Supplementary Information 2

Computation of bgPC scores for all individuals by projection of their Procrustes coordinates onto the bgPC tangent space using 'Mathematica'

Designate a directory in which the data files and Mathematica programs are stored.

```
SetDirectory[NotebookDirectory[]];    (* Set directory in which the Data and this
program are located  *)
```

Loading data

```
 (*  Procrustes coordinates data of All individuals    *)
AllSymGPAdata = Import["Symm.BE.GPA.AllInd.txt", "Table"];

(*  Mean Procrustes coordinates for each group of 'treatment type' by 'population'
*)
GroupSymGPSdata = Import["Symm.BE.GPA.bg.txt", "Table"];

(*  bgPC coefficients obtained from bgPCA based on mean Procrustes coordinates
   for each treatment type group by population. The calculations were performed
   in MorphoJ (Klingenberg 2011) on the data from "Symm.BE.GPA.AllInd.txt".      *)
bgCoeffsdata = Import["bgPCcoeffs.txt", "Table"];

(*  'Head CS' scorers of All individuals   *)
HeadCSdata = Import["HeadCS.landsemiland.BE.txt",  "Table"];
```

Reference: Klingenberg, C. P. (2011) MorphoJ: an integrated software package for geometric morphometrics. *Molecular Ecology Resources*, 11, 353–357.

Computation of bgPC scores for all individuals

```
AllIndSAymbgPCscorsList =
  Table[(AllSymGPAdata[[2 ;;, 8 ;;]][[i]] - Mean[GroupSymGPSdata[[2 ;;, 7 ;;]]]), {i,
1, 332}] .bgCoeffsdata[[2 ;;, 2 ;;]];
AllIndSAymbgPCscorsList // Dimensions                    (*  Dimension check   *)
```

Data alignment

```
bgPCList = Table[ToExpression["bgPC" <> ToString[i]], {i, 14}];
result = List /@ HeadCSdata[[;; , 2]];
AllIndSymHeadCSbgPCscorsList =
  Join[
   Join[AllSymGPAdata[[;; , ;; 5]], result, 2],
   Join[{bgPCList}, AllIndSAymbgPCscorsList]
   , 2
   ];
AllIndSymHeadCSbgPCscorsList[[;; 5]] // TableForm
```

A part of the output data

```
Id          Location  ...   bgPC1         bgPC2         ...
EC-d14-01   Erimo     ...   0.0277112     0.00962554    ...
EC-d14-02   Erimo     ...   0.0241041     0.0204539     ...
...
```