Morphometrics

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```
install.packages("shapes")
library(shapes)
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http://life.bio.sunysb.edu/morph/
> software
> Utility programs
Download tpsUtil
> Thin-plate spline Downlaod tpsRelw
Download tpsSmall

http://swordtail.tamu.edu/anyfish/Modeling_body_and_fin_shape_%28morphometrics%29 1. Build a TPS file using tpsUtil
2. Open tpsUtil
* Build tps file from images
* Input directory -> go to file with images
* Output to create file where you'll save info
* Setup - check all of images you want, create

3. Can view that setup file in a text editor

- LM=0 : "landmark ID"
- info for each image selected
- after the landmarks are set, that LM will have numbers for each.

4. Landmark tps files

- Open tpsDig
- Open tps file
- Input source, open the tps file
- Set scale: Options>Image tools or tool bar picture with tools images
  ** a) Measure tab
  Reference length - scale to image
  Set scale > click and click along ruler

  b) Apply landmark > Digitize landmarks (circle and cross image button)
  cursor becomes circle cross
  click on landmarks - the first and 22nd are identical (or some number - the midway?)
  match landmarking guide - exact order of landmarks in each image
  number and order must match all
  File > Save data > save and overwrite

c) Visulaization aids
   - Menu > preliminatries > option: create or edit wireframe
   - Menu > file > option: import outline file

d) Convert TPS into NTS
   - TPSUtil, convert TPS/NTS file
   - check box for using the sacale factor
   - check box for using image names as labels

e) Procrustes superimposed
   - Menu > preliminatries> option: Procrustes fit

5. TPSSmall - test whether variation in shape is too large

- regresses through the origin the set of Euclidean distances in the Euclidean space onto the set of Procrutes shape distances
- want approximation to give regression with both slope and correlation virtually equal to 1

6. Consensus file (An average of a population)

- Open tpsRelw
  - Landmark all LMs, combine and generate a consensus for that population
- Data > open the TPS file
- Compute > Consensus
  - Display > Consensus
  - see the cons
  - File > Save > Save consensus... > Save with ".TPS"