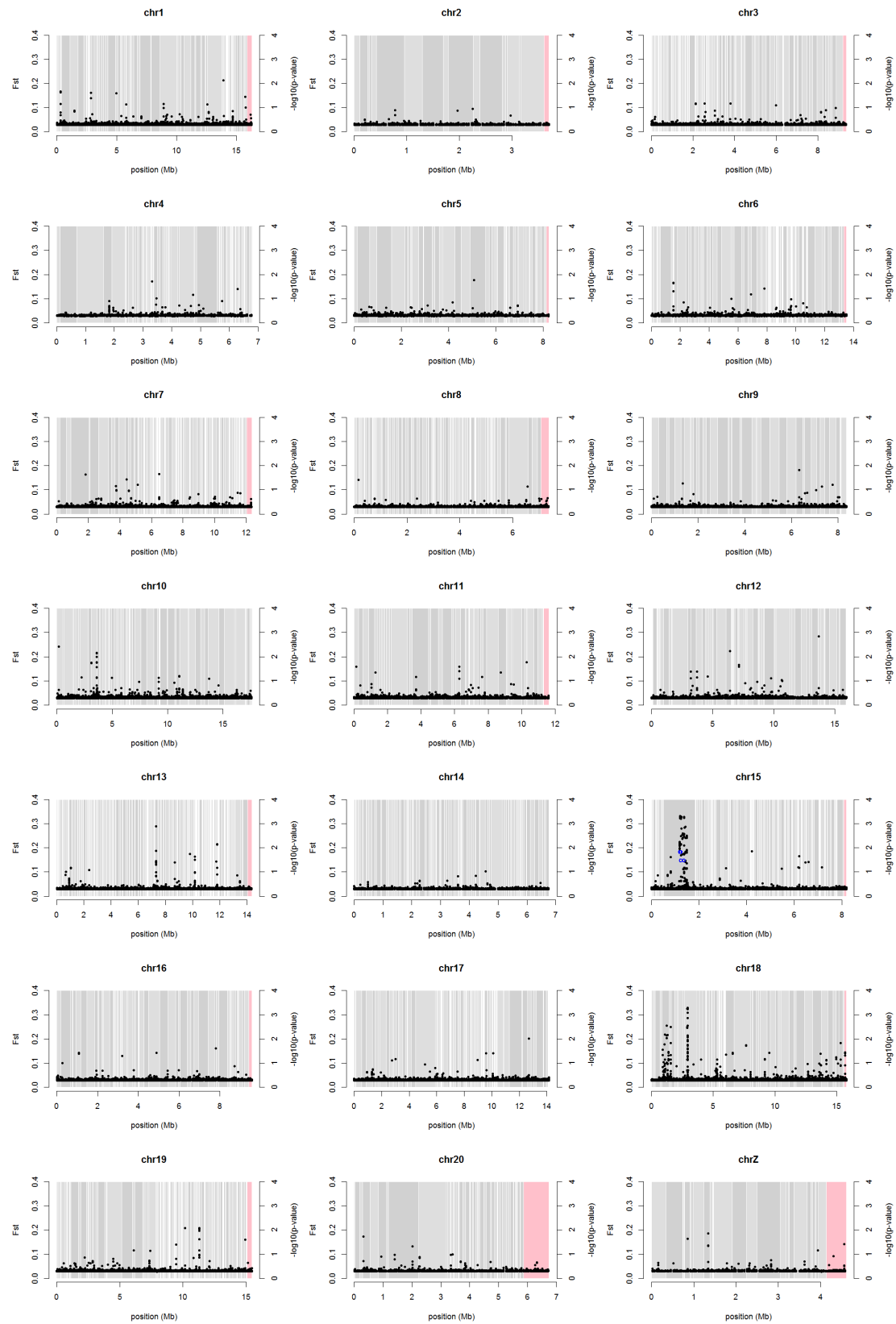
SI figure 4. F_{ST} and significant phenotypic associations across chromosomes of interest for each of the populations. Points indicate F_{ST} values of all SNPs from the reference mapped data; squares, F_{ST} values of outliers from the *de novo* assembled data; open circles and crosses, $-\log_{10}(p\text{-value})$ for SNPs showing significant phenotypic associations from the reference aligned and *de novo* assembled data respectively (colours indicate the phenotype, as shown in figures 3 and 4). Genome scaffolds are indicated with alternate dark and light grey shading. Scaffolds that were mapped to a chromosome but could not be positioned within it are placed at the end of each chromosome and indicated in pink.



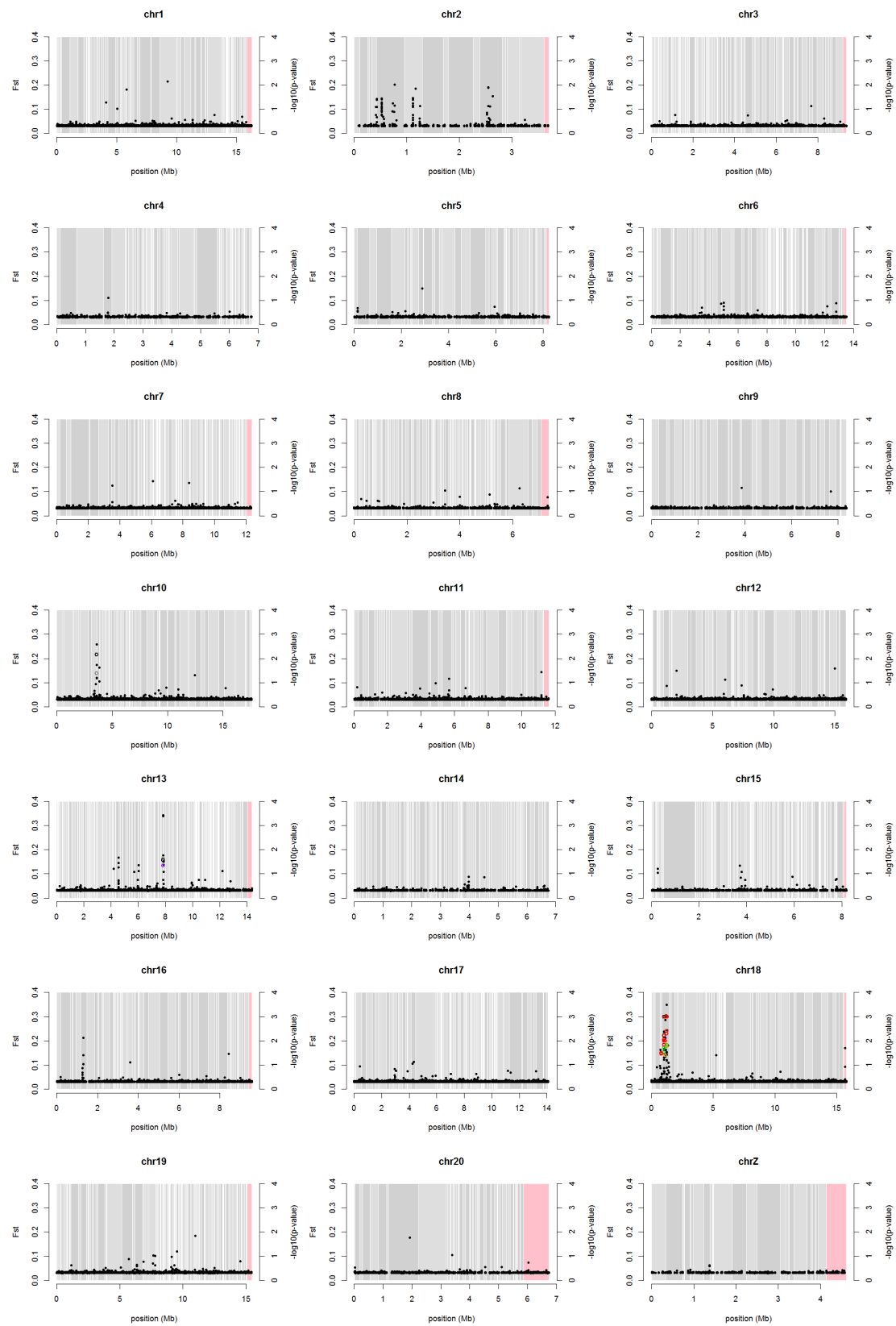
SI Figure 5. *H. melpomene* Peru hybrid zone population. F_{ST} values (black points) and significant phenotypic associations (open circles, colours as in figure 3) from reference mapped data plotted across each chromosome. Scaffolds are shaded as in SI figure 4.



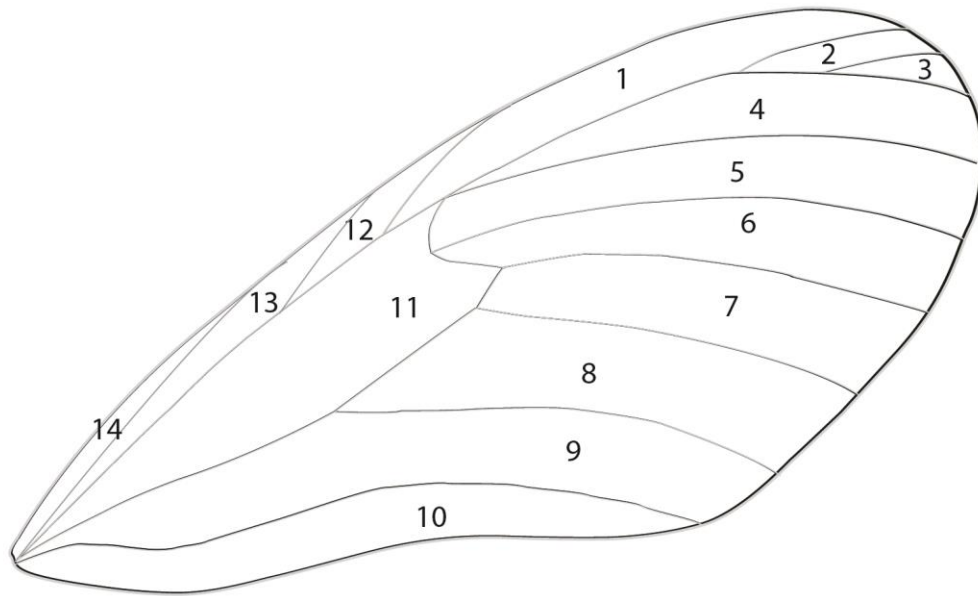
SI Figure 6. *H. erato* Peru hybrid zone population. See SI Figure 5 legend for details.



SI Figure 7. *H. melpomene* Ecuador hybrid zone population. See SI Figure 5 legend for details.



SI Figure 8. *H. erato* Ecuador hybrid zone population. See SI Figure 5 legend for details.



SI figure 9. Numbering of forewing “cells” for analysis of forewing band shape.

SI table1 STRUCTURE analysis of “*H. melpomene*” in Ecuador showing the estimated proportions of the genome of each individual coming from population 1 (*H. timareta*) and population 2 (*H. melpomene*). Individuals in bold are those identified as being *H. timareta* in the phylogenetic and principal components analyses.

ID	pop1	pop2	%Missing
Mel16338	0	1	0
Mel16339	0.007	0.993	0
Mel16341	0	1	0
Mel16347	0	1	0
Mel16349	0	1	0
Mel16354	0	1	0
Mel16424	0	1	0
Mel16425	1	0	0
Mel16427	1	0	0
Mel16428	0.006	0.994	0
Mel16429	1	0	0
Mel16436	1	0	0
Mel16540	0.008	0.992	0
Mel16542	0	1	0
Mel16654	0.003	0.997	0
Mel16655	0	1	0
Mel16657	0.018	0.982	1
Mel16658	0	1	0
Mel16686	0	1	0
Mel16689	0	1	0
Mel16690	0	1	7
Mel16692	0	1	0
Mel16694	0	1	0
Mel16696	0	1	0
Mel16698	0	1	1
Mel17380	1	0	0
Mel17382	1	0	0
Mel17387	0.007	0.993	0
Mel17390	1	0	3
Mel17402	1	0	0

SI table 2. Summary of genomic regions (chromosome and scaffold number) associated with each phenotype in order of significance (highest to lowest in each comparison). NA = phenotype not tested, none = no significant association found. Un = unmapped scaffold. Those found across >1 population/species are shown in bold.

	Peru		Ecuador	
	<i>melpomene</i>	<i>erato</i>	<i>melpomene</i>	<i>erato</i>
% sig. associations <1Mb from known loci	69%	26%	94%	59%
% sig. F_{ST} outliers <1Mb from known loci	65%	48%	61%	38% (57% inc. Ro)
FW red	Chr15 (HE671917)	ChrZ (HE670627), Chr19 (HE670447) Chr18 (HE670865, HE669320, HE671969)	none	Chr18 (HE670865, HE669320)
rays/dennis	un (HE670458), Chr18 (HE670865), Chr13(HE670521)	Chr2 (HE670235, HE670771), Un (HE671447), Chr10 (HE670319), Un (HE671888)	un (HE670458)	Chr18 (HE670865) Chr3 (HE670534)
B/D gen	un (HE670458), Chr18 (HE670865, HE671865, HE671488)	Chr2 (HE670235, HE670771), Un (HE671888), Chr19 (HE670447), ChrZ (HE670627), Un (HE668563), Chr10 (HE670319), Chr18 (HE671969, HE670865)	none	Chr18 (HE670865)
FW yellow	Chr15 (HE667780), Un (HE670411), Chr2 (HE669188), Chr6 (HE671507)	none	none	Chr18 (HE670865)
HW yellow	Chr15 (HE667780)	Chr17 (HE671853), Chr10 (HE668478), Chr17 (HE671591), Chr10 (HE669460)	NA	NA
N gen	NA	NA	Chr15 (HE667780)	NA
Spot 7	NA	NA	Chr10 (HE668478)	Chr10 (HE668478), Chr13 (HE670984, HE669551)
Spot 8	Chr18 (HE670865) Chr20 (HE671554)	none	none	Chr10 (HE668478), Chr13 (HE670984, HE669551)
Spot 11	Chr18 (HE671625)	Chr10 (HE668478),	none	Chr13 (HE670984),

		Un (HE671447) Chr2 (HE670519), Chr10 (HE670517), Chr2 (HE670235, HE670771)		Chr2 (HE670771), Chr10 (HE668478)
Rounded	NA	NA	NA	Chr13 (HE669551, HE670984)
Altitude	Chr18 (HE670865, HE671488), Un (HE670458), Chr15 (HE667780), Chr18 (HE671625)	Chr2 (HE670235, HE670771), Chr6 (HE670447), Un (HE668563), Chr10 (HE670319) Un (HE671447), Chr18 (HE670865), ChrZ (HE670627)	none	none

SI table 3. Complete table of novel genomic regions showing phenotypic associations or divergence outliers

chrom.	Scaffold	Position [‡]	Comparison [*]	association (p value) [‡]	F_{ST} [‡]	Closest Gene Distance [†]	GO function	putative protein
unmapped (chr13)	HE669551	4,467	<i>erato Ecuador</i> : refmap assoc (Ro, spot 7/8), refmap outlier	0.007	0.307	HMEL004352 0 (S)	microtubule binding	radial spoke head 3
chr13	HE670984	4,951- 4,959	<i>erato Ecuador</i> : refmap assoc (Ro, spot 11 , spot 7/8), refmap outlier	0.024	0.343	HMEL009926 3,915	structural constituent of ribosome, RNA binding	ribosomal protein S4
unmapped (chr20)	HE671554	82,726- 82,851	<i>melp Peru</i> : refmap assoc (spot 8)	0.017		HMEL016146 0 (A/S/I)	protein binding, zinc ion binding	MICAL-like
chr17	HE671853	190,306	<i>erato Ecuador</i> : refmap assoc (HWY)	0.001		HMEL014236 0 (I)	catalytic activity, serine-type endopeptidase activity	serine protease 30
unmapped	HE670458	97	<i>melp Ecuador</i> : refmap assoc (rays); <i>melp Peru</i> : refmap assoc (alt, rays , D gen)	0.001		no genes on this scaffold, in repetitive region		
chr18	HE671488	228,759- 228,922	<i>melp Peru</i> : refmap assoc (alt, D gen), refmap outlier, denovo outlier; <i>melp Ecuador</i> : refmap outlier	0.006	0.329	HMEL014920 19,171		
chr2	HE670771	179,067- 179,278	<i>erato Peru</i> : refmap assoc (alt, rays, D gen , spot 11); <i>erato Ecuador</i> : denovo assoc (spot 11)	0.003		HMEL008318 0 (I)	catalytic activity, protein binding	fatty acid synthase

chr2	HE670771	199,742	<i>erato</i> Peru: denovo assoc (alt, rays), denovo outlier	0.014	0.217	HMEL008322	0 (A)	odorant binding protein 7
chr2	HE670519	293,177-293,603	<i>erato</i> Peru: refmap outlier, denovo assoc (spot 11), denovo outlier	0.021	0.158	HMEL007059	0 (I/A)	oxidoreductase 3-activity dehydroecdysone 3alpha-reductase
chr2	HE670235	24,536-24,614	<i>erato</i> Peru: refmap assoc (alt, rays, D gen , spot 11)	0.003		HMEL005708	56,981	taste receptor activity olfactory receptor 4
chr2	HE671428	6,795	<i>erato</i> Ecuador: refmap outlier		0.143	HMEL014154	0 (S)	choline dehydrogenase activity, oxidoreductase activity, acting on CH-OH group of donors, flavin adenine dinucleotide binding glucose dehydrogenase
chr2	HE671428	99,432	<i>erato</i> Ecuador: refmap outlier		0.145	HMEL014163	0 (A)	heat shock protein 70
chr6	HE671933	31,161-31,367	<i>melp</i> Peru: denovo outlier, refmap outlier		0.175	HMEL016074	7,925	oxidoreductase activity amine oxidoreductase
chr6	HE671934	15,458	<i>melp</i> Peru: ref map outlier		0.104	HMEL016075	4,121	oxidoreductase activity amine oxidoreductase

*The position of the SNP with the strongest result in a given region, unless multiple equally supported SNPs are present in which case a range is given. *Analysis in which SNP is detected: melp, *H. melpomene*; erato, *H. erato*; ref map, reference aligned data; denovo, *de novo* assembled data; outlier, BayeScan outlier analysis; assoc, association analysis (rays, presence of hindwing rays and fore/hindwing dennis patches; Dgen, predicted *B/D* genotype; spot, presence of non-black colour in that wing cell; alt, altitude;; Ro, rounding of distal edge of forewing band). The analysis giving the most significant result is shown in bold. ‡ Value for the most significant analysis is given. † If a SNP is within a gene (distance=0) then in parenthesis: A, non-synonymous; S, synonymous; I, within an intron.

SI table 4 samples and sampling locations used in this study

ID	Species	subspecies	sex	location	Lat.	Long.	Alt.	MID	SRA accession
16301	H. erato	notabilis	male	Ecuador (Km25 Llandia)	-1.3333	-77.9341	953m	TCAGA	ERS353344
16302	H. erato	Hybrid	male	Ecuador (Km25 Llandia)	-1.3333	-77.9341	953m	ACACG	ERS353345
16305	H. erato	notabilis	male	Ecuador (Km25 Llandia)	-1.3333	-77.9341	953m	ACCAT	ERS353346
16307	H. erato	Hybrid	male	Ecuador (Km25 Llandia)	-1.3333	-77.9341	953m	CAACT	ERS353347
16314	H. erato	Hybrid	female	Ecuador (Km25 Llandia)	-1.3333	-77.9341	953m	AGGAC	ERS353348
16322	H. erato	notabilis	male	Ecuador (Km25 Llandia)	-1.3333	-77.9341	953m	ATGCT	ERS353349
16446	H. erato	lativitta	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	CTAGG	ERS353350
16451	H. erato	Hybrid	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	CGATA	ERS353351
16454	H. erato	lativitta	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	GCATT	ERS353352
16457	H. erato	Hybrid	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	GAAGC	ERS353353
16460	H. erato	Hybrid	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	TAATG	ERS353354
16467	H. erato	lativitta	female	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	GTACA	ERS353355
16553	H. erato	lativitta	male	Ecuador (Y de Misahuallí)	-1.0614	-77.6684	440 m	GTGTG	ERS353356
16556	H. erato	lativitta	male	Ecuador (Y de Misahuallí)	-1.0614	-77.6684	440 m	CCGGT	ERS353357
16634	H. erato	Hybrid	male	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	GAGAT	ERS353358
16638	H. erato	Hybrid	male	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	TAGCA	ERS353359
16640	H. erato	Hybrid	male	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	ACGTA	ERS353360
16642	H. erato	Hybrid	female	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	CAGTC	ERS353361
16702	H. erato	notabilis	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	GGAAG	ERS353362
16703	H. erato	notabilis	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	TTAAT	ERS353363
16704	H. erato	notabilis	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	TGACC	ERS353364
16705	H. erato	notabilis	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	TTGGC	ERS353365
16707	H. erato	notabilis	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	ACTGC	ERS353366
16709	H. erato	notabilis	female	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	ATATC	ERS353367
16712	H. erato	notabilis	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	CGGCG	ERS353368
17394	H. erato	lativitta	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	AGAGT	ERS353369
17396	H. erato	lativitta	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	CCAAC	ERS353370
17397	H. erato	lativitta	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	CTGAA	ERS353371
17406	H. erato	lativitta	female	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	GCGCC	ERS353372
17409	H. erato	lativitta	female	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	TCGAG	ERS353373
16338	H. melpomene	Hybrid	male	Ecuador (Fátima 2)	-1.4259	-78.0182	1058 m	ACACG	ERS353374
16339	H. melpomene	Hybrid	male	Ecuador (Fátima 2)	-1.4259	-78.0182	1058 m	CAACT	ERS353375
16341	H. melpomene	Hybrid	male	Ecuador (Fátima 2)	-1.4259	-78.0182	1058 m	AGGAC	ERS353376
16347	H. melpomene	plesseni	female	Ecuador (Fátima 2)	-1.4259	-78.0182	1058 m	TCAGA	ERS353377
16349	H. melpomene	plesseni	female	Ecuador (Fátima 2)	-1.4259	-78.0182	1058 m	ACCAT	ERS353378
16354	H. melpomene	plesseni	male	Ecuador (Fátima 2)	-1.4259	-78.0182	1058 m	ATGCT	ERS353379
16424	H. melpomene	Hybrid	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	GAAGC	ERS353380
16425	H. timareta	ssp nov	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	CTAGG	ERS353381
16427	H. timareta	ssp nov	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	GCATT	ERS353382
16428	H. melpomene	Hybrid	female	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	TAATG	ERS353383
16429	H. timareta	ssp nov	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	GTACA	ERS353384
16436	H. timareta	ssp nov	male	Ecuador (El Capricho Km 5.7)	-1.1878	-77.8311	824 m	CGATA	ERS353385

16540	H. melpomene	malleti	male	Ecuador (Y de Misahuallí)	-1.0614	-77.6684	440 m	GTGTG	ERS353386
16542	H. melpomene	malleti	male	Ecuador (Y de Misahuallí)	-1.0614	-77.6684	440 m	CCGGT	ERS353387
16654	H. melpomene	Hybrid	male	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	GAGAT	ERS353388
16655	H. melpomene	Hybrid	female	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	TAGCA	ERS353389
16657	H. melpomene	Hybrid	female	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	ACGTA	ERS353390
16658	H. melpomene	Hybrid	male	Ecuador (Km37 SanFcoDeLlandia Km3.3)	-1.3062	-77.9098	839 m	CAGTC	ERS353391
16686	H. melpomene	plesseni	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	GGAAG	ERS353392
16689	H. melpomene	plesseni	female	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	TGACC	ERS353393
16690	H. melpomene	plesseni	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	TTAAT	ERS353394
16692	H. melpomene	plesseni	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	TTGGC	ERS353395
16694	H. melpomene	plesseni	male	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	ACTGC	ERS353396
16696	H. melpomene	plesseni	female	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	ATATC	ERS353397
16698	H. melpomene	plesseni	female	Ecuador (El Topo)	-1.3980	-78.1781	1307 m	CGGCG	ERS353398
17380	H. timareta	ssp nov	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	AGAGT	ERS353399
17382	H. timareta	ssp nov	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	CCAAC	ERS353400
17387	H. melpomene	malleti	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	CTGAA	ERS353401
17390	H. timareta	ssp nov	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	GCGCC	ERS353402
17402	H. timareta	ssp nov	male	Ecuador (San Perdo de Arajuna)	-1.0988	-77.5845	376 m	TCGAG	ERS353403
NCS0815	H. erato	emma	male	Peru (KM 24 Tarapoto Yurimaguas road)	-5.9816	-76.2152	179 m	CCAAC	ERS353404
NCS0816	H. erato	emma	male	Peru (KM 24 Tarapoto Yurimaguas road)	-5.9816	-76.2152	179 m	CGATA	ERS353405
NCS0818	H. erato	emma	male	Peru (KM 24 Tarapoto Yurimaguas road)	-5.9816	-76.2152	179 m	GAAGC	ERS353406
NCS0819	H. erato	emma	male	Peru (KM 24 Tarapoto Yurimaguas road)	-5.9816	-76.2152	179 m	AGGAC	ERS353407
NCS0821	H. erato	emma	male	Peru (KM 24 Tarapoto Yurimaguas road)	-5.9816	-76.2152	179 m	ACACG	ERS353408
NCS0377	H. erato	emma	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177 m	TAATG	ERS353409
NCS0378	H. erato	emma	female	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177 m	GAGAT	ERS353410
NCS0379	H. erato	emma	female	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177 m	GCATT	ERS353411
NCS0380	H. erato	emma	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177 m	ACGTA	ERS353412
NCS0328	H. erato	Hybrid		Peru (Pongo, Site 34)	-6.3345	-76.2858	220 m	CTAGG	ERS353413
NCS0345	H. erato	Hybrid	male	Peru (Barranquita Km7)	-6.2897	-76.2289	192 m	CAACT	ERS353414
NCS0709	H. erato	Hybrid	male	Peru (Barranquita Km7)	-6.2897	-76.2289	192 m	TCGAG	ERS353415
NCS0616	H. erato	Hybrid	male	Peru (Barranquita Km7)	-6.2897	-76.2289	192 m	ATATC	ERS353416
NCS0677	H. erato	Hybrid	female	Peru (Bonilla)	-6.2179	-76.2731	179 m	TAGCA	ERS353417
NCS0680	H. erato	Hybrid	male	Peru (Bonilla)	-6.2179	-76.2731	179 m	GTACA	ERS353418
NCS0681	H. erato	Hybrid	male	Peru (Bonilla)	-6.2179	-76.2731	179 m	GCGCC	ERS353419
NCS0701	H. erato	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	CTGAA	ERS353420
NCS0736	H. erato	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	GTGTG	ERS353421
NCS0864	H. erato	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	ACTGC	ERS353422
NCS0261	H. erato	favorinus	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	CCGGT	ERS353423
NCS0268	H. erato	favorinus	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TTGGC	ERS353424
NCS0287	H. erato	favorinus	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	AGAGT	ERS353425
NCS0290	H. erato	favorinus	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	ATGCT	ERS353426
NCS0298	H. erato	favorinus	female	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	CGGCG	ERS353427
NCS0312	H. erato	favorinus	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TCAGA	ERS353428
NCS0313	H. erato	favorinus	female	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TTAAT	ERS353429

NCS0468	H. erato	favorinus	male	Tarapoto) Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	ACCAT	ERS353430
NCS0381	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	TAATG	ERS353431
NCS0383	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	CGATA	ERS353432
NCS0386	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	GAAGC	ERS353433
NCS0371	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	AGGAC	ERS353434
NCS0368	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	ACACG	ERS353435
NCS0366	H. melpomene	aglaope	female	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	CCAAC	ERS353436
NCS0367	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	CTAGG	ERS353437
NCS0372	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	GAGAT	ERS353438
NCS0370	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	GCATT	ERS353439
NCS0361	H. melpomene	aglaope	male	Peru (KM 24 YTB Km 6 to Michela Batista)	-5.9442	-76.2445	177m	ACGTA	ERS353440
NCS0702	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	CAACT	ERS353441
NCS0704	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	CAGTC	ERS353442
NCS0705	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	TAGCA	ERS353443
NCS0706	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	TCGAG	ERS353444
NCS0857	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	ATATC	ERS353445
NCS0861	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	GTACA	ERS353446
NCS0862	H. melpomene	Hybrid	female	Peru (Shapajilla)	-6.3148	-76.3198	314 m	GCGCC	ERS353447
NCS0732	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	CTGAA	ERS353448
NCS0735	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	GTGTG	ERS353449
NCS0737	H. melpomene	Hybrid	male	Peru (Shapajilla)	-6.3148	-76.3198	314 m	ACTGC	ERS353450
NCS0509	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	CCGGT	ERS353451
NCS0510	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	AGAGT	ERS353452
NCS0511	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TGACC	ERS353453
NCS0518	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TTGGC	ERS353454
NCS0523	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	ATGCT	ERS353455
NCS0525	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	CGGCG	ERS353456
NCS0526	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	GGAAG	ERS353457
NCS0527	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TCAGA	ERS353458
NCS0528	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	TTAAT	ERS353459
NCS0529	H. melpomene	amaryliis	male	Peru (Urahuasha Trail, Tarapoto)	-6.4741	-76.3437	495 m	ACCAT	ERS353460
8228	H. melpomene	melpomene	male	French Guyana (Pointe Macouria)	4.9138	-52.3595		CGATA	
8229	H. melpomene	melpomene	male	French Guyana (Pointe Macouria)	4.9138	-52.3595		GAAGC	
14671	H. melpomene	melpomene	female	Panama (Puerto Lara)	8.6136	-78.1398		TAATG	
114671	H. melpomene	melpomene	male	Panama (Puerto Lara)	8.6136	-78.1398		ACACG	
2071	H. melpomene	rosina	male	Panama (Gamboa)	9.1192	-79.6975	80 m	CAACT	
2097	H. melpomene	rosina	female	Panama (Gamboa)	9.1192	-79.6975	80 m	CGGCG	
9111	H. melpomene	ecuadrensis	male	Ecuador (Old Zamora road)	-4.0439	-78.9861		GAGAT	
9112	H. melpomene	ecuadrensis	male	Ecuador (Old Zamora road)	-4.0439	-78.9861		TAGCA	
8265	H. cydno	chioneus	female	Panama (Cerro Campana)	8.6874	-79.9197	900 m	ACGTA	
2440	H. cydno	chioneus	female	Panama (Pipeline Road)	9.1286	-79.7153		CAGTC	
14629	H. erato	hyدارا	female	Panama (Puerto Lara)	8.6136	-78.1398		GTGTG	ERS353461

14642	H. erato	hyدارا	male	Panama (Puerto Lara)	8.6136	-78.1398		CCGGT	ERS353462
2979	H. erato	petiverana	male	Panama (Pipeline Road)	9.1286	-79.7153		GTACA	ERS353463
2981	H. erato	petiverana	male	Panama (Pipeline Road)	9.1286	-79.7153		TTGGC	ERS353464
9126	H. erato	etylus	male	Ecuador (Old Zamora road)	-4.0439	-78.9861		ACTGC	ERS353465
9128	H. erato	etylus	male	Ecuador (West of Macas)				ATATC	ERS353466
202	H. erato	chestertonii	male	Colombia (Yotoco)	3.8889	-76.4330	1640 m	AGGAC	ERS353467
208	H. erato	chestertonii	male	Colombia (Yotoco)	3.8889	-76.4330	1640 m	GGAAG	ERS353468
8179	H. erato	hyدارا	female	French Guyana (Sabance)	4.9632	-52.4200		TTAAT	ERS353469
8181	H. erato	hyدارا	female	French Guyana (Sabance)	4.9632	-52.4200		TGACC	ERS353470
2842	H. himera		male	Ecuador (San Pedro de la Bendita)				ACCAT	ERS353471
2843	H. himera		female	Ecuador (San Pedro de la Bendita)				ATGCT	ERS353472
09-233	H. timareta	thelxinoe	male	Peru (El Afluente-Nuevo Eden)	-5.6628	-77.6961			
09-234	H. timareta	thelxinoe	female	Peru (El Afluente-Nuevo Eden)	-5.6628	-77.6961			
09-103	H. hecale	felix	male	Peru (Idea Religiosa, Munichis)	-5.9103	-76.2258			
09-310	H. hecale	felix	female	Peru (Km18 Tarapoto Yurimaguas road)	-6.4531	-76.2886			
M2158	H. cydno	cordula		Venezuela (San Cristobal)	7.7989	-72.1989			
M2253	H. cydno	cordula		Venezuela (San Cristobal)	7.7989	-72.1989			
CM2	H. melpomene	melpomene	male	Colombia (Virgen de Chirajara, Meta)	4.2133	-73.8028			
CM7	H. melpomene	melpomene	male	Colombia (Morcote, Casanare)	5.6169	-72.3000			
9179	H. timareta	timareta	male	Ecuador (El Topo)	-1.3980	-78.1781	1300 m		
9180	H. timareta	timareta	male	Ecuador (El Topo)	-1.3980	-78.1781	1300 m		
9211	H. clysonimus		male	Ecuador (El Topo)	-1.3980	-78.1781	1300 m		ERS353473

SI table 5 phenotypic scoring used for the association mapping analyses

***H. melpomene* Peru**

id	HWY	FWY	band	rays	B/Dgen	spot11	spot8	Alt
NCS0361	1	1	0	1	1	0	0	177
NCS0366	1	1	0	1	1	0	0	177
NCS0367	1	1	0	1	1	0	0	177
NCS0368	1	1	0	1	1	0	0	177
NCS0370	1	1	0	1	1	0	0	177
NCS0371	1	1	0	1	1	0.5	0	177
NCS0372	1	1	0	1	1	0	0	177
NCS0381	1	1	0	1	1	0	0	177
NCS0383	1	1	0	1	1	0	0	177
NCS0386	1	1	0	1	1	0	0	177
NCS0509	0	0	1	0	0	1	1	495
NCS0510	0	0	1	0	0	1	1	495
NCS0511	0	0	1	0	0	1	1	495
NCS0518	0	0	1	0	0	1	1	495
NCS0523	0	0	1	0	0	1	1	495
NCS0525	0	0	1	0	0	1	0.5	495
NCS0526	0	0	1	0	0	1	1	495
NCS0527	0	0	1	0	0	1	1	495
NCS0528	0	0	1	0	0	1	1	495
NCS0529	0	0	1	0	0	1	1	495
NCS0702	0	1	1	1	0.5	0.5	1	314
NCS0704	1	1	1	0	0	0	0.5	314
NCS0705	1	1	1	1	0.5	0	0.5	314
NCS0706	1	1	1	1	0.5	0	0	314
NCS0732	1	1	1	0	0	0	1	314
NCS0735	1	1	1	1	0.5	0	0.5	314
NCS0737	0	0	0	1	1	0	0	314
NCS0857	1	1	1	1	0.5	0	0.5	314
NCS0861	1	1	1	1	0.5	0	0.5	314
NCS0862	1	1	1	1	0.5	0	0.5	314
λ	1.06771	1.077615	1.038463	1.065412	1.064946	1.082042	1.030612	1.07879

***H. erato* Peru**

id	HWY	FWY	band	rays	Dgen	spot11	spot8	Alt
NCS0261	1	1	1	0	0	1	1	495
NCS0268	1	1	1	0	0	1	1	495
NCS0287	1	1	1	0	0	1	1	495
NCS0290	1	1	1	0	0	1	1	495
NCS0298	1	1	1	0	0	1	1	495
NCS0312	1	1	1	0	0	1	1	495
NCS0313	1	1	1	0	0	1	1	495
NCS0328	0	0	1	1	0.5	0.5	0.5	202
NCS0345	1	1	0	1	1	0.5	0.5	192
NCS0377	0	0	0	1	1	0	0	177
NCS0378	0	0	0	1	1	0	0	177
NCS0379	0	0	0	1	1	0	0	177
NCS0380	0	0	0	1	1	0	0	173
NCS0468	1	1	1	0	0	1	1	495
NCS0616	0	1	1	1	0.5	0	0.5	192
NCS0677	0.5	1	0	1	1	1	1	179
NCS0680	1	1	0	1	1	0	0	179
NCS0681	0.5	1	0	1	1	0.5	1	179

NCS0701	0.5	1	0	1	1	0	0	314
NCS0709	0	1	0	1	1	0.5	0	192
NCS0736	0	1	0	1	1	0	0.5	314
NCS0815	0	0	0	1	1	0	0	179
NCS0816	0	0	0	1	1	0.5	0.5	179
NCS0818	0	0	0	1	1	0.5	0.5	179
NCS0819	0	0	0	1	1	0	0	179
NCS0821	0	0	0	1	1	0	0.5	179
NCS0864	0	0	1	1	0.5	0	0.5	314
λ	1.000129	1.028878	1.039016	1.120408	1.097814	1	1	1.09526

***H. melpomene* Ecuador**

id	Ngen	FWY	band	rays	B/Dgen	spot8/11	spot7	Alt
Mel16338	0	0	1	0	0	0.5	0.5	1058
Mel16339	1	1	1	0	0	1	0	1058
Mel16341	1	0	1	0	0	1	0	1058
Mel16347	0	0	1	0	0	1	0	1058
Mel16349	0	0	1	0	0	1	0	1058
Mel16354	0	0	1	0	0	1	0	1058
Mel16424	1	1	0	1	1	0.5	0.5	824
Mel16428	1	1	0	1	1	0	0.5	824
Mel16540	1	1	0	1	1	0	1	440
Mel16542	1	1	0	1	1	0	1	440
Mel16654	1	1	0	1	1	1	0	839
Mel16655	0	1	0	1	1	1	0	839
Mel16657	1	0	1	1	0.5	1	0	839
Mel16658	0	0	1	1	0.5	1	0	839
Mel16686	0	0	1	0	0	1	0	1307
Mel16689	0	0	1	0	0	1	0	1307
Mel16690	0	0	1	0	0	1	0	1307
Mel16692	0	0	1	0	0	1	0	1307
Mel16694	0	0	1	0	0	1	0	1307
Mel16696	0	0	1	0	0	1	0	1307
Mel16698	0	0	1	0	0	1	0	1307
Mel17387	1	1	0	1	1	0	1	376
λ	1.027461	1.071173	1.103239	1.113599	1.101478	1.173255	1.19786	1.218549

***H. erato* Ecuador**

id	Ro	FWY	band	rays	Dgen	spot11	spot7/8	Alt
16301	1	0	1	0	0	1	0	953
16302	1	1	0	1	1	1	0	953
16305	1	0	1	0	0	1	0	953
16307	1	1	1	1	0.5	1	0	953
16314	1	0	1	1	0.5	1	0	953
16322	1	0	1	0	0	1	0	953
16446	0	1	0	1	1	0	1	824
16451	1	1	0	1	1	0	1	824
16454	0	1	0	1	1	0	1	824
16457	0	1	0	1	1	0	0.5	824
16460	1	1	0	1	1	0	1	824
16467	0	1	0	1	1	0	1	824
16553	0	1	0	1	1	0	1	440
16556	0	1	0	1	1	0	1	440
16634	1	1	0	1	1	1	0	839
16638	1	1	0	1	1	1	0	839

16640	1	1	0	1	1	1	0	839
16642	1	0	1	1	0.5	1	0	839
16702	1	0	1	0	0	1	0	1307
16703	1	0	1	0	0	1	0	1307
16704	1	0	1	0	0	1	0	1307
16705	1	0	1	0	0	1	0	1307
16707	1	0	1	0	0	1	0	1307
16709	1	0	1	0	0	1	0	1307
16712	1	0	1	0	0	1	0	1307
17394	0	1	0	1	1	0	1	376
17396	0	1	0	1	1	0	1	376
17397	0	1	0	1	1	0	1	376
17406	0	1	0	1	1	0	1	376
17409	0	1	0	1	1	0	1	376
λ	1.049888	1.088066	1.050227	1.215971	1.141715	1.051948	1.053683	1.21257

HWY, presence of hindwing yellow bar (0.5, partial band visible); FWY, yellow in forewing band; band, red in forewing band; rays, presence of hindwing rays and fore/hindwing dennis patches; B/Dgen, predicted *B/D* genotype (0.5, heterozygotes); spot, presence of non-black colour in that wing cell (0.5, partial colour or one side of wing only); Alt, altitude; Dgen, predicted *D* genotype (0.5, heterozygotes); Ngen, predicted *N* genotype (phenotypes are dominant so no heterozygotes scored); Ro, rounding of distal edge of forewing band; λ , inflation factor used to correct for population stratification in each analysis (from reference aligned data, 1=no inflation).