

## Supplementary information for

### Spatiotemporal variations in retrovirus-host interactions among Darwin's finches

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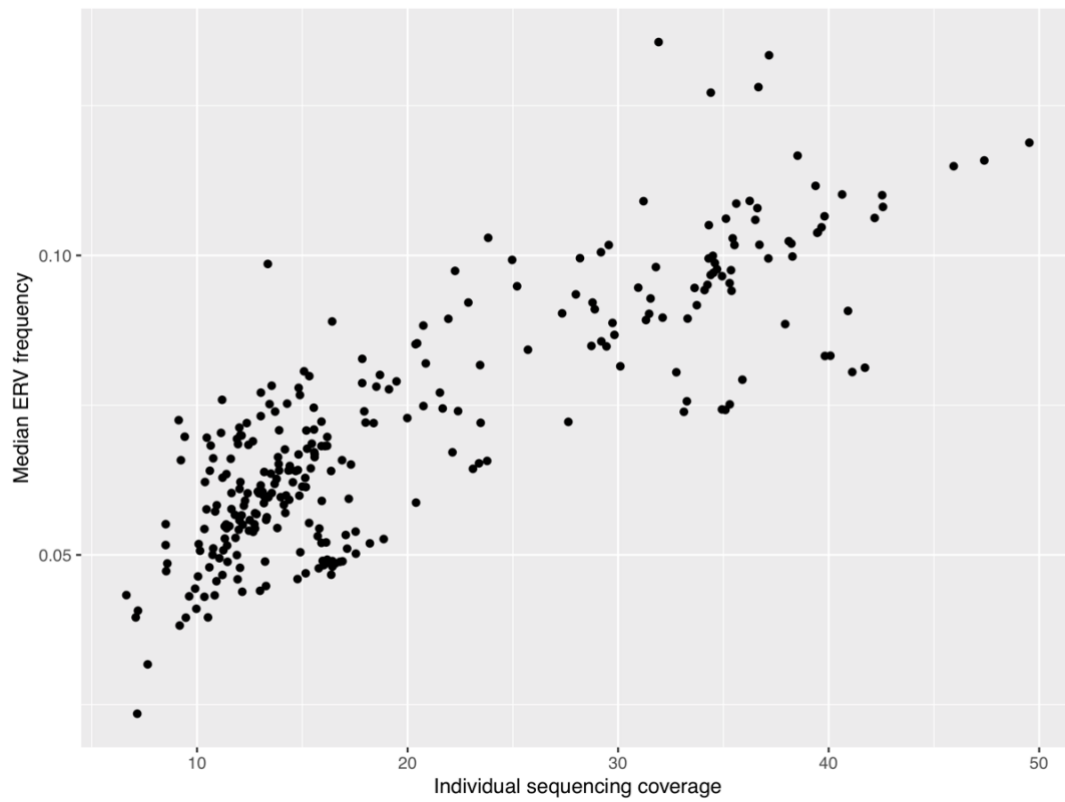
This PDF file includes:

Supplementary Fig. 1 – 6

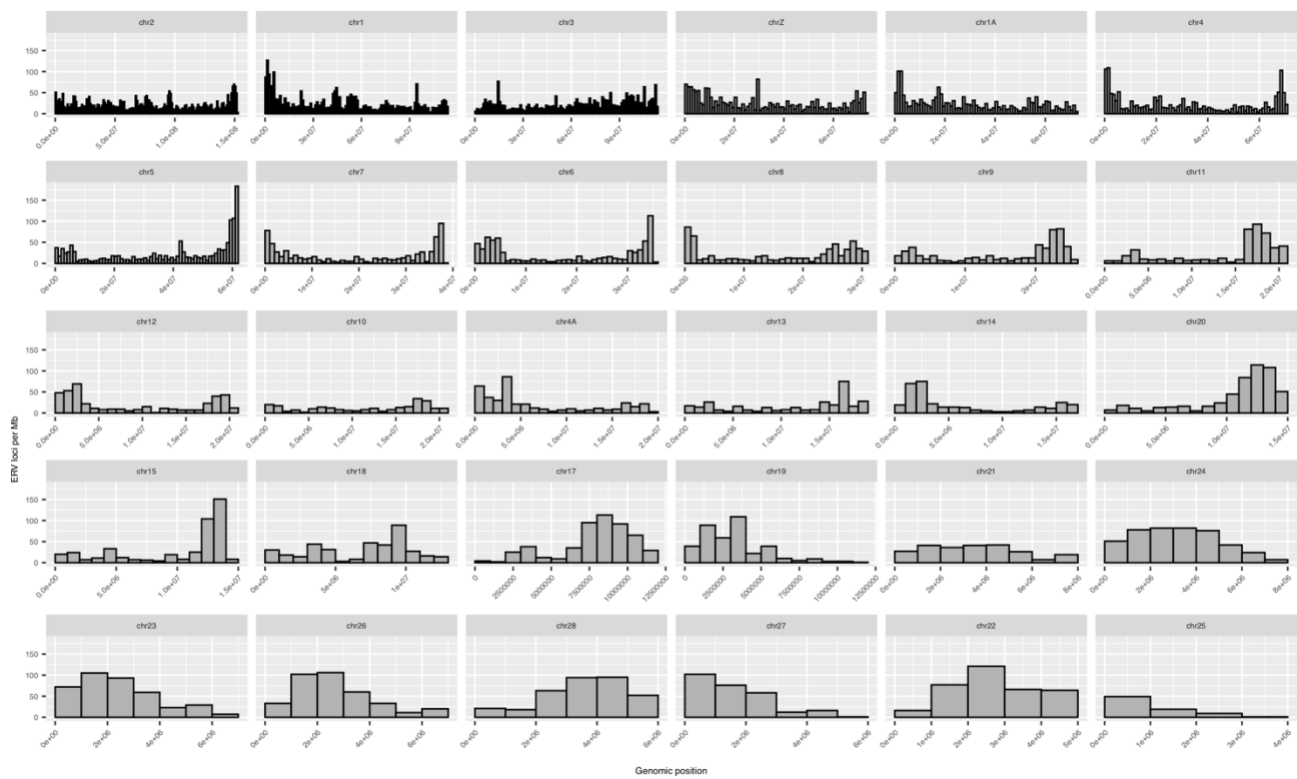
Supplementary Table 1 – 2

Other supplementary materials for this manuscript include the following:

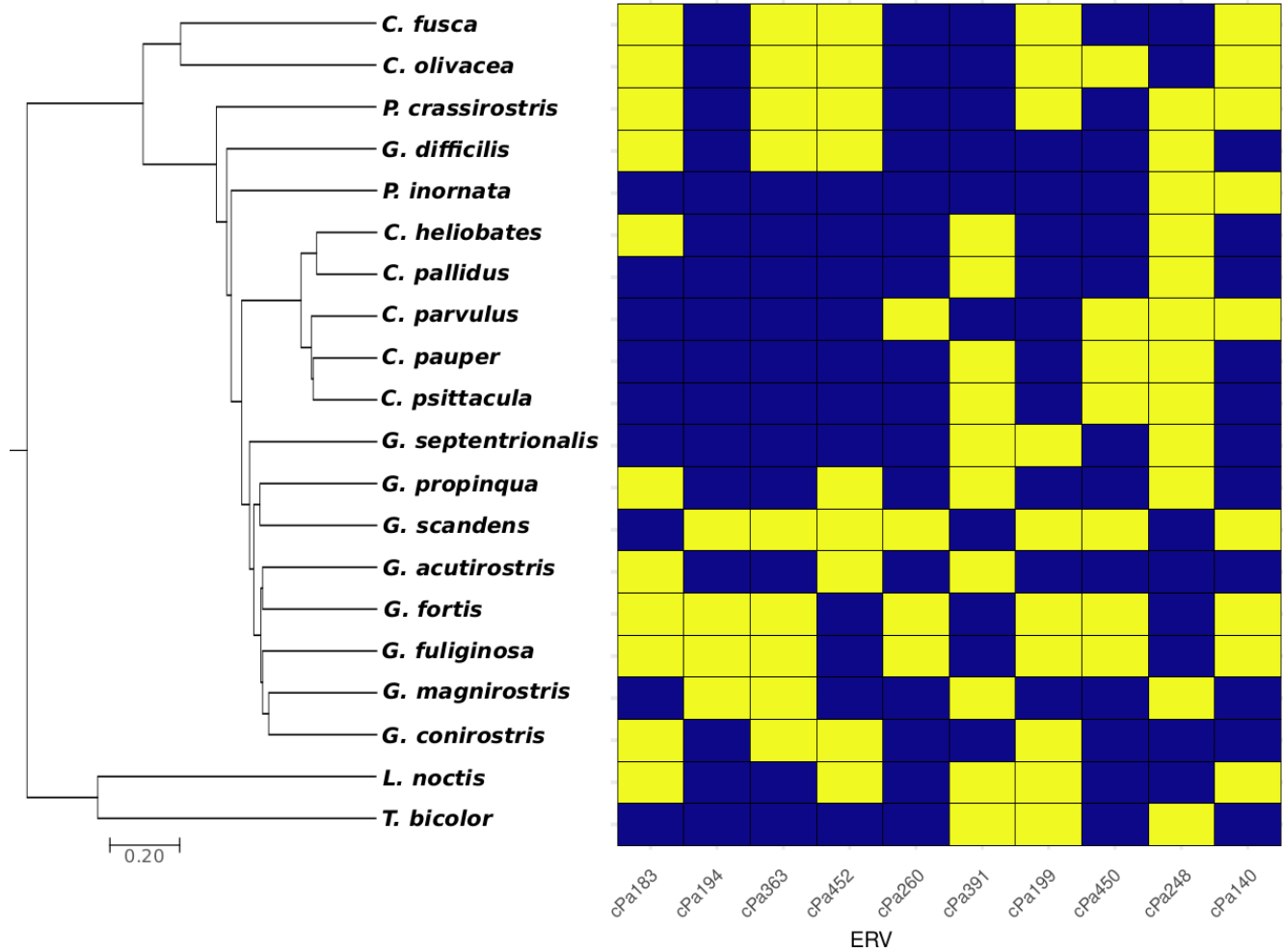
Supplementary Data 1 – 2



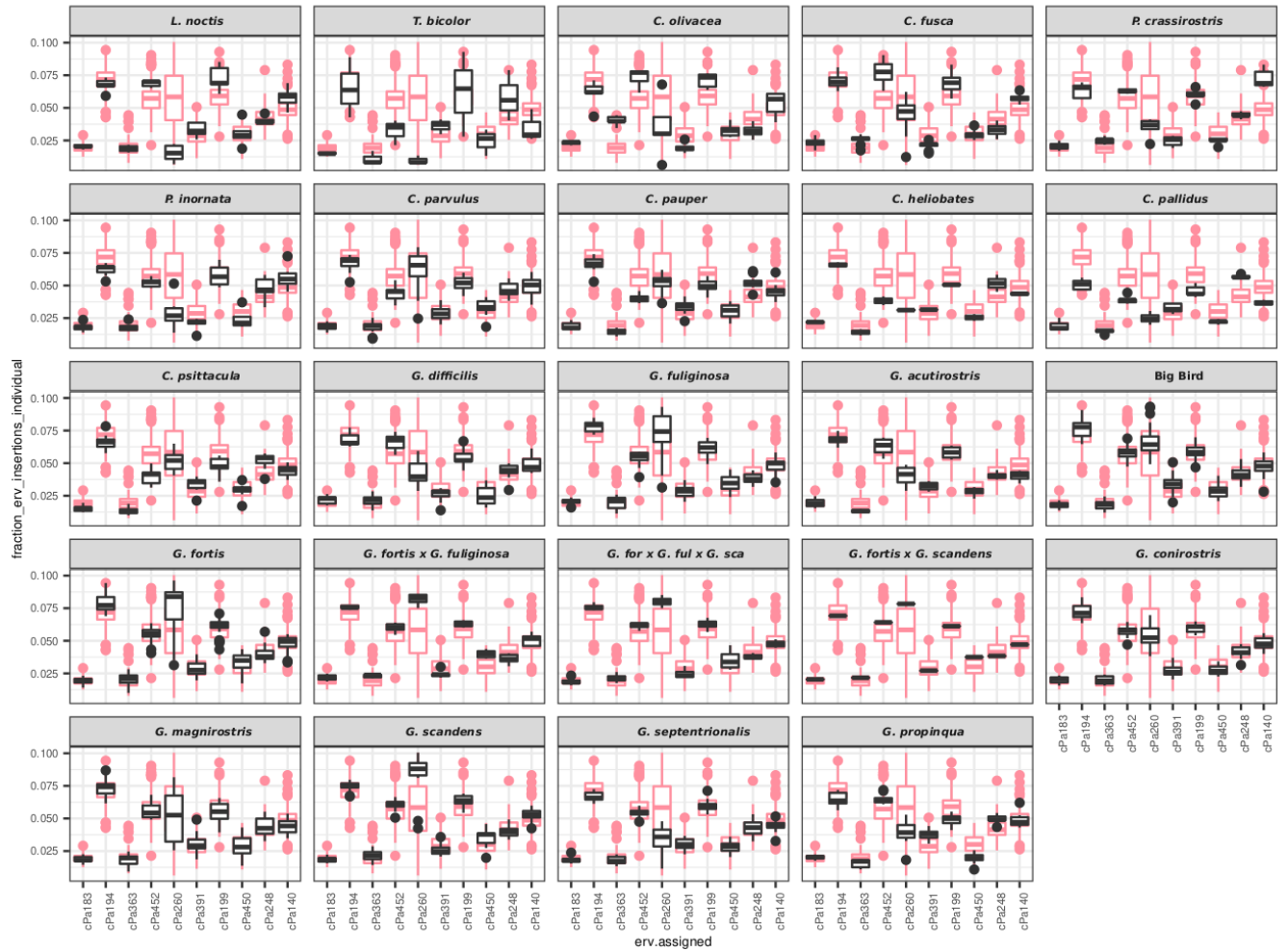
**Supplementary Fig. 1 | Relationship between ERV detection by RetroSeq and mapped coverage.**  
Plot of mean whole-genome sequencing mapped coverage (x) and the number of detected RetroSeq ERV loci called per individual.



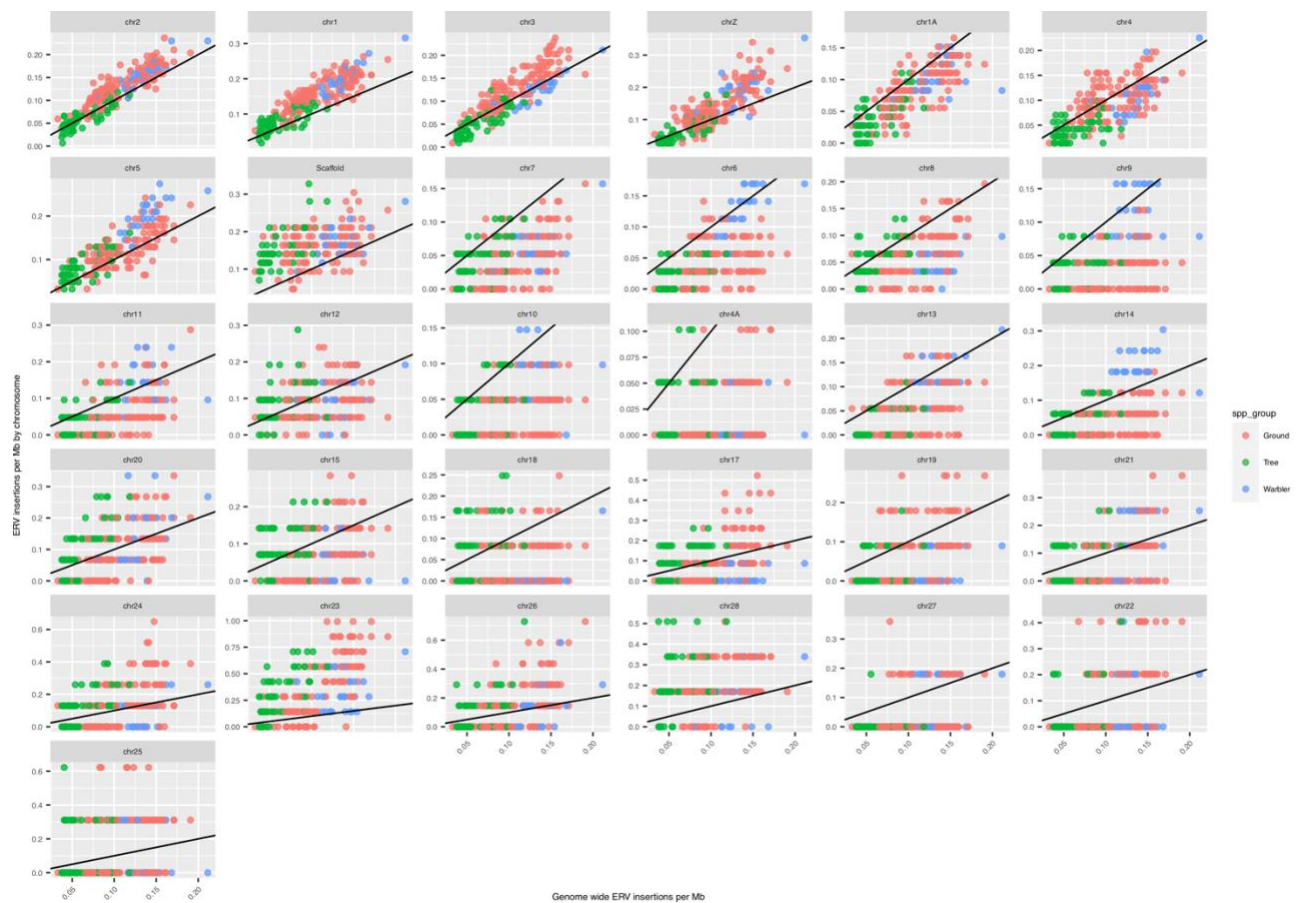
**Supplementary Fig. 2 | ERV genome density by chromosomes.** Non-uniform overall ERV distribution density histograms showing differences between and along chromosomes.



**Supplementary Fig. 3 | ERV enrichment in host phylogenetic context.** The enrichment of each of the top 10 most abundant ERVs is shown for the investigated non-hybrid species of Darwin's finch. An MIR value  $> 1$  (yellow cell) indicates that an ERV is more abundant within a given species than the median of abundance of across all species. An MIR value  $< 1$  (blue cell) indicates that a given species is deficient in a particular ERV. In general, the distribution of enrichment in the top 10 most abundant ERVs does not follow an obvious pattern, and the same holds true when all ERVs are considered, indicating that no single species or clade of Darwin's finches are relatively enriched for closely related ERVs.

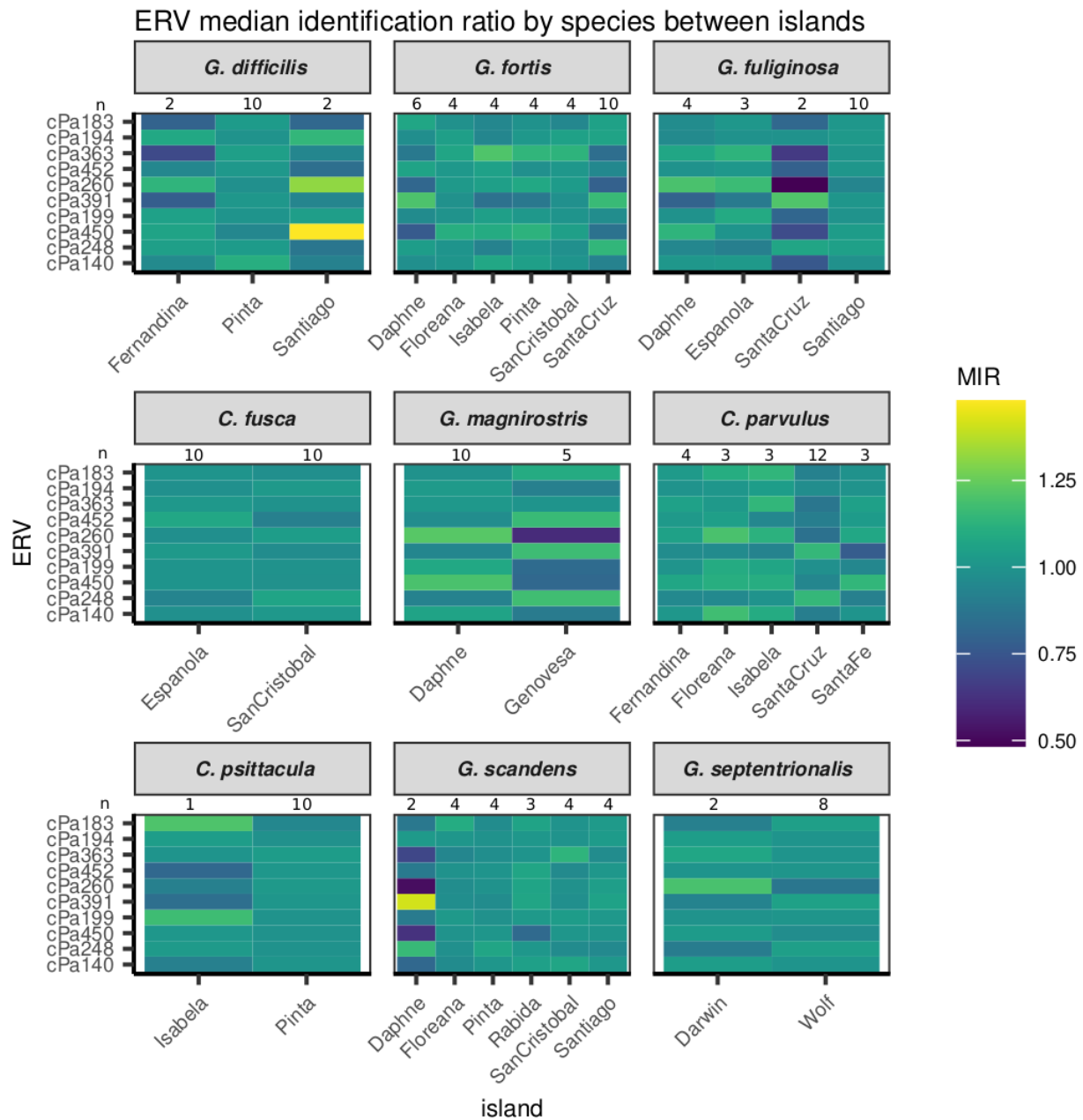


**Supplementary Fig. 4 | Relative abundance of common ERVs.** The 10 most frequent ERVs showed significant variation in abundance both within and between species. The relative fraction of insertions of an ERV within an individual was plotted as a data point in the box plots. Red data points are for all finch samples, and black is the subset corresponding to only the species in the labeled window. The boxplot bottom and top hinges represent 25% and 75% confidence respectively, and whiskers indicate the 95% confidence interval. Variation in relative ERV abundance among all samples (e.g. cPa260), could be attributed to either within species variation (e.g. *G. fortis* and *G. magnirostris*), between species variation (e.g. *L. noctis* and *G. scandens*), or both.



### Supplementary Fig. 5 | Density of cPa452 by chromosome for warbler-, tree- and ground finches.

Density on each chromosome of *Beta-like 1* ERV cPa452 compared to overall density for each individual sample of ground finch (red color), tree finch (green color), and warbler finch (blue color). Points above the line indicate that cPa452 occurs with a higher density on the chromosome indicated than in the overall genome, where density is measured in ERVs per Mb.



**Supplementary Fig. 6 | Contrasting ERV landscapes across finches and islands.** Relative abundance of the 10 most frequent ERVs showed variation between island populations of the same species. Modified MIR normalized ERV abundance values both vertically across ERVs and horizontally across islands. A contrasting color between island populations for a given ERV indicates a difference in relative abundance between populations, either higher (lighter color), or lower (darker color). Variation in MIR increased with small sample size (e.g. *G. scandens* from Daphne island), however some contrasts are more likely to represent large actual differences in ERV abundance between island populations (e.g. cPa260 in *G. magnirostris*).

### Supplementary Table 1 | Nomenclature conversion.

Nomenclature conversion for phylogeny taxa and locus specific identifiers where "X" is a place holder for locus number 1–n.

| clade      | fasta/phylogeny | dataframe               |
|------------|-----------------|-------------------------|
| Beta-like1 | cPa219          | ERV-AB1.cPa219.X-CamPar |
| Beta-like1 | cPa258          | ERV-AB1.cPa258.X-CamPar |
| Beta-like1 | cPa190          | ERV-AB1.cPa190.X-CamPar |
| Beta-like1 | cPa220          | ERV-AB1.cPa220.X-CamPar |
| Beta-like1 | cPa104          | ERV-AB1.cPa104.X-CamPar |
| Beta-like1 | cPa18           | ERV-AB1.cPa18.X-CamPar  |
| Beta-like1 | cPa541          | ERV-AB1.cPa541.X-CamPar |
| Beta-like1 | cPa4            | ERV-AB1.cPa4.X-CamPar   |
| Beta-like1 | cPa14           | ERV-AB1.cPa14.X-CamPar  |
| Beta-like1 | cPa95           | ERV-AB1.cPa95.X-CamPar  |
| Beta-like1 | cPa247          | ERV-AB1.cPa247.X-CamPar |
| Beta-like1 | cPa545          | ERV-AB1.cPa545.X-CamPar |
| Beta-like1 | cPa529          | ERV-AB1.cPa529.X-CamPar |
| Beta-like1 | cPa479          | ERV-AB1.cPa479.X-CamPar |
| Beta-like1 | cPa478          | ERV-AB1.cPa478.X-CamPar |
| Beta-like1 | cPa255          | ERV-AB1.cPa255.X-CamPar |
| Beta-like1 | cPa131          | ERV-AB1.cPa131.X-CamPar |
| Beta-like1 | cPa216          | ERV-AB1.cPa216.X-CamPar |
| Beta-like1 | cPa150          | ERV-AB1.cPa150.X-CamPar |
| Beta-like1 | cPa302          | ERV-AB1.cPa302.X-CamPar |
| Beta-like1 | cPa246          | ERV-AB1.cPa246.X-CamPar |
| Beta-like1 | cPa526          | ERV-AB1.cPa526.X-CamPar |
| Beta-like1 | cPa463          | ERV-AB1.cPa463.X-CamPar |
| Beta-like1 | cPa563          | ERV-AB1.cPa563.X-CamPar |
| Beta-like1 | cPa549          | ERV-AB1.cPa549.X-CamPar |
| Beta-like1 | cPa523          | ERV-AB1.cPa523.X-CamPar |
| Beta-like1 | cPa387          | ERV-AB1.cPa387.X-CamPar |
| Beta-like1 | cPa527          | ERV-AB1.cPa527.X-CamPar |
| Beta-like1 | cPa395          | ERV-AB1.cPa395.X-CamPar |
| Beta-like1 | cPa60           | ERV-AB1.cPa60.X-CamPar  |
| Beta-like1 | cPa285          | ERV-AB1.cPa285.X-CamPar |
| Beta-like1 | cPa546          | ERV-AB1.cPa546.X-CamPar |
| Beta-like1 | cPa257          | ERV-AB1.cPa257.X-CamPar |
| Beta-like1 | cPa130          | ERV-AB1.cPa130.X-CamPar |
| Beta-like1 | cPa472          | ERV-AB1.cPa472.X-CamPar |
| Beta-like1 | cPa575          | ERV-AB1.cPa575.X-CamPar |
| Beta-like1 | cPa572          | ERV-AB1.cPa572.X-CamPar |
| Beta-like1 | cPa518          | ERV-AB1.cPa518.X-CamPar |
| Beta-like1 | cPa138          | ERV-AB1.cPa138.X-CamPar |
| Beta-like1 | cPa510          | ERV-AB1.cPa510.X-CamPar |
| Beta-like1 | cPa200          | ERV-AB1.cPa200.X-CamPar |
| Beta-like1 | cPa544          | ERV-AB1.cPa544.X-CamPar |
| Beta-like1 | cPa542          | ERV-AB1.cPa542.X-CamPar |
| Beta-like1 | cPa177          | ERV-AB1.cPa177.X-CamPar |
| Beta-like1 | cPa515          | ERV-AB1.cPa515.X-CamPar |
| Beta-like1 | cPa540          | ERV-AB1.cPa540.X-CamPar |
| Beta-like1 | cPa241          | ERV-AB1.cPa241.X-CamPar |
| Beta-like1 | cPa127          | ERV-AB1.cPa127.X-CamPar |
| Beta-like1 | cPa530          | ERV-AB1.cPa530.X-CamPar |
| Beta-like1 | cPa11           | ERV-AB1.cPa11.X-CamPar  |
| Beta-like1 | cPa290          | ERV-AB1.cPa290.X-CamPar |
| Beta-like1 | cPa552          | ERV-AB1.cPa552.X-CamPar |
| Beta-like1 | cPa555          | ERV-AB1.cPa555.X-CamPar |
| Beta-like1 | cPa543          | ERV-AB1.cPa543.X-CamPar |
| Beta-like1 | cPa101          | ERV-AB1.cPa101.X-CamPar |
| Beta-like1 | cPa256          | ERV-AB1.cPa256.X-CamPar |
| Beta-like1 | cPa142          | ERV-AB1.cPa142.X-CamPar |
| Beta-like1 | cPa582          | ERV-AB1.cPa582.X-CamPar |
| Beta-like1 | cPa551          | ERV-AB1.cPa551.X-CamPar |
| Beta-like1 | cPa51           | ERV-AB1.cPa51.X-CamPar  |
| Beta-like1 | cPa511          | ERV-AB1.cPa511.X-CamPar |
| Beta-like1 | cPa333          | ERV-AB1.cPa333.X-CamPar |
| Beta-like1 | cPa50           | ERV-AB1.cPa50.X-CamPar  |
| Beta-like1 | cPa183          | ERV-AB1.cPa183.X-CamPar |
| Beta-like1 | cPa500          | ERV-AB1.cPa500.X-CamPar |



|            |                                  |                         |
|------------|----------------------------------|-------------------------|
| Beta-like1 | cPa34                            | ERV-AB1.cPa34.X-CamPar  |
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| Beta-like1 | cPa194                           | ERV-AB1.cPa194.X-CamPar |
| Beta-like1 | cPa74                            | ERV-AB1.cPa74.X-CamPar  |
| Beta-like1 | cPa402                           | ERV-AB1.cPa402.X-CamPar |
| Beta-like1 | cPa585                           | ERV-AB1.cPa585.X-CamPar |
| Beta-like1 | cPa400                           | ERV-AB1.cPa400.X-CamPar |
| Beta-like1 | cPa394                           | ERV-AB1.cPa394.X-CamPar |
| Beta-like1 | cPa482                           | ERV-AB1.cPa482.X-CamPar |
| Beta-like1 | cPa173                           | ERV-AB1.cPa173.X-CamPar |
| Beta-like1 | cPa16                            | ERV-AB1.cPa16.X-CamPar  |
| Beta-like1 | cPa71                            | ERV-AB1.cPa71.X-CamPar  |
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| Beta-like1 | cPa390                           | ERV-AB1.cPa390.X-CamPar |
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| Beta-like2 | cPa228                           | ERV-AB2.cPa228.X-CamPar |
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| Beta-like2 | cPa353                           | ERV-AB2.cPa353.X-CamPar |
| Beta-like2 | cPa391                           | ERV-AB2.cPa391.X-CamPar |
| Beta-like2 | cPa426                           | ERV-AB2.cPa426.X-CamPar |
| Beta-like2 | cPa313                           | ERV-AB2.cPa313.X-CamPar |
| Beta-like2 | cPa332                           | ERV-AB2.cPa332.X-CamPar |
| Beta-like2 | cPa157                           | ERV-AB2.cPa157.X-CamPar |
| Beta-like2 | cPa199                           | ERV-AB2.cPa199.X-CamPar |
| Beta-like  | HML7_repbases_HERVK11DI_MER11D   | ERV-K(HML7).X-CamPar    |
| Beta-like  | HML8_repbases_HERVK11I_MER11A    | ERV-K(HML8).X-CamPar    |
| Beta-like  | HML2_Pheonix                     | ERV-Phoenix.X-CamPar    |
| Beta-like  | HML2_repbases_HERVK_LTR5         | ERV-K(HML2).X-CamPar    |
| Beta-like  | HML1a_repbases_HERV-K14CI_LTR14C | ERV-K(HML1a).X-CamPar   |
| Beta-like  | HML1b_repbases_HERV-K14I_LTR14A  | ERV-K(HML1b).X-CamPar   |
| Beta-like  | HML4_repbases_HERVK13I_LTR13     | ERV-K(HML4).X-CamPar    |
| Beta-like  | HML3_repbases_HERVK9I_MER9       | ERV-K(HML3).X-CamPar    |
| Beta-like  | HML5_repbases_HERVK22I_LTR22     | ERV-K(HML5).X-CamPar    |
| Beta-like  | HML6_repbases_HERVK3I_LTR3       | ERV-K(HML6).X-CamPar    |
| Beta       | ENTV_NC004994                    | ERV-ENTV.X-CamPar       |
| Beta       | JSRV_DQ838494                    | ERV-JSRV.X-CamPar       |
| Beta       | MPMV_NC001550                    | ERV-MPMV.X-CamPar       |
| Beta       | SMRV_NC001514                    | ERV-SMRV.X-CamPar       |
| Beta       | MMTV_NC001503                    | ERV-MMTV.X-CamPar       |
| Beta       | PyERV_AF500296                   | ERV-PyERV.X-CamPar      |
| Beta-like  | cPa492                           | ERV-AB.cPa492.X-CamPar  |
| Alpha      | ALVA_M37980                      | ERV-ALVA.X-CamPar       |
| Alpha      | ALV_NC001408                     | ERV-ALV.X-CamPar        |
| Alpha      | ALVE_FJ793550                    | ERV-ALVE.X-CamPar       |
| Alpha      | ALVJ_Z46390                      | ERV-ALVJ.X-CamPar       |
| Alpha-like | cPa224                           | ERV-AB.cPa224.X-CamPar  |
| Alpha-like | cPa360                           | ERV-AB.cPa360.X-CamPar  |
| Alpha-like | cPa163                           | ERV-AB.cPa163.X-CamPar  |
| Alpha-like | cPa182                           | ERV-AB.cPa182.X-CamPar  |
| Lenti      | SIV_NC001870                     | ERV-SIV.X-CamPar        |
| Lenti      | HIV2_NC001722                    | ERV-HIV2.X-CamPar       |
| Lenti      | HIV1_NC001802                    | ERV-HIV1.X-CamPar       |
| Lenti      | SIV_NC001549                     | ERV-SIV.X-CamPar        |
| Lenti      | RELK_ERVK                        | ERV-RELK.X-CamPar       |
| Lenti      | EIAV_NC001450                    | ERV-EIAV.X-CamPar       |
| Lenti      | FIV_NC001482                     | ERV-FIV.X-CamPar        |
| Lenti      | VISNA_S55323                     | ERV-VISNA.X-CamPar      |
| Lenti      | CAEV_NC001463                    | ERV-CAEV.X-CamPar       |
| Lenti      | BIV_NC001413                     | ERV-BIV.X-CamPar        |

|            |                                     |                          |
|------------|-------------------------------------|--------------------------|
| Delta      | HTLV1_NC001436                      | ERV-HTLV1.X-CamPar       |
| Delta      | STLV1_NC000858                      | ERV-STLV1.X-CamPar       |
| Delta      | STLV2_NC001815                      | ERV-STLV2.X-CamPar       |
| Delta      | HTLV2_M10060                        | ERV-HTLV2.X-CamPar       |
| Delta      | BLV_NC001414                        | ERV-BLV.X-CamPar         |
| Gamma      | PERVA_AY099323                      | ERV-PERVA.X-CamPar       |
| Gamma      | PERVB_AY099324                      | ERV-PERVB.X-CamPar       |
| Gamma      | PERVC_HM159246                      | ERV-PERVC.X-CamPar       |
| Gamma      | PERV_AJ293656                       | ERV-PERV.X-CamPar        |
| Gamma      | KWERV_GQ222416                      | ERV-KWERV.X-CamPar       |
| Gamma      | MDEV_AF053745                       | ERV-MDEV.X-CamPar        |
| Gamma      | MSEV_CT990572                       | ERV-MSEV.X-CamPar        |
| Gamma      | KoRV_AF151794                       | ERV-KoRV.X-CamPar        |
| Gamma      | GaLV_M26927                         | ERV-GaLV.X-CamPar        |
| Gamma      | MoMLV_J02255                        | ERV-MoMLV.X-CamPar       |
| Gamma      | FrMuLV_NC001362                     | ERV-FrMuLV.X-CamPar      |
| Gamma      | MLV_Mpmv5                           | ERV-Mpmv.5.X-CamPar      |
| Gamma      | MLV_Pmv4                            | ERV-Pmv.4.X-CamPar       |
| Gamma      | MLV_Xmv43                           | ERV-Xmv.43.X-CamPar      |
| Gamma      | FeLV_NC001940                       | ERV-FeLV.X-CamPar        |
| Gamma      | BaEV_D10032                         | ERV-BaEV.X-CamPar        |
| Gamma      | PtERV1_AC142352                     | ERV-PtERV1.X-CamPar      |
| Gamma      | rRVRV_JQ303225                      | ERV-rRVRV.X-CamPar       |
| Gamma      | REV_NC006934                        | ERV-REV.X-CamPar         |
| Gamma-like | S71_repbased_HERVS71_LTR6A          | ERV-S71.X-CamPar         |
| Gamma-like | HERV-E_repbased_HERVE_LTR2          | ERV-HERVE.X-CamPar       |
| Gamma-like | PERVE_NC003059                      | ERV-PERVE.X-CamPar       |
| Gamma-like | HERV-R_repbased_HERV3_LTR4          | ERV-HERVR.X-CamPar       |
| Gamma-like | HERV-XA34_repbased_HERVFH21I_LTR21A | ERV-HERVXA34.X-CamPar    |
| Gamma-like | HERVFc2_repbased                    | ERV-HERVFc2.X-CamPar     |
| Gamma-like | HERVHcons                           | ERV-GE.cPaHcons.X-CamPar |
| Gamma-like | HERV-Fb_repbased_HERVH48I_MER48     | ERV-HERVFb.X-CamPar      |
| Gamma-like | HERV-F_repbased_HERVFH19I_LTR19A    | ERV-HERVF.X-CamPar       |
| Gamma-like | HERV30_repbased_HERV30I_LTR30       | ERV-HERV30.X-CamPar      |
| Gamma-like | HERV-W_repbased_HERV17_LTR17        | ERV-HERVW.X-CamPar       |
| Gamma-like | MER52A_repbased_MER52AI_MER52A      | ERV-MER52A.X-CamPar      |
| Gamma-like | PRIMA41_repbased_PRIMA41_MER41A     | ERV-PRIMA41.X-CamPar     |
| Gamma-like | cPa358                              | ERV-GE.cPa358.X-CamPar   |
| Gamma-like | cPa251                              | ERV-GE.cPa251.X-CamPar   |
| Gamma-like | cPa113                              | ERV-GE.cPa113.X-CamPar   |
| Gamma-like | cPa447                              | ERV-GE.cPa447.X-CamPar   |
| Gamma-like | cPa227                              | ERV-GE.cPa227.X-CamPar   |
| Gamma-like | cPa357                              | ERV-GE.cPa357.X-CamPar   |
| Gamma-like | cPa273                              | ERV-GE.cPa273.X-CamPar   |
| Gamma-like | cPa583                              | ERV-GE.cPa583.X-CamPar   |
| Gamma-like | cPa168                              | ERV-GE.cPa168.X-CamPar   |
| Gamma-like | cPa450                              | ERV-GE.cPa450.X-CamPar   |
| Gamma-like | cPa475                              | ERV-GE.cPa475.X-CamPar   |
| Gamma-like | cPa469                              | ERV-GE.cPa469.X-CamPar   |
| Gamma-like | cPa62                               | ERV-GE.cPa62.X-CamPar    |
| Gamma-like | cPa201                              | ERV-GE.cPa201.X-CamPar   |
| Gamma-like | cPa505                              | ERV-GE.cPa505.X-CamPar   |
| Gamma-like | cPa152                              | ERV-GE.cPa152.X-CamPar   |
| Gamma-like | cPa109                              | ERV-GE.cPa109.X-CamPar   |
| Gamma-like | cPa205                              | ERV-GE.cPa205.X-CamPar   |
| Gamma-like | cPa61                               | ERV-GE.cPa61.X-CamPar    |
| Gamma-like | HERV-I_repbased_HERVI_LTR10B        | ERV-HERVI.X-CamPar       |
| Gamma-like | HERV-ADP_repbased_HERVP71A_I_LTR71A | ERV-HERVADP.X-CamPar     |
| Epsilon    | WDSV_NC001867                       | ERV-WDSV.X-CamPar        |
| Epsilon    | Xen1_AJ506107                       | ERV-Xen1.X-CamPar        |
| SnRV-like  | cPa443                              | ERV-S.cPa443.X-CamPar    |
| SnRV-like  | cPa264                              | ERV-S.cPa264.X-CamPar    |
| SnRV-like  | cPa15                               | ERV-S.cPa15.X-CamPar     |
| SnRV-like  | cPa248                              | ERV-S.cPa248.X-CamPar    |
| SnRV-like  | cPa140                              | ERV-S.cPa140.X-CamPar    |
| SnRV-like  | SnRV_NC001724                       | ERV-SnRV.X-CamPar        |
| Spuma      | EqFV_NC002201                       | ERV-EqFV.X-CamPar        |
| Spuma      | BFV_NC001831                        | ERV-BFV.X-CamPar         |
| Spuma      | FeFV_NC001871                       | ERV-FeFV.X-CamPar        |
| Spuma      | HFV_NC001736                        | ERV-HFV.X-CamPar         |
| Spuma      | SFV_U04327                          | ERV-SFV.X-CamPar         |
| Spuma      | MSFV_NC010819                       | ERV-MSFV.X-CamPar        |
| Gypsy      | Cer1_U15406                         | Gypsy-Cer1.X-CamPar      |

**Supplementary Table 2 | ERV locus density by chromosome.**

| chromosome | number of loci | chromosome size | ERV loci per MB |
|------------|----------------|-----------------|-----------------|
| chr2       | 3149           | 152240728       | 20,68           |
| chr1       | 2732           | 113967701       | 23,97           |
| chr3       | 2417           | 113435954       | 21,31           |
| chrZ       | 1888           | 73580794        | 25,66           |
| chr1A      | 1708           | 72438334        | 23,58           |
| chr4       | 1567           | 71061686        | 22,05           |
| chr5       | 1389           | 62010874        | 22,40           |
| chr7       | 699            | 38189422        | 18,30           |
| chr6       | 751            | 35412503        | 21,21           |
| chr8       | 644            | 30584378        | 21,06           |
| chr9       | 560            | 25423666        | 22,03           |
| chr11      | 487            | 20882383        | 23,32           |
| chr12      | 417            | 20836500        | 20,01           |
| chr10      | 249            | 20345023        | 12,24           |
| chr4A      | 404            | 19694112        | 20,51           |
| chr13      | 314            | 18340482        | 17,12           |
| chr14      | 327            | 16472583        | 19,85           |
| chr20      | 531            | 14936690        | 35,55           |
| chr15      | 439            | 14104672        | 31,12           |
| chr18      | 383            | 12083600        | 31,70           |
| chr17      | 519            | 11493945        | 45,15           |
| chr19      | 388            | 11160396        | 34,77           |
| chr21      | 239            | 7910879         | 30,21           |
| chr24      | 442            | 7709400         | 57,33           |
| chr23      | 388            | 7058734         | 54,97           |
| chr26      | 365            | 6857747         | 53,22           |
| chr28      | 343            | 5889000         | 58,24           |
| chr27      | 265            | 5560827         | 47,65           |
| chr22      | 344            | 4946000         | 69,55           |
| chr25      | 78             | 3215879         | 24,25           |